

**The Overvaluation of Weight or Shape as a Defining Feature of Binge Eating
Disorder: A Population-Based Investigation of Psychopathology and Psychosocial
Impairment**

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Statement of Originality

The thesis is submitted to the Australian National University in fulfilment of the requirements for the Doctor of Philosophy (Clinical). The work presented in this thesis is, to the best of knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted this material, either in full or in part, for a degree at this or any other institution.



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July 2015



Preface and Author Contributions

All of the current thesis is based on the original work of the author, with the exception of the below that requires acknowledgment:

1. Study One: *Correlates of binge eating with and without overvaluation of weight or shape: further evidence from a general population sample of women*, the author conceived of the study aims and hypotheses, completed the data analysis, interpreted the results, prepared the manuscript for submission, revised and approved the final manuscript that was published. The data featured in this study was based on data from the article of: Lucas, N., Windsor, T. D., Caldwell, T. M., & Rodgers, B. (2010). Psychological distress in non-drinkers: Associations with previous heavy drinking and current social relationships. *Alcohol and Alcoholism*, 45, 95–102.
2. Study Two: *Generic and eating disorder-specific impairment in binge eating disorder with and without overvaluation of weight or shape*, the author designed the study, carried out ethics approval recruitment and data collection. In addition to this, the author formulated the study aims and hypotheses, completed the data analysis, interpreted the results and prepared the manuscript for submission, revised and resubmitted the final manuscript.
3. Study Three: *Loss of control eating with and without the undue influence of weight or shape on self-evaluation: evidence from an adolescent population*, the author designed the study, assisted with recruitment of the sample, data collection and data entry. In addition to this, the author formulated the study aims and hypotheses, completed the data analysis, interpreted the results and prepared the manuscript for submission, revised and approved the final manuscript that was published.

4. Study Four: *Emotion regulation difficulties in binge eating disorder with and without overvaluation of weight or shape*, the author designed the study, carried out ethics approval, recruitment and data collection. In addition to this, the author formulated the study aims and hypotheses, completed the data analysis, interpreted the results and prepared the manuscript for submission.

The journal articles that are presented in this dissertation feature the author as the primary investigator in each incidence. However, it is important to identify the other authors of each paper, as listed below:

1. Harrison, C., Mond, J., Rieger, E., Hay, P., & Rodgers, B. (2015). Correlates of binge eating with and without overvaluation of weight or shape: further evidence from a general population sample of women, *Advances in Eating Disorders: Theory, Research and Practice*, 3, 20-33. doi: 10.1080/21662630.2014.948468
2. Harrison, C., Mond, J., Rieger, E., & Rodgers, B. (2015). Generic and eating disorder-specific impairment in binge eating disorder with and without overvaluation of weight or shape. *Behaviour Research and Therapy*, under revision.
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4. Harrison, C., Mond, J., Rieger, E. & Rodgers, B. (2015). Emotion regulation difficulties in binge eating disorder with and without overvaluation of weight or shape. *Psychiatry Research, submitted.*

Overview

This thesis consists of a general introduction and a series of manuscripts that are summarised and discussed as a body of work in the general discussion. The general introduction consists of two chapters that begin by outlining the nature, epidemiology and aetiology of binge eating disorder (BED). It is noted that unlike anorexia nervosa and bulimia nervosa, the diagnostic criteria for BED do not contain a cognitive criterion, namely, overvaluation of weight or shape. Reasons for considering a cognitive criterion in BED include enhancing the clinical utility of the diagnosis and aligning the diagnosis with dominant theoretical perspectives on eating disorders. Current literature on overvaluation in BED is reviewed and important limitations are noted including; the reliance on treatment-seeking samples, failure to assess psychosocial impairment as an outcome variable, the lack of research that is relevant across the lifespan and the failure to consider aetiological mechanisms, in comparisons of BED with and without overvaluation. Finally, the overall thesis aims are outlined. Chapters three through six form four manuscripts. Study one aimed to extend current literature through examining the status of overvaluation in BED within a community based population utilising measures of psychosocial impairment. Study two aimed to investigate the nature of impairment experienced by individuals with BED in the presence and absence of overvaluation, utilising both generic and eating disorder specific measures of quality of life impairment. Study three aimed to broaden the applicability of research across the lifespan by conducting similar research in an adolescent population. Study four aimed to investigate emotion regulation difficulties, a major theorised aetiological mechanism, in BED with and without overvaluation. Chapter Seven summarises overall findings and implications of the current research, taking into account the strengths and limitations of the body of work as a whole, while also considering directions for future research.

Acknowledgments

I dedicate this thesis to the alpha and omega, the architect of cognition, emotion and perception, who gifts us with life. I owe everyday to Jesus the Christ and am thankful for the favour He gave me over this thesis. His love and peace has sustained me throughout my degree and his character motivates me as a clinical psychologist.

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I am thankful to my husband Samuel for his ongoing support and who inspires me in academia, and to my parents John and Lynne for their continued support over my entire education, the sacrifices that they made to provide me the education opportunities I have had. Also to my chocolate labrador puppy Lindt, who sat on my lap or napped at my feet during most of the write up.

Abstract

Binge eating disorder (BED) is characterised by the consumption of an abnormally large amount of food and the experience of a loss of control over one's eating. Concerns have been raised around the absence of a cognitive criterion, namely overvaluation of weight or shape toward one's self-worth (overvaluation), in current BED diagnostic criteria. The current thesis aimed to investigate the status of overvaluation within BED by means of a series of community-based studies.

Study one examined eating disorder psychopathology, distress and psychosocial functioning across groups of women with probable BED with and without overvaluation, obese individuals who reported no binge eating (obese controls) and normal-weight individuals who reported no binge eating (healthy controls). Women with probable BED and overvaluation reported significantly greater eating disorder psychopathology, distress, and poorer psychosocial functioning. No significant differences on any outcome measures were found between probable BED without overvaluation and obese control groups.

Study two examined eating disorder psychopathology, generic and disease-specific quality of life across groups of women with probable BED with and without overvaluation, obese controls and healthy controls. A comparison group of individuals with BED receiving specialist treatment was also considered. Participants with probable BED and overvaluation reported significantly greater eating disorder psychopathology and poorer generic and disease-specific quality of life, comparable to BED patients receiving specialist treatment. Participants with probable BED without overvaluation did not differ from obese controls on any these measures.

Study three examined eating disorder psychopathology, distress and quality of life among female adolescents with loss of control (LOC) eating across groups of LOC eating with and without overvaluation, obese control and healthy control. Participants in the LOC eating with overvaluation subgroup reported significantly greater eating disorder psychopathology than all other groups, while levels of eating disorder psychopathology did not differ between LOC eating without overvaluation and obese control groups. On measures of distress and quality of life there were no significant differences between LOC eating with and without overvaluation groups.

Study four examined eating disorder psychopathology and emotion regulation (ER) difficulties, a core theorised aetiological mechanism in BED, across groups of women with probable BED with and without overvaluation, obese controls and healthy controls. A comparison group of individuals with a clinical BED diagnosis was again also considered. Participants with probable BED and overvaluation reported significantly greater ER difficulties, comparable to BED patients receiving specialist treatment. Participants with probable BED without overvaluation more closely resembled obese controls with respect to ER difficulties.

The current findings provide evidence that overvaluation indicates a significantly more severe presentation in terms of eating disorder psychopathology, psychosocial impairment, generic and eating disorder specific quality of life as well as ER difficulties. It highlights the need for reference to overvaluation in the diagnostic criteria for BED and questions the clinical significance of BED in the absence of overvaluation. Though further research is needed, particularly in adolescents, the inclusion of overvaluation in diagnostic criteria would enhance the clinical utility of the BED diagnosis and become consistent with a transdiagnostic conceptualisation of eating disorder psychopathology.

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Chapter One
Binge Eating Disorder

Binge Eating Disorder

The current chapter provides an introduction to binge eating disorder (BED), including a brief review of diagnostic criteria according to the *Diagnostic Statistical Manual, 5th edition* (DSM-5) (APA, 2013). Additionally, it acknowledges the absence of a cognitive criterion in the DSM-5 diagnostic criteria for BED, the core focus of the current thesis. The lack of a cognitive criterion, namely, the overvaluation of shape and weight toward one's self-worth ('overvaluation'), in the diagnosis of BED is of concern for several reasons. Many believe that overvaluation is a core feature common to all eating disorder psychopathology (Fairburn et al., 2003; Hay, 2013a), thus its inclusion would align these criteria with those of the other main eating disorders. Additionally, as will be addressed in chapter two, it is believed that its inclusion would aid in enhancing the clinical utility of the BED diagnostic criteria, while also informing and facilitating research efforts (First, 2010) and differentiating individuals with a clinically significant mental health problem from individuals who may more closely resemble obese individuals who do not binge eat.

Following this, the current chapter reviews the epidemiology of BED with regard to the prevalence, risk factors, age of onset, duration of illness, comorbidity, impairment and help-seeking behaviour. The chapter then goes on to outline current understandings concerning the aetiology of the disorder. Finally, the chapter provides an overview of evidence-based treatment for BED.

1.1 Diagnostic Criteria

Eating disorders are characterised by enduring disturbances in eating and related behaviours that result in impairment of both physical health and psychosocial functioning (American Psychiatric Association [APA], 2013). Typically, disordered eating occurs along three primary dimensions: (i) restrictive eating where dietary variety

and intake is limited; (ii) binge eating or overeating, where abnormally large amounts of food is consumed with a sense of loss of control over one’s eating; and (iii) inappropriate and/or extreme weight-control (“compensatory”) behaviours such as vomiting or excessive exercise (APA, 2013; Craighead, Martinez, & Klump, 2013).

BED was introduced as a provisional diagnosis for further research in the *Diagnostic Statistical Manual, 4th edition* (DSM-IV) (APA, 1994) and included as a formal diagnosis in the *Diagnostic Statistical Manual, 5th edition* (DSM-5) (APA, 2013). BED is characterised by the consumption of an abnormally large amount of food within a discrete time period and the experience of loss of control over one’s eating (APA, 2013). As exhibited in the DSM-5 diagnostic criteria for BED in Table 1, in addition to these two primary markers of binge eating, BED requires the presence of three or more of five behavioural features, namely: eating rapidly; eating until uncomfortably full; eating without feeling physically hungry; eating alone; and the presence of negative emotions following the binge including guilt, disgust and depression (APA, 2013). The frequency of binge eating required for a DSM-5 diagnosis is at least once per week for three months, a lower threshold than that (of at least twice per week for six months) included in the DSM-IV-TR (APA, 2000). In addition, individuals with BED must experience significant distress and impairment due to binge eating. By definition these features occur in the absence of the extreme weight-control behaviours observed in bulimia nervosa (BN) and anorexia nervosa (AN) binge-eating/purging subtype (APA, 2013).

Table 1: DSM-5 diagnostic criteria for Binge Eating Disorder (APA, 2013)

DSM-5 Diagnostic Criteria for Binge Eating Disorder 307.51 (F50.8)
A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:

-
1. Eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than what most people would eat in a similar period of time under similar circumstances.
 2. A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).
- B. The binge-eating episodes are associated with three (or more) of the following:
1. Eating much more rapidly than normal.
 2. Eating until feeling uncomfortably full.
 3. Eating large amounts of food when not feeling physically hungry.
 4. Eating alone because of feeling embarrassed by how much one is eating.
 5. Feeling disgusted with oneself, depressed, or very guilty afterward.
- C. Marked distress regarding binge eating is present.
- D. The binge eating occurs, on average, at least once a week for 3 months.
- E. The binge eating is not associated with the recurrent use of inappropriate compensatory behavior as in bulimia nervosa and does not occur exclusively during the course of bulimia nervosa or anorexia nervosa.

Specify if:

In partial remission: After full criteria for binge-eating disorder were previously met, binge eating occurs at an average frequency of less than one episode per week for a sustained period of time.

In full remission: After full criteria for binge-eating disorder were previously met, none of the criteria have been met for a sustained period of time.

Specify current severity:

The minimum level of severity is based on the frequency of episodes of binge eating (see below). The level of severity may be increased to reflect other symptoms and the degree of functional disability.

Mild: 1–3 binge-eating episodes per week.

Moderate: 4–7 binge-eating episodes per week.

Severe: 8–13 binge-eating episodes per week.

Extreme: 14 or more binge-eating episodes per week.

Reproduced from the DSM-5 (APA, 2013)

Concern has been expressed regarding the absence of a cognitive criterion in the diagnosis of BED. Indeed, an early critique of the provisional BED diagnostic criteria included in the *DSM-IV-TR* (APA, 2000) noted this limitation (Masheb & Grilo, 2000). However, the current diagnostic conceptualisation of BED remains that of a “behavioural overeating construct” (Grilo, 2013). Such a conceptualisation is in direct contrast to that of the other formal eating disorders, namely, AN and BN, given that both of these diagnoses rely upon a core cognitive criterion. That criterion is the

overvaluation of weight or shape ('overvaluation') (APA, 2013; Fairburn, Cooper, & Shafran, 2003).

Overvaluation is believed to be a core construct in the conceptualisation of eating disorders (APA, 2013; Fairburn, Cooper, & Shafran, 2003), and studies indicate that while it is related to constructs such as body dissatisfaction and weight/shape concern, overvaluation is a distinct and independent construct (Grilo, 2013; Mond & Hay, 2011). This is such that body dissatisfaction is prevalent throughout the general population, however only a minority of individuals evaluate their self-worth primarily or solely dependent upon their weight/shape (Grilo, 2013; Mond & Hay, 2011). Additionally, while individuals with eating disorders overvalue their weight and shape, some individuals do not report body dissatisfaction (Cooper & Fairburn, 1993). Data supporting such claims include studies conducting factor analysis in obese individuals and individuals with BED, indicating that body dissatisfaction and overvaluation exist as independent constructs (Grilo et al., 2010; Hrabosky et al., 2008). Additionally, longitudinal data exist to demonstrate the independence of such constructs (Masheb, Grilo, Burke-Martindale, & Rothschild, 2006), including across the lifespan (Allen, Byrne, McLean, & Davis, 2008). Such findings further support overvaluation as a stable construct, while body dissatisfaction is more variable and influenced by transient factors such as fluctuations in mood states (Cooper & Fairburn, 1993; Masheb et al., 2006; Masheb & Grilo, 2003). Thus, given that overvaluation is believed to be an independent, stable and enduring construct that maintains eating disordered symptoms, concern for the lack of reference to such a criterion for BED in the DSM-5 has arisen.

1.2 Epidemiology of BED

Prevalence. The lifetime and 12-month prevalence of BED among adults in the United States (US) population have been estimated to be 2.8%, and 1.2%, respectively

(Hudson, Hiripi, Pope, & Kessler, 2007). In adolescent populations, lifetime and 12-month prevalence rates for BED have been estimated at 1.6%, and 0.6%, respectively (Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). However, much of the available epidemiological data are derived from western populations (Hudson et al., 2007; Smink, van Hoeken, & Hoek, 2012). The World Health Organisation's (WHO) World Mental Health (WMH) Surveys, which incorporated studies in 14 countries. Data from this survey estimate a lifetime prevalence of 1.9% and a 12-month prevalence of 0.2-1.0% for BED in adults (Kessler et al., 2013). In all populations, the prevalence of BED has consistently been found to be higher than that of AN and BN (Hudson et al., 2007; Kessler et al., 2013). Currently, there is minimal epidemiological data examining prevalence rates of BED in the presence and absence of overvaluation. Data from one epidemiological study within young women in the Australian Capital Territory found that approximately 46% of women identified as probable cases of BED reported overvaluation (Mond, Hay, Rodgers, & Owen, 2006). In a study where participants were female community volunteers, 68% of participants identified as individuals with BED reported overvaluation (Grilo, Masheb, & White, 2010). Thus, differences in methodologies and the lack of large scale epidemiological studies make it difficult to confidently state the prevalence rates of BED with overvaluation, and further studies are required in order to determine the impact on prevalence rates should overvaluation be acknowledged among the DSM-5 criteria for BED.

In terms of gender, findings from epidemiological studies suggest that the prevalence of binge eating and, perhaps, its adverse impact on psychosocial functioning, may be increasing in men (Hay, Mond, Buttner, & Darby, 2008; Striegel, Bedrosian, Wang, & Schwartz, 2012). Epidemiological data from a US study suggested that the lifetime prevalence of BED in men is around 2%, compared to 3.5% in women. The 12-

month prevalence of BED in this study among men was 0.8%, compared to 1.6% among women (Hudson et al., 2007). Hence, sex differences in prevalence are less pronounced for BED than for other eating disorders (Kessler et al., 2013). Available evidence suggested that men with BED experience similarly increased risk of obesity and psychosocial impairment to women (Striegel et al., 2012). When compared with women, men with BED may have higher rates of obesity and drug abuse, comparable rates of depression and self-esteem (Barry, Grilo, & Masheb, 2002). While little research has examined overvaluation in men, research indicates that men with BED report lower levels of body dissatisfaction and drive for thinness (Barry, Grilo, & Masheb, 2002).

Risk factors. A number of risk factors for the development of BED have been identified (Hilbert et al., 2014; Striegel-Moore et al., 2005). Results of a case-control study (Striegel-Moore et al., 2005) indicated that women with BED experienced significantly greater childhood obesity, dysfunctional eating within their family of origin (specifically binge eating or overeating), higher parental demands and higher rates of family discord than both psychiatric and healthy control groups. These findings have been corroborated by more recent research that identifies childhood obesity and family overeating as risk factors (Hilbert et al., 2014). Additionally, a community-based case-control study further identified risk factors associated with BED including negative self-evaluation, adverse childhood experiences, parental depression and negative comments about weight/shape (Fairburn et al., 1998). The study proposed that BED was associated with the combined exposure to risk factors for psychiatric illness more generally, in combination with risk factors for obesity. A recent, prospective, population-based study found that adolescent weight or shape concerns reported at age 14 years mediated the association between parent-reported body mass index (BMI) in

the overweight range at age 10 and the risk of developing BED (Allen, Byrne, & Crosby, 2014).

Evidence also suggests that genetics have a role to play in the aetiology of BED, although the nature and extent of this influence remain unclear (Bulik & Trace, 2013). Understanding that BED is the result of a complex interaction between genetics and environment can increase empathy towards sufferers (Bulik & Trace, 2013, p. 35).

Age of onset and duration of illness. In the US National Comorbidity Survey Replication (Hudson et al, 2007), the mean age of onset for BED was 25.4 years, outside of the median age range of 18-21 years for all eating disorders (AN, BN, BED and EDNOS combined), whereas the median duration of the illness (number of years with BED) was 4.0 years, slightly shorter than the 5.0 years for BN (Hudson et al., 2007). In this study, BED had a 12-month persistence among lifetime cases of 44.2% compared with 30.6% in BN. Data from WHO WMH Surveys indicated a mean age of onset for BED of 23.3 years, slightly younger than that of the US study but still comparatively older than the age of onset for BN (Kessler et al., 2013). The median duration of BED in the WHO WMH Surveys was 4.3 years, 2.2 years shorter than that of BN, while the mean 12-month persistence among lifetime cases of BED was 44.3% compared with 37.3% for BN, comparable to the US data (Kessler et al., 2013).

Comorbidity. BED is associated with increased risk of both mental and physical health problems. Individuals with BED frequently experience substantial weight gain leading to obesity (Kessler et al., 2013; Mond, Star, & Hay, 2013). They consistently experience a higher Body Mass Index ($BMI = kg/m^2$) than the general population, along with comorbidity of numerous chronic health problems including diabetes, hypertension and osteo-arthritis (Kessler et al., 2013). Approximately half to two-thirds of individuals with BED are obese (Hudson et al., 2007).

Further, recent epidemiological data indicate that approximately three-quarters of individuals with a lifetime diagnosis of BED meet lifetime criteria for another mental disorder (Kessler et al., 2013). The most commonly reported comorbid psychological conditions are anxiety and affective disorders, substances use disorders and body dysmorphism (Hudson et al., 2007; Javaras et al., 2008).

Functional Impairment. As would be expected, given these physical and mental health problems, BED is often associated with marked impairment in quality of life (Mond, Star, & Hay, 2013). In the WMH Surveys, 46.7% of individuals with BED reported significant role impairment due to their eating disorder (Kessler et al., 2013). In the US National Comorbidity Survey Replication (Hudson et al, 2007), 62.6% of individuals with BED reported impairment in any life domain over the last 12 months, although only 18.5% reported severe impairment in any life domain over the last 12 months. This was in contrast to individuals with BN, of whom 43.9% reported experiencing severe impairment in any life domain over the last 12 months. However, it is possible that the study measures employed were less sensitive to the types of impairment experienced by individuals with BED. Greater understanding of the nature and extent of impairment experienced by individuals with BED is required (Jenkins, Hoste, Meyer, & Blissett, 2011a; Mond et al., 2013). Current suggestions include the notion that overvaluation acts as an indicator of severity, corresponding with greater impairment in individuals with BED (Grilo et al., 2010; Mond et al., 2006). However, additional data is required to evaluate this proposal, which will be a focus of the current thesis.

Help-seeking. In the WMH Surveys, 57.7% of individuals with BED received treatment for emotional problems, while 38.3% received treatment specifically for an eating disorder (Kessler et al., 2013). For bulimic-type disorders, including BN, BED,

and variants of such disorders, mental health treatment is often not sought, levels of distress and impairment in role functioning being the best predictor of help-seeking behaviour (Mond et al., 2007a; Mond et al., 2009). Given that overvaluation has been found to be associated with distress and impairment (Mond et al., 2006), it is likely that more individuals with BED and overvaluation seek treatment. Further, individuals with BED are more likely to seek treatment for weight loss than for an eating problem (Mond et al., 2007a). Given the high rates of obesity among individuals with BED, it is not surprising that BED is common among individuals receiving specialist treatment for obesity (Wilfley, Wilson, & Agras, 2003).

1.3 Aetiology of BED

In terms of understanding the aetiology of BED, conceptual models have predominantly focused on two pathways to binge eating, namely dietary restraint and negative affect. Dietary restraint models have been emphasised in the aetiology of AN and BN, such that the occurrence of binge eating among individuals with these disorders is seen as the body's physiological response to dieting, the latter precipitated, in turn, by weight/shape concerns (Polivy & Herman, 1985). Dietary restraint theory proposes that individuals impose strict dietary rules that result in increased hunger, cravings and rigid cognitive thinking styles that make binge eating more likely (Johnson, Pratt, & Wardle, 2012). Additionally, negative emotion is believed to disrupt cognitive control, inhibiting their ability to conform to strict dietary rules (Haedt-Matt & Keel, 2011; Polivy & Herman, 1985). Thus, dietary restraint is central in the aetiology of binge eating according to restraint theory, though negative emotion has a role to play it acts as an inhibitor (Johnson et al., 2012; Polivy & Herman, 1985).

The applicability of this approach to BED is, however, problematic. While individuals with BED report comparable levels of weight or shape concerns to those

with BN, they report significantly less dietary restraint and in many cases binge eating occurs against a background of overeating rather than restraint (Craighead, Martinez, & Klump, 2013). Further, many individuals with BED report the onset of binge eating prior to the development of weight or shape concerns (Mussell et al., 1995). Thus, researchers have looked at alternative mechanisms when considering the occurrence of binge eating among individuals with BED (Heatherton & Baumeister, 1991; Leehr et al., 2015; Polivy & Herman, 1993; Telch, Agras, & Linehan, 2001).

Emotion regulation models. Emotion regulation difficulties are a known marker of both eating disorder and general psychopathology (Brockmeyer et al., 2014; Svaldi, Griepenstroh, Tuschen-Caffier, & Ehring, 2012). These difficulties may be of particular significance among individuals with BED, however, in that they have been hypothesised to play a role in the aetiology of the disorder (Leehr et al., 2015; Polivy & Herman, 1993).

Emotion regulation (ER) is defined as the “processes by which individuals influence which emotions they have, when we have them, and how they experience and express these emotions” (Gross, 1998, p. 275). Affect regulation theory proposes that firstly, negative emotion precipitates binge eating and secondly, binge eating results in an immediate alleviation of negative emotion (Haedt-Matt & Keel, 2011). Binge eating as a response to negative emotion is therefore maintained via negative reinforcement. Several theories have sought to explain specifically the link between emotion and binge eating. First, escape theory postulates that binge eating acts to alleviate negative emotion *during* the binge, through providing an escape from self-awareness by narrowing focused attention to immediate stimuli (Heatherton & Baumeister, 1991). It proposes that negative emotion precedes a binge and reduces during the binge, but returns on completion with return to self-awareness (Heatherton & Baumeister, 1991).

Second, expectancy theory acknowledges the role of negative emotion in maintaining binge eating due to positive expectancy beliefs about binge eating founded in behavioural learning (Haedt-Matt & Keel, 2011). Individuals with eating disorders who binge eat report greater positive expectancy that binge eating will result in a reduction of negative emotion. This is compared to both healthy and psychiatric controls, as well as individuals with eating disorders but do not report binge eating (Haedt-Matt & Keel, 2011; Hohlstein, Smith, & Atlas, 1998). The model proposes that the *expected* consequence (ie., reduction in negative emotion), is more important in predicting binge eating than the actual consequence experienced as a result (Haedt-Matt & Keel, 2011; Hohlstein et al., 1998). Thirdly, masking theory proposes that binge eating serves to “mask” existing problems, such that negative emotion can be attributed to the binge eating, perceived as within the individual’s control, rather than the initial cause of distress (Munsch, Meyer, Quartier, & Wilhelm, 2012).

A recent model of the role of ER in binge eating among individuals with BED, which seeks to integrate these different approaches, is shown in Figure 1 (Lehr et al., 2015).

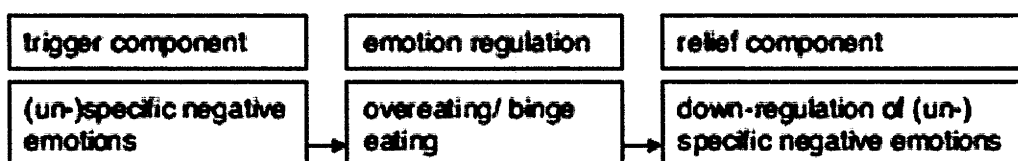


Figure 1: Emotion regulation model of binge eating in BED (reproduced from Lehr et al., 2015).

The model states, first, that negative emotion acts as a trigger among individuals with BED, evidenced in studies demonstrating that negative emotion is the most

commonly reported precipitant of binge eating (Leehr et al., 2015; Polivy & Herman, 1993). Between 69% to 100% of individuals with BN or BED reported on their own initiative (as apposed to explicitly asked by the self-report questionnaire) that negative emotion was a trigger for binge eating (Haedt-Matt & Keel, 2011). Additionally, although the data are inconsistent (Telch & Argas, 1996), some results from experimental studies of BED demonstrate that when a negative mood is induced in participants, they consume significantly more food during a taste test directly following (Chua, Touyz, & Hill, 2004). Additional data suggest that individuals with BED struggle to control their eating in the presence of negative emotions and report greater levels of negative emotions on days that they binge eat, though the negative emotion may be the trigger or consequence of the binge eating (Schulz & Laessle, 2010).

Second, individuals with BED may engage in binge eating as an ER strategy, likely due to a lack of more adaptive ER strategies (Leehr et al., 2015). Given that negative affect is a known antecedent of binge eating, it is hypothesised that individuals with eating disorders lack ER strategies to adaptively manage such emotional states (Hilbert & Tuschen-Caffier, 2007; Whiteside et al., 2007). One study found that individuals reporting binge eating additionally reported lower emotion regulation capacity and the utilisation of more dysfunctional ER strategies compared to individuals who did not report binge eating (Whiteside et al., 2007). Further, a recent literature review concluded that individuals with BED exhibit significantly greater ER difficulties than obese individuals without BED (Leehr et al., 2015).

Third, individuals with BED experience a down-regulation of negative emotion as a result of binge eating (Leehr et al., 2015; Polivy & Herman, 1993). Evidence suggests that the down-regulation of emotion occurs only during the binge or in the short-term after the binge, since many individuals report negative emotion increases

following the binge episode (Deaver, Miltenberger, Smyth, Meidinger, & Crosby, 2003). Despite this, the ‘relief’ experienced during the binge appears to be sufficient to maintain the behaviour (Leehr et al., 2015; Polivy & Herman, 1993). In sum, ER has been proposed as a key aetiological mechanism in BED, in contrast to the more prominent role of dietary restraint in the aetiology of AN and BN.

Emotion regulation and overvaluation. Minimal literature has sought to integrate the role of overvaluation and emotion regulation in BED (Whiteside et al., 2007). One study that investigated possible subtyping of BED noted that negative affect played a role in the maintenance of binge eating behaviours, while overvaluation played a stronger role in the maintenance of eating disordered psychopathology (Masheb & Grilo, 2008). Emotion regulations models, as mentioned above, have sought to explain how negative affect and binge eating are related, theorising that binge eating is an emotion regulation behaviour such that negative affect serves to maintain the disorder (Leehr et al., 2015). The cognitive-behavioural model, as will be outlined in the following chapter, attempts to integrate the maintenance roles that emotion regulation (or mood intolerance) and overvaluation play in binge eating (Fairburn, 2008). However, in order to examine the role of overvaluation in BED in order to inform diagnostic recommendations, further understanding around the relationship between emotion regulation and overvaluation is required (e.g., are there separate subtypes of BED based on differential roles of affect regulation and overvaluation, or do they coincide to represent a more severe disorder).

1.4 Treatment of BED

A number of recent papers have offered thorough reviews of randomised controlled trials (RCTs) of psychological therapies in the treatment of BED (Hay, 2013b; Iacovino et al., 2012; Kass, Kolko, & Wilfley, 2013). Reviews suggest that

cognitive behaviour therapy (CBT) demonstrates the largest evidence base, followed by Interpersonal Psychotherapy (IPT) (Iacovino et al., 2012; Wilson & Shafran, 2005). CBT for BED targets problematic patterns of eating, addressing the “binge-diet cycle”, promoting regular healthy eating, increasing flexibility in dietary content and specifically addressed overvaluation (Iacovino et al., 2012). This is in contrast to IPT that focuses primarily on poor interpersonal functioning where a lack of interpersonal skills, isolation or conflict may perpetuate the binge eating (Iacovino et al., 2012). The largest RCT that examined CBT and IPT for BED, in group format, reported comparable abstinence rates between the two modalities, with 79% (CBT) and 73% (IPT) abstinent from binge eating at the end of treatment, and 59% (CBT) and (62%) at a one-year follow up (Wilfley et al., 2002).

There is increasing evidence for the effectiveness of dialectical behaviour therapy (DBT) in the treatment of BED (Hay, 2013b; Iacovino et al., 2012; Kass, Kolko, & Wilfley, 2013). The benefits of DBT in the treatment of BED may reflect the fact that, in contrast to cognitive behavioural and dietary restraint approaches, this treatment specifically addresses ER difficulties (Telch et al., 2001). DBT treatment focuses on skills to enhance regulation of affect within a group therapy environment, and demonstrates significant reductions in binge eating frequency (Telch et al., 2001).

Behavioural weight loss (BWL) therapy may also be beneficial in the treatment of BED, although opinion is divided in this regard (Hay, 2013b; Iacovino et al., 2012; Kass, Kolko, & Wilfley, 2013). Grilo and colleagues (2011) sought to compare the efficacy of CBT and BWL treatments for BED over a 12-month period in obese patients with BED. Treatment protocols included straight CBT, straight BWL and CBT+BWL (Grilo, Masheb, Wilson, Gueorguieva, & White, 2011). At follow up (12 months following treatment), remission rates in binge eating were 51% for CBT, 36% for BWL

and 40% for CBT+BWL, though no significant differences between groups were observed. However, at six and 12 month follow up participants receiving CBT reported significantly lower frequency of binge eating compared to BWL. Throughout treatment BWL and CBT+BWL produced significant weight loss, however at six and 12 month follow up no significant difference in weight loss was found between any of the three groups (Grilo et al., 2011). This study supported prior research indicating CBT's superiority to BWL treatments and that CBT+BWL shows little additional benefits when compared to a straight CBT protocol (Munsch et al., 2007). Further research indicates these changes are stable over time (Fischer, Meyer, Dremmel, Schlup, & Munsch, 2014).

Research is accumulating to suggest that CBT is efficacious in self-help as well as face-to-face format (Vocks et al., 2010). The majority of this research has utilised a self-help manual called *Overcoming Binge Eating* (1995, 2013), which entails CBT adapted for BED along with brief, regular meetings with a therapist. Guided self-help CBT (CBTgsh) has demonstrated benefits in reducing binge eating and associated psychopathology comparable to IPT and superior to guided self-help BWL (BWLgsh) (Grilo & Masheb, 2005; Iacovino et al., 2012; Wilson, Wilfley, Agras, & Bryson, 2010). Guided self-help DBT delivered remotely with phone support may also be efficacious in the treatment of BED, findings from one recent study showing a significant reduction in binge eating, improved quality of life and improved affect regulation (Masson, von Ranson, Wallace, & Safer, 2013). Although these results were comparable to that of other treatments, the effects of guided self-help DBT were not maintained as well as other psychological therapies (Masson et al., 2013).

Overall, the literature suggests that CBT and IPT demonstrate greatest empirical support in the treatment of BED. However, 'third wave' therapies, DBT in particular,

may also be beneficial. Additionally, BED appears to respond to both face-to-face and self-help treatment modalities for these treatment protocols.

1.5 Summary

In sum, BED was introduced as a formal diagnosis in the DSM-5. Current conceptualisations note the absence of a cognitive criterion, namely, overvaluation in contrast to the other formal eating disorders. BED is characterised by the consumption of large amounts of food and the experience of loss of control over eating. BED is the most common eating disorder, with an older age of onset and shorter duration of illness compared with AN and BN. Sex differences in the prevalence of BED are less pronounced than those for other eating disorders, though prevalence is still higher in women. BED is associated with high levels of comorbidity with other mental health problems, physical health problems associated with obesity, and impairment in psychosocial functioning. Further, mental health care is rarely received among individuals with BED. Aetiological conceptualisations of BED emphasise the role of emotion regulation difficulties, in contrast to the role of dietary restraint hypothesised to be central to the aetiology of AN and BN. Currently, the literature support the use of CBT and IPT in the treatment of BED, in both face-to-face and self-help modalities, although there is increasingly evidence for the use of DBT.

Chapter Two

The Overvaluation of Weight or Shape in BED

The Overvaluation of Weight or Shape in BED

The current chapter proposes that overvaluation of weight or shape, namely where an individual's self-evaluation is predominantly or solely invested in one's weight and shape, warrants consideration among the diagnostic criteria for BED for two main reasons. First, it is widely held that overvaluation is a core – perhaps the core – feature common to all eating disorder psychopathology (Fairburn et al., 2003; Hay, 2013a). The inclusion of overvaluation among the diagnostic criteria for BED would be consistent with this view and would serve to align these criteria with those of the other main eating disorders. Second, a primary stated aim of the DSM-5 is to maximise the clinical utility of its diagnostic formulations, while also informing and facilitating research efforts (First, 2010). As outlined below, inclusion of overvaluation among the diagnostic criteria for BED would also serve this purpose by differentiating individuals with a clinically significant mental health problem from individuals who may more closely resemble obese individuals who do not binge eat.

Additionally, the current chapter provides a review of the current literature on the status of overvaluation within BED and the major methodological limitations of this research including: (i) failure to include psychosocial impairment as an outcome measure, i.e., in addition to eating disorder and comorbid psychopathology; (ii) reliance on treatment-seeking samples; (iii) failure to consider the status of overvaluation across the lifespan, for example, through the inclusion of adolescents in addition to adults in relevant research; and (iv) failure to consider the role of the putative aetiological variable emotional regulation in research addressing the status of overvaluation in BED.

2.1 The Overvaluation of Weight or shape in Cognitive Behavioural Theory

According to cognitive behavioural theory, overvaluation is described as a dysfunctional system of self-worth, such that the individual evaluates his or her self-

worth based primarily or solely on their weight or shape (Fairburn et al., 2003). The construct is defined in the DSM-5 within the eating disorder of AN and BN, as “self-evaluation that is unduly influenced by weight and/or shape” (APA, 2013, pp. 339, 345). Healthy individuals formulate a sense of self-worth from a range of domains such as their relationships, work place and academic achievements, their parenting ability and their values or virtues. In contrast, individuals with eating disorders tend to evaluate themselves based primarily or solely on their weight and/or shape and their ability to control these (Fairburn et al., 2003; Murphy, Straebl, Cooper, & Fairburn, 2010).

The over-investment of self-worth in one’s weight or shape has been described as a *dysfunctional* system of self-evaluation due to several negative consequences. First, it is believed that over-investment in one’s appearance is ‘risky’ in the sense of ‘having all your eggs in one basket’ (Fairburn, 2008, p. 99). The risk is that when things go wrong in this aspect of the individual’s life, their self-worth, will be shaken (Fairburn, 2008). Second, over-investment in one’s weight or shape results in a narrowing of perspective or vision, such that controlling one’s weight or shape becomes of primary focus and consumes excessive amounts of the individuals time and cognition, while other important aspects of life become marginalised (Fairburn, 2008). Finally, such investment is problematic in light of the biological determinants involved in the regulation of body weight or shape. According to set point theory, one’s weight or shape is under strict physiological control and therefore can only be manipulated in the short-term (Dokken, 2007; Harris, 1990; Keesey & Powley, 1986). Therefore, individuals may find themselves highly invested in striving for a potentially unattainable goal, likely with adverse consequences including the psychosocial and physical impairment apparent in individuals with eating disorders (Bohn et al., 2008).

According to Fairburn et al. (2003), all eating disorders share this distinctive “core psychopathology” of overvaluation and this shared pathology underpins a “transdiagnostic” conceptualisation of eating disorders (Fairburn et al., 2003; Hay, 2013a). This conceptualisation incorporates the tenet that overvaluation is a central mechanism in the maintenance of eating disorders, such that other clinical features of these disorders stem directly from it (Fairburn et al., 2003; Fairburn, 2008). In this model (as shown in Figure 2.1), binge eating is seen to result from two possible pathways, namely, dietary restraint and emotion regulation.

First, as a result of overvaluation of weight or shape, individuals engage in strict dieting. When strict dietary rules are inevitably broken, dietary restraint is abandoned and binge eating ensues (Fairburn et al., 2003). This is consistent with dietary restraint models that form the dominant theoretical basis of aetiology in AN and BN (Polivy & Herman, 1985). Second, negative affect (referred to as mood intolerance) results in binge eating episodes that are reinforced due to their ability to neutralise negative emotions, allowing for numbing and distraction *during* the binge, despite the enhanced negative emotion such as guilt and disgust experienced *following* the binge (Fairburn et al., 2003; Fairburn, 2008). Within BED, however, there is little evidence that dietary restraint is a primary factor in binge eating. Hence, attention has focused on the role of mood intolerance as an aetiological and maintenance factor in BED (Cooper & Fairburn, 2011; Fairburn et al., 2003), incorporating emotion regulation theories (Deaver et al., 2003; Leehr et al., 2015; Polivy & Herman, 1993). Presumably, overvaluation of weight or shape, exacerbated as a result of binge eating, induces negative mood, thereby leaving the individual vulnerable to further binge eating, thus maintaining the behaviour. In this way, overvaluation functions as a trigger and

maintenance factor for the binge eating behaviour of individuals with BED, just as it is proposed to maintain the key features of AN and BN.

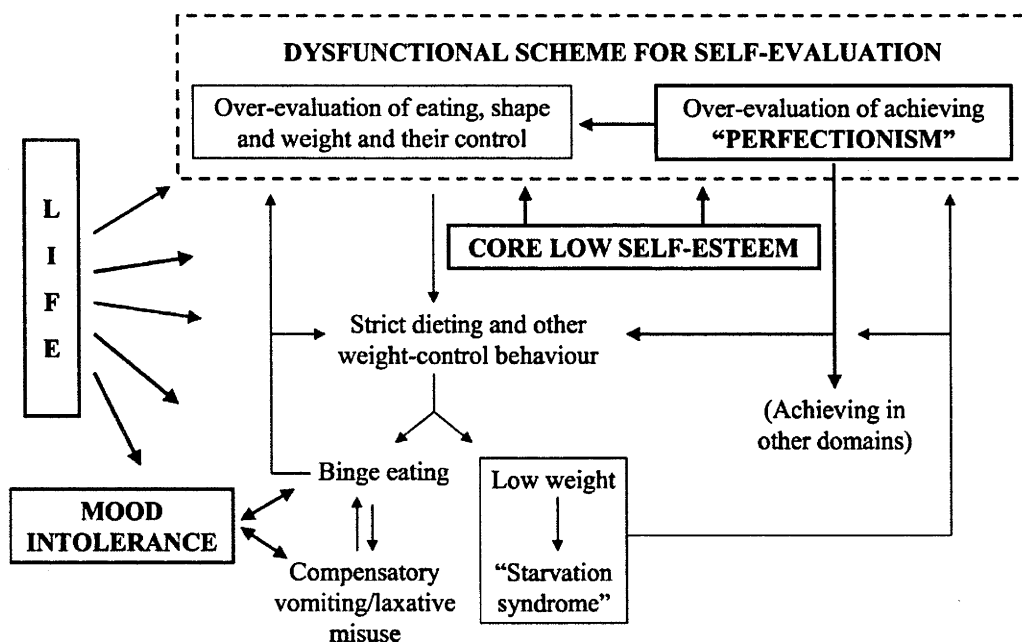


Figure 2.1: Schematic representation of the extended “enhanced” transdiagnostic cognitive behavioural theory of the maintenance of eating disorders (life = interpersonal life) (reproduced from Fairburn, et al., 2003, p. 253).

The cognitive behavioural transdiagnostic model provides a comprehensive theoretical framework of eating disorder psychopathology (Fairburn et al., 2003; Fairburn, 2008). While the diagnostic criteria for AN and BN include overvaluation, and hence fit within the transdiagnostic model, the DSM-5 diagnostic criteria for BED do not include or otherwise make reference to overvaluation.

2.2 Clinical Utility in BED

Classification systems, such as the DSM, are designed to reflect understanding and create predictability, and are successful when they fulfil practical need (First, 2010). The DSM is widely used in clinical decision-making as well as for research purposes

(First, 2010). The DSM-5 Task Force made it clear that the improvement of clinical utility was a key priority for the revision process, stating that “the DSM is above all a manual to be used by clinicians, and changes made for DSM-5 must be implementable in routine specialty practices” (Kendler, Kupfer, Narrow, Phillips, & Fawcett, 2009). Hence, the majority of changes made in DSM-IV were in order to enhance clinical utility (First et al., 2004). Clinical utility within the DSM was defined by First and colleagues (2010) as fulfilling the four functions of: (i) communication of clinical information to various stakeholders including clients and families; (ii) aiding in the implementation of effective treatment interventions; (iii) predicting future clinical management; and (iv) differentiation of disorder from non-disorder (First, 2010). Thus, changes that improve any of these four functions are seen to enhance clinical utility. As discussed below, a second benefit of the inclusion of overvaluation among the diagnostic criteria for BED is that of enhancing clinical utility, particularly through facilitating treatment practice and aiding in differentiating disorder from non-disorder.

Enhancing clinical utility through aiding in effective treatment

interventions. A criticism of the current diagnostic criteria for BED is the lack of treatment specificity, namely that a range of conceptually and procedurally varied treatment protocols demonstrate efficacy in the treatment of BED (Mitchell, Devlin, de Zwaan, Crow, & Peterson, 2008). This is demonstrated as outlined previously, in recent reviews of randomised controlled trials that describe cognitive behavioural therapy (CBT) as having the largest research base, followed by interpersonal psychotherapy (IPT) (Iacovino et al., 2012; Wilson & Shafran, 2005). However, there is increasing evidence for the effectiveness of dialectical behaviour therapy (DBT) (Hay, 2013b; Iacovino et al., 2012; Kass et al., 2013; Telch, Agras, & Linehan, 2001) and guided self-help formats for CBT, IPT (Grilo & Masheb, 2005; Iacovino et al., 2012; Wilson,

Wilfley, Agras, & Bryson, 2010) and DBT modalities (Masson et al., 2013). Given that BED responds to a variety of therapies including guided self-help modalities, it has been suggested that the clinical management of BED would benefit from greater treatment specificity (Mitchell et al., 2008). The potential role of overvaluation in improving treatment specificity is apparent in the stepped-care model of BED treatment proposed by Iacovino and colleagues' (2012). As can be seen in Figure 2.2, Iacovino and colleagues (2012) propose that the presence of overvaluation, which is known to indicate a more severe presentation of BED (Grilo et al., 2008; Grilo, Masheb, & White, 2010), may direct clinicians to those presentations for which more intensive treatment may be required.

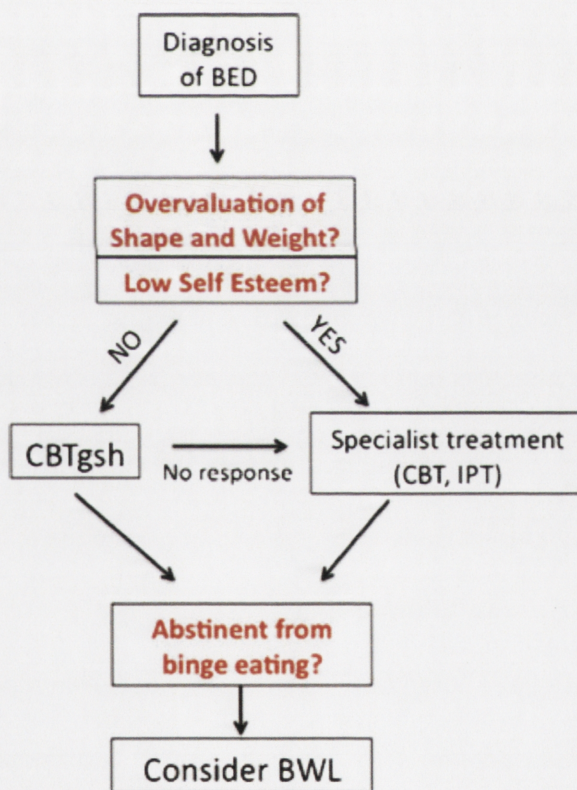


Figure 2.2: Potential stepped care model for the treatment of BED (Reproduced from Iacovino, et al., 2012).

Enhancing clinical utility through differentiating a disorder from non-disorder or another disorder. Overvaluation also has the potential to enhance clinical utility through facilitating the differentiation of presentations of BED and variants of BED that are clinically significant from those that are not (First, 2010). This is an important goal given that recurrent binge eating is common across a variety of presentations (Stunkard & Allison, 2003) and given the high rates of comorbidity of BED with other mental health problems (Kessler et al., 2013). To the extent that the presence of overvaluation among individuals with BED and variants of BED differentiates clinically significant disorders from conditions that are not clinically significant, reference to overvaluation among the diagnostic criteria for BED would further improve the clinical utility of the diagnosis. In particular, the occurrence of ‘false positive’ diagnoses could be reduced (First, 2010).

In sum, there are two potential benefits of the reference to overvaluation in the diagnostic criteria for BED. First, BED as a diagnosis would be aligned with the transdiagnostic model of eating disorders in which overvaluation is believed to be the core psychopathology common to all eating disorders. Second, reference to overvaluation in BED criteria would add clinical utility to the diagnosis by aiding (i) the implementation of effective treatment interventions and (ii) the differentiation of clinically significant presentations from disorders that are not clinically significant.

2.3 Literature Review: Overvaluation in BED

A number of studies have sought to examine the status of overvaluation among individuals with BED and variants of BED. Findings among adult populations strongly suggest that the presence of overvaluation provides important clinical information, particularly in terms of indicating a more severe disorder. Mond and colleagues (2007b) sought to examine the status of overvaluation in BED in a large, community-based

sample of women. Participants with a probable diagnosis of BED were compared to obese individuals who did not report binge eating, as well as individuals with eating disorders recruited from a specialist eating disorders service. Participants completed a self-report questionnaire assessing eating disorder psychopathology, health related quality of life and service utilisation. Individuals with BED and overvaluation reported very high levels of eating disorder symptomatology and functional impairment, and impairment in quality of life, comparable to individuals receiving specialist treatment for an eating disorder (Mond et al., 2007b). In contrast, individuals with BED in the absence of overvaluation reported levels of eating disorder symptomatology and functional impairment similar to those of obese individuals who did not have episodes of binge eating. The authors concluded that inclusion of overvaluation among the diagnostic criteria for BED warrants greater consideration (Mond et al., 2007b). However, these findings failed to be replicated in subsequent studies.

Grilo and colleagues (2008) similarly investigated the status of overvaluation in BED through comparing levels of eating disorder psychopathology, distress and BMI among individuals with BED with and without overvaluation. This study utilised a comparison group of overweight individuals ($BMI \geq 25$) who did not binge eat. Participants were women recruited via media advertisement targeting individuals with binge eating or general weight problems, and women were recruited to participate in research and treatment studies in the psychiatry departments of two universities. The data utilised a consecutive subset of participants recruited for a prior university study on BED (Hrabosky, Masheb, White, & Grilo, 2007). Diagnosis and assignment to overvaluation subgroups were made by means of a structured clinical interview. Self-report measures on eating and mood were administered. Participants with BED and overvaluation reported greater eating disorder and depressive psychopathology than the

comparison groups of participants with BED without overvaluation and overweight individuals who did not report binge eating. However, both BED groups reported greater eating disorder psychopathology and negative affect than the overweight control group. The authors concluded that overvaluation offers an important distinguishing clinical feature and diagnostic specifier in BED (Grilo et al., 2008).

The status of overvaluation among individuals with BED was further investigated by Grilo and colleagues in a study that included comparison groups of individuals with BN and sub-threshold BN (Grilo et al., 2009). Participants were women recruited from treatment studies in two universities and a consecutive subset of women recruited for two prior studies on overvaluation in BED (Grilo et al., 2008; Hrabosky et al., 2007). Diagnoses were made via a structured clinical interview and groups of women who met criteria for BED, BN and sub-threshold BN were identified. Participants with BED and overvaluation reported significantly greater eating disorder psychopathology than all other groups, while participants with BED in the absence of overvaluation and both BN comparison groups did not differ from each other with respect to levels of eating disorder psychopathology. The authors concluded that overvaluation is an important indicator of severity among individuals with BED and that inclusion of overvaluation as a diagnostic specifier in the criteria for BED should be considered. The authors argued against the inclusion of overvaluation as a diagnostic criterion on the grounds that some individuals with clinically significant symptomatology might be excluded from diagnosis were this course to be followed (Grilo et al., 2009).

Building on these studies, Grilo and colleagues (2010) further investigated the status of overvaluation in BED in a community-based sample of women recruited via online advertisements for research on eating and dieting (Grilo, Masheb, & White,

2010). Participants followed a link to complete an online survey where they completed self-report measures on eating and negative affect. Individuals with BED with and without overvaluation were compared with individuals who met criteria for BN and individuals who were overweight but who did not have binge eating or purging behaviours or overvaluation. Both BED groups had significantly greater eating disorder psychopathology than the overweight comparison group. However, the presence of overvaluation in BED indicated a significantly more severe presentation in terms of both eating disorder psychopathology and negative affect, comparable to individuals with BN. These findings were taken to provide further support for the view that the presence of overvaluation among individuals with BED indicates a more severe psychopathology but that BED in the absence of overvaluation may also be clinically significant, i.e., given its differentiation from the overweight control group (Grilo et al., 2009).

The finding that overvaluation is associated with greater severity of eating disorder and comorbid psychopathology was replicated in a primary care study of obese individuals also conducted by Grilo and colleagues (Grilo et al, 2012). Participants in this study were an ethnically diverse sample of obese men and women who met criteria for BED according to the DSM-5, recruited for treatment studies in primary care university-based medical health care centres (Grilo et al., 2012). Participants underwent structured clinical interviews in order to assess eating disorder psychopathology and additional Axis I Disorders in accordance with the DSM-5, whereas depression and self-esteem were assessed by means of self-report measures. Where overvaluation was reported, participants reported higher levels of eating disorder symptomatology and depression, lower self-esteem, and greater co-morbidity with other psychological disorders, particularly anxiety (Grilo et al., 2012). Thus the authors concluded inline

with previous evidence, that overvaluation indicates an important clinical distinguishing feature within BED, extending this research to an ethnically diverse sample with a primary care setting (Grilo et al., 2012).

In order to further elucidate the utility of overvaluation as a diagnostic criterion for BED, Goldschmidt and colleagues (Goldschmidt et al., 2010) compared women diagnosed with BED with threshold and sub-threshold levels of overvaluation, recruited as part of a community-based study of BED, namely, the New England Women's Health Project. The study further utilised a control group of women diagnosed with psychiatric disorders other than eating disorders, in the absence of a psychotic disorder. In addition to structured clinical interviews for diagnostic purposes, self-report measures of psychiatric functioning, social functioning and healthcare utilisation were administered (Goldschmidt et al., 2010). Participants with BED and threshold overvaluation reported a more severely impaired profile than both BED participants with sub-threshold overvaluation and participants in the psychiatric comparison group. This was such that participants with BED and threshold overvaluation reported greater general psychopathology, social dysfunction, distress, lifetime comorbid psychiatric disorders and increased health service utilisation than both BED participants with sub-threshold overvaluation and the psychiatric comparison group. Despite this, women with BED and sub-threshold overvaluation had comparable levels of psychosocial impairment to psychiatric control participants. Thus, in line with prior conclusions (Grilo et al., 2009, 2010), the authors concluded that overvaluation is an important severity specifier within BED given BED with sub-threshold overvaluation still indicated impairment across a variety of domains (Goldschmidt et al., 2010).

Given this developing body of research, it has been noted that a lack of research into the prognostic significance of overvaluation in BED exists. Three recent studies

have attempted to address this gap. Ojserkis and colleagues (2012) sought to investigate the role of overvaluation in treatment outcomes for individuals with BED. The study included patients with BED, diagnosed via interview assessment, participating in a randomised control trial of group behavioural therapy (BT), individual CBT and fluoxetine (Ojserkis, Sysko, Goldfein, & Devlin, 2012). Participants were randomly allocated to groups including i) placebo and group BT only, ii) fluoxetine and group BT only, iii) placebo, group BT and individual CBT, and iv) fluoxetine, group BT and CBT. All groups were comprised of approximately equal numbers of individuals with and without overvaluation. The study found that the presence of overvaluation was associated with a more severe presentation at the initial assessment and significantly higher scores on binge eating severity and lower self-esteem at post-treatment (Ojserkis et al., 2012).

Additionally, a further study sought to examine predictors and moderator involved in treatment outcome for individuals with BED (Grilo, Masheb, & Crosby, 2012). The study utilised a sample of adult patients who met criteria for BED with a randomised double-blind placebo-controlled design with participants receiving CBT, fluoxetine or both. Findings suggested that overvaluation was the most significant predictor of treatment outcomes, predicting binge-eating remission independent of treatment condition, such that individuals reported overvaluation experienced lower rates of binge eating remission post-treatment (Grilo et al., 2012). These results were then furthered and confirmed by a later study with obese participants with BED who were allocated to treatment groups receiving CBT or BWL, with a 12-month follow up following the end of treatment (Grilo et al., 2013). The study found that overvaluation failed to be associated with BMI or binge eating frequency at the initial assessment, however on initial presentation overvaluation was associated with greater eating

disorder psychopathology, depression and poorer self-esteem. Further, in line with prior studies, the presence of overvaluation was associated with poorer rates of binge eating remission and higher frequency of binge eating at the 12-month follow up assessment, even after controlling for depression and self-esteem (Grilo et al., 2013). Overall prognostic studies indicate that the presence of overvaluation in individuals with BED likely indicates a more severe presentation and thus is in need of additional clinical attention.

Currently, few studies have examined overvaluation within child and adolescent populations limiting the generalisability of such findings across the lifespan. One of the few studies examining overvaluation in youth was within a community-based population of children aged 8-13 years of age (Hilbert & Czaja, 2009). The study found that overvaluation identified children with higher recurrent LOC eating, indicating a more severe presentation in terms of eating disorder psychopathology, depressive symptoms and behavioural problems. The study concluded that overvaluation aided in the delineation of defining 'normal' and LOC eating in children, thus indicating its potential to enhance the diagnostic specificity of classification systems. The only other study thus far that has examined overvaluation among children and adolescents (aged 7-18 years) with BED utilised a sample of participants presenting at five research institutions (including universities and hospitals) for non-intervention research, weight-loss treatment or clinic-based eating disorders or obesity treatment (Goldschmidt et al., 2011). Loss of Control (LOC) eating was assessed among youth, given evidence demonstrating that within children and adolescents LOC eating indicates psychosocial impairment independent of the amount of food consumed (Bravender et al., 2010; Goldschmidt et al, 2008). A structured clinical interview was utilised to assess eating disorder features and additional self-report measures of child behaviour and self-esteem

were administered. Participants were divided into subgroups of LOC eating with moderate overvaluation, LOC eating with minimal or no overvaluation along with two overweight control groups (both who denied LOC eating and compensatory behaviours) with moderate overvaluation and minimal or no overvaluation. Results indicated that both LOC groups reported poorer self-esteem, greater behavioural problem than overweight control groups independent of the status of overvaluation. Thus, authors concluded that in contrast to adults, overvaluation failed to indicate a meaningful differentiation in youth with LOC eating (Goldschmidt et al., 2011).

In sum, firstly the available evidence within adults indicates that the presence of overvaluation is an important clinical feature in BED, indicating a subgroup of individuals with this disorder who experience significantly higher levels of eating disorder and comorbid psychopathology. Secondly, the evidence within adults also suggests that individuals with BED in the absence of overvaluation may have elevated levels of eating disorder and comorbid psychopathology when compared with obese individuals who do not binge eat at least, although the evidence is not conclusive in this regard. Additionally, overvaluation is associated with poorer treatment outcomes, including lower rates of binge eating remission post-treatment. It has been suggested that overvaluation should be included in the DSM-5 as a diagnostic specifier, given that it communicates important clinical information, but not as a diagnostic criterion because this might exclude from diagnosis some individuals who do in fact have clinically significant eating disorders. However, within adolescents findings suggest that overvaluation fails to indicate a more “severe” presentation among youth reporting LOC eating, thus additional research into such inconsistency is required.

2.4 Limitations of the Existing Literature

Although the evidence outlined above strongly suggests that the presence of overvaluation among adults with BED and variants of BED provides important clinical information, there are at least four important limitations with this evidence that preclude any firm, more specific conclusions. These limitations are outlined below:

Failure to include appropriate measures of impairment in psychosocial functioning. One important limitation of the existing research is the reliance upon measures of symptomatology at the expense of measures of impairment and psychosocial functioning more broadly. Psychopathology incorporates not only the presence of symptomatology but also the clinically significant impact of such symptoms on role functioning (APA, 2013; Bohn et al., 2008). Early research found that individuals with eating disorders had poorer quality of life when compared to both individuals with chronic physical health problems, such as angina and cystic fibrosis, and healthy individuals (Keilen, Treasure, Schmidt, & Treasure, 1994). However, assessment of psychopathology often focuses on symptoms of specific disorders, neglecting their impact on the individual's quality of life (Jenkins et al., 2011). This is the case with much of the existing research addressing the status of overvaluation in relation to BED. For this reason, claims that individuals with BED in the absence of overvaluation are experiencing a clinically significant eating disorder (e.g., Grilo et al., 2008, 2009, 2010) may be premature.

In addition, while measures of impairment and psychosocial functioning have been under-utilised, the *nature* of the impairment experienced by individuals with BED also remains unclear. Where impairment in psychosocial functioning associated with BED with and without overvaluation has been investigated, research has relied on generic measures of health-related quality of life (Mond et al., 2007b). While providing a simple, tangible assessment of the impact of ill health on individuals' quality of life, a

concern with the use of generic quality of life measures is that they may not be sufficiently sensitive to the sorts of impairment uniquely associated with particular health problems. Thus, it has been proposed that disease specific, namely, eating disorder specific, measures of health related quality of life should be employed instead of, or in addition to, generic measures for monitoring and outcome assessment purposes (Mitchison et al., 2013). Therefore, in order to determine levels of impairment experienced within BED with and without overvaluation, appropriate measures of both generic and eating disorder specific health related quality of life should be utilised.

Further, when considering the inclusion of measures of psychosocial impairment in order to establish the *clinical* nature of a group, such conclusions can only be made when appropriate comparison groups are utilised. This is important, in the current context, given the high prevalence of obesity among individuals with BED and given that obesity is known to be associated with distress and functional impairment independent of the occurrence of binge eating (Dingemans & van Furth, 2012). A potential limitation of the existing literature, several studies at least, is the use of a comparison group of overweight individuals who report the absence of all eating disorder features – binge eating, overvaluation, extreme weight-control behaviours, etc. – rather than the absence of binge eating per se (e.g., Grilo et al., 2008, 2010). The use of such a comparison group, that more closely resembles a ‘healthy’ control group rather than an obese control group who fail to report binge eating, would have the effect of intensifying differences between the BED without overvaluation and overweight control groups (Mond et al., 2007b). Another study utilised only a psychiatric control group (Goldschmidt et al., 2010).

Over-reliance on treatment-seeking samples. A second important limitation of the existing literature is the reliance on treatment-seeking samples in many studies

(Grilo et al., 2008, 2009, 2012). This is important because, as is the case with many mental health problems, only a minority of individuals with BED receive specialist treatment and the characteristics of individuals in this subgroup may be quite different from those of individuals with BED more generally (Mond et al, 2007; Kessler et al, 2013; Williams, Tarnopolsky, & Hand, 1980). Factors likely to affect whether treatment is sought and/or the *type* of treatment sought by individuals with mental health problems include illness severity, demographic variables (e.g., socio-economic status, age, sex), environmental variables such as distance from and access to treatment facilities, and “mental health literacy” variables such as an individual’s recognition that symptoms are indicative of a mental health problem and their understanding of the nature and treatment of such problems (Mond, Hay, Rodgers, & Owen, 2007a; Williams et al, 1980). Available evidence suggests that the occurrence of high levels of distress and disability is the best predictor of help-seeking among individuals with bulimic-type eating disorders and that seeking help for a problem with weight and/or comorbid mental health problem is far more common than seeking help for an eating problem (Mond et al., 2007a; Kessler et al, 2013). Given these findings, and given that distress and disability are important outcome variables in research addressing the status of overvaluation in BED, reliance upon treatment-seeking samples in this research is problematic. To date few community-based studies have been conducted and those that have been conducted have been limited in one or more of the other respects noted.

Failure to consider the status of overvaluation across the lifespan. A third limitation of the existing evidence is the reliance, almost without exception, on samples of adults. For this reason, the applicability of the current research across the lifespan remains unknown. This is of concern for several reasons. First, eating disorder psychopathology may manifest differently in children and adolescents than in adults

and the ability of classification schemes to capture age-related variation of this kind is unclear (Bravender et al., 2010; WCEDCA, 2007). Indeed improving the classification of eating disorders across the lifespan was a major goal of DSM-5 (Walsh, 2012). Various developmental factors, including limited verbal and abstract reasoning abilities, less emotional awareness, and less behavioural inhibition, impact upon the differentiation of eating disorders among adolescents (Bravender et al., 2010; WCEDCA, 2007). Current classification schemes likely do not capture these developmental differences.

For example, recommendations have been made to suggest that loss of control (LOC) eating, independent of the amount of food consumed, be considered as the hallmark feature of BED in children and adolescents (Bravender et al., 2010; Goldschmidt et al., 2008). This is in contrast to DSM-5 criteria for BED, in which binge eating requires both loss of control over eating and consumption of an “objectively large” amount of food, and reflects increasing awareness that LOC is a better marker of psychopathology than the amount of food consumed among young people who binge eat (Bravender et al., 2010; Goldschmidt et al., 2008). Further, researchers have questioned whether the concept of an “undue influence of weight or shape on self-evaluation” can reasonably be applied in children and adolescents (Bravender et al., 2010; Goldschmidt et al., 2011). Understanding of such concepts may require a level of cognitive sophistication that is beyond children and younger adolescents at least (Bravender et al., 2010; WCEDCA, 2007). It may be that the phenomenology of BED in young people differs from that observed in adults in several key respects, such that separate, developmentally-appropriate criteria and/or or sub-classifications may be required (WCEDCA, 2007). For these reasons, research addressing the status of

overvaluation among individuals with BED and variants of BED would ideally include both adults and young people.

Failure to consider key aetiological mechanisms. A fourth notable limitation of the current literature is the failure to consider the role of key aetiological variables in comparisons between subgroups of individuals with BED with and without overvaluation. Indeed emotion regulation difficulties have been identified as a defining feature across the spectrum of eating disorders (Svaldi et al., 2012). Additionally, as has been noted, emotion regulation has been proposed as a major aetiological mechanism in BED (Polivy & Herman, 1993) and emotion regulation models offer increasing insight into the nature of the disorder (Leehr et al., 2015). When considering the clinical significance of BED in the absence of overvaluation, levels of psychopathology and psychosocial impairment are key outcome variables. However, examination of whether this subgroup fits within dominant theoretical accounts of BED as these relate to aetiological mechanisms is also important. As has also been outlined above, individuals with BED can be identified not only by the presence of binge eating and weight or shape concerns, but the presence of significant emotion regulation difficulties (Craighead et al., 2013; Leehr et al., 2015). Indeed, it has been suggested that the absence of adaptive emotion regulation strategies may be a defining feature of BED that distinguishes individuals with this disorder from obese individuals who do not binge eat (Leehr et al., 2015). Hence, examination of emotion regulation difficulties among individuals with BED with and without overvaluation has the potential to inform the issue of whether BED without overvaluation is best conceptualised as: (i) a less severe presentation of BED, exhibiting the same aetiological mechanisms; or (ii) a disorder that does not align with accepted models of aetiology and that may therefore best be viewed as belonging in a category other than the eating disorders.

2.5 Summary

Research in adults strongly suggests that the presence of overvaluation among individuals with BED and variants of BED indicates very high levels of eating disorder and general psychopathology and impairment in psychosocial functioning, whereas the clinical significance of BED in the absence of overvaluation is unclear. It has been suggested that overvaluation should be included as a severity specifier rather than a diagnostic criterion for BED, although limitations of the existing literature preclude any firm conclusions in this regard. These limitations include the reliance on treatment-seeking samples, failure to assess psychosocial impairment as an outcome variable, the lack of research that is relevant across the lifespan (specifically research relating to the status of overvaluation among young people with BED and variants of BED) and the failure to consider aetiological mechanisms, emotion regulation in particular, in comparisons of BED with and without overvaluation.

2.6 The Current Research

The goal of the current research program was to further investigate the status of overvaluation in BED while attempting, as far as possible, to circumvent the key limitations outlined above. Specific aims were:

- 1) To compare adults with BED with and without overvaluation with respect to levels of eating disorder psychopathology and psychosocial impairment (Study One, Chapter Three).
- 2) To compare adults with BED with and without overvaluation on both generic and disease-specific measures of psychosocial impairment (Study Two, Chapter Four).
- 3) To compare adolescents with loss of control eating with and without overvaluation with respect to levels of eating disorder

psychopathology and psychosocial impairment (Study Three, Chapter Five).

- 4) To compare adults with BED with and without overvaluation with respect to emotion regulation difficulties (Study Four, Chapter Six).

Chapter Three

Correlates of Binge Eating With and Without Overvaluation of Weight or Shape: Further Evidence From a General Population Sample of Women

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Introduction

As outlined in the previous chapters, the current literature suggests that within the adult population, the presence of overvaluation among individuals with BED and variants of BED indicates higher levels of eating disorder and general psychopathology. This is in contrast to those individuals with BED in the absence of overvaluation, such that the clinical significance of this presentation is unclear. It has been suggested that the most appropriate option may be the inclusion of overvaluation as a severity specifier rather than a diagnostic criterion for BED, given that individuals with BED in the absence of overvaluation are believed to experience clinically significant symptomatology.

However, as outlined in the previous chapter, several limitations in the existing literature preclude any firm conclusions in this regard. As such, the current study sought to address these limitations namely, through utilising a community based, rather than treatment-seeking sample given treatment-seeking samples are unlikely to be representative of the disorder as a whole. Further, the study sought to assess psychosocial impairment as an outcome variable given that psychopathology entails not simply clinically significant symptoms, but further the clinically significant impact of such symptoms, resulting in significant impairment in the individual's life. Finally, the study utilised appropriate comparison groups, namely individuals who were obese and did not report binge eating, and a healthy comparison of individuals within the normal weight range, in the absence of any eating disordered behaviours (including binge eating). These groups were believed to be the most appropriate comparison groups given the high prevalence of obesity among individuals with BED, and given that obesity is known to be associated with distress and functional impairment independent

of the occurrence of binge eating. Previous studies have failed to utilise an obese comparison group of individuals who do not binge eat.

Thus, study one specifically sought to compare adults with BED with and without overvaluation with respect to levels of eating disorder psychopathology and psychosocial impairment in order to further determine the role of overvaluation in the diagnosis of BED, and thereby seeking to clarify the clinical status of BED in the presence and absence of overvaluation.

Correlates of binge eating with and without overvaluation of weight or shape: further evidence from a general population sample of women

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The objective of this work was to further examine the status of the overvaluation of weight/shape in binge-eating disorder (BED) by examining correlates of probable BED with and without overvaluation. Subgroups of women – probable BED with overvaluation ($n = 37$), probable BED without overvaluation ($n = 78$), obese individuals who reported no binge eating ('obese controls') ($n = 194$), and normal-weight individuals who reported no binge eating ('healthy controls') ($n = 573$) – recruited from a general population sample, were compared on measures of eating disorder psychopathology, general psychological distress, and psychosocial functioning. Women with probable BED with overvaluation reported significantly higher levels of eating disorder psychopathology and general psychological distress, and significantly poorer psychosocial functioning, than those with probable BED without overvaluation. No significant differences on any outcome measures were found between women with probable BED without overvaluation and obese controls. The findings provide additional evidence for the role of overvaluation in indicating disorder severity among individuals with BED and variants of this disorder. Moreover, it highlights the need for further consideration of the status of overvaluation in relation to BED diagnostic criteria.

Keywords: binge-eating disorder; overvaluation; diagnostic criteria

Findings from several recent studies suggest that, among individuals with binge-eating disorder (BED) and variants of BED, the overvaluation of weight or shape ('overvaluation') indicates a more severe disorder, in terms of eating disorder psychopathology, general psychological distress, and impairment in psychosocial functioning (Goldschmidt et al., 2010; Grilo, Hrabosky, & White, 2008; Grilo, Masheb, & White, 2010; Mond, Hay, Rodgers, & Owen, 2006). Concerns have been expressed about the absence of any reference to overvaluation among the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5) criteria for BED (Grilo, 2013; Mond, 2013), in light of the presence of overvaluation as a core feature of anorexia nervosa and bulimia nervosa (BN) and, according to some authorities, all eating disorders (Fairburn, Cooper, & Shafran, 2003; Hay, 2013).

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Three community-based studies have examined the relationship between overvaluation and disorder severity in BED. In a community sample of women with a probable BED diagnosis (i.e. 'diagnosis' based on self-report data), Mond et al. (2006) found that participants who overvalued their weight or shape reported significant levels of distress and functional impairment, comparable to those of patients with other eating disorder diagnoses. In contrast, levels of distress and disability among participants with BED in the absence of overvaluation did not differ from those of obese individuals reporting no binge eating. Grilo et al. (2010) found in a community-based study of women with probable BED, recruited by means of an Internet advertisement, that participants who overvalued their weight or shape had higher levels of eating disorder psychopathology than those who did not. Furthermore, participants with BED in the absence of overvaluation had higher levels of eating disorder psychopathology than overweight individuals without eating disorder symptoms. In a community-based study of women with BED diagnosed by means of interview assessment, Goldschmidt et al. (2010) found that participants with BED who overvalued their weight or shape, had significantly higher levels of general psychopathology, psychosocial impairment, and health-care utilisation than those who did not. In this study, and in contrast to Mond et al.'s (2006) study, women with BED in the absence of overvaluation experienced marked impairment in certain aspects of functioning. A limitation of Goldschmidt et al.'s (2010) study, however, is that there was no obese control group, namely individuals who were obese but did not report episodes of binge eating.

Remaining research addressing the status of overvaluation in relation to BED has been confined to treatment-seeking samples (Grilo et al., 2008, 2009; Hrabosky, Masheb, White, & Grilo, 2007). A concern with this research is that many individuals with BN, BED and variants of these disorders, do not receive treatment from a mental health professional (Mond, Hay, Rodgers, & Owen, 2007), and distress and functional impairment predict whether such treatment is received (Mond, Hay, Rodgers, Darby et al., 2009). Therefore, findings bearing on the clinical significance of overvaluation derived from such treatment-seeking samples may lack generalisability (Wilfley, Pike, Dohm, Striegel-Moore, & Fairburn, 2001). Ideally, findings from both community and clinical samples would be used to inform the validity and utility of classification schemes for mental health problems (First, 2010; Mond, 2013).

A second concern with existing studies of the status of overvaluation in relation to BED is that a comparison group of obese individuals who do not have binge-eating episodes has not always been included (Goldschmidt et al., 2010; Grilo et al., 2009). This may be a significant omission given that individuals with BED are frequently obese and in women specifically, obesity may be associated with distress and functional impairment independent of the occurrence of binge eating (Dingmans & van Furth, 2012; Mond, Hay, Rodgers, & Owen, 2009). A finding that individuals with BED in the absence of overvaluation do not differ, in terms of distress and disability, from obese individuals reporting no binge eating would further support the need to refer to overvaluation in the diagnostic criteria for BED. Indeed, higher levels of general psychopathology and greater impairment in quality of life associated with BED, when compared with obesity, were one of the key validators used to support the inclusion of BED as formal diagnosis in DSM-5 (American Psychiatric Association [APA], 2013).

The goal of the present study was to expand this literature by further examining the status of overvaluation among individuals with a probable diagnosis of BED, addressing some of the limitations of the existing literature through (i) recruitment of participants from a general population sample, (ii) inclusion of appropriate comparison groups, and (iii) inclusion of several different outcome measures. Specifically, we sought to compare subgroups of women with a probable diagnosis of BED with and without overvaluation, obese individuals who reported no binge eating ('obese controls'), and women who were neither obese nor reported binge eating, ('healthy controls') on measures of eating disorder psychopathology, general psychological distress, and psychosocial functioning.

Consistent with the available evidence, it was hypothesised that women with BED who overvalued their weight or shape would have significantly higher scores on each of these measures than women with BED in the absence of overvaluation. We were also interested to compare scores on each measure between women with BED in the absence of overvaluation, women who were obese but did not report binge eating and women who were neither obese nor reported binge eating. The available evidence did not, in our view, permit any firm hypotheses in this regard.

Method

Study design and participants

Participants were women aged 20–44 years who participated in a 2006 Australian study, the Food, Drink, Lifestyle and Wellbeing Survey (FDLWBS) (Lucas, Windsor, Caldwell, & Rodgers, 2010). The recruitment procedures have been detailed previously (Lucas et al., 2010). In summary, self-report questionnaires were posted to 18,000 women and men born in 1983–1985, 1973–1975, and 1963–1965, and selected at random from the Australian Electoral Roll. The questionnaire included measures of eating disorder features, including items assessing the overvaluation of shape and weight, general psychological distress, psychosocial functioning, height and weight, and demographic characteristics (Lucas et al., 2010). Participation was on a voluntary basis and no remuneration was given. The study methods were approved by the Australian National University Human Research Ethics Committee.

Completed questionnaires were received from 1899 women and 957 men, yielding an overall crude response rate of 15.9%. As in previous research (Grilo et al., 2009, 2010; Mond et al., 2006), only women were included in the current study. The comparatively smaller sample size and comparatively lower prevalence of binge eating among male participants precluded meaningful analysis involving these participants. Response rates were higher among the oldest age group (14.7% for 20–22-year-olds, 14.8% for 30–32-year-olds, and 18.2% for 40–42-year-olds). No reminder letters or further mail-outs were employed (Lucas et al., 2010).

Measures

Demographic characteristics

Participants first completed questions addressing demographic characteristics, namely: age, language spoken at home (English, not English), country of birth (Australia, not Australia), marital status, employment status, educational attainment, and annual income. Participants' body mass index (BMI, kg/m²) was derived from self-reported height and weight.

Eating Disorder Examination Questionnaire

The Eating Disorder Examination Questionnaire (EDE-Q) is a 36-item self-report measure of eating disorder features that focuses on the past 28 days (Fairburn & Beglin, 1994). Scores on each of the four subscales, as well as a global score, may be derived from 22 items assessing core attitudinal eating disorder features, namely, restraint, eating concern, weight concern, and shape concern. Scores on these items (and subscales) range from '0' to '6', with higher scores indicating higher symptom levels (Fairburn & Beglin, 1994). The EDE-Q subscales have been found to have very good internal consistency, test-retest reliability, and convergent validity in a range of study populations, including general population samples of women (Berg, Peterson, Frazier, & Crow, 2012; Fairburn & Beglin, 1994; Mond, Hay, Rodgers, Owen, & Beumont, 2004). In the present study, as in other studies (Berg et al., 2012; Mond, Rodgers et al., 2007),

scores on items of the Weight and Shape Concerns subscales were highly correlated ($r = .91$). Hence, and also consistent with previous studies (Berg et al., 2012; Mond, Rodgers et al., 2007), items of these scales were combined to form an overall Weight/Shape Concerns scale. Cronbach alphas for the Restraint, Eating Concern, Weight/Shape Concerns, and global scale scores in the present study were, respectively, .80, .83, .93, and .94. The EDE-Q items assessing overvaluation were omitted when calculating a 'revised' EDE-Q global score for the purpose of comparisons involving this outcome.

Remaining items of the EDE-Q assess the occurrence and frequency of specific eating disorder behaviours, namely binge eating, purging (self-induced vomiting and/or laxative misuse), and excessive exercise. Since the assessment of extreme dietary restriction is not included among these items, an item of the EDE-Q Restraint subscale specifically, 'On how many days (in the past 28 days) have you gone for long periods of time (i.e. 8 or more waking hours) without eating anything at all in order to influence your shape or weight?' was used for this purpose (Fairburn & Beglin, 1994).

General psychological distress

General psychological distress was assessed with the six-item version of the Kessler Psychological Distress Scale (K-6), a brief, self-report measure designed to screen for mental disorders in epidemiological studies and widely used for this purpose (Kessler et al., 2002). Examples of items are: 'In the past four weeks, how often did you feel nervous' and 'In the past four weeks, how often did you feel restless or fidgety?' Responses are scored on a 5-point Likert-type scale ranging from 'none of the time' ('0') to 'all of the time' ('4'), such that total scores range from 0 to 24, with higher scores indicating higher levels of distress. The K-6 has excellent psychometric properties including demonstrated validity in identifying clinically significant symptoms of anxiety and depression in general population samples (Kessler et al., 2002). Cronbach's alpha in the present study sample was .90.

Assessment of psychosocial functioning

Psychosocial functioning was assessed using measures of subjective well-being (satisfaction with life), social support, and social integration, as described below.

Satisfaction with Life Scale

The Satisfaction with Life Scale (SWLS) is a five-item measure designed to provide a brief assessment of the individual's perceived overall satisfaction with their life (Diener, Emmons, Larsen, & Griffin, 1985). Examples of items are: 'In most ways my life is close to my ideal' and 'The conditions of my life are excellent.' Items are scored on a 7-point scale ranging from '1' ('strongly disagree') to '7' ('strongly agree'), such that total scores range from 5 to 35 with higher scores indicating greater life satisfaction. High internal consistency, test-retest reliability, and convergent validity have been reported in various study populations (Pavot & Diener, 1993, 2008). Cronbach's alpha in present study was .90.

Medical Outcomes Study Perceived Social Support Survey

The Medical Outcome Study Perceived Social Support Survey (Sherbourne & Stewart, 1991) is a 19-item, self-report assessment of the perceived availability of different forms of social support, including emotional/informational, tangible, affectionate, and positive social interaction.

Participants are asked how often each of several different kinds of social support are available should they be needed, for example, 'Someone you can count on to listen to you when you need to talk' and 'Someone to get together with for relaxation'. Items are scored on a 5-point scale ranging from 'none of the time' ('1') to 'all of the time' ('5'), such that total scores range from 19 to 95 with higher scores indicating greater perceived availability of social support. The scale has demonstrated reliability and validity (Sherbourne & Stewart, 1991). Cronbach's alpha in the present study was .97.

Social integration

Social integration was measured using three items adapted from the British National Survey of Health and Development, that assess the respondent's self-reported levels of interaction with friends and family (Rodgers, 1996), namely: 'On average, how often do you meet friends or relatives socially?'; 'How many friends or relatives do you meet socially on a regular basis?'; and 'How many friends or relatives can you visit at any time, or who could visit you at any time, without waiting for an invitation?' (Rodgers, 1996). For the first item, responses were scored on a 5-point scale ranging from 'monthly or less' to '4 or more times a week', whereas responses to the second and third questions were scored on a 6-point scale ranging from 'none' to 'more than 15'. Total scores have been found to have good convergent validity (Rodgers, 1996) and acceptable reliability (Lucas et al., 2010) in previous studies. Cronbach's alpha in the present study was .70.

Creation of study subgroups

Four subgroups of participants were created: (1) probable BED with overvaluation; (2) probable BED without overvaluation; (3) obese controls; and (4) healthy controls. Probable cases of BED were participants who reported, on relevant items of the EDE-Q, regular episodes of binge eating in the absence of regular extreme weight-control behaviours (purging, extreme dietary restriction, and excessive exercise). Consistent with the DSM-5 criteria for BED (APA, 2013; Wilson & Sysko, 2009), regular binge eating was defined as at least weekly episodes in which an unusually large amount of food was consumed and a sense of loss of control overeating was experienced at the time of eating. In the absence of any agreed-upon operational definition of regular extreme weight-control behaviours, a conservative threshold of twice per month was employed in order to clearly distinguish probable cases of BED from individuals with a sub-threshold form of BN (Cooper & Fairburn, 2003). Thus, regular purging was defined as self-induced vomiting or misuse of laxatives or diuretics as a means of controlling weight or shape at least twice in the past 28 days; regular unhealthy dietary restriction was defined as going for long periods (8 or more waking hours) without eating anything at all as a means of controlling weight or shape at least twice in the past 28 days; and regular excessive exercise was defined as exercising in a 'driven' or 'compulsive' way as a means of controlling weight or shape at least twice in the past 28 days. Given the reliance on self-report data, however, participants so identified are referred to as 'probable BED cases'.

The overvaluation of weight or shape was assessed using the two EDE-Q items that specifically assess this construct, namely, 'Over the past four weeks, how much has your *weight* influenced how you think about (judge) yourself as a person?' ('importance of weight') and 'Over the past four weeks, how much has your *shape* influenced how you think about (judge) yourself as a person?' ('importance of shape'). Consistent with previous research employing the EDE-Q in community samples (Grilo et al., 2010; Mond et al., 2006), participants who scored five or six on either (or both) of these items were considered to have the overvaluation. These scores indicate

that self-evaluation was influenced by their weight or shape either 'markedly' (score of '6') or 'more than moderately but less than markedly' ('5').

Participants classified as 'obese controls' were women who had a BMI ≥ 30.0 (Flegal, Carroll, & Ogden, 2012) and who reported no binge-eating episodes in the last 28 days. Participants classified as 'healthy controls' were women who had BMIs in range of $20.0 \leq \text{BMI} < 25.0$ (Mond, Hay, Rodgers, & Owen, 2009) and who reported no binge-eating episodes or use of extreme weight-control behaviours in the past 28 days. Participants who were underweight (BMI < 20.0) reported weight-control behaviours as outlined above, or who had BMIs in the range of $25.0 \leq \text{BMI} < 30.0$, but did not report binge eating, were excluded from the analysis.

Statistical analysis

Analysis of variance (ANOVA) was used to compare scores on measures of eating disorder psychopathology (EDE-Q revised global score), general psychological distress (K-6), and psychosocial functioning (life satisfaction, perceived social support, and social integration), between groups. Post hoc tests with Bonferroni correction were used to identify the source of any statistically significant *F* values. A significance level of 0.05 was used for all tests and all tests were two-tailed. Complete case analysis (list-wise deletion of missing values) was employed for missing data. Levels of missing data were $< 2.0\%$ for the variables considered in the current study, with the exception of personal annual income, for which 3.9% of the data were missing, and the BMI, for which 7.1% of the data were missing. All analyses were conducted using the IBM Statistical Package for the Social Sciences (SPSS) (version 20.0).

Results

Preliminary analysis

In view of the low response rate in the FDLWBS, and given that the only information about non-respondents was their age and sex, Lucas et al. (2010) conducted analysis to determine the representativeness of the sample in terms of socio-demographic characteristics. This analysis, details of which have been reported previously (Lucas et al., 2010), indicated that individuals not in the paid labour force were under-represented (10.4% vs. 15.4%), and those with university qualifications over-represented (29.6% vs. 16.7%), among FDLWBS participants. In addition, sample representativeness interacted with age and sex. For example, women with children were under-represented among younger, but not older, FDLWBS participants. Otherwise, participants were representative of the total Australian population in terms of socio-demographic characteristics (Lucas et al., 2010).

For the present study, additional analysis was conducted to determine the representativeness of the study sample in terms of levels of eating disorder psychopathology. Specifically, EDE-Q data from the present study were compared with those of a large, general population sample of Australian women aged 18–42 years (Mond et al., 2006). There were no significant differences between the samples with respect to either scores on the EDE-Q subscales or the occurrence of specific eating disorder behaviours, nor any differences that approached significance at the .05 level. Mean (SD) EDE-Q global scores for the FDLWBS and normative samples were 1.44 (1.22) and 1.52 (1.25), respectively, whereas the prevalence of regular binge eating in the different samples was 9.8% and 10.6%, respectively.

Descriptive statistics

Of the total sample of 1899 women, 573 (30.2%) were classified as healthy controls, 194 (10.2%) were classified as obese controls and 115 (6.1%) were classified as probable BED cases. Among

participants in the probable BED subgroup, 37 (32.2%) overvalued their weight or shape while the remaining 78 participants (67.8%) did not have overvaluation.

The demographic characteristics of participants are given in Table 1. As can be seen, the study subgroups differed with respect to age ($F_{(3,878)} = 11.51, p < .05$), BMI ($F_{(3,874)} = 747.75, p < .05$), marital status, child status, and educational attainment (all $p < 0.05$), whereas there were no differences between groups with respect to language spoken at home, country of birth, employment status, and annual income (all $p > .05$).

Main analysis

Results of the ANOVA are shown in Table 2. As can be seen, significant differences between groups were observed on all five-outcome variables. Post hoc tests with Bonferroni correction indicated, first, that women with BED who overvalued their weight or shape scored significantly higher on the EDE-Q revised global score and K-6 and lower on measures of satisfaction with life, social support, and social integration than women with BED in the absence of overvaluation (all $p < .05$); and second, that there were no significant differences between individuals with BED in the absence of overvaluation and obese controls on any of these measures (all $p > .05$). Participants with BED in the absence of overvaluation had significantly higher scores than healthy controls on the EDE-Q revised global score and K-6 (both $p < .05$), whereas there were no significant differences between these groups on measures of social support, satisfaction with life and social integration (all $p > .05$).

Additional analysis

Three sets of additional analyses were conducted. First, in view of the violation of the assumption of homogeneity of variance for some outcome measures, the analysis was repeated using rank-ordered data (Winer, 1971). The only changes to the findings were that the difference between probable BED without overvaluation and obese controls on the K-6 reached significance ($p < .05$) whereas the difference between probable BED with overvaluation and obese controls with respect to social support was no longer significant ($p > .05$).

Second, in view of the between-group differences in age, BMI, and certain demographics characteristics (Table 1), the analysis was repeated using analysis of covariance to control for these differences. The only changes to the findings were that the differences between obese controls and healthy controls on measures of social support and satisfaction with life were no longer significant ($p > .05$).

Finally, the analysis was repeated using an alternative, more stringent operational definition of the 'obese controls', namely, participants who were obese and who reported neither regular binge eating, nor regular extreme weight-control behaviours, nor overvaluation (Grilo et al., 2010). When using this more stringent definition, the difference between participants with probable BED in the absence of overvaluation and obese controls on the K-6 reached statistical significance ($p < .05$). Otherwise the findings were unchanged.

Discussion

Summary of main findings

We compared subgroups of women with a probable diagnosis of BED, namely, those with and without the overvaluation of weight or shape, on measures of eating disorder psychopathology, general psychological distress, and psychosocial functioning. Subgroups of obese controls

Table 1. Demographic characteristics of participants by study subgroup: probable BED with overvaluation; probable BED without overvaluation; obese control; normal-weight no reported binge eating ('healthy controls').

	Probable BED with overvaluation (<i>n</i> = 37)		Probable BED without overvaluation (<i>n</i> = 78)		Obese control (<i>n</i> = 194)		Healthy control (<i>n</i> = 573)		<i>F</i>	<i>P</i>
	Mean (SD)	%	Mean (SD)	%	Mean (SD)	%	Mean (SD)	%		
Age	32.16 (7.49)		30.56 (8.05)		35.36 (7.31)		31.87 (7.96)		11.51	<0.05
BMI	29.89 (6.27)		26.29 (5.60)		35.25 (5.11)		22.22 (1.43)		747.75	<0.05
		%		%		%		%	χ^2	<i>P</i>
<i>Language at home</i>										
English	94.6		82.1		90.2		88.7			
Not English	5.4		17.9		9.8		11.3		5.15	.16
<i>Country of birth</i>										
Australia	94.6		87.2		88.7		84.4			
Not Australia	5.4		12.8		11.3		15.6		4.67	.20
<i>Children</i>										
Yes	54.1		47.4		62.9		49.0			
No	45.9		52.6		37.1		51.0		12.06	<0.05
<i>Marital status</i>										
Never married	37.8		46.2		26.3		37.6			
Married or living as married	51.4		48.7		67.0		56.1			
Separated/divorced or widowed	10.8		5.1		6.7		6.3		13.63	<0.05
<i>Highest level of education achieved</i>										
10 years or less	13.5		13.0		24.6		10.7			
12 years	35.1		28.6		22.0		23.7			
Trade certificate or diploma	18.9		29.9		27.2		22.5			
Bachelor's or higher degree	32.4		28.6		26.2		43.1		38.46	<0.05
<i>Current employment status</i>										
Employed full-time	45.9		42.3		41.7		46.0			
Employed part-time or casually	27.0		34.6		34.4		37.4			
Unemployed and looking for work	8.1		6.4		4.2		2.1			
Not in the paid labour force	18.9		16.7		19.8		14.5		12.84	.17
<i>Personal annual income</i>										
Less than \$15,000	36.1		26.3		27.4		25.1			
\$15,000–35,000	16.7		35.5		38.4		30.9			
\$35,000–70,000	36.1		31.6		30.0		33.5			
More than \$70,000	11.1		6.6		4.2		10.5		14.85	.10

Table 2. Mean (SD), age, BMI and scores on measures of eating disorder psychopathology (EDE-Q revised global score), social integration, life satisfaction (SWLS), social support (MOS-SSS) and general psychological distress (K-6) by study subgroup: probable BED with overvaluation; probable BED without overvaluation; obese control; normal-weight no reported binge eating ('healthy control').

	Probable BED with overvaluation (n = 37)	Probable BED without overvaluation (n = 78)	Obese control (n = 194)	Healthy control (n = 573)	F	p	Partial η^2	Post hoc ^{a,b}
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)				
EDE-Q (revised) global score	3.54 (0.14)	1.77 (0.10)	1.82 (0.07)	0.88 (0.04)	165.07	<0.05	.372	1 > 2, 3 > 4
Social integration	6.73 (0.46)	8.69 (0.32)	8.00 (0.22)	8.47 (0.12)	5.60	<0.05	.020	1 < 2, 4
SWLS	14.97 (0.69)	17.69 (0.47)	16.76 (0.30)	18.74 (0.17)	18.39	<0.05	.059	1 < 2, 4; 3 < 4
MOS-SSS	68.42 (2.44)	81.35 (1.68)	76.14 (1.07)	81.47 (0.62)	13.85	<0.05	.045	1 < 2, 3, 4; 3 < 4
K-6	8.35 (0.65)	5.69 (0.44)	4.70 (0.28)	4.23 (0.16)	15.00	<0.05	.049	1 > 2, 3, 4; 2 > 4

^aSignificance of post hoc tests following Bonferroni adjustment for multiple comparisons ($\alpha=0.05$).

^bPost hoc tests: 1 = probable BED with overvaluation; 2 = probable BED without overvaluation; 3 = obese control; 4 = healthy control.

(women who were obese but did not report binge-eating episodes) and healthy controls (women who were neither obese nor engaging in binge eating) were included for comparative purposes. The main findings were twofold. First, women with BED who overvalued their weight or shape had significantly higher levels of eating disorder psychopathology and general psychological distress, and significantly poorer life satisfaction, social integration, and social support, than those who did not overvalue their weight or shape. Second, in the main analyses, no significant differences were found between women with probable BED in the absence of the overvaluation and obese controls on any of these measures. Women with probable BED in the absence of overvaluation had higher levels of eating disorder psychopathology and general psychological distress than healthy controls, whereas these groups did not differ on measures of life satisfaction, social integration, or social support.

Study implications

The finding that women with probable BED who overvalued their weight or shape had significantly higher levels of eating disorder psychopathology, distress, and disability than those who did not was expected. Among individuals who report regular binge eating in the absence of regular extreme weight-control behaviours, the presence of overvaluation has consistently been found to indicate a more severe disorder (Grilo, 2013; Mond, 2013). The present findings can be seen to provide further evidence for the role of overvaluation in indicating disorder severity among individuals with BED and sub-threshold variants of BED and, in turn, the need for recognition of this distinction in classification schemes.

The inclusion of comparison groups of obese controls and healthy controls in the present study permitted consideration of the related issue of the clinical significance of BED in the absence of overvaluation. The finding that participants with a probable diagnosis of BED in the absence of overvaluation did not differ from obese controls on any of the study measures, or from healthy controls on measures of social integration, satisfaction with life or social support, is consistent with a previous Australian community-based study (Mond et al., 2006). These findings call into question the clinical significance of BED and variants of BED in the absence of overvaluation.

Two other community-based studies have yielded somewhat different findings in this regard. Grilo et al. (2010) found that women with probable BED in the absence of overvaluation had higher levels of eating disorder psychopathology than overweight individuals reporting no binge eating. A limitation of this study, however, is the lack of assessment of psychosocial functioning or impairment, given higher levels of eating disorder symptoms among overweight individuals who binge eat, when compared to those who do not binge eat, would be expected. Furthermore, Grilo and colleagues used a more stringent operational definition of 'obese controls' in their research, namely, overweight (BMI > 25) in the absence not just of binge eating but of any eating disorder features – binge eating, purging, and overvaluation. Given the known associations between eating disorder features and psychosocial impairment (Mond & Hay, 2007), and the inclusion of overweight (BMI > 25), rather than only obese (BMI > 30) participants, this latter definition would have the effect of maximising differences between the probable BED without overvaluation and the 'obese control' subgroups. In the current study, a previously non-significant difference between these subgroups with respect to levels of general psychological distress became significant when the analysis was repeated using the more stringent operational definition of obese controls employed by Grilo and colleagues.

In the only other community-based study to address this issue that we are aware of, Goldschmidt et al. (2010) found that women with BED in the absence of overvaluation had marked impairment in certain aspects of psychosocial functioning. However, this finding is difficult to

interpret since neither an obese control nor healthy control was included in this study. At the very least, the current findings, when taken with those of Mond et al. (2006), suggest that the clinical significance of eating disorders characterised by recurrent binge eating without recurrent extreme weight-control behaviours and overvaluation warrants further consideration.

Although the present findings provide further evidence for the role of overvaluation in indicating disorder severity among individuals with BED and sub-threshold variants of BED, exactly how this role might be recognised in classification schemes is unclear (Grilo, 2013; Mond, 2013). One option would be to include overvaluation as a diagnostic criterion for BED (Mond et al., 2006). This would have the effect of minimising 'false positive' diagnoses (First, 2010; Wakefield, Schmitz, First, & Horwitz, 2007) while also bringing the diagnosis of BED into line with those of anorexia nervosa and BN (Hay, 2013). A second option would be to include overvaluation as a diagnostic specifier for BED (Goldschmidt et al., 2010; Grilo et al., 2010). While still serving to indicate disorder severity and facilitate treatment planning, this option would have the effect of minimising 'false negative' diagnoses. The relative merits of these different approaches also warrant greater consideration (Mond, 2013).

Study limitations and other methodological considerations

The current study has several strengths, including the recruitment of participants from a general population sample, the inclusion of comparison groups of an obese control and healthy control, and the inclusion of several different measures of psychosocial functioning. Nevertheless, several limitations of the current study need to be considered when interpreting the findings.

First, participation rates were low and little information was available concerning the characteristics of non-respondents. However, comparison of the characteristics of study participants with normative sample did not suggest any biases in terms of levels of eating disorder psychopathology.

Second, as in Mond et al.'s (2006) study, probable BED cases were identified by means of self-report assessment of binge eating. Since the occurrence and/or frequency of binge eating may be over-estimated when using self-report assessment (Fairburn & Beglin, 1994; Mond et al., 2004), it is possible that probable BED cases in the current study were 'mild'. Furthermore, the use of self-report assessment dictated a time frame for the assessment of regular binge eating of one month, as opposed to the three-month duration specified in the DSM-5 (APA, 2013). The comparatively high proportion of participants classified as BED without overvaluation in the current study might reflect, in part, these considerations. Nevertheless, findings of the present study were strikingly similar to those of Mond et al.'s (2006) study, in which a twice-per-week threshold for binge eating was employed in identifying probable BED cases.

Third, there was no assessment of certain additional criteria for BED specified in the DSM-5, namely, the occurrence of three or more of five possible behavioural indicators of binge eating (eating rapidly, eating until uncomfortably full, eating alone, eating when not hungry, and guilt and disgust following binge eating) and the presence of marked distress associated with binge eating, in the current study. However, these criteria are typically not used for research purposed because their validity is unclear (Grilo & White, 2011; Mond et al., 2013; Striegel-Moore & Franko, 2008).

Fourth, as in previous community-based studies, only women were included in the current study. Given that binge eating may be nearly as common in men as in women (Hay, Mond, Buttner, & Darby, 2008; Striegel, Bedrosian, Wang, & Schwartz, 2012), it will be important to include males in future research addressing the prevalence and correlates of BED with and without overvaluation.

Fifth, and also as in previous studies, the cross-sectional design of the current study limits the impact of the findings. The use of a prospective study design in future research would permit, for example, consideration of the role of overvaluation in predicting outcome among individuals with BED and variants of BED and the occurrence and extent of crossover between subgroups of participants with and without overvaluation. Recent studies in clinical samples have begun to address these issues (Masheb & Grilo, 2008; Ojserkis, Sysko, Goldfein, & Devlin, 2012). Ideally, research in both community and clinical settings, employing both cross-sectional and longitudinal study designs, would be conducted.

Finally, we note that research addressing the status of overvaluation in relation to the diagnosis of BED has, thus far, been largely if not entirely confined to samples drawn from USA and Australian populations (Goldschmidt et al., 2010; Grilo et al., 2010; Mond et al., 2006). Research from European and non-Western nations would therefore be a welcome addition to the field.

Conclusion

The present findings provide further evidence for the role of overvaluation in indicating disorder severity among individuals with BED and variants of BED and, in turn, the need for recognition of this distinction in classification schemes. The relative merits of different possible ways to achieve this recognition may warrant greater consideration.

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Chapter Four

Generic and Eating Disorder-Specific Impairment in Binge Eating Disorder with and without Overvaluation of Weight or Shape

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Introduction

Study one's findings indicate additional evidence for the role of overvaluation in indicating disorder severity in the diagnosis of BED. The study compared subgroups of adult women with a probable diagnosis of BED in the presence and absence of overvaluation on measures of eating disorder psychopathology, general distress and psychosocial functioning. Findings indicate that women with probable BED and overvaluation have significantly greater eating disorder psychopathology, distress and impairment than individuals with BED in the absence of overvaluation. The unique finding of the study was such that in addition, BED in the absence of overvaluation did not differ significantly on measures of psychopathology or impairment to an obese comparison of individuals who did not report binge eating. These findings question the clinical significance of BED in the absence of overvaluation.

However, prior to any substantial conclusions, a primary limitation exists in that the study relied solely upon generic measures of impairment. This is of concern given that such measures may not adequately assess and describe the nature and extent of impairment experienced by individuals with BED. Specifically, it has been suggested such measures may not be sensitive enough to the nature and extent of disease specific impairment experienced by individuals with eating disorders. Thus, it may be that low levels of impairment observed in individuals with BED in the absence of overvaluation may reflect, in part, the use of measures insufficiently sensitive to the type of impairment experienced by these individuals. Therefore any conclusions around the clinical significance of this group would be premature.

In light of this, study two sought to address limitations of study one through utilising measures of both disease specific (eating disorder) measures of impairment and generic health related quality of life measures. The study maintained the strengths of

study one, utilising a community-based sample and appropriate comparison groups in a sample of adult women with probable BED. It aimed to compare adults with BED with and without overvaluation on both generic and disease-specific measures of psychosocial impairment.

Abstract

Objective. We sought to elucidate the nature and extent of impairment in quality of life among individuals with binge eating disorder (BED) with and without the overvaluation of weight or shape (“overvaluation”). **Method.** Subgroups of women - probable BED with overvaluation (n = 102), probable BED without overvaluation (n = 72), obese individuals reporting no binge eating (“obese control”, n = 40), and “normal weight” individuals reporting no binge eating (“healthy control,” n = 40) - were recruited from a community-based sample in which individuals with eating disorder symptoms were over-represented. They were compared on measures of eating disorder psychopathology and generic and disease-specific measures of quality of life. Scores on these measures among individuals with BED receiving specialist treatment were also considered. **Results.** Participants with BED and overvaluation had high levels of eating disorder psychopathology and impairment in both generic and disease-specific quality of life, comparable to those of BED patients receiving specialist treatment, and significantly higher than all other subgroups, whereas participants with BED in the absence of overvaluation did not differ from obese controls on any of these measures. **Conclusion.** The findings provide further evidence for the need to consider reference to overvaluation among the diagnostic criteria for BED. The relative merits of the inclusion of overvaluation as a diagnostic criterion or as a diagnostic specifier for BED warrant greater consideration.

Key words: Binge eating disorder; diagnostic criteria, quality of life

Generic and Eating Disorder-Specific Impairment in Binge Eating Disorder with and without Overvaluation of Weight or Shape

In recent years, concerns have been expressed about the lack of reference to the overvaluation of weight and/or shape (“overvaluation”), or a similar cognitive criterion, among the diagnostic criteria for binge eating disorder (BED) (Grilo, 2013). These concerns are based on evidence, from both community and clinical samples, that: (i) individuals with BED or variants of BED who overvalue their weight or shape report high levels of eating disorder and comorbid psychopathology (Goldschmidt et al., 2010; Grilo et al., 2008; Grilo, Masheb, & White, 2010; Mond, Hay, Rodgers, & Owen, 2007a); and (ii) BED in the absence of overvaluation does not appear to be associated with clinically significant levels of distress and disability (Harrison, Mond, Rieger, Hay, & Rodgers, 2014; Mond et al., 2007a). Further, the lack of a cognitive criterion for BED means that criteria for this diagnosis are at odds with those of other eating disorder diagnoses (American Psychiatric Association [APA], 2013). For these reasons, it has been suggested that overvaluation should be included as either a diagnostic criterion, or severity specifier, for BED (Grilo, 2013; Mond, Star, & Hay, 2013). Neither of these options were adopted in DSM-5, presumably because the available evidence was not considered to be sufficiently compelling by the Eating Disorders Work Group (Mond, 2013).

A limitation of existing research concerning the status of BED with and without overvaluation is the failure to adequately describe the nature of the impairment within the respective subgroups (Grilo et al., 2009, 2010). Studies examining impairment in psychosocial functioning associated with BED with and without overvaluation have, thus far, relied on generic measures of health-related quality of life (Harrison et al.,

2014; Mond et al., 2007a). These measures assess key areas of the individual's functioning likely to be impacted by ill-health, such as their physical, emotional, social, and occupational functioning, without reference to the particular condition or disease that is causing the ill-health (Frisch, 1999). They provide a simple, tangible assessment of the impact of ill-health on individuals' quality of life and as such, are routinely used as an outcome measure among individuals treated for mental health problems, including eating disorders (Mond, Owen, Hay, Rodgers, & Beumont, 2005; Spitzer, Kroenke, Linzer et al., 1995).

However, a concern with the use of generic quality of life measures is that they may not be sufficiently sensitive to the sorts of impairment uniquely associated with particular health problems. For this purpose, disease-specific quality of life measures, which assess the impact of specific health or disease states on role functioning, may be more appropriate (Frisch, 1999). In the eating disorders field, as in other fields of clinical research, several disease-specific measures of quality of life have been developed (Engel, Adair, Las Hayas, & Abraham, 2009). It has been proposed that these measures should be employed instead of, or in addition to, generic measures for monitoring and outcome assessment purposes, although evidence for the putative superiority of eating-disease-specific measures is thus far limited (Mitchison et al., 2013).

In the context of research addressing impairment among individuals with BED, reliance on generic quality of life measures may be problematic because it may lead to erroneous conclusions concerning the clinical significance of participant subgroups. In particular, it is possible that the comparatively low levels of impairment observed among individuals with BED in the absence of overvaluation may reflect, in part, the use of measures that are insufficiently sensitive to the types of impairment affecting

these individuals' lives. If so, then the conclusion that BED in the absence of overvaluation is not "clinically significant" due to its lack of association with elevated impairment may be premature. Including both generic and disease-specific measures of quality of life in research examining the correlates of BED with and without overvaluation would make it possible to address this concern, while also providing more detailed information concerning the nature of the impairment experienced by individuals in both subgroups.

The goal of the current study was, therefore, to compare individuals with a probable BED diagnosis with and without overvaluation on measures of eating disorder psychopathology and both generic and disease-specific measures of quality of life. As in our previous research (Harrison et al., 2014; Mond et al., 2007a), we chose to recruit participants for the BED subgroups from a community-based, rather than a treatment-seeking, sample, since only a minority of individuals with bulimic-type eating disorders receive treatment for an eating problem and impairment in psychosocial functioning is strongly predictive of whether such treatment is received (Mond et al., 2009; Mond, Hay, Rodgers, & Owen, 2007b). Also as in previous research conducted by the authors (Harrison et al., 2014; Mond et al., 2007a), subgroups of obese individuals who did not report binge eating ("obese controls") and individuals who were neither obese nor reported binge eating ("healthy controls") were included for comparative purposes. The inclusion of an obese control group was important given individuals with BED are frequently obese and in women specifically, obesity is associated with distress and functional impairment independent of binge eating (Dingmans & van Furth, 2012; Mond, Hay, Rodgers, & Owen, 2009). Additionally, given the current study compared individuals with a probable diagnosis of BED, a further comparison group comprising of individuals with BED receiving specialist treatment was included. The inclusion of

both the healthy control and BED patients receiving specialist treatment allowed for the issue of the clinical significance of BED with and without overvaluation could more specifically be addressed.

Based on findings from previous, population-based studies (Grilo et al, 2010; Harrison et al., 2014; Mond et al., 2007a), we hypothesized: first, that individuals with probable BED and overvaluation would have significantly higher levels of eating disorder psychopathology and significantly greater impairment on both quality of life measures, than individuals with probable BED in the absence of overvaluation. In view of inconsistency among existing evidence, there were no other a priori hypotheses.

Method

Study design and participants

Participants included 748 women aged 18 to 79 years ($M = 40.23$ $SD = 14.39$) recruited from two main sources, namely: (i) the websites and social media channels of Non-Government organizations likely to have an interest in women's eating and/or weight-related health problems (29.4% of the sample); and ii) Australian newspapers within the Australian Capital Territory (ACT) and the (two largest Australian) states of New South Wales and Victoria (69.8% of the sample).

For the recruitment of participants via the internet, potentially relevant health organizations were first identified via Google and Facebook searches using the following key words: 'obesity', 'diabetes', 'type two diabetes', 'weight loss', 'eating disorders' and 'women's health'. Terms were then further specified through combining the key words with 'Australia' and each of the Australian states/territories. For each organization identified, the administrators of Facebook groups and/or relevant contacts were approach with a request to advertise the study, including a link to the online

survey, via their website, social media channels, and/or email to members/clients. Of the 69 organizations approached, 18 (26%) agreed to participate.

For the recruitment of participants via newspapers, an online listing of Australian newspapers (newspapers.com.au) was used to identify newspapers in the selected geographical areas, which were then approached via email and/or phone. The approach included information about the study and a request to promote the study, including a link to the online survey, by means of: (i) a community notice (either in print or on their Facebook page); (ii) a letter to the Editor; or (iii) a news story. Newspapers not approached included those for which online contact details were not available and those that catered for specific cultural or religious groups. Of a total of 437 newspapers approached, 136 (30.8%) agreed to promote the study in one or more of the forms mentioned above.

The online survey, which utilised the Qualtrics survey software package, was anonymous and took approximately 30 minutes to complete. It included measures of eating disorder features, generic and eating disorder disease-specific measures of health-related quality of life, height and weight, and basic demographic information. All participants were offered the chance to enter a draw to win one of three \$100 gift vouchers. The study was approved by the Australian National University Human Research Ethics Committee (2013/027).

Of 748 questionnaires that were initiated, data for 122 participants who had unacceptably high levels of missing data (failure to complete all items of one or more of the key study measures) were excluded. Participants in the current study were the remaining 626 women. Missing data was minimal among these participants (< 0.01% for all variables). No significant differences were observed between respondents who were excluded or retained on any of the demographic characteristics assessed as

outlined below (all $p > .05$), with the exception that respondents who were excluded were older than study participants ($t_{(746)} = 3.25, p < .05$).

Measures

Demographic characteristics

Demographic characteristics assessed included: age; first language (English, not English); country of birth (Australia, not Australia); possession of private health insurance (no, yes); and residential post-code. Based on participants' postal code, their state/territory of residence and Socio-Economic Indexes for Areas (SEIFA) decile were determined (Australian Bureau of Statistics, 2013a). SEIFA is a measure developed by the Australian Bureau of Statistics, where residential areas are assigned an index indicating relative socioeconomic advantage/disadvantage for that area, indices are then ranked and areas of residency allocated a decile allowing comparison across Australia (Australian Bureau of Statistics, 2013a, 2013b).

Eating Disorder Examination Questionnaire (EDE-Q)

The EDE-Q is a 36-item self-report measure of eating disorder features that focuses on the past 28 days (Fairburn & Beglin, 1994; Fairburn & Beglin, 2008). It consists of 22 items assessing core attitudinal eating disorder features, namely, restraint, eating concern, weight concern, and shape concern. Scores on these items range from "0" to "6", with higher scores indicating higher symptom levels (Fairburn & Beglin, 1994; Fairburn & Beglin, 2008). Item scores may be averaged to create a global score that indicates overall levels of eating disorder psychopathology. Remaining items of the EDE-Q assess the occurrence and frequency of specific eating disorder behaviors over the previous 28-day period, namely, binge eating, purging (self-induced vomiting and/or laxative misuse) and excessive exercise. Since the assessment of extreme dietary

restriction is not included among these items, an item from the restraint subscale, namely, “On how many days (in the past 28 days) have you gone for long periods of time (i.e., 8 or more waking hours) without eating anything at all in order to influence your shape or weight?”, was used for this purpose (Mond, Hay, Rodgers, & Owen, 2006).

The items comprising the EDE-Q global score have been found to have high internal consistency, test-retest reliability, and convergent validity, in various study populations (Berg, Peterson, Frazier, & Crow, 2012; Mond, Hay, Rodgers, Owen, & Beumont, 2004a). Cronbach’s alpha for the global score in the current study was .83. The reliability and validity of self-report assessment of the occurrence and/or frequency of eating disorder behaviors is lower and more variable. In particular, the occurrence and/or frequency of binge eating may be over-estimated when using self-report assessment (Berg et al, 2012; Mond et al, 2004a).

Medical Outcomes Study (12-item) Short-Form (SF-12)

The SF-12 is a generic, 12-item, self-report measure of impairment in role functioning associated with physical and mental health impairment developed from the original (36-item) measure (SF-36) (Ware, Kosinski, & Keller, 1996; Windsor, Rodgers, Butterworth, Anstey, & Jorm, 2006). Item response options are variable, some being dichotomous, others using a 3, 5 or 6-point likert-type scale. Scores on each of two subscales, measuring physical (Physical Component Summary scale; PCS) and mental (Mental Component Summary scale; MCS) health impairment, respectively, are derived from relevant items. Scores on these scales are standardized so as to have a mean of 50.0 and standard deviation of 10.0, with lower scores indicating greater impairment (Ware et al., 1996). In the current study, scale scores were derived using the RAND scoring method (Windsor et al., 2006), which allows for correlations between

factor scores. Example items for the PCS include, “During the past four weeks, were you limited in the kind or work or other activities undertaken as a result of your physical health?”, and for the MCS, “During the past four weeks have you accomplished less than you would like as a result of any emotional problems?” The SF-12 has been found to have very good psychometric properties in both clinical and community samples (Mond et al., 2004; Sanderson & Andrews, 2002; Ware et al., 1996). MCS scores of 40 or less have been taken to indicate moderate impairment in mental health, whereas MCS scores of 30 or less have been taken to indicate severe impairment in mental health (Sanderson & Andrews, 2002). Cronbach alpha’s for the PCS, MCS and total score in the current study were 0.77, 0.80 and 0.83 respectively.

Clinical Impairment Assessment (CIA)

The CIA is a 16-item, self-report measure of impairment in role functioning associated with eating disorder symptoms (Bohn & Fairburn, 2008; Bohn et al., 2008). Items assess the extent to which eating disorder symptoms are perceived to cause impairment in each of three domains, namely, personal, cognitive, and social, during the past 28 days. Despite this, only a global score, is calculated via the sum of scores on all 16 items, since the measure was intended to provide a single index of eating-disorder-related impairment (Bohn & Fairburn, 2008; Bohn et al., 2008). Scores on each item range from “0” (“not at all”) to “3” (“a lot”), so that total scores range from “0” to “48”, with higher scores indicating higher levels of impairment. All items begin with the phrase: “Over the past 28 days, to what extent have your eating habits, exercising or feelings about your eating, shape or weight...”. Specific areas of impairment are then specified, for example, “...made it difficult to concentrate?” and “...affected your work performance?” The CIA has been found to have good psychometric properties, including sensitivity to change and predictive validity (Bohn et al., 2008). Findings

from this research suggest that a global score of 16 or greater indicates the presence of an eating disorder (Bohn et al., 2008). A mean, score of 8.25 ($SD = 9.35$) in the general population has recently been reported (Welch, Birgegård, Parling, & Ghaderi, 2011). Cronbach's alpha for the global score in the current study was .95.

Creation of study subgroups

Probable cases of BED were identified according to relevant items of the EDE-Q, i.e. episodes of binge eating, defined as episodes of overeating in which an unusually large amount of food was consumed and a sense of loss of control over eating was experienced, that occurred, on average, at least weekly over the past 28 days (APA, 2013; Harrison et al., 2014). These episodes needed to occur in the absence of “regular extreme weight-control behaviors”. A conservative threshold of twice per month was used to define this term so as to clearly distinguish probable cases of BED from individuals with a sub-threshold form of BN (Cooper & Fairburn, 2003; Harrison et al., 2014). Thus, regular purging was defined as self-induced vomiting or misuse of laxatives or diuretics as a means of controlling weight or shape at least twice in the past 28 days; regular extreme dietary restriction was defined as going for long periods (8 or more waking hours) without eating anything at all as a means of controlling weight or shape more than 1–5 times in the past 28 days; and regular excessive exercise was defined as exercising in a ‘driven’ or ‘compulsive’ way as a means of controlling weight or shape at least twice in the past 28 days. In the absence of interview assessment of binge eating and other eating disorder features, the term “probable BED cases” is used in preference to “individuals with BED”. Overvaluation was assessed using the two EDE-Q items that specifically assess this construct, namely, “Over the past four weeks, how much has your *weight* influenced how you think about (judge) yourself as a person?” (“importance of weight”) and “Over the past four weeks, how

much has your *shape* influenced how you think about (judge) yourself as a person?” (“importance of shape”). Consistent with previous research in community-based samples (Grilo et al., 2010; Harrison et al., 2014; Mond et al, 2007a), participants who scored 5 or 6 on either (or both) of these items, indicating that their self-evaluation was influenced by their weight or shape “markedly” (“6”) or “more than moderately but less than markedly” (“5”), were considered to have overvaluation (the EDE-Q items assessing overvaluation were omitted when calculating the EDE-Q global score so as to create a “revised” global score for use in between-group comparisons). Obese controls were participants who had a body mass index (BMI, kg/m^2) ≥ 30.0 (Flegal, Carroll, Kit, & Ogden, 2012) and who reported *no* binge eating episodes over the past 28 days. Healthy controls were participants with a BMI in the “normal weight” range for adults ($18.5 \leq \text{BMI} < 25.0$) who reported no binge eating episodes and no regular extreme weight-control behaviors in the past 28 days. BMI was derived from participants’ self-reported height and weight (Mond et al, 2004a). Participants who were underweight (BMI < 18.5) or who were within healthy weight range but reported extreme weight-control behaviors were excluded from the analysis. Of the total sample of 626 women, 40 were classified as healthy controls, 40 were classified as obese controls, and 174 were classified as probable BED cases. Of the latter, 102 (58.6%) overvalued their weight or shape; the remaining 72 participants (41.4%) did not report overvaluation.

Clinical sample

Data for each study measure for individuals with BED receiving specialist treatment (for an eating disorder) were included for comparative purposes. EDE-Q and CIA data for BED patients ($n = 205$) were derived from Welch and colleagues (2011) study of individuals receiving treatment at one of 26 eating disorder care units in

Sweden (Welch, Birgegård, Parling, & Ghaderi, 2011). Data for the SF-12 were derived from individuals (n= 10) referred to the ACT Eating Disorders Day Program (Mond, Hay, Rodgers, Owen, & Beumont, 2005; Mond et al, 2007a).

Statistical analysis

Complete case analysis (list-wise deletion of missing values) was employed in all analysis. One-way, between-groups analysis of covariance (ANCOVA) was used to compare scores on measures of eating disorder psychopathology (revised EDE-Q global score), generic quality of life (SF-12; PCS, MCS), and eating-disorder-specific quality of life (CIA), between study subgroups as outlined above, controlling for between-groups differences in demographic characteristics. Post-hoc tests were used to identify the source of any significant *F* values. A significance level of .05 was used for all tests, all tests were two-tailed and all analysis was conducted using the IBM SPSS statistical software package (version 20.0).

Results

The demographic characteristics of study participants, by group, are shown in Table 1. As can be seen, study groups differed with respect to age, BMI, first language, country of birth, socio-economic status as measured by the SEIFA, and state/territory of residence (all $p < .05$). Results of the ANCOVA are summarised in Table 2. As can be seen, there were significant differences between groups on all outcome measures. Post-hoc tests indicated that:

- (i) For the (revised) EDE-Q global score, women with BED and overvaluation had higher scores than participants in all other groups, whereas scores on this measure did not differ between the BED without overvaluation and the obese

control subgroups. Healthy control participants had lower EDE-Q scores than participants in all other groups.

- (ii) For the SF-12, women with BED with overvaluation had lower scores (indicating greater physical-health-related impairment) than BED without overvaluation, obese and healthy control participants, while scores did not differ between any of the other subgroups. This was the case for both PCS and MCS subscales.
- (iii) For the CIA, participants with BED and overvaluation had higher scores than all other groups whereas scores on this measure did not differ between the BED without overvaluation and the obese control subgroups. Healthy control participants had lower scores on the CIA than participants in all other groups.

As is also apparent in Table 2, scores on the EDE-Q and CIA were markedly elevated among participants in the BED with overvaluation subgroup, comparable to those of individuals with BED receiving specialist treatment, whereas scores on these measures among participants with BED in the absence of overvaluation were similar to those of obese control participants. Marked, clinically significant impairment in mental health (as measured by the SF-12 MCS), was similarly observed among participants in the BED with overvaluation subgroup, whereas scores on the SF-12 MCS among participants with BED in the absence of overvaluation were intermediate between the BED with overvaluation and obese control subgroups.

Table 1: Demographic characteristics of participants by study subgroup: probable BED with overvaluation; probable BED without overvaluation; obese non-binge eaters (obese controls); normal-weight non-binge eaters (healthy controls).

	Probable BED with overvaluation (n=102)	Probable BED without overvaluation (n=72)	Obese control (n=40)	Healthy control (n=40)	F	p
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
Age	44.71 (13.90)	41.25 (14.36)	48.63 (14.12)	36.30 (11.84)	6.29	.000
BMI	34.92 (10.37)	31.42 (9.08)	39.27 (10.22)	21.58 (1.81)	29.03	.000
	%	%	%	%	χ^2	p
First Language						
English	99.0	91.7	100.0	90.0		
Not English	1.0	8.3	0.0	10.0	10.46	.015
Country of Birth						
Australia	90.2	93.1	72.5	75.0		
Not Australia	9.8	6.9	27.5	25.0	14.39	.002
Private Health Cover						
Yes	60.8	72.2	57.5	62.5		
No	39.2	27.8	42.5	37.5	3.33	.344
SEIFA DECILE ^(a)						
1	3.0	9.9	10.0	0.0		
2	5.9	7.0	2.5	7.5		
3	10.9	4.2	15.0	0.0		

Table 1 (continued): Demographic characteristics of participants by study subgroup: probable BED with overvaluation; probable BED without overvaluation; obese non-binge eaters (obese controls); normal-weight non-binge eaters (healthy controls).

SEIFA DECILE ^(a)	Probable BED with overvaluation (n=102)		Probable BED without overvaluation (n=72)		Obese control (n=40)		Healthy control (n=40)		χ	P
	%		%		%		%			
4	15.8	9.9	10.0	5.0						
5	4.0	1.4	2.5	0.0						
6	8.9	9.9	15.0	0.0						
7	3.0	7.0	0.0	0.0						
8	3.0	4.2	5.0	0.0						
9	18.8	23.9	20.0	22.5						
10	26.7	22.5	20.0	65.0					54.83	.001
Home State										
ACT	27.7	38.0	37.5	82.5						
NSW	56.4	40.8	50.0	15.0						
VIC	10.9	15.5	10.0	0.0						
QLD	1.0	1.4	2.5	2.5						
SA	3.0	1.4	0.0	0.0						
NT	1.0	1.4	0.0	0.0						
TAS	0.0	1.4	0.0	0.0					45.78	.000

^(a) Socio-Economic Indexes for Areas (SEIFA) decile (Australian Bureau of Statistics, 2013a)

Table 2: Mean (SE) scores on measures of eating disorder psychopathology and generic and eating-disorder-specific quality of life by study subgroup controlling for demographic characteristics (age, first language, country of birth, socio-economic status and home state).

	BED Patients ^{(d)(e)}	Probable BED with overvaluation (n= 102) (1)	Probable BED without overvaluation (n= 72) (2)	Obese Control (n= 40) (3)	Healthy Control (n=40) (4)	Mean (SE)	F	p	Effect size ^(f)	Post hoc
EDE-Q ^(a)	3.89 (1.04) ^(d)	3.61 (.09)	2.42 (.11)	2.64 (.15)	.97 (.15)	76.67	.000	.49	1 > 2, 3 > 4	
SF-12 PCS ^(b)	40.18 (13.11) ^(e)	38.68 (1.03)	45.78(1.25)	46.27 (1.69)	49.74 (1.72)	13.39	.000	.14	1 < 2, 3, 4	
SF-12 MCS ^(b)	30.36 (7.96) ^(e)	33.53 (.92)	36.88 (1.23)	41.00 (1.90)	41.65 (2.32)	6.59	.000	.10	1 < 2, 3, 4	
CIA ^(c)	28.50 (9.28) ^(d)	25.42 (.86)	12.13 (1.04)	12.72 (1.41)	2.87 (1.43)	72.50	.000	.47	1 > 2, 3 > 4	

^(a) Eating Disorder Examination Questionnaire (EDE-Q) global score (Fairburn & Beglin, 2008).

^(b) Medical Outcomes Study (12-item) Short-Form (SF-12) Physical (PCS) and Mental (MCS) component summary scales (Ware et al., 1996).

^(c) Clinical Impairment Assessment (CIA) (Bohn et al., 2008).

^(d) BED patients data for Eating Disorder Examination Questionnaire (EDE-Q) and Clinical Impairment Assessment (CIA) (Welch et al., 2011).

^(e) BED patients data for Medical Outcomes Study (12-item) Short-Form (SF-12) Physical (PCS) and Mental (MCS) component summary scales (Mond et al., 2005).

^(f) Partial eta squared

Discussion

Summary of main findings

We compared subgroups of women with a probable diagnosis of BED with and without overvaluation, obese women who did not engage in binge eating, and women in the normal weight range who did not engage in binge eating, on measures of eating disorder psychopathology and generic and disease-specific measures of quality of life (“psychosocial impairment”). Data on these measures for individuals with BED receiving specialist treatment, derived from previously published research, were further included for comparative purposes. The main findings were threefold. First, women with BED and overvaluation had significantly higher levels of eating disorder psychopathology and psychosocial impairment than all other subgroups. Second, scores on these measures did not differ between women with BED in the absence of overvaluation and obese controls. Third, whereas levels of eating-disorder psychopathology and psychosocial impairment among participants in the BED with overvaluation subgroup were markedly elevated, comparable to those of individuals with BED receiving specialist treatment, scores on these measures among participants with BED in the absence of overvaluation more closely resembled those of obese individuals who did not binge eat. This was the case for both generic and eating-disorder-specific measures of impairment.

Study implications

Taken together, these findings provide further evidence, first, that individuals with BED and overvaluation are a highly impaired subgroup in terms of eating disorder psychopathology and impairment in psychosocial functioning; and second, that individuals with BED in the absence of overvaluation may not be experiencing

clinically significant levels of eating disorder psychopathology and psycho-social impairment. Hence, the current findings support reference to overvaluation within the diagnostic criterion for BED, namely, as a diagnostic criterion or, perhaps, a diagnostic specifier. The current findings also indicate the need for clinicians to assess overvaluation among individuals with BED and variants of BED and to monitor changes in the levels of this construct during treatment (Grilo, 2013; Mond et al., 2013). There may also be implications for eating disorders prevention and early intervention programs, namely, the need to specifically target overvaluation in order to reduce the individual and community health burden associated with this feature (Mitchison, Hay, Slewa-younan, & Mond, 2012; Mond, Rodgers, Hay, & Owen, 2011; Wilfley, Agras, & Taylor, 2013).

Concerns have been expressed that the inclusion of overvaluation as a diagnostic criterion for BED may lead to unacceptably high numbers of “false negative diagnoses”, namely, individuals who have a clinically significant eating disturbance but who do not receive a diagnosis and who may therefore be denied access to certain forms of treatment. For this reason, it has been suggested that the inclusion of overvaluation as a “severity specifier” for BED, rather than a diagnostic criterion, may be preferable. This option arguably would facilitate treatment planning while minimising false negative diagnoses (First, 2010; Wakefield, Schmitz, First, & Horwitz, 2007). On the other hand, inclusion of overvaluation as a diagnostic specifier, rather than as a criterion, may lead to an unacceptably high proportion of “false positive diagnoses”, namely, individuals who receive a diagnosis of BED in the absence of clinically significant distress or disability (Spitzer & Wakefield, 1999). Inclusion of overvaluation as a diagnostic criterion would have the effect of minimising these false positive diagnoses. The

relative priority given to minimization of these different types of error - false positive and false negative diagnoses - needs to be carefully considered when formulating diagnostic criteria for mental health problems, since there are important adverse consequences associated with both (Mond, 2013; Wakefield et al., 2007). With respect to diagnostic criteria for BED, attention has, thus far, focused on the potential for false negative diagnoses associated the inclusion of overvaluation as a diagnostic criterion (Grilo, 2013) whereas the potential for false positives associated with inclusion of overvaluation as a diagnostic specifier has rarely been considered.

Two further advantages of the inclusion of overvaluation as a diagnostic criterion for BED warrant consideration. First, the inclusion of overvaluation as a diagnostic criterion for BED would bring this diagnosis into line with those of anorexia nervosa and bulimia nervosa, consistent with a “transdiagnostic” view of eating disorder psychopathology (Fairburn, Cooper, & Shafran, 2003). Second, inclusion of overvaluation as a diagnostic criterion for BED would potentially eliminate the need for other criteria, the value of which is unclear (Mond, 2013; Grilo & White, 2011; White & Grilo, 2011). Specifically, DSM-5 criteria for BED require, in addition to recurrent episodes of binge eating and the absence of regular compensatory behaviors: (i) that the episodes of binge eating are associated with three or more behavioral indicators of loss of control over eating (e.g. “eating much more rapidly than normal”; “eating until feeling uncomfortably full”; “feeling disgusted with oneself, depressed, or very guilty after overeating”); and (ii) that “marked distress regarding binge eating is present” (APA, 2013). These criteria were introduced for the provisional diagnosis of BED in DSM-IV, guided, in part, by the perceived need to minimize false positive diagnoses on the part of the DSM-IV Task Force (Mond, 2013; Spitzer & Wakefield, 1999). They

have been retained in DSM-5, despite the fact that there is little empirical evidence to support their validity (Grilo & White, 2011; White & Grilo, 2011). Given the strong association between the presence of overvaluation and psychosocial impairment, inclusion of overvaluation as a diagnostic criterion, instead of one or both of these other criteria, may be a more parsimonious approach, one that would be beneficial for both research and clinical practice. The issue of whether clinically significant distress or impairment is an appropriate criterion for mental disorders is beyond the scope of the current discussion. Here we simply note, as the authors of DSM-5 did, that in the absence of clear biological markers for mental disorders, there remains a need for generic criteria of this kind (APA, 2013).

Study limitations and other methodological consideration

Several limitations of the current study methods should be considered when interpreting the findings. First, the BED groups were identified on the basis on self-report assessment of eating disorder features (Fairburn & Beglin, 1994; Mond, Hay, Rodgers, Owen, & Beumont, 2004b). Although concordance between self-report and interview assessment of overvaluation may be good, the occurrence and/or frequency of binge eating is likely to be over-estimated when using self-report assessment (Fairburn & Beglin, 1994; Mond et al., 2004b). Further, use of the EDE-Q dictates a time frame for the assessment of binge eating and other eating disorder features of one month, as opposed to the three-month duration specified in DSM-5 (American Psychiatric Association, 2013). For these reasons, we have used the term “probable BED cases”, rather than “individuals with BED” in the current research.

Also, as in previous studies (Harrison et al., 2014; Mond et al., 2007a), no attempt in the current study was made to assess the additional DSM criteria for BED

referred to above, namely, the presence of three or more behavioral indicators of loss-of-control over eating and/or of marked distress associated with binge eating. As has been noted, the utility of these criteria is unclear and as such they are rarely used for research purposes (Grilo & White, 2011; Mond, 2013; Striegel-Moore & Franko, 2008). As has also been noted, inclusion of overvaluation as a diagnostic criterion would potentially render the behavioral indicators of loss of control over eating and/or marked distress criteria redundant. Ideally, however, these criteria would be assessed in future research so that the issue of their utility relative to that of overvaluation could be directly addressed.

Additional limitations of the current study were the use of a cross-sectional study design and the inclusion of only female participants. Further prospective research is needed to examine the temporal stability of overvaluation and its associations with psychosocial impairment and other outcomes over time, addressed in some studies (Masheb & Grilo, 2008; Ojserkis, Sysko, Goldfein, & Devlin, 2012; Sonnevile et al., 2015). Inclusion of males with BED and variants of BED in future research is important because these conditions are relatively common in men and because findings from recent epidemiological studies suggest that the prevalence of binge eating, and its impact on psychosocial functioning, may be increasing in men (Hay, Mond, Buttner, & Darby, 2008; Striegel, Bedrosian, Wang, & Schwartz, 2012). Notable strengths of the current study were the recruitment of participants from a mixed, community-based sample in which individuals with eating disorder symptoms were over-represented, the inclusion of comparison groups of obese individuals who did not binge eat, normal-weight individuals who did not binge eat, and individuals with BED receiving specialist

treatment, and the inclusion of both generic and disease-specific measures of impairment.

Conclusion

The current findings provide further support for the reference to overvaluation within the diagnostic criteria for BED. This would have benefits for both research and clinical practice and may obviate the need for additional criteria, currently included in the DSM, the value of which is unclear. The relative merits of the inclusion of overvaluation as a diagnostic criterion or as a diagnostic specifier for BED warrant greater consideration.

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Chapter Five

Loss of Control Eating with and without the Undue Influence of Weight or Shape on Self-evaluation: Evidence from an Adolescent Population

Harrison, C., Mond, J., Bentley, C., Gratwick-Sarll, K., Rieger, E. & Rodgers, B. (2014). Loss of control eating with and without the undue influence of weight or shape on self-evaluation: evidence from an adolescent population, *Journal of Eating Disorders*, 2: 31. doi:10.1186/s40337-014-0031-1

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Introduction

Collectively, study one and two provide further support for the inclusion of overvaluation as a diagnostic criterion for BED in future revisions of classification schemes. Both studies demonstrated in community-based samples of adult women that individuals with BED and overvaluation report significantly greater eating disorder symptomatology, distress, generic and eating disorder specific impairment. This is in comparison to individuals with BED in the absence of overvaluation who perform in a largely indistinguishable manner from an obese control group who do not report binge eating, on all of these outcome measures. The consistency of these findings indicates that the lack of impairment reported by BED in the absence of overvaluation cannot be attributed to measures that are not sensitive to the nature of the distress experienced by these individuals, the limitation that study two sought to address. Therefore, such findings question the clinical possibility of a reference to a cognitive criterion in the diagnosis of BED.

However, prior to any diagnostic changes, a noteworthy limitation of the previous studies lies in the fact that they have almost entirely focused on adult populations. Very few studies have examined the role of overvaluation in children and adolescents with BED, so that it is unknown whether such findings can be generalised across the lifespan. This is of concern given that binge eating commonly presents in children and adolescents and thus, diagnostic schemes need to account for eating disorders across the lifespan. Additionally, the literature has already raised the concern that the current diagnostic criteria in BED lack applicability to children and adolescents. Namely, it has been proposed that loss of control (LOC) eating, rather than binge eating

per se, is more applicable to children and adolescence, given it is LOC eating that is known to be associated with impairment and distress in this population.

Therefore, study three aimed to examine the status of overvaluation in relation to LOC eating among adolescents. The study compared adolescents with LOC eating with and without overvaluation with respect to levels of eating disorder psychopathology and psychosocial impairment, in order to aid understandings regarding the generalisability of findings across the lifespan.



RESEARCH ARTICLE

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Loss of control eating with and without the undue influence of weight or shape on self-evaluation: evidence from an adolescent population

Carmel Harrison^{1*}, Jonathan Mond^{1,2}, Caroline Bentley¹, Kassandra Gratwick-Sarll¹, Elizabeth Rieger¹ and Bryan Rodgers³

Abstract

Background: The overvaluation of weight and/or shape ("overvaluation"), a diagnostic criterion for anorexia nervosa and bulimia nervosa, is increasingly supported for inclusion in the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5) criteria of binge eating disorder (BED). However, current evidence has been largely confined to adult populations. The current study aims to examine the status of overvaluation among adolescents with loss of control (LOC) eating recruited from a large, population-based sample.

Method: Subgroups of female adolescents – LOC eating with overvaluation (n = 30); LOC eating without overvaluation (n = 58); obese no LOC eating ("obese control") (n = 36); and "normal-weight control" (normal-weight, no LOC eating) (n = 439) – recruited from secondary schools within the Australian Capital Territory (ACT) were compared on measures of eating disorder psychopathology, general psychological distress and quality of life.

Results: Participants in the LOC eating with overvaluation subgroup reported significantly higher levels of eating disorder psychopathology than all other groups, while levels did not differ between participants in the LOC eating without overvaluation and obese control subgroups. On measures of distress and quality of life there were no significant differences between LOC eating with and without overvaluation subgroups. Both reported significantly greater distress and quality of life impairment than normal-weight controls. LOC eating with overvaluation participants had significantly higher levels of distress and quality of life impairment than obese controls, whereas scores on these measures did not differ between LOC eating without overvaluation and obese control subgroups.

Conclusion: The results suggest that the presence of overvaluation among adolescents with LOC eating indicates a more severe disorder in terms of eating disorder psychopathology, however may not indicate distress and disability as clearly as it does among adults with BED.

Keywords: Binge eating disorder, Loss of control eating, Diagnostic criteria, Overvaluation, Adolescents

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Background

The overvaluation of weight and/or shape ("overvaluation") is described as a dysfunctional system of self-worth, such that the individual evaluates his or her self-worth based primarily or solely on their weight and/or shape [1]. Findings from both community and clinical samples in adults suggest that, among individuals with binge eating disorder (BED) or variants of BED, overvaluation indicates a significantly more severe disorder in terms of eating disorder symptomatology, comorbid psychopathology, and psychosocial impairment [2-5]. Conclusions from such findings suggest that overvaluation should be incorporated among Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5) criteria for BED, either as a diagnostic specifier or a diagnostic criterion, inline with the other formal eating disorders anorexia nervosa and bulimia nervosa [6-8]. Concerns have been expressed that the absence of overvaluation in the diagnosis of BED may hinder both clinical practice and epidemiological research [9].

A conspicuous limitation of the existing literature however, is that it is almost entirely confined to adult populations [4,5,7]. Given that binge eating is common among children and adolescents, and given the need to develop classification schemes that take in to account eating disturbances across the lifespan, this is problematic [10]. Further, it is increasingly recognised that the DSM-5 definition of binge eating, which requires both consumption of an objectively large amount of food and loss of control over eating, may be problematic in children and adolescents, such that loss of control over eating – but not the amount of food consumed – is key in this population [11,12]. Hence, an alternative diagnostic criterion for BED in children and adolescents, in which the term loss of control (LOC) eating is used in preference to binge eating, has been suggested [11,12].

To our knowledge, only two studies have examined the status of overvaluation in young people with LOC eating [13,14]. Hilbert and Czaja found, in a community based study of children (aged 8–13 years), that overvaluation successfully identified children experiencing high recurrent LOC eating as a more severe presentation, in terms of eating disorder psychopathology, depressive symptoms and behavioural problems than all other groups [13]. Further, overvaluation aided in delineating eating defined as "normal", and LOC eating among children, thereby enhancing the specificity of classification [13]. Goldschmidt et al. compared overweight youth with LOC eating with ("moderate") and without ("minimal or no") overvaluation, along with comparison groups of overweight youth with no LOC eating with and without overvaluation, on measures of eating disorder psychopathology, behavioural problems and self-esteem [14]. Youth with LOC eating and overvaluation reported greater eating disorder symptomatology than all other

groups, whereas youth with LOC eating without overvaluation were comparable to the overweight comparison group of no LOC eating, but reporting overvaluation. Further, youth reporting LOC eating with overvaluation experienced lower self-esteem than the overweight controls without overvaluation, whilst no other significant differences were found between groups on this measure. Both youth experiencing LOC eating with and without overvaluation reported significantly more behavioural problems than overweight controls regardless of overvaluation status. However, overvaluation did not distinguish between LOC eating subgroups on outcome measures of self-esteem and behavioural problems. The authors concluded that overvaluation failed to indicate a more severe symptomatology in adolescence [14].

One reason why anticipated differences may not have emerged in Goldschmidt et al.'s study, is that LOC eating was deemed to be present if participants reported one or more episodes of this behaviour in the past three months, as opposed to the DSM-5 binge frequency criterion for BED of one or more episodes per week [14]. Given the use of this relatively liberal criterion for "regular LOC eating", it is possible that LOC eating in Goldschmidt et al.'s study was not severe enough for differences between groups to emerge. The use of overweight – as opposed to obese – comparison groups could have further minimised group differences. Finally, Hilbert and Czaja's study included youth up to age 13 years, thus Goldschmidt et al.'s study is the only study to our knowledge, investigating overvaluation in BED and variants of BED within adolescents aged 13–18 years. Given recent interest in developing diagnostic criteria for eating disorders that are applicable across the lifespan [10], and observed differences between children and adults in terms of overeating behaviour [11,12], the lack of research addressing the status of overvaluation among adolescents with LOC eating is problematic.

The aim of the present study was, therefore, to examine the status of overvaluation in relation to LOC eating in an adolescent sample. Specifically, we sought to compare levels of eating disorder psychopathology, general psychological distress and impairment in psychosocial functioning, between four subgroups of female adolescents who: (1) reported LOC eating with overvaluation; (2) reported LOC eating without overvaluation; (3) were obese individuals without LOC eating (obese controls); and (4) were normal weight without LOC eating (normal-weight controls). In view of the paucity of existing evidence, our only hypothesis was that adolescents with LOC eating who overvalued their weight or shape would have significantly higher levels of eating disorder psychopathology than obese controls and normal-weight controls.

Method

Study design and recruitment of participants

Participants were recruited as part of the *ACT Schools Mental Health Literacy Survey*, a cross-sectional study examining eating-disordered behaviour among secondary school students attending schools within the Australian Capital Territory (ACT) region of Australia (population of approx. 370,000 in 2012), which includes the city of Canberra [15]. The recruitment procedures have been detailed previously [16]. In brief, participants were recruited from 12 ACT schools, which varied in terms of type (Government, Independent, and Catholic), location and numbers of students at the school. The study was presented as an opportunity for schools to promote “mental health literacy” and no remuneration was provided. Consent to participate was required from both students and their parents. The study design and methods were approved by the Australian National University Human Research Ethics Committee (2011/573), the ACT Department of Education and Training (2011/00468-8) and the Catholic Education Office (R106903).

All students in classes selected for participation who attended class on the day(s) assigned for data collection were invited to complete a printed, self-report questionnaire, in their classrooms, under the supervision of a teacher and one or more members of the research team. The questionnaire included measures of eating disorder symptoms, general psychological distress, quality of life and basic demographic information. Body mass index (BMI: kg/m²) was calculated from self-reported height and weight [16]. Classification of weight status was based on the age-and-gender-specific BMI cut-points recommended by the Centers for Disease Control and Prevention (CDC) [17].

Completed questionnaires were received from 1749 students, a participation rate of 78.7% of all students invited to participate. Data for nine participants who were less than 12 years of age or greater than 18 years and a further 70 participants (4.0%) who were found to have unacceptably high levels of missing data or implausible data were excluded. The final sample therefore comprised of 1670 students aged 12–18 years. Of these, 1135 (68.0%) were female, 531 were male and 4 did not indicate their gender. The overrepresentation of female students, which reflected greater perceived relevance of the study material among the principals of all-girls schools and/or among the heads of faculties (e.g. psychology) in which female students were over-represented, was anticipated and was considered advantageous in addressing study aims that dictated relatively large numbers of participants with eating disorder symptoms [18]. The mean (SD) ages of male and female participants were, respectively, 14.85 (1.70) years and 15.51 (1.63) years. The sample comprised of 3.6% of all male secondary school

students in the ACT in 2012 and 7.8% of all female secondary school students [19]. Reflecting the demographic profile of the ACT region, [20] the vast majority of participants were born in Australia (88.3%) and had English as a first language (90.4%).

Participants in the current study were the 1135 female adolescents. Male participants were excluded because the comparatively low prevalence of LOC eating among males precluded meaningful subgroups analysis. Although it would have been possible to combine male and female participants, this course was not taken because the goal of the current study was to extend prior research in women with BED and variants of BED to an adolescent population [7] and because, in the absence of any prior research on the status of overvaluation in males with BED or variants of BED, it was unclear how the inclusion of males might affect the findings.

Study measures

Eating Disorder Examination Questionnaire (EDE-Q)

The EDE-Q is a 36-item self-report measure that assesses the occurrence and frequency of eating disorder features during the past 28 days [21]. A global score is derived from 22 items assessing core attitudinal features, namely, dietary restraint, concerns about eating, weight concern and shape concern. Scores on these items range from “0” to “6”, with higher scores indicating higher symptom levels [21]. Cronbach's alpha for the global score in the current study sample was 0.97.

Remaining items of the EDE-Q assess the occurrence and frequency of specific eating disorder behaviours, namely, binge eating and the use of self-induced vomiting, laxative misuse and excessive exercise, as a means of controlling weight or shape. For the current study, an additional item assessing the occurrence of subjective binge eating episodes, namely, episodes of perceived overeating in which a loss of control is experienced but the amount of food consumed is not unusually large, was included. The inclusion of this item permitted the assessment of LOC eating, this being defined as the occurrence of objective and/or subjective binge eating episodes [16]. As in previous studies [22,23], minor changes to the wording of some EDE-Q items were made in order to ensure the suitability of the instrument for use in an adolescent population.

Assessment of psychosocial functioning

Psychosocial functioning was assessed using measures of general psychological distress and quality of life as detailed below.

Kessler (10-item) psychological distress scale (K-10)

The K-10 is a 10-item measure of general psychological distress developed for use as a screening instrument in

epidemiological studies of mental disorders and widely used for this purpose [24,25]. In Australia, it is also used as an outcome measure for individuals treated in community mental health services and for routine population health monitoring [26]. Participants are required to indicate the frequency or occurrence of 10 symptoms of anxiety or depression during the past four weeks. Responses are scored on a five-point, Likert-type scale ranging from “none of the time” (“1”) to “all of the time” (“5”). Total scores therefore range from 10 to 50, with higher scores indicating higher levels of distress. The K-10 has very good psychometric properties and is suitable for use in both adult and adolescent populations [24,25,27,28]. Cronbach’s alpha for participants in the current study sample was 0.91.

Pediatric quality of life inventory (15-item) (PedsQL™ 4.0 SF15)

The *PedsQL™ 4.0 SF15* is a 15-item, self-report, generic measure of quality of life developed specifically for use in paediatric populations [29,30]. Participants are asked how true each of a series of 15 statements were for them during the past four weeks, with items designed to address individuals’ perceived functioning in each of four domains: physical health (5 items); emotional well-being (4 items); social functioning (3 items); and academic (school) functioning (3 items). Responses are scored on a five-point, Likert-type scale ranging from “never” (“0”) to “always” (“4”), with higher scores indicating poorer perceived functioning in the domain concerned. In the current study, domain scores were calculated as mean scores of the specific items comprising each domain. The *PedsQL™ 4.0 SF15* has been found to be a reliable and valid measure of quality of life in young people, with psychometric properties comparable to those of the original (23-item) instrument [29,30]. Cronbach alphas in the current study sample ranged from 0.80 (physical health subscale) to 0.89 (total score).

Creation of study subgroups

Consistent with the study aims, four subgroups of participants were created: (1) LOC eating with overvaluation; (2) LOC eating without overvaluation; (3) obese no LOC eating (obese controls); and (4) normal-weight no LOC eating (normal-weight controls).

Given that LOC eating, regardless of the amount of food consumed, indicates eating disorder and general psychopathology in youth [11,12], the current study, inline with prior research [14], focused on LOC eating. Consistent with DSM-5 criteria for binge frequency [31], “LOC eating” was defined as at least weekly LOC episodes during the past four weeks. Further, and also consistent with the DSM-5 criteria for BED, inclusion in the LOC subgroups required that regular LOC eating

occurred in the absence of the regular use of extreme weight-control behaviours. In the absence of any agreed-upon operational definition of “regular extreme weight-control behaviours”, a conservative threshold, namely, twice per month, was employed in order to clearly distinguish participants in the LOC subgroups from individuals with a sub-threshold form of bulimia nervosa [32]. Thus, regular purging was defined as self-induced vomiting or misuse of laxatives or diuretics as a means of controlling weight or shape at least twice in the past 28 days. Regular extreme dietary restriction was defined, using an item of the EDE-Q, as going for long periods (8 or more waking hours) without eating anything at all as a means of controlling weight or shape more than 1–5 times in the past 28 days, and regular excessive exercise was defined as exercising in a “driven” or “compulsive” way as a means of controlling weight or shape at least twice in the past 28 days. These definitions have been used in previous, population-based studies of young women [7,33].

Participants with LOC eating were separated into those with and without overvaluation on the basis of responses to the two EDE-Q items that assess this construct, namely, “Over the past four weeks, how much has your *weight* influenced how you think about (judge) yourself as a person?” (“importance of weight”) and “Over the past four weeks, how much has your *shape* influenced how you think about (judge) yourself as a person?” (“importance of shape”). Consistent with previous research employing the EDE-Q within community samples [4,5], participants who scored 5 or 6 on either (or both) of these items were considered to have overvaluation. Scores of this magnitude indicate that self-evaluation was influenced by their weight or shape either “markedly” (score of “6”) or “more than moderately but less than markedly” (“5”). Items of the EDE-Q assessing overvaluation were omitted when comparing subgroups with respect to overall levels of eating disorder psychopathology as measured by the EDE-Q global score, thus creating a “revised” global score for the purpose of comparisons involving this outcome [7].

“Obese controls” were participants with a BMI above the 90th percentile for their age and sex [17] and who did not report any episodes of LOC eating during the past 28 days. “Normal-weight controls” were participants whose BMI was between the 5th and 85th percentile for their age and sex [17] and who reported no episodes of either LOC eating or extreme weight-control behaviours during the past 28 days. Participants who were underweight (BMI <5th percentile) were excluded from this subgroup. No attempt was made to exclude participants with overvaluation from the control groups since this would have detracted from the validity of comparisons between these groups and the LOC eating groups.

Of the 1,135 participants, 422 (37.2%) were classified as normal-weight controls, 36 (3.2%) were classified as obese controls, and 88 (7.8%) were classified as LOC eating. Among participants in the LOC eating subgroup, 30 (34.1%) overvalued their weight or shape while the remaining 58 participants (65.9%) did not have overvaluation.

Statistical analysis

One-way analysis of variance (ANOVA) was used to compare scores on measures of eating disorder psychopathology (EDE-Q revised global score), general psychological distress (K-10), and quality of life (*PedsQL™ 4.0 SF15*) between groups. Post-hoc tests were used to identify the source of any statistically significant F values. In view of the small subgroup sizes and small number of outcome variables, no adjustment for multiple comparisons was employed. A significance level of 0.05 was used for all tests and all analysis was conducted using the IBM SPSS statistical software package (version 20.0).

Results

As would be expected, differences between groups were observed with respect to BMI ($F_{(3,533)} = 156.65, p < .05$), whereas there were no differences between groups with respect to age, first language, country of birth, residential postcode or school type (all $p > .05$).

Results of the ANOVA appear in Table 1. As can be seen, significant differences between groups were observed for all outcome variables: EDE-Q (revised) global score

($F_{(3,542)} = 70.16, p < .05$), K-10 ($F_{(3,542)} = 15.70, p < .05$), and all subscales of the *PedsQL™ 4.0 SF15* ($F_{(3,541)} = 20.71, p < .05$). Post-hoc tests indicated that participants with LOC eating and overvaluation had higher EDE-Q global scores than women with LOC eating in the absence of overvaluation ($p < .05$), while scores on this measure did not differ between participants with LOC eating in the absence of overvaluation and obese controls ($p > .05$). Normal-weight participants had lower EDE-Q global scores than participants in all other groups ($p < .05$).

There were no significant differences between LOC eating with overvaluation and LOC eating without overvaluation subgroups with respect to levels of general psychological distress or on any of the *PedsQL™ 4.0 SF15* subscales (all $p > .05$) and both of these groups had higher levels of distress, and higher scores on each of the *PedsQL™ 4.0 SF15* subscales, than normal-weight controls (all $p < .05$). Participants in the LOC eating with overvaluation subgroup had higher levels of distress, and significantly greater impairment in emotional, social and academic functioning, than obese controls (all $p < .05$), whereas scores on these measures did not differ between LOC eating without overvaluation and obese control subgroups (all $p > .05$). However both LOC eating subgroups with and without overvaluation reported significantly greater impairment on the *PedsQL™ 4.0 SF15* total than the obese control subgroup ($p < .05$), whilst there were no differences between participants in either of the LOC eating subgroups and obese control participants on the physical health subscale of the *PedsQL™ 4.0 SF15* ($p > .05$).

Table 1 Mean (SD) scores on measures of eating disorder psychopathology (EDE-Q revised global score), general psychological distress (K-10), and quality of life (*PedsQL™ 4.0 SF15*) among study subgroups

	LOC eating with overvaluation of shape/weight (1)	LOC eating without overvaluation of shape/weight (2)	Obese controls (3)	Healthy controls (4)		Eta squared ⁽ⁱ⁾	Post hoc
n	30	58	36	422			
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	F	p	
Age	15.89 (1.37)	15.72 (1.72)	15.89 (1.56)	15.36 (1.70)	2.46	.062	
BMI	23.99 (4.89)	21.16 (3.46)	29.51 (3.83)	19.90 (2.21)	156.65	.000*	
	Mean (SE)	Mean (SE)	Mean (SE)	Mean (SE)	F	p	
EDE-Q revised global	3.31 (.20)	1.80 (.13)	1.80 (.20)	.94 (.05)	70.16	.000*	0.28 1 > 2,3 > 4
K10	27.23 (1.42)	24.40 (1.09)	20.64 (1.18)	19.73 (.34)	15.70	.000*	0.08 1, 2 > 4; 1 > 3
<i>PedsQL™ 4.0 SF15</i> subscales							
Emotional well-being	3.00 (.12)	2.63 (.10)	2.23 (.13)	2.20 (.04)	12.39	.000*	0.06 1, 2 > 4; 1 > 3
Social functioning	2.31 (.18)	2.13 (.13)	1.81 (.15)	1.66 (.03)	12.51	.000*	0.06 1, 2 > 4; 1 > 3
Academic functioning	3.31 (.19)	3.01 (.12)	2.60 (.18)	2.56 (.04)	9.54	.000*	0.05 1, 2 > 4; 1 > 3
Physical health	2.10 (.15)	2.10 (.12)	1.80 (.13)	1.60 (.03)	13.02	.000*	0.07 1, 2 > 4,
<i>PedsQL™ 4.0 SF15</i> Total	59.43 (2.51)	64.28 (2.09)	73.06 (2.69)	75.93 (.70)	20.71	.000*	0.10 1, 2 < 3, 4

*Significant $p < 0.05$.

ⁱeta squared effect size; 0.01 = small, 0.06 = medium, 0.14 = large [34].

Discussion

Summary of main findings

The current study compared subgroups of female adolescents with LOC eating, with and without overvaluation of weight and/or shape, on measures of eating disorder psychopathology, general psychological distress, and quality of life. Subgroups of obese participants reporting no LOC eating (obese controls) and adolescents of normal weight not experiencing LOC eating (normal-weight controls) were included for comparison purposes. Participants with LOC eating and overvaluation had significantly higher levels of eating disorder psychopathology than all other subgroups, whereas participants with LOC eating in the absence of overvaluation did not differ from obese controls with respect to levels of eating disorder psychopathology. There were no significant differences between LOC eating with overvaluation and LOC eating without overvaluation subgroups on any of the other measures. Participants with LOC eating and overvaluation had significantly higher levels of distress and impairment in emotional, social and academic functioning than obese controls, whereas no such differences were observed between LOC eating without overvaluation and obese controls.

Study implications

The finding that participants with LOC eating and overvaluation had significantly higher levels of eating disorder psychopathology than all other subgroups, when taken with the finding that participants in the LOC eating without overvaluation subgroup did not differ from obese controls in this regard, aligns with findings from previous research in adult [5-7] and adolescent populations [14]. Whilst overvaluation has been recognised as a distinct construct [6], high correlations between this construct and the broader construct of weight/shape concerns, as measured by the EDE-Q, exist [1,35]. The finding that the presence of overvaluation was associated with higher EDE-Q global scores, while notable, is not surprising, given significantly greater scores on the EDE-Q might reflect, in part, this association [35]. Nevertheless, the current findings in adolescents provides further evidence that overvaluation indicates disorder severity in terms of eating disorder psychopathology among individuals with BED and variants of BED [4,7]. Further, given that adolescents with LOC eating in the absence of overvaluation had comparable levels of eating disorder psychopathology to obese control participants, also in line with previous adult research [7], the current findings provide further evidence that LOC in the absence of overvaluation may not constitute a clinically significant pattern of behaviour.

Contrary to findings in both community and clinical samples of adult females with BED and variants of BED [4,7], but consistent with the findings of Goldschmidt

and colleagues in adolescent females [14], no significant differences were observed between LOC eating subgroups on measures of psycho-social impairment, namely, general psychological distress and quality of life. However, there was evidence suggestive of such differences. Whereas participants with LOC eating and overvaluation had significantly higher levels of general psychological distress and impairment in social, psychological, and academic functioning than obese controls, there were no differences between participants with LOC eating in the absence of overvaluation and obese controls on any of these measures. These findings suggest that further investigation of the correlates of LOC eating with and without overvaluation in adolescents may be warranted.

At least two explanations for the lack of clear differences in levels of distress and disability between LOC eating subgroups among adolescents might be given, should this finding prove to be replicable. First, the concept of "overvaluation" may be more difficult for young people to grasp than for adults [10,14], making it more difficult to measure and differentiate between LOC eating with and without overvaluation. Second, evidence concerning the onset of overvaluation and its relationship to the onset of LOC eating and other eating disorder behaviours is lacking [36]. If overvaluation is associated with chronicity of overeating, then its influence on young people with LOC eating might only become apparent later in life. This interpretation would be consistent with the observation, in the current study and in Goldschmidt et al.'s study [14], that the presence of overvaluation among young people with LOC eating indicates greater severity in terms of eating disorder psychopathology but not in terms of distress and disability. Further population-based research, employing a prospective study design and, if possible, interview assessment of key constructs will be needed to elucidate these different possible interpretations.

Study limitations

At least four limitations of the current study methods should be noted. First, all variables were assessed using self-report measures. While self-report assessment of psycho-social functioning is unlikely to be problematic, limitations inherent in the self-report assessment of eating-disordered behaviour are well known [21,37,38]. In particular, the occurrence and/or frequency of binge eating may be overestimated when using self-report assessment and self-report assessment of loss of control over eating may be unreliable when the amount of food consumed is not unusually large [21,37,38]. Further, whereas high correlations between self-report and interview assessment of weight/shape concerns have been observed in several studies, little is known about the validity of self-report assessment of the more specific

construct of overvaluation [21,37,38]. A study of young adult women supported the validity of self-report assessment of overvaluation, when compared with interview assessment [37], but evidence in adolescents is lacking [38]. It should also be noted that the EDE-Q assesses LOC eating and other behaviours over the past 28 days, as opposed to the 3-month duration specified in DSM-5 criteria for BED [31]. It is possible that different findings would have been observed had interview assessment and/or a 3-month time frame been employed.

Second, sample size for the LOC eating and obese control subgroups ($n = 30$, $n = 58$, $n = 36$) was relatively small. Hence, the failure to detect significant differences between these groups may reflect, in part, a lack of statistical power. The finding that there were significant differences between LOC eating with overvaluation and obese control participants on measures of distress and quality of life, but no such differences between LOC eating without overvaluation and obese control participants, is consistent with this interpretation.

Third, the cross-sectional design of the current study precludes any inferences as to the correlates of LOC eating with and without overvaluation over time. Research employing a prospective study design is needed to examine issues such as the utility of overvaluation in predicting outcomes among adolescents with LOC eating, and its temporal stability.

Finally, as in previous community-based studies, only females were included in the current study. Although very large sample sizes would be needed to examine the status of overvaluation among adolescent males with LOC eating in a community sample, research of this kind would be of interest given that LOC eating may be relatively common in boys [16].

Strengths of the current study include the recruitment of participants from a large, population-based sample, high participation rates, the inclusion of obese control and normal-weight control groups, and the inclusion of established measures of eating disorder psychopathology, general psychological distress and quality of life.

Conclusion

The results provide further evidence that the presence of overvaluation among adolescents with LOC eating indicates a more severe disorder in terms of eating disorder psychopathology, whereas overvaluation may not indicate distress and disability as clearly as it does among adults with BED and variants of BED.

Abbreviations

BED: Binge eating disorder; LOC eating: Loss of control eating; ACT: The Australian Capital Territory.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

JM and CH designed the study, CH, CB and KG carried out data collection. CH conducted the statistical analysis and drafted the manuscript. ER, JM and BR were consulted on the statistical analysis. All authors read and approved the final manuscript.

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Chapter Six

Emotion Regulation Difficulties in Binge Eating Disorder with and without Overvaluation of Weight or Shape

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Introduction

Thus far, study one and two provided support for the inclusion of overvaluation as a diagnostic criterion for BED in future revisions of classification schemes. However, study three's findings, one of the first to investigate overvaluation in female adolescents, differed somewhat. Firstly, study three found that individuals reporting LOC eating and overvaluation reported significantly greater eating disorder psychopathology in comparison to all other subgroups, namely LOC eating without overvaluation, obese individuals who do not engage in binge eating and the healthy comparison group. Further, individuals with LOC eating in the absence of overvaluation were comparable to obese individuals who did not report binge eating on eating disorder psychopathology. However, there were no significant differences between LOC eating in the presence and absence of overvaluation on any of the measures of impairment. Some explanations for this inconsistency with the adult literature include the possibility that overvaluation is a construct that young people do not fully comprehend, making it difficult to measure. Alternatively, it may be that overvaluation, given its association with chronicity, may only fully develop later in the course of the disorder. Therefore, further research into the development of overvaluation and its presence in young people is warranted.

If overvaluation plays a less substantial role in younger people with binge eating, this raises the question as to what other constructs may be pivotal in this developmental period and, indeed, might continue to play a role (in addition to overvaluation) at later developmental stages. Indeed, within the broader field of research within BED, evidence is gathering for the utilisation of 'third wave' cognitive behavioural therapies, such as DBT, as outlined in earlier chapters. Such protocols are

based primarily of aetiological models of emotion regulation, which conceptualise the disorder as one of difficulty with regulating negative emotion. While various theories as identified in chapter one, attempt to explain these pathways, overall the models are grouped under the umbrella term of ‘affect regulation models’. No studies to date have investigated the link between overvaluation and emotion regulation, nor attempted to simultaneously address these two lines of thought in the conceptualisation of BED. Therefore, prior to any diagnostic recommendations, it would be important to consider whether individuals with BED in the absence of overvaluation are experiencing significant emotion regulation difficulties, as conceptualised by affect regulation models to be a core aetiological factor in the maintenance of BED. However, if an absence of emotion regulation problems is another way that individuals with BED in the absence of overvaluation do not fit with current conceptualisations of the disorder, this would again question the clinical significance of this group.

Therefore, study three aimed to compare adults with BED with and without overvaluation with respect to emotion regulation difficulties. The study maintained the strengths of study one, utilising a community-based sample and appropriate comparison groups in a sample of adult women with probable BED.

Abstract

Objective. To examine the status of overvaluation of weight and/or shape ('overvaluation') in binge eating disorder (BED) among women with probable BED from a community-based sample, through investigating emotion regulation (ER) difficulties, a core etiological mechanism in BED. **Method.** Four groups of women - probable BED with (n = 102) and without overvaluation (n = 72), obese individuals reporting no binge eating ('obese controls', n = 40), and normal weight individuals reporting no binge eating ('healthy controls', n = 40) - were recruited from a community-based sample and compared on ER difficulties. Data for formally diagnosed BED patients, from a previous study, were also considered. **Results.** Women with probable BED and overvaluation reported significantly greater ER difficulties than all other groups and had similar levels of ER difficulties to BED patients. Women with probable BED without overvaluation were comparable to the obese control group on total ER difficulties and the majority of the ER difficulties subscales. **Discussion.** BED in the absence of overvaluation does not appear to align with current models of the disorder in which ER difficulties are a core etiological mechanism. The findings provide further evidence for the need to include overvaluation as a diagnostic criterion for BED.

Key words: Binge eating disorder; overvaluation; diagnostic criteria; emotion regulation

Emotion Regulation Difficulties in Binge Eating Disorder With and Without Overvaluation of Weight and Shape

Increasing evidence supports the need to reference a cognitive criterion, namely, overvaluation of weight and/or shape ('overvaluation'), within the diagnostic criteria for binge eating disorder (BED) (American Psychiatric Association [APA], 2013; Grilo, 2013). Specifically, there is now strong evidence that the presence of overvaluation in individuals with BED is associated with a more severe presentation in terms of eating disorder (ED) psychopathology, general psychopathology and impairment in psychosocial functioning, than BED in the absence of overvaluation (Goldschmidt et al., 2010; Grilo, Masheb, & White, 2010; Harrison, Mond, Rieger, & Rodgers, 2015; Harrison, Mond, Rieger, Hay, & Rodgers, 2014; Mond, Hay, Rodgers, & Owen, 2007).

To further inform the pathological status of BED with and without overvaluation, research addressing other ED etiological and maintenance factors, i.e., other than overvaluation, may also be instructive. Emotion regulation (ER) difficulties have been identified as a core etiological mechanism in BED, in line with dominant affect regulation models (Polivy and Herman, 1993; Leehr et al., 2015). While models differ on the mechanisms believed to be involved in the regulation of emotion, there is a consensus, first, that negative emotion is a commonly reported precipitant of binge eating (Polivy and Herman, 1993; Leehr et al., 2015) and second, that individuals engage in binge eating as a ER strategy, likely due to a lack of more adaptive ER strategies to manage such emotional states (Hilbert and Tuschen-Caffier, 2007; Whiteside et al., 2007; Leehr et al., 2015). Indeed a lack of adaptive ER strategies is a feature that differentiates individuals with BED from individuals who are obese but who do not have BED (Leehr et al., 2015). As a result of binge eating the individual

experiences a down-regulation of negative emotion, either during or immediately following the binge-eating episode (Deaver et al., 2003). Thus, ER difficulties have been incorporated in influential theoretical accounts of the etiology and maintenance of ED behavior, such as the cognitive-behavioral transdiagnostic model, in which mood intolerance is a key maintaining factor (Fairburn, Cooper, & Shafran, 2003; Fairburn, 2008).

The present study sought to determine the potential role of ER difficulties in informing the clinical status of BED with and without overvaluation. Consistent with our previous research addressing the clinical significance of BED with and without overvaluation (Harrison et al., 2014, 2015). ER difficulties were compared between four groups: individuals with BED and overvaluation; individuals with BED in the absence of overvaluation; obese individuals who do not have episodes of binge eating (“obese controls”); and normal-weight individuals who do not have binge eating episodes (“healthy controls”). Also consistent with our previous research (Harrison et al., 2014; Mond et al., 2007) participants were recruited from a community-based, rather than a treatment-seeking sample (Mond et al., 2009; Mond et al., 2007). For the current study, data from individuals with a clinical diagnosis of BED, from a previous study (Goldschmidt et al., 2010; Grilo et al., 2010; Harrison et al., 2014) and given that ER difficulties are associated with more severe ED pathology (Svaldi et al., 2012), were included as an additional point of comparison. Given that the presence of overvaluation indicates a more severe presentation among individuals with BED and sub-threshold variants of BED (Goldschmidt et al., 2010; Grilo et al., 2010; Harrison et al., 2014) and given that ER difficulties are associated with more severe ED pathology (Svaldi et al., 2012) it was hypothesized that individuals with BED and overvaluation would have

significantly greater ER difficulties than all other groups. There were no other a priori hypotheses.

Method

Study design and participants

Participants included 748 women aged 18 to 79 years ($M = 40.23$, $SD = 14.39$) recruited from two main sources, namely: (i) the websites and social media channels of non-Government organizations that have an interest in women's eating and/or weight-related health problems (29.4% of the sample); and ii) Australian newspapers within the Australian Capital Territory and the two largest Australian states of New South Wales and Victoria (69.8% of the sample).

The recruitment procedures have been detailed previously (Harrison et al., 2015). In brief, potentially relevant health organizations were first identified via Google and Facebook searches. For each organization identified, the administrators of Facebook groups and/or relevant contacts were approached with a request to advertise the study, including a link to the online survey, via their website, social media channels, and/or email to members/clients. In addition, an online listing of Australian newspapers (newspapers.com.au) was used to identify newspapers in the selected geographical areas, which were then approached via email and/or telephone. Newspapers promoted the study along with a link to the online survey, by means of: (i) a community notice (either in print or on their Facebook page); (ii) a letter to the Editor; or (iii) a news story. Of a total of 437 newspapers approached, 136 (30.8%) agreed to promote the study in one or more of the forms mentioned above.

The online survey, which utilized the Qualtrics survey software package, was anonymous and took approximately 30 minutes to complete. It included measures of

ED symptomatology, ER difficulties, and socio-demographic characteristics. All participants were offered the chance to enter into a draw to win one of three AUS\$100 gift vouchers. The study was approved by the Australian National University Human Research Ethics Committee (2013/027).

Of 748 surveys that were initiated, data for 122 participants who had unacceptably high levels of missing data (failure to complete all items of one or more of the key study measures) were excluded. Participants in the current study were the remaining 626 women. Missing data was minimal among these participants (< 0.01% for all variables). No significant differences were observed between respondents who were excluded or retained on any of the demographic characteristics assessed as outlined below (all $p > .05$), with the exception that respondents who were excluded were significantly older than study participants ($t_{(746)} = 3.25, p < .05$).

Measures

Demographic characteristics. Demographic characteristics assessed included: age; first language (English, not English); country of birth (Australia, not Australia); possession of private health insurance (no, yes); and residential post-code. Based on participants' residential postal-code, Socio-Economic Indexes for Areas (SEIFA) decile were determined. SEIFA is a measure developed by the Australian Bureau of Statistics (Australian Bureau of Statistics, 2013a, 2013b) where residential areas are assigned an index indicating relative socioeconomic advantage/disadvantage for that area. Indices are then ranked and areas of residency allocated a decile allowing comparison across Australia.

Eating Disorder Examination Questionnaire (EDE-Q). The EDE-Q is a 36-item self-report measure of ED pathology that focuses on the past 28 days (Fairburn &

Beglin, 2008, 1994). It consists of 22 items assessing core attitudinal ED features, namely, concerns about dietary restraint, concerns about eating behaviors and concerns about weight or shape. Scores on these items range from “0” to “6”, with higher scores indicating higher symptom levels. A global score, taken to indicate overall levels of ED pathology, is derived as the average of these items. Remaining items of the EDE-Q assess the occurrence and frequency of specific ED behaviors over the previous 28-day period, namely, binge eating, purging (self-induced vomiting and/or laxative misuse), and excessive exercise. Since the assessment of extreme dietary restriction is not included among these items, an item from the Dietary Restraint subscale, namely, “On how many days (in the past 28 days) have you gone for long periods of time (i.e., 8 or more waking hours) without eating anything at all in order to influence your shape or weight?”, was used for this purpose (Mond, Hay, Rodgers, Owen, & Mitchell, 2006). The items comprising the EDE-Q global score have been found to have high internal consistency, test-retest reliability, and convergent validity, in various study populations (Berg, Peterson, Frazier, & Crow, 2012; Mond, Hay, Rodgers, Owen, & Beumont, 2004). Cronbach’s alpha for the global score in the current study was .83. The reliability and validity of self-report assessment of the occurrence and/or frequency of ED behaviors is lower and more variable. In particular, the occurrence and/or frequency of binge eating may be over-estimated when using self-report assessment (Berg et al., 2012; Mond et al., 2004).

Difficulties in Emotion Regulation Scale (DERS). The DERS is a 36-item self-report measure that assesses ER difficulties across six subscales (Gratz and Roemer, 2004). Participants are asked to indicate how often each of a series of statements applies to them, response options ranging from “1” (“almost never [0-

10%]”) to “5” (“almost always [91-100%]”). The subscales are: non-acceptance and emotional response (e. g., “When I’m upset, I feel like I am weak”; sum of scores ranging from 6 to 30); difficulties engaging in goal-directed behavior (e. g., “When I’m upset, I have difficulty focusing on other things”; sum of scores ranging from 5 to 25); impulse control difficulties (e. g., “When I’m upset, I have difficulty controlling my behaviors”; sum of scores ranging from 6 to 30); lack of emotional awareness (e.g., “When I’m upset, I acknowledge my emotions [reverse scored]”; sum of scores ranging from 6 to 30); limited access to emotion regulation strategies (e.g., “When I’m upset, I believe that I will remain that way for a long time”; sum of scores ranging from 8 to 40); and lack of emotional clarity (e.g., “I have no idea how I am feeling”; sum of scores ranging from 5 to 25). Both subscale and total scores are calculated, with higher scores indicating greater difficulties with ER. The DERS has good psychometric properties (Gratz and Roemer, 2004; Fowler et al., 2014) and has been used in previous ED research including BED research (Whiteside et al., 2007; Svaldi et al., 2012; Gianini et al., 2013; Brockmeyer et al., 2014). Cronbach alphas for the subscales in the current study ranged from .83 (clarity subscale) to .96 (total score).

Creation of study groups

Probable cases of BED were identified according to relevant items of the EDE-Q, that is, episodes of (objective) binge eating that occurred, on average, at least weekly over the past 28 days (APA, 2013; Harrison et al., 2014). These episodes needed to occur in the absence of “regular extreme weight-control behaviors”. A conservative threshold of twice per month was used to define this term so as to clearly distinguish probable cases of BED from individuals with a sub-threshold form of BN (Cooper and Fairburn, 2003; Harrison et al., 2014). Thus, regular purging was defined as self-

induced vomiting or misuse of laxatives or diuretics as a means of controlling weight or shape at least twice in the past 28 days; regular extreme dietary restriction was defined as going for long periods (8 or more waking hours) without eating anything at all as a means of controlling weight or shape more than 1–5 times in the past 28 days; and regular excessive exercise was defined as exercising in a ‘driven’ or ‘compulsive’ way as a means of controlling weight or shape at least twice in the past 28 days. In the absence of interview assessment of binge eating and other ED features, the term “probable BED cases” is used.

Overvaluation was assessed using the two EDE-Q items that specifically assess this construct, namely, “Over the past four weeks, how much has your *weight* influenced how you think about (judge) yourself as a person?” (“importance of weight”) and “Over the past four weeks, how much has your *shape* influenced how you think about (judge) yourself as a person?” (“importance of shape”). Consistent with previous research in community-based samples (Grilo et al., 2010; Harrison et al., 2014; Mond et al., 2007) participants who scored 5 or 6 on either (or both) of these items, indicating that their self-evaluation was influenced by their weight or shape “markedly” (“6”) or “more than moderately but less than markedly” (“5”), were considered to have overvaluation (the EDE-Q items assessing overvaluation were omitted when calculating the EDE-Q global score so as to create a “revised” global score for use in between-group comparisons).

Obese controls were participants with BMI ≥ 30.0 (Ogden et al., 2006) and who reported *no* binge eating episodes over the past 28 days. Healthy controls were participants with a BMI in the normal weight range for adults ($18.5 \leq \text{BMI} < 25.0$) who reported no binge eating episodes and no regular extreme weight-control behaviors in

the past 28 days. BMI was derived from participants' self-reported height and weight (Mond et al., 2004). Of the total sample of 626 women, 40 were classified as healthy controls, 40 as obese controls and 174 as probable BED cases. Of the latter, 102 (58.6%) overvalued their weight or shape whereas the remaining 72 participants (41.4%) did not report overvaluation.

BED patients

Data for the EDE-Q and DERS for individuals with BED receiving treatment ($n = 25$), diagnosed via interview assessment, were obtained from Svaldi and colleagues (2012) study.

Statistical analysis

Statistical analyses were conducted using the IBM SPSS statistical software package (version 20.0). Complete case analysis (list-wise deletion of missing values) was employed in all analyses. One-way, between-groups analysis of covariance (ANCOVA) was used to compare scores on emotion regulation difficulties (DERS) between study groups as outlined above, controlling for between-group differences in demographic characteristics. Post-hoc tests were used to identify the source of any significant F values. A significance level of .05 (two-tailed) was used for all tests.

Results

Differences between groups with respect to demographic characteristics and eating disorder psychopathology have been detailed previously (Harrison et al., 2015). In brief, study groups differed with respect to age, BMI, first language, country of birth, socio-economic status as measured by the SEIFA, and state/territory of residence (all $p < .05$). Participants with probable BED and overvaluation had higher (revised) EDE-Q

global scores than participants in all other groups, whereas healthy control participants had lower EDE-Q scores than participants in all other groups. Scores on the EDE-Q did not differ between the probable BED without overvaluation and obese control groups.

Results of the ANCOVAs are summarized in Table 1. Key findings were:

1. Participants with probable BED and overvaluation had greater total ER difficulties than participants in all other groups whereas healthy control participants had fewer ER difficulties than participants in all other groups. Total DERS scores did not differ between probable BED without overvaluation and obese control groups.
2. Participants with probable BED and overvaluation had higher scores on all 6 subscales of DERS than participants in all other groups whereas healthy control participants had lower scores than participants in both BED group on all but two of the DERS subscales (non-acceptance and emotional response, limited access to emotion regulation strategies). On these two subscales, healthy controls only had significantly lower scores than BED with overvaluation. Participants with probable BED without overvaluation had comparable scores to the obese control participants on all but two of the DERS subscales (difficulties engaging in goal directed behaviour, impulse control difficulties). Additionally, no differences between the obese and healthy controls were found on any of the subscales.
3. Participants with probable BED and overvaluation reported significantly more limited access to emotion regulation strategies than all other study groups, otherwise no differences between groups were observed in this regard.

4. Participants with probable BED and overvaluation had levels of ER difficulties comparable to those of BED patients, whereas ER difficulties among participants in the BED without overvaluation group more closely resembled those of obese (and healthy) control participants (Svaldi et al., 2012).

Discussion

Summary of main findings

The current study sought to compare ER difficulties among women with a probable diagnosis of BED, recruited from a large community-based sample, who did and did not have overvaluation of weight or shape. Obese and normal-weight individuals recruited from the same study population were included for comparative purposes, as well as BED patients from a prior study. There were four main findings. First, women with probable BED and overvaluation reported significantly greater ER difficulties than all other groups. Second, scores on total ER difficulties and majority of the specific aspects of ER difficulties did not differ between participants with probable BED without overvaluation and obese control participants. Third, participants with BED and overvaluation had levels of ER difficulties comparable to those of BED patients, whereas levels of ER difficulties among participants with BED in the absence of overvaluation more closely resembled those of obese individuals who did not binge eat. Women with BED and overvaluation also had significantly more limited access to ER strategies than all other groups, comparable to BED patients, whereas access to ER strategies did not differ between other groups.

Study implications

The current findings further understanding of the status of BED with and without overvaluation through examining ER difficulties. Current models (Polivy and Herman, 1993; Leehr et al., 2015) propose that negative emotion triggers binge eating, which is then maintained through a down-regulation of negative emotion experienced as a result of the binge as well as a lack of alternative adaptive ER strategies (Hilbert and

Tuschen-Caffier, 2007; Whiteside et al., 2007), a feature seen to differentiate individuals with BED from individuals who are obese but do not have BED (Leehr et al., 2015). Hence, the current findings suggest that BED without overvaluation, as a group, does not fit within current conceptualisations of the disorder. An additional implication of the current findings is that BED without overvaluation may more readily be classified as an impulse-control disorder than as an ED (Grant et al., 2005). This follows from the finding that participants with probable BED without overvaluation differed from obese control participants on only two of the six DERS subscales, namely, difficulties engaging in goal directed behavior and impulse control difficulties.

It has been proposed that inclusion of overvaluation should be either as a severity specifier (Grilo, 2013) or a diagnostic criterion for BED (Harrison et al., 2015, 2014; Mond et al., 2007). Either option would serve to improve the clinical utility of the diagnosis, for example, indicating the need for specialist vs self-help and/or behavioral weight-loss treatment approaches within a stepped care model (Iacovino et al., 2012). In addition, given that overvaluation in BED is associated with ER difficulties, the presence of overvaluation would indicate the need for both overvaluation and ER strategies to be targeted in treatment. Inclusion of overvaluation as a diagnostic criterion would, however, have the additional benefits of minimising false positive diagnoses (First, 2010; Harrison et al., 2014, 2015) and aligning BED with other EDs (Fairburn et al., 2003; Fairburn, 2008). Hence we prefer this option. Indeed, the current findings are consistent with a transdiagnostic approach in supporting the role of mood intolerance as a maintaining factor for ED, given that the presence of overvaluation was found to indicate significant ER difficulties among individuals with a probable BED diagnosis.

Study Strengths and Limitations

To our knowledge, this is the first study to examine ER in relation to overvaluation among individuals with a probable BED diagnosis. Recruitment of participants from a community-based sample, the inclusion of appropriate comparison groups, and the use of an established measure of ER difficulties and strategies, are additional strengths of the current research.

However, there were important limitations of the current research. First, the BED and other study subgroups were identified on the basis of self-report assessment of eating disorder features (Fairburn & Beglin, 1994; Mond et al., 2004) and using a time frame for the assessment of these features of one month rather than the three-month duration specified in DSM-5 (APA, 2013). Also as in most previous studies (Harrison et al., 2014; Mond et al., 2007), no attempt was made to assess the additional DSM criteria for BED, namely, the presence of three or more behavioral indicators of loss-of-control over eating and/or of marked distress associated with binge eating, in the current study. However there is little evidence to support the validity of these criteria and as such they are rarely used for research purposes (Grilo, Masheb, Wilson, Gueorguieva, & White, 2011; Mond, Star, & Hay, 2013; Striegel-Moore & Franko, 2008). Additional limitations of the current study were the use of a cross-sectional study design and the inclusion of only female participants. Prospective research is needed to examine the temporal stability of overvaluation and its associations with ER difficulties and other outcomes over time (Masheb and Grilo, 2008; Ojserkis et al., 2012). Inclusion of males with BED and variants of BED in future research is important because these conditions are relatively common in men and because findings from recent epidemiological studies suggest that the prevalence of binge eating, and its impact on psychosocial functioning, may be increasing in men (Hay et al., 2008; Striegel et al., 2012).

Conclusion

The present study found that women with BED and overvaluation reported significantly greater ER difficulties than women with BED in the absence of overvaluation. In addition, women with BED in the absence of overvaluation closely resembled obese women who did not engage in binge eating in terms of overall ER difficulties. These results support the inclusion of overvaluation as a diagnostic criterion for BED in future revisions of classification schemes.

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Chapter Seven
General Discussion

General Discussion

This final chapter will provide a review of the main findings of this research program and address the broader implications of these findings. Additionally, this chapter will consider the strengths and limitations of the research program, identify directions for future research and seek to draw some final conclusions.

7.1 Summary of Main Findings

The goal of the current research was to improve upon existing research addressing, and thereby further understanding of, the status of overvaluation in BED by: (i) utilising community-based samples of individuals with BED; (ii) including appropriate comparison groups; (iii) comparing individuals on measures of both eating disorder psychopathology and psychosocial impairment, including both generic and eating-disorder specific quality of life measures; (iv) extending the research to include young people, i.e., adolescents, in addition to adults; and (v) examining emotion regulation difficulties, a putatively key aetiological mechanism in BED, in order to further elucidate the status of BED with and without overvaluation.

Overall, the findings are in accordance with previous research in adults indicating that the presence of overvaluation indicates a more severe presentation among individuals with BED and variants of this disorder. In addition, the current research provides preliminary support for the hypotheses that: (i) adults with BED and overvaluation from community-based samples experience levels of eating disorder psychopathology, general and eating disorder specific psychosocial impairment and emotion regulation difficulties comparable to those of individuals with BED receiving specialist treatment; and (ii) that, in contrast, adults with BED in the absence of overvaluation from the community have levels of eating disorder psychopathology,

general and eating disorder specific psychosocial impairment and emotion regulation difficulties more closely resembling individuals who are obese but do not binge eat.

The pattern of findings observed among the adolescent population was somewhat different. Consistent with the results for adults, the presence of overvaluation with LOC eating among adolescents was associated with significantly greater levels of eating disorder psychopathology than LOC in the absence of overvaluation. Contrary to the adult findings, however, no significant differences were observed between LOC eating with and without overvaluation on measures of psychosocial impairment. Adolescents with LOC eating and overvaluation did, however, have significantly higher levels of disorder psychopathology and psychosocial impairment than obese adolescents who did not have LOC eating episodes, whereas adolescents with LOC eating in the absence of overvaluation were comparable to the obese control group on these measures. Hence, while there was indirect evidence that overvaluation indicates a more severe presentation among adolescents with LOC eating, the findings were not as clear-cut as those observed among adults with BED and variants of BED.

Overall, the findings suggest that among adults with BED, the presence of the overvaluation indicates a clinically significant eating disorder, whereas the clinical significance of BED in the absence of overvaluation is unclear. These findings suggest that inclusion of overvaluation among the diagnostic criteria for BED warrants greater consideration. However, the fact that the LOC eating with and without overvaluation groups were not as clearly distinguishable in the adolescent sample indicates that further research among adolescents is needed to elucidate the role of overvaluation in youth and to inform the potential for diagnostic consistency across the lifespan.

7.2 Diagnostic and Treatment Implications

As outlined in Chapter Two, there are two important benefits of the inclusion of overvaluation among the diagnostic criteria for BED: (i) aligning BED with the transdiagnostic cognitive behavioural theory of eating disorders, and with other eating disorders (Fairburn et al., 2003); and (ii) improving the clinical utility of the diagnosis.

The findings of the current research are consistent with the transdiagnostic model of eating disorders, which holds that overvaluation is a core feature common to all eating disorders including BED. In the absence of overvaluation, individuals with BED and variants of BED are generally indistinguishable from obese individuals who do not have episodes of binge or LOC eating. In terms of implications for clinical practice, and also consistent with the transdiagnostic model, the current findings suggest, first, that clinicians need to assess and monitor overvaluation throughout the treatment process, given its clear association with distress and impairment (Grilo, 2013; Mond et al., 2013); and second, it is likely overvaluation needs to be a key target of treatment such as with the other formal eating disorders, anorexia nervosa and bulimia nervosa, though additional prospective data is required (Fairburn, 2008). The current findings also suggest that overvaluation might usefully be targeted in prevention and early intervention programs for individuals at risk of or showing early signs of BED, though such a claim is controversial and requires additional data on the effectiveness of such an approach (Evans et al., 2011; Mitchison, Hay, Slewa-younan, & Mond, 2012; Wilfley, Agras, & Taylor, 2013).

The current findings also have implications for the specific formulation of the transdiagnostic theory of eating disorders (Fairburn et al., 2003; Fairburn, 2008). As outlined previously (see Figure 2.2), the model currently proposes that overvaluation and mood intolerance are core maintaining factors for binge eating but that

overvaluation impacts on binge eating indirectly via dietary restraint. While individuals with BED report comparable levels of weight or shape concerns to bulimia nervosa, they report significantly less dietary restraint, and in many cases binge eating occurs against a background of overeating rather than restraint (Craighead, Martinez, & Klump, 2013). Further, it is not uncommon for individuals with BED to report that the occurrence of binge eating episodes predated that of concerns about weight or shape (Mussell et al., 1995). Hence, models of the aetiology of BED that place greater emphasis on emotion regulation than on dietary restraint have been developed (Heatherton & Baumeister, 1991; Leehr et al., 2015; Polivy & Herman, 1993; Telch et al., 2001). In order for BED to fit within the transdiagnostic conceptualisation of eating disorder psychopathology, it may be that an additional pathway linking overvaluation, mood intolerance and binge eating is necessary. Such a pathway would align aetiological models of emotion regulation with current and other findings bearing on the significance of overvaluation among individuals with BED and variants of BED, thereby providing for the incorporation of BED in current transdiagnostic approaches to eating disorder psychopathology. Such tentative hypotheses require further research and validation in order to develop the transdiagnostic conceptualisation of eating disorders to effectively incorporate BED.

A second key benefit of including overvaluation among the diagnostic criteria for BED is that this would improve the clinical utility of the diagnosis (First, 2010). However, reference to overvaluation among the diagnostic criteria for BED as a diagnostic specifier, rather than a criterion per se, might also be considered and this option has been advocated by some authorities (Grilo, 2013). The inclusion of overvaluation as a diagnostic specifier for BED would improve clinical utility in at least

three of the four ways identified by First (2010), namely: (i) “splitting a heterogeneously broad diagnostic category”; (ii) facilitating effective interventions; and (iii) predicting future clinical management. The use of a specifier for overvaluation to improve clinical utility in these ways would resemble the use of specifiers in depressive disorders and the other eating disorders (Grilo et al., 2012).

Reference to overvaluation as a diagnostic specifier, rather than a diagnostic criterion, would, however, neglect the fourth function of clinical utility outlined by First et al. (2010), namely, the *differentiation of a disorder from non-disorder*. This entails striking an appropriate balance between “false positive” and “false negative” diagnoses. Earlier version of the DSM were criticised for overly liberal diagnostic thresholds leading to ‘over pathologising’, potentially leading to unnecessary stigma, inappropriate use of health care resources based on inflated estimate of disease prevalence (Caplan & Cosgrove, 2004; Wakefield et al, 2007). The broader use of a ‘clinical significance criterion’ in DSM-IV was designed to address this “false positives” problem (Spitzer & Wakefield, 1999). On the other hand, overly stringent diagnostic criteria might be conducive to unacceptably high rates of “false negative diagnoses”, namely, individuals with clinical significant disorders failing to receive a diagnosis and, potentially, the treatment that they need (Wakefield et al., 2007).

With respect to diagnostic criteria for BED, attention has, thus far, focused on the potential for false negative diagnoses associated the inclusion of overvaluation as a diagnostic criterion (Grilo, 2013) whereas the potential for false positives associated with inclusion of overvaluation as a diagnostic specifier has not been considered (Mond, 2013). The main argument for the inclusion of overvaluation as a specifier has been that an unacceptably high proportion of individuals with significant eating disorder

psychopathology would be excluded from diagnosis and, potentially, access to treatment, were overvaluation to be included as a diagnostic criterion (Grilo, 2013). On the other hand, failure to include overvaluation as a diagnostic criterion for BED may be conducive to unacceptably high levels of false positive diagnoses.

Inclusion of overvaluation as a diagnostic criterion may also eliminate the need for two of additional criteria for BED (i.e., additional to the occurrence of binge eating episodes and the absence of extreme weight-control behaviours) currently included in the DSM, namely, the presence of three or more of five possible behavioural markers of loss of control over eating (e.g., eating much more rapidly than normal, eating until feeling uncomfortably full) and the presence of marked distress associated with binge eating. In the absence of a clinical significance criterion for the provisional (DSM-IV) diagnosis of BED, the inclusion of these criteria was designed to reduce the occurrence of false positive diagnoses (Mond, 2013; Spitzer & Wakefield, 1999). However their validity remains unclear and as such they are rarely used for research purposes (Grilo, Masheb, Wilson, Gueorguieva, & White, 2011; Mond, 2013; Striegel-Moore & Franko, 2008). Inclusion of overvaluation in place of these criteria would be a more parsimonious approach to minimising the occurrence of false positives.

7.3 Strengths and Limitations of the Current Research

Strengths. The current program of research had three main strengths. First, the utilisation of large, community-based samples is essential for understanding ‘bulimic type’ eating disorders such as BED and BN. This follows from the fact that only a small proportion of individuals with these disorders receive specialist mental health treatment and individuals in this subgroups are likely to be atypical in various respects (Fairburn, Welch, Norman, O’Connor, & Doll, 1996; Mond et al., 2007a; Wilfley, Pike, Dohm,

Striegel-Moore, & Fairburn, 2001). In particular, given that distress and disability were key outcome variables in the current research program, and given that these variables are strongly predictive of help-seeking (Mond et al., 2009), the recruitment of participants from a community-based sample was important.

A second strength of the current research was the inclusion of appropriate comparison groups in all studies. The inclusion of an obese non-binge eating subgroup in particular was considered important given that: (i) individuals with BED frequently are obese; (ii) in women at least, obesity is associated with distress and functional impairment independent of the occurrence of binge eating (Dingemans & van Furth, 2012); (iii) greater impairment in quality of life when compared with obesity was a key feature of BED deemed to support its inclusion as a formal diagnosis in DSM-5 (APA, 2013; Mond, 2013). A healthy comparison group comprised of individuals in the normal weight range who did not have binge eating or other eating disorder behaviours was also included in all of studies comprising the current research program and in studies three and four data from individuals with BED receiving specialist treatment were also considered. The inclusion of these different comparison groups made it possible to consider the clinical significance of BED with and without overvaluation more carefully than has been possible in much of the existing research.

Third, the current research program includes one of the very few studies to have addressed the role of overvaluation in BED among adolescents. This is important given that taking a life-span approach to the assessment and treatment of eating disorders and other mental disorders was a key aim of the DSM-5 revision process (American Psychiatric Association, 2013; Walsh, 2012). The findings illustrate the difficulty of developing diagnostic criteria for mental disorders that are developmentally-sensitive

when key diagnostic features may present differently in young people and adults.

Overvaluation appears to be such a feature in that comprehension, and in turn assessment, of this construct likely requires a level of developmental maturity exceeding that typically observed in childhood and early adolescence (Bravender et al., 2010).

Finally, the current research is, to the author's knowledge, the first to examine emotional regulation difficulties in relation to the presence or absence of overvaluation over individuals with BED and variants of BED. This made it possible to examine not only whether individuals with BED with and without overvaluation experience eating disorder psychopathology, distress and disability of clinical significance; but also, whether and to what extent the respective subgroups fit within current conceptualisations of BED in which emotion regulation is seen to be a core aetiological and maintaining factor (Leehr et al., 2015; Polivy & Herman, 1993). As outlined above, findings in this review are consistent with the conclusion that BED in the absence of overvaluation does not constitute a clinically significant eating disorder.

Limitations. At least three limitations of the current research program should be acknowledged. First, and arguably most importantly, all of the studies comprising the current research program relied on self-report data in identifying probable cases of BED with and without overvaluation, along with the comparison groups of obese and normal-weight non-binge eaters. While self-report assessment of overvaluation, height and weight has been found to correspond closely with interview data in most populations (Berg, Peterson, Frazier, & Crow, 2012; Fairburn & Beglin, 1994; Mond, Hay, Rodgers, Owen, & Beumont, 2004), it is well known that the occurrence and/or frequency of binge eating episodes is likely to be over-estimated when using self-report assessment

(Fairburn & Beglin, 1994; Mond, Hay, Rodgers, Owen, & Beumont, 2004). Further, the self-report measure of eating disorder symptoms employed in the current study assesses these symptoms over the past 28 days, as opposed to the three month period required in the DSM-5 (APA, 2013). An additional limitations of the EDE-Q is that it does not assess the additional criteria for BED referred to above, namely, the behavioural markers of loss of control over eating and the presence of marked distress regarding binge eating (APA, 2013). As has also been noted, however, the validity of these criteria remain unclear and as such they are rarely used for research purposes even where interview assessment is employed (Grilo, Masheb, Wilson, Gueorguieva, & White, 2011; Mond, 2013; Striegel-Moore & Franko, 2008).

To the extent that these limitations reduce the likelihood of probable BED cases being clinically significant, the findings of the current research would need to be interpreted with caution. However, there was little evidence that probable cases of BED in the current research were in any sense “mild”. Among adults and when overvaluation was present at least, levels of eating disorder and comorbid psychopathology observed among probable BED cases in the current research were as elevated as those of individuals with BED receiving specialist treatment. It is possible that identification of probable cases of BED among adolescents by means of self-report assessment is more problematic and that the “cases” identified in study two were relatively mild when compared with those of adolescents with BED receiving specialist treatment. This might account, in part, for the less clear differentiation of overvaluation subgroups among adolescents with a probable BED diagnosis observed in the current research. The inclusion of a comparison group of adolescents with BED receiving specialist treatment will be needed to address this issue in future research of this kind.

A second important limitation of the current research program is that only females were included. The rationale for this decision was twofold. First, comparison of the current findings with those of previous research, in which all-female samples have typically been employed, was deemed to be important. Second, the lower base rates of BED and overvaluation in males suggested that very large sample sizes would be needed to address the study aims while retaining the use of community-based samples (Striegel-Moore et al., 2009). Nevertheless, findings from recent epidemiological studies suggest that the prevalence of both binge eating and overvaluation and, perhaps, the adverse impact of these on mental health and quality of life, may be increasing in males (Hay, Mond, Buttner, & Darby, 2008; Striegel, Bedrosian, Wang, & Schwartz, 2012). The inclusion of males in future research of this kind will therefore be important.

A third notable limitation of the current research program is the use of a cross-sectional study design in all four studies. The use of a prospective study design in future research would permit, among other things, consideration of the role of overvaluation in predicting outcomes among individuals with BED and variants of BED. Recent studies have begun to explore these issues (Ojserkis, Sysko, Goldfein, & Devlin, 2012). Ojserkis and colleagues (2012) found that clinical levels of overvaluation among women and men receiving treatment for BED were associated with greater severity of eating pathology, depression and self-esteem prior to treatment and that overvaluation significantly predicted greater binge eating severity and lower self-esteem following treatment (Ojserkis et al., 2012). The use of a prospective study design would also permit issues relating to developmental change in the importance of overvaluation and/or emotion regulation difficulties among individuals with a probable BED diagnosis to be explored. Clinical samples will likely be required for research of this kind, in view

of the difficulty of conducting prospective, community-based studies that include both males and females.

7.4 Future Directions

As suggested above, a key issue for future research will be the applicability of the current diagnostic criteria for BED to young people (Bravender et al., 2010). Study two of the current thesis was one of the few to examine overvaluation in youth with a probable BED diagnosis, concluding, along with the only other study of this kind, that overvaluation does not appear to play as clear a role in indicating impairment among adolescents with BED as it does among adults (Goldschmidt et al., 2011). Differences in the presentation and correlates of BED in young people and adults is not altogether surprising and recommendations taking these differences into account have been made (Bravender et al., 2010). These include the need to assess LOC eating rather than binge eating when considering the occurrence of BED among children and adolescents and, perhaps, lower thresholds for the frequency of LOC eating (Bravender et al., 2010).

Differences between adolescents and adults also likely exist with regard to the role of overvaluation among individuals with BED. The Workgroup for the Classification of Eating Disorders in Children and Adolescents (WCEDA) noted that the overvaluation requires ‘higher-order abstract reasoning’ that may not be present until late adolescence (WCEDCA, 2007). Hence, developmental differences in the role of overvaluation among individuals with BED would not be surprising. Further, given the association between overvaluation and severity, it may be that chronicity of illness is associated with impairment such that impairment is less evident or prominent in the early stages of the disorder. Further research into BED among children and adolescents

will be needed to inform developmentally-specific criteria not only for BED but for eating disorders more generally (APA, 2013; Bravender et al., 2010).

A second important direction for future research will be clarification of the status of BED in the absence of overvaluation. The current findings strongly suggest that this presentation does not constitute a clinically significant eating disorder. This follows from the fact that individuals in this subgroup were indistinguishable from the obese individuals who do not have binge eating episodes in most respects. On the other hand, individuals with BED in the absence of overvaluation had higher levels of distress and disability than healthy individuals and differed from obese non-binge eaters in certain respects relating to emotion regulation. Specifically, individuals with BED in the absence of overvaluation may have greater difficulty engaging in goal-directed behaviour and greater impulse control difficulties than obese individuals who do not binge eat. This finding raises the possibility, albeit tentative, that BED in the absence of overvaluation may warrant consideration as a disorder of impulse-control rather than an eating disorder (Grant, Levine, Kim, & Potenza, 2005).

7.5 Conclusion

The current research provides support for the inclusion of overvaluation as a diagnostic criterion for BED in future revisions of classification schemes. This would improve the clinical utility of the diagnosis by drawing attention to overvaluation as a key target of treatment, while also serving to align BED with AN, BN and variants of all three disorders within a transdiagnostic framework. It would also provide for a more parsimonious classification than that currently available, which includes diagnostic criteria the validity of which is unclear and which are likely redundant. Further research will be needed to elucidate the significance of overvaluation among males and young

people with BED and variants of BED, including the clinical significance of BED in the absence of overvaluation and the significance of emotional regulation difficulties in this subgroup. Ideally, this research would be conducted in prospective, community-based samples.

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