TRANSDIAGNOSTIC FEATURES OF BULIMIA NERVOSA

AND BINGE EATING DISORDER

by

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ABSTRACT

The transdiagnostic cognitive behavioural theory of eating disorders

(Fairburn, Cooper, & Shafran, 2003) is a relatively new theory, which attempts to

describe how all eating disorders, including Bulimia Nervosa (BN) and Binge Eating

Disorder (BED), are maintained. The theory suggests that in certain patients, core

psychopathology interacts with one or more of four additional maintenance

mechanisms which further maintain the eating disorder, thereby obstructing change.

The four proposed maintenance factors include the role of a particular type of

perfectionism, clinical perfectionism; difficulty in tolerating strong mood states, or

mood intolerance; interpersonal difficulties; and an extremely low self-esteem,

termed core low self-esteem.

This series of studies examines both the cognitive and behavioural processes

involved in the core psychopathology of eating disorders, and the additional

proposed maintenance mechanisms in BN and BED. The overall aim of these studies

is to investigate whether the additional processes described by the transdiagnostic

cognitive behavioural theory of eating disorders (Fairburn et al., 2003) operate in

BN and BED, thereby providing a more comprehensive account of the maintenance

of these eating disorders.

The first study used questionnaires to assess features of the transdiagnostic

cognitive behavioural model of eating disorders (Fairburn et al., 2003) in a group of

20 participants with BN and 15 with BED. These groups were compared to control

groups of 20 participants each who were normal weight (NW) and overweight (OW)

but not eating disordered. It was followed by two studies examining the cognitive

processes maintaining disturbed and disordered eating. The second study examined

memory biases to eating, shape, weight and achieving perfection in disturbed eaters

using six groups of 20 participants, varying by levels of dietary restraint, whether or

not they were currently dieting and whether they were NW or OW. The third study

examined attentional bias (using a modified visual probe task) towards the same

kind of information in the disordered eaters from the first study.

Overall, the results of the studies indicated that individuals with BED and

BN exhibit similar features, which supports the notion of similar maintenance

factors across eating disorders proposed by the transdiagnostic cognitive behavioural

theory (Fairburn et al., 2003). Both mood intolerance and interpersonal difficulties

were identified to be specific maintenance factors in these eating disorders. While

perfectionism and low self-esteem were identified in high levels for both eating

disorders, the nature of clinical perfectionism and core low self-esteem requires

further investigation. In relation to the cognitive tasks, a differential memory bias for

eating, shape, weight and achieving perfectionism was evident for those who were

high in dietary restraint in comparison to those who were currently dieting

suggesting that cognitive processes play a role in the maintenance of disturbed

eating. It was followed by findings that the BN and BED groups exhibited a similar

attentional bias effect, with a characteristic hypervigilance-avoidance response to

information that was congruent with beliefs about eating, shape, weight and

perfectionism.

This series of studies provided support for BN and BED being adequately

described by the transdiagnostic cognitive behavioural theory of eating disorders

(Fairburn et al., 2003). The implications of these results are discussed in relation to the diagnostic status of BED, the transdiagnostic theory of eating disorders and the implications of identification and management of these disorders.

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CHAPTER 1

INTRODUCTION AND OVERVIEW

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1.1 INTRODUCTION

Eating disorders such as Anorexia Nervosa (AN) and Bulimia Nervosa (BN) represent a significant clinical problem and have been well researched over previous decades. Disordered eating is characterised by significant psychological dysfunction and impairment to social, occupational and personal functioning. By comparison, disturbed eating is generally defined by unhealthy eating habits, such as those associated with restrained eating or in those who are obese or overweight (OW) and disturbed eaters can be distinguished from those with disordered eating as they do not tend to have the same characteristic psychological features seen in AN and BN.

In addition to the above mentioned eating disorders, research criteria have been proposed for a third distinct eating disorder, Binge Eating Disorder (BED) and this disorder is considered distinct from both AN and BN and dissimilar to the Eating Disorder Not Otherwise Specified (eating disorder NOS) category, under which it is currently classified (APA, 2000). The primary features of BED include uncontrolled binge eating in the absence of concurrent purging or compensatory behaviours often characteristic of BN. In comparison to AN and BN, far less is understood about the processes involved in BED and there has been a suggestion that BED may be a form of disturbed eating, similar to those who are OW or obese rather than a distinct eating disorder. It has also been suggested that BED shares similar processes to BN and is a variant of this disorder.

This research is particularly interested in two of the eating disorders, BN and BED. It is suggested that eating disorders such as BN and BED are particularly prevalent among young females across a variety of different cultures (APA, 2000;

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Hoek & Van Hoeken, 2003) and represent a significant cost to both individuals and society. Despite their relative prevalence, eating disorders are recognised as being notoriously difficult to treat. This means that by developing a better understanding of the processes involved in maintaining eating disorders there are likely to be advances in the treatment approach for these patients.

Cognitive behavioural theories of eating disorders appear to be the most influential in the treatment of these disorders (Byrne & McLean, 2002). In general, these theories highlight the influence of overconcern with eating, weight and shape and their control directly contributes to dietary restraint, which in turn leads to binge eating episodes and subsequent compensatory purging behaviours. In cognitive behavioural theory, treatment strategies are targeted at each of these factors.

More recently, these factors have been included in one composite theory, the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). This theory suggests that similar factors contribute to the development and maintenance of all eating disordered behaviour (including those involved in BN and BED as well as AN and eating disorder NOS). The transdiagnostic cognitive behavioural theory extends on previous theories by suggesting that (one or more of) four additional maintaining mechanisms may be present in individuals with eating disorders and that these additional factors further obstruct change. As such, the transdiagnostic cognitive behavioural theory is able to describe the maintenance of separate eating disorders as it is able to individualise the maintenance factors involved in any person's eating disorder by examining the core processes and whether there is evidence of the additional maintenance mechanisms operating.

The four additional maintenance mechanisms include the influence of a

certain kind of perfectionism, termed clinical perfectionism; an extremely low self-

esteem, termed core low self-esteem; as well as mood intolerance and interpersonal

difficulties. These factors have been incorporated into cognitive behavioural

conceptualisations where overconcern with eating, shape and weight (and their

control) and overconcern with achieving perfectionism, in combination with very

low self-esteem, are all suggested as potential factors contributing to dietary restraint

and the subsequent triggering of binge eating and compensatory purging. Adverse

interpersonal events and mood problems are seen as further triggers to binge eating

and eating problems in general. Overall the transdiagnostic cognitive behavioural

theory (Fairburn et al., 2003) provides an account that seems to explain all eating

disordered behaviour but this theory has yet to be tested empirically and also has not

been examined in relation to BED.

Fairburn et al. (2003) suggest that the transdiagnostic cognitive behavioural

theory has implications for treatment as it is well recognised that the treatment of

eating disorders poses a significant clinical challenge. This treatment builds upon

past successful cognitive behavioural treatments for BN (Fairburn, Marcus, &

Wilson, 1993) through the inclusion of the four additional maintaining mechanisms

and is suggested to be an effective form of treatment regardless of the diagnosis and

provided outpatient treatment is appropriate. The main advantage of this treatment is

that it operates on additional problems which may obstruct change (Fairburn et al.,

2003) thereby providing a more potent treatment. The treatment is also highly

individualised which accounts for the many variations that occur in presentations of

these patients. It is also worth noting that further treatment advances for eating

disorders have been made in the field of interpersonal psychotherapy (Fairburn,

1997) and dialectical behaviour therapy (Safer, Telch, & Agras, 2001; Wiser &

Telch, 1999) although the evidence supporting these treatments for the full spectrum

of eating disorder presentations is yet to be presented. Overall, eating disorders are

associated with pervasive psychological characteristics which tend to make

treatment challenging and there is a lack of research across the board regarding this

patient group (and the full spectrum of eating disorder cases). This highlights the

importance of ongoing research to both underpin the theoretical basis on which

treatments are based and to support the treatments themselves. This thesis attempts

to explore the theoretical underpinnings of the transdiagnostic cognitive behavioural

theory of eating disorders in BN and BED.

1.2 THE TRANSDIAGNOSTIC APPROACH TO EATING DISORDERS AND

ITS APPLICATION TO BINGE EATING DISORDER

As BED has been proposed as a separate psychiatric condition (APA, 2000)

research regarding the similarities and differences of BED and other eating disorders

(such as BN) has important implications for its inclusion in the next version of the

Diagnostic and Statistical Manual (DSM). BED is proposed to describe individuals

who are currently classified under eating disorder NOS and whose primary form of

disordered eating is characteristic binge eating. Unlike in BN, those with BED do

not tend to engage in compensatory purging following their binges and therefore are

often OW. A number of shared characteristics between BED and OW and those who

are obese have also been noted; although it is suggested that the nature of overeating (i.e. binge eating) is slightly different in BED. This highlights the importance of comparing those with BED to both BN and those who are OW or obese.

The overall aim of this thesis is firstly to confirm that BED should be considered an eating disorder as opposed to a form of eating disturbance, and secondly, to examine whether BED and BN share similar shared characteristics that can be explained through the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), or whether separate mechanisms operate for each. One way to examine these aims is through the idea of a continuum of eating habits and weight, evolving from those who are normal weight (NW) or OW and have fairly typical eating habits, to those with disturbed eating habits. At this end of the continuum, dietary restraint and overeating would be seen to progress into disordered eating where there may be more severe dietary restriction, binge eating behaviours and compensatory behaviours.

Another way to examine this is to directly compare BN and BED on the processes described in the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). This means that it is important to consider whether BN and BED share similarities or demonstrate differences in the presence (or absence) of the influence of clinical perfectionism, core low self-esteem, mood intolerance and interpersonal difficulties. It is also important to consider whether BN and BED can be explained by one theoretical model, as these disorders have different features and would therefore be conceptualised slightly differently (although this is accounted for by the transdiagnostic cognitive behavioural theory).

Finally, in order to examine one of the core features identified by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), this study also aims to further investigate the nature of the dysfunctional scheme for self-evaluation proposed to be evident across eating disorders such as BN and BED as this feature appears to be a core process in all eating disorders and one of the main maintenance factors. This will be examined in relation to overconcern with eating, shape and weight (and their control) and overconcern with achieving perfection through experimental cognitive bias tasks.

It is well recognised that the nature of cognitive bias in eating disorders such as BN and BED has important implications for both the theory and treatment of eating disorders (Williamson, Muller, Reas, & Thaw, 1999), although this has been relatively neglected by research. The impact of cognitive bias in both BN and BED may involve clinical features such as selective attention to or avoidance of certain food types (particularly those that are typically high in calorie and fat content); repetitive checking, selective attention to or avoidance of weighing the self or of specific body parts (usually the stomach, thighs and buttocks); and finally selective attention to, or avoidance of, information consistent with a belief that the individual needs to achieve perfection and meet very high and demanding personal standards.

Cognitive bias in BN and BED can be examined by experimental tasks that assess attentional bias. Research investigating attentional bias in eating disorders is limited and until recently, has tended to utilise a methodology known as the modified Stroop task. Findings from studies utilising this task indicate that there is interference in the information processing of words and pictures related to eating

and shape in individuals with eating disorders (Green, Corr, & De Silva, 1999; Lovell, Williams, & Hill, 1997; Sackville, Schotte, Touyz, Griffiths, & Beumont, 1998; Walker, Ben-Tovim, Paddick, & McNamara, 1995) suggesting support for the notion of a dysfunctional scheme for self-evaluation in eating disorders. The other finding from these studies is that those with eating disorders show selective attention towards more general threatening words, such as those that relate to aspects of the self (e.g. "failure") (McManus, Waller, & Chadwick, 1996; Waller & Meyer, 1997). This finding suggests possible evidence for the notion of over-concern with aspects relating to the self, such as achieving perfection which are extended on by the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003).

Significant limitations in the Stroop methodology have been noted (Dobson & Dozois, 2004; Huon, 1995; Lee & Shafran, 2004) resulting in the development and utilisation of another task, the visual dot probe task (MacLeod & Mathews, 1988; Posner, Snyder, & Davidson, 1980). This task has been found to demonstrate a range of attentional bias effects in a range of groups, including those with eating disorders, those who experience high eating disorder symptomatology, those with body dissatisfaction and those who are high in dietary restraint. Specifically, these studies have found attentional to be preferentially directed towards negative information relating to shape and weight and away from positive information relating to shape and weight for individuals with AN and BN (Reiger et al., 1998; Shafran, Lee, Cooper, Palmer, & Fairburn, 2007); and towards eating related information generally those with the full range of eating disorders (Shafran et al., 2007). Studies have also found that attention is preferentially directed towards high

calorie food when those without eating disorders are fasted and for those who score highly on eating related symptomatology (but do not reach full criteria for any eating disorder); and towards low calorie food when non-fasted (Placanica, Faunce, & Job, 2002). There have also been findings of preferential attention towards negative shape and weight related information for individuals high in body dissatisfaction (Smith & Rieger, 2006) and to indicate that less time is required for restrained eaters to process food words (Boon, Vogelzang, & Jansen, 2000). Overall, these studies indicate that individuals with eating disorders, and those with concerns about eating, shape and weight, experience particular biases in the processing of food and weight related information.

Understanding the biases in information processing has implications for the transdiagnostic cognitive behavioural model of eating disorders (Fairburn et al., 2003) as the dysfunctional scheme for self-evaluation is central to this model, highlighting the importance of investigation of information processing. It is important to examine these processes within those with BN and BED to see whether both of these groups can be adequately described by this theory.

1.3 OVERVIEW OF THESIS

To begin, Chapter 2 provides a definition of each of the eating disorders of focus (BN and BED). This chapter provides an overview of the areas of overlap and the distinctive features these eating disorders as well as for the dietary behaviour of individuals who are NW and OW or obese. Consideration is given to factors such as

prevalence, sex, distribution, age of onset, course and comorbidity and the similarities and differences of these conditions are examined to determine whether BN and BED can both be explained by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003).

Chapter 3 provides an overview of the general theory of dietary behaviour relevant to the aetiology of BN, BED and obesity as well as disturbances in the eating behaviour of individuals who are NW. The continuity theory of eating disorders is examined, with consideration of a range of eating behaviours, from normal eating through to disturbed and disordered eating. Further factors such as dietary restraint, obesity and binge eating are examined as these behaviours are evident (though to varying degrees) in both BN and BED.

Chapter 4 examines the cognitive behavioural theory of BN and BED and the suggestion of a need for an omnibus theory of eating disorders. The transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) is described and the core maintaining mechanisms of clinical perfectionism, core low self-esteem, mood intolerance and interpersonal difficulties are described in detail. Empirical support for each of these maintaining mechanisms is provided for BN and BED as a way of examining whether the additional mechanisms operate consistently across these eating disorders. Individuals with BN and BED are compared to those who are OW and NW for each of maintaining mechanisms in order to determine whether the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) can explain both of these conditions.

Chapter 5 examines the literature pertaining to cognitive bias in eating

disorders as it relates to one of the core features of eating disorders, the

dysfunctional scheme for self evaluation. Both memory bias and attentional bias are

explored through relevant research on dietary behaviour, eating disorders and other

psychiatric disorders. The implications for the presence of cognitive bias in relation

to the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et

al., 2003) are reviewed. Methodological issues are raised in relation to measuring

tools for cognitive bias.

The empirical chapters (Chapters 6-8) make comparisons between two sets

of groups. The first set of groups comprises individuals with diagnoses of eating

disorders and their controls by comparing individuals who binge eat with and

without compensatory behaviour (in the form of purging), those who are OW and do

not binge eat and those who are NW and do not binge eat. The second set of groups

comprises of individuals with disturbed eating and their controls, and compares

individuals on several dimensions including high or low dietary restraint, whether

they are currently dieting or not dieting and whether they are NW or OW.

Chapter 6 reports the results of between group comparison of eating and

general symptomatology and core maintaining mechanisms from the transdiagnostic

cognitive behavioural theory of eating disorders (Fairburn et al., 2003) between the

first set of four groups and specifically examines the similarities and differences for

BN and BED. Widely used measures of eating psychopathology and

symptomatology are utilised, as are measures of perfectionism and self-esteem as

well as interpersonal difficulties and mood intolerance. In addition, this chapter

presents descriptive information about the groups in terms of demographic variables and binge eating behaviour.

Chapter 7 considers the presence of a memory bias using an explicit memory recall task in OW and NW individuals high and low in dietary restraint and who may or may not be currently dieting. Specifically, memory bias for information relating to overconcern with eating, shape and weight and perfection is explored, as these are key features of the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003).

Chapter 8 extends the findings of the previous chapter and examines the presence of an attentional bias via a modified visual probe task in individuals with BN and BED as opposed to those who are OW or NW. Attentional bias for information relating to overconcern with eating, shape and weight and perfectionism in individuals in these four groups. Implications for the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) are examined.

Finally, Chapter 9 provides a summary and integration of the overall results specifically in relation to the implications for the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). Methodological issues are highlighted and directions for future research are proposed.

CHAPTER 2

THE PROBLEM OF EATING DISORDERS

2.1 INTRODUCTION

The current classification of eating disorders has recently come into question (Fairburn et al., 2003; Williamson, White, York-Crowe, & Stewart, 2004) due to recognition of common features evident across diagnoses (Fairburn et al., 2003; Wade, Bergin, Martin, Gillespie, & Fairburn, 2006). Examination of the similarities and differences of eating disorders allows for advances in the classification and diagnosis of eating disorders. This is more than an empty exercise because appropriate classification may have treatment implications. The features that this research is focusing on include prevalence, course and demographics of BN and BED as well as similarities and differences of the symptomatology and psychopathology of these eating disorders.

This thesis is interested in examining the similarities and differences of the eating disorders which are characterised by binge eating, including BN and BED. The main interest is in establishing how the phenomenological experience of BN and BED is both similar and different as the majority of previous research conducted on these disorders appears to have focused just on the differences between the two. Research has suggested that BN and BED can be distinguished by age of onset, and whether the individual commenced by dieting or binge eating first. There have also been general differences found in psychopathology and symptomatology. Similarities have been established in terms of prevalence, incidence and sex distribution. Although previous research tends to suggest that there are a number of differences between the disorders, and has tended to conclude that they are separate

conditions, the question is whether these disorders are distinct or whether they involve variations on one common disorder of eating.

As BED has been closely linked with obesity (Ricca et al., 2000) this has led to questions as to whether BED represents a condition closer to the behaviour of those who are obese or OW, than those with eating disorders. As a result, research has varied in the conceptualisation of BED with some considering BED as part of a continuum of the spectrum of BN (Fairburn, Welch, & Hay, 1993; Raymond, Mussell, Mitchell, de Zwann, & Crosby, 1995); some considering it to be a behavioural condition experienced by a subset of obese individuals (de Zwaan, Nutzinger, & Schoenbeck, 1992); and others proposing that BED is a unique disorder that is categorically different to both BN and obesity (Geliebter, Hassid, & Hashim, 2001). Another more recent proposition is that BED and BN should not be categorised separately, but rather under the overarching umbrella of eating disorder diagnosis (Fairburn et al., 2003). This would suggest that the separate eating disorder categories should be eliminated and one eating disorder continuum replace it. It would also imply that a similar approach to prevention, assessment and treatment could be applied across eating disorders. This suggestion has important implications for the research conducted on these conditions.

Although it has been established that there are key differences between BN and BED and between BED and obesity, there has been limited research focusing on the similarities of these disorders and whether they should be classified under a transdiagnostic cognitive behavioural theory (Fairburn et al., 2003). This research provides evidence in support of the proposition that individuals with BED do

experience a degree of psychopathology reflective of other eating disorders, rather

than a disturbance in eating as in those who are OW or obese. In order to examine

the various perspectives on BED, this research also compares characteristics of BN,

BED and the condition of being obese or OW, as this will assist in determining

whether BED also fits into a transdiagnostic cognitive behavioural theory of eating

disorders.

2.2 WHAT IS AN EATING DISORDER

Eating disorders are characterised by extreme disturbances in eating

behaviour and represent a significant health concern (Garner & Garfinkel, 1997).

The most recognised and utilised scheme for classifying and diagnosing eating

disorders, the American Psychiatric Association's DSM-IV (APA, 2000), recognises

two eating disorders, AN and BN as well as a third category for eating disorder NOS

(or atypical eating disorders). Research criteria for BED are also provided.

Diagnostic criteria for AN, BN and the proposed criteria for BED are outlined in

Table 1. There are no identified criteria for those individuals characterised by eating

disorder NOS; instead this diagnosis is reserved for individuals whose eating

disorder reaches clinical severity but does not meet diagnostic criteria of AN or BN.

Table 1

Diagnostic criteria for the DSM-IV eating disorders

Anorexia Nervosa
1. Over-evaluation of shape and weight and their control
2. Intense fear of gaining weight or becoming fat, despite being underweight
3. Active maintenance of low body weight (less than 85% of what would be expected or a body mass index of ≤17.5)
4. Amenorrhea (in post-pubertal females)

Bulimia Nervosa
1. Over-evaluation of shape and weight and their control, as in anorexia nervosa
2. Recurrent binge eating: A binge includes any episode of eating during which an objectively large amount of food is eaten for the circumstances with an associated sense of loss of control at the time
3. Compensatory weight-control behaviours (e.g. prolonged dietary restriction; recurrent self-induced vomiting or laxative misuse)

Eating Disorder Not Otherwise Specified
1. Includes a range of other disordered eating patterns
2. A residual category for those individuals who present with eating disorders of a clinical severity that do not meet criteria for anorexia nervosa or bulimia nervosa

Binge Eating Disorder
1. Periods of uncontrolled, impulsive or continuous eating to the point of being uncomfortably full
2. Repeated episodes of binge eating, as in bulimia nervosa
3. No compensatory behaviour, contrary to that in bulimia nervosa

The current classification system from the DSM-IV (APA, 2000) implies

that all of these eating disorders are distinct conditions requiring distinct forms of

treatment, thereby encouraging them to be researched separately. Despite this, when

the diagnostic criteria for each eating disorder are examined there are a number of

similarities and relatively few differences, with one exception, that BED often has

less of the common features of other eating disorders.

The proposed criteria for BED do not recognise the overconcern with shape

and weight, dietary restriction or compensatory or non-compensatory weight control

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behaviours evident in other eating disorders. Another easily recognised difference between BED and BN is that those with BED are often OW while those with BN tend to be NW (Striegel-Moore et al., 2001). Further, individuals with BED tend to overeat as well as binge eat (Pincus & First, 1999) and this is not a common feature of BN and AN, where there is similar eating behaviour (with the exception of high calorie binge episodes) between episodes of marked dietary restriction and restraint. This raises the question as to whether BED is a distinct and separate condition with similar phenomenology to other eating disorders or whether BED could be characterised according to the transdiagnostic cognitive behavioural model of eating disorders (Fairburn et al., 2003). This would suggest that BED is not a separate condition, rather an eating disorder with similar characteristics to other eating disorders (i.e. it is arbitrary to classify BED separately).

2.2.1 The Issue of Weight

While some eating disorders have weight characteristics as part of their diagnostic criteria, weight appears to be less important than other psychological characteristics in the key criteria of eating disorders. It is important to understand the characteristics of those who are NW, OW or obese as these individuals are commonly used as comparison groups for those with eating disorders and those with eating disorders tend to have significant concerns with shape and weight, with the exception of perhaps those with BED.

Obesity is recognised as the condition of being significantly OW in relation to standard or ideal body weight estimates for age and sex (Romano & Quinn,

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1995). This is most commonly described by Body Mass Index (BMI), calculated as weight (in kilograms) divided by height (in meters) squared (kg/m^2). BMI estimates are established for NW individuals between 20.0 and 24.9, OW individuals between 25.0 and 29.9 and obese individuals over 30.0 (Keys, Fidanza, Karvonen, Komura, & Taylor, 1972). BMI estimates are also commonly used for individuals with eating disorders.

While eating disorders are defined by behavioural and psychological factors, definitions of obesity are based solely on the body weight and height, suggesting that the nature of being OW or obese is markedly different to that of eating disorders. This suggests that the issue of weight has implications for the potential diagnosis of eating disorders with particular implications for the diagnosis of BED, which is not recognised as having many of the behavioural and psychological characteristics of other eating disorders, such as BN.

2.2.2 The Same Disorder or Distinct Conditions?

One of the main issues that this thesis aims to address is whether BN and BED reflect the same disorder (that is, are just varying forms of the same eating disorder) or whether they are distinct and separate disorders. As indicated, the implication for the prevention and treatment of these disorders is dramatic, as a similar but individualised treatment could be applied should they represent the same disorder. This is worth considering given the low rates of success in the treatment of some forms of eating disorder (e.g. AN). However, if eating disorders involve

distinct conditions, with separate and distinguishable onset and maintenance factors, then distinct treatments would be required to adequately address these conditions.

One way that the relationship between eating disorder diagnoses has been conceptualised is using a circular diagram (see Figure 1).
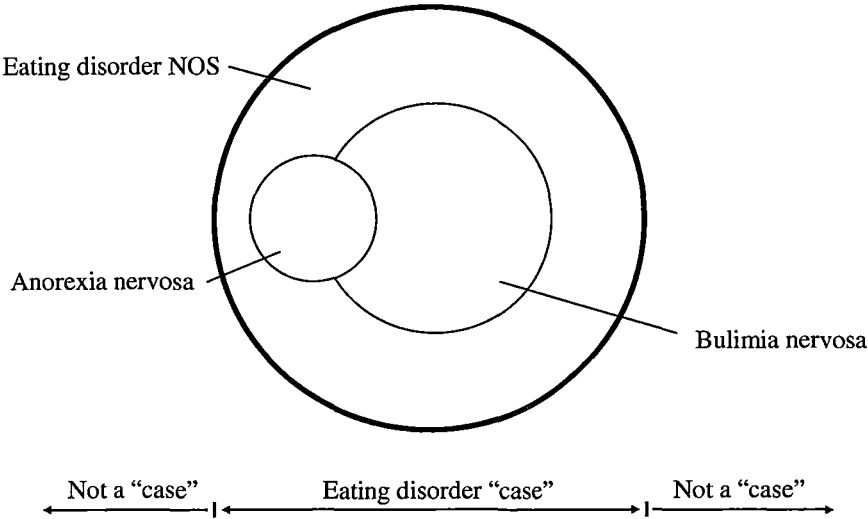
Figure 1. Representation of eating disorder diagnoses (reproduced from Fairburn & Bohn, 1995).

As depicted in Figure 1, there is a substantial amount of overlap between different eating disorders. This includes the possibility for some individuals to meet criteria for both BN and AN due to their symptomatology (in this case, the diagnosis of AN would trump that of BN). This diagram also reflects the boundaries of what would be considered disordered eating and the boundaries where the individual is considered not an eating disorder "case" though there may be some disturbed eating.

Eating disorder NOS includes three subgroups of patients. The first subgroup involves those individuals that closely resemble AN or BN but fail to meet full diagnostic criteria (e.g. they continue to menstruate as in AN or frequency of binge eating does not meet criteria for BN). The second subgroup involves those patients who demonstrate, in a non-standard way, the clinical features of AN and BN, thereby exhibiting a kind of mixed eating disorder. The third subgroup, involves those patients who meet criteria for BED.

Despite some of the obvious differences between these disorders, there tend to be a number of similarities between those with eating disorders. The main question that remains is whether BED is similar enough to the other eating disorders to be conceptualised within one transdiagnostic cognitive behavioural theory and whether already established eating disorder diagnoses (e.g. AN and BN) are appropriately described by the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003).

2.3 DEMOGRAPHIC VARIABLES OF BULIMIA NERVOSA AND BINGE EATING DISORDER

One way of examining whether BN and BED could both be described by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) is to examine the demographic characteristics associated with each of these conditions. Similarities and differences between these disorders could be compared and allow for the possibility of them being classified under one transdiagnostic theory.

2.3.1 Prevalence and Incidence of Bulimia Nervosa and Binge Eating Disorder

BN and BED represent a significant proportion of all eating disorders, with BN representing approximately thirty percent of all those with eating disorders and BED approximately ten percent of all of those in the eating disorder NOS category (Fairburn & Harrison, 2003). Interestingly, the eating disorder NOS category, where BED is currently classified, represents the majority of cases of eating disorder, including between 50 and 60 percent of adult cases (Fairburn & Harrison, 2003).

Although the prevalence of BN and BED differs within clinical samples presenting for treatment, the literature suggests that these disorders have similar prevalence in the general population, with most estimates ranging from 1 to 4.5 percent (APA, 2000; Fombonne, 1996; Hay, 1998; Hoek & Van Hoeken, 2003; Kinzl, Traweger, Trefalt, Mangweth, & Biebl, 1999; Striegel-Moore & Franko, 2003) regardless of culture (Hoek & Van Hoeken, 2003). It is thought these estimates have been relatively stable across time (Fombonne, 1996; Hoek & Van Hoeken, 2003).

It is also worth noting that BED has been reported to have a particularly high prevalence in community weight control programs, with one estimate placing it as high as 50% (APA, 2000) in this population, highlighting the relationship between BED and obesity. Other estimates suggest that there is a higher prevalence of BN in young females (Hoek & Van Hoeken, 2003) and a higher prevalence of obesity in BED (Hoek & Van Hoeken, 2003). Overall, the findings for both BN and BED indicate that these disorders affect certain groups of individuals more than others

(namely young females) suggesting that this group should be a particular focus of research.

The relative incidence of BN and BED is also suggested as similar; however it is difficult to assess the incidence of BED as this disorder is currently recognised as one in need of further research and it would seem that researchers tend to utilise different definitions of binge eating which results in participant groups that are not directly comparable (Striegel-Moore & Franko, 2003). The incidence of BN is suggested to be approximately 12 per 100 000 population (Hoek & Van Hoeken, 2003) although it is also suggested that there may have been a significant increase in the incidence of BN over time (Hoek & Van Hoeken, 2003). Those at highest risk of developing BN are females between the ages of 20 and 24 (Hoek & Van Hoeken, 2003) and those who are at greatest risk of developing BED are also females, but individuals with BED are generally older than those with BN (Hoek & Van Hoeken, 2003).

As obesity is often linked with BED (and due to the fact that BED is a relatively recently recognised condition), it is also worth noting that the prevalence of those who are OW and obese has also dramatically increased over the past 15 years (Finkelstein, 2000). The 2005 National Health Survey (NHS) by the Australian Bureau of Statistics (ABS) found that of Australians aged 18 years or over, 62 percent of males and 45 percent of females were OW or obese (ABS, 1998) By comparison, to the 1995 NHS, the proportion of adults classified as OW or obese had increased by 10 percent for males and 8 percent for females, suggesting an increase in the prevalence of obesity over time (ABS, 1998). The finding for

individuals who are OW highlights the importance of continuing research on the differences between those with disturbed eating patterns and those with clinical eating disorders as obesity also represents an increasing health concern.

It should be noted that one of the problems with estimating prevalence rates for eating disorders is that they tend to represent the number of people who have actually been identified as having an eating disorder. This is problematic as individuals with eating disorders tend to conceal their illness and avoid treatment (Fairburn & Harrison, 2003). It also means that prevalence and incidence rates do not include the actual number of people who are currently experiencing an eating disorder (Hoek & Van Hoeken, 2003). There also appear to have been no studies on the incidence of eating disorders in the general population (Hoek & Van Hoeken, 2003) and this means that the prevalence rates identified by clinical samples should be interpreted with caution as they may not be truly representative.

2.3.2 Sex Distribution of Bulimia Nervosa and Binge Eating Disorder

While the prevalence rate of eating disorders in males and females differs, it appears that here are similar rates of occurrence of BN and BED for the different sexes (Hoek & Van Hoeken, 2003). Both BN and BED are found to be more common in females and there have been some important differences in the characteristics of males and females with BN, including findings that males have a higher pre-illness body weight, different modes of onset for BN in males and females and distinct psychotherapeutic needs for males relating to sexuality, exercise

and issues of family and temperament (Lundholm & Anderson, 1986). This suggests that it is important to study males and females separately.

One distinguishing finding on BED is that this disorder appears to be more common in OW women than OW men (de Zwaan et al., 1992; Rissanen, 1993; Spitzer et al., 1992; Yanovski, Nelson, Dubbert, & Spitzer, 1993). The gender related finding for those who are OW or obese is reversed for those without eating disorders, with males more likely to be obese than females (ABS, 1998). This would suggest that the specific characteristics of BED occur more commonly in women, and that men may overeat in general more often. Due to the fact that females are more commonly diagnosed with BN (in particular young females), this research will focus on females between the age of 18 and 30.

2.3.3. Age of Onset and Risk for Bulimia Nervosa and Binge Eating Disorder

There is some evidence that the age of onset for BN, BED and obesity varies considerably (APA, 2000) and identifying the ages of onset for each of these conditions provides information that can be used to assist in establishing the different pathways to the aetiology of these disorders. The age of onset of BN has been consistently reported as during late adolescence and early adulthood (APA, 2000; Bulik, Sullivan, Carter, & Joyce, 1997) while the age of onset for BED has been found to be slightly older, usually in early adulthood (Mussell et al., 1995; Spurrell, Wilfey, Tanofsky, & Brownell, 1997; Telch & Agras, 1994).

The age of onset of obesity by contrast is highly variable and there is no clear at-risk time with age of onset occurring throughout childhood to adulthood (Sobara

& Geliebter, 2002). One finding in relation to those who are obese or OW has been a consistent pattern of the age of onset of obesity in individuals with BED which has been found to be during mid-adolescence (Brody, Walsh, & Devlin, 1994; Spitzer et al., 1993) suggesting that this may be an at-risk time for developing BED in obese individuals when it coincides with the onset of binge eating.

2.3.4. Course of Bulimia Nervosa and Binge Eating Disorder

The course of BN and BED appears to be mostly chronic but in both disorders there appears to be a relatively long period of symptomatology prior to these individuals seeking treatment (Fairburn & Harrison, 2003; Herzog, Keller, Lavori, & Sacks, 1991). This means that the actual course of the disorder may not be accurately known. Both of these disorders tend to involve chronic and intermittent periods of symptoms over the long-term and migration of symptoms and this often results in temporal movements between diagnoses (Fairburn & Harrison, 2003). As a result, it is important to be able to recognise the factors that contribute to the onset and maintenance of these disorders early.

One of the ways that the onset of these disorders can be recognised early is by examining the onset of dieting, binge eating and compensatory behaviours. When examining the prodromal experience of these disorders, it is noted that the age of commencement of dieting differs between BN and BED, with those with BN tending to diet earlier and in their mid-adolescence, while those with BED tend to commence dieting in late adolescence (Raymond et al., 1995; Spurrell et al., 1997).This suggests that for BN, weight concerns and dietary restriction tend to

precede binge eating and compensatory behaviours (Bulik et al., 1997), while binge eating preceding dietary restriction is evident in only a small subset of those with BN (Haiman & Devlin, 1999; Mussell et al., 1997). Overall, it appears that dieting is a common precipitant to developing BN and highlights the role of dietary restraint in the onset and maintenance of this disorder.

The age of commencement of binge eating also differs for BN and BED. In BN, binge eating tends to occur in late adolescence, suggesting there is a lag between commencing dieting and commencing binge eating in this disorder (Raymond et al., 1995). By contrast, binge eating behaviour prior to the onset of BED appears to be the usual course, although there are some individuals who diet prior to the onset of BED (Raymond et al., 1995).

Findings on the impact of the progression of BN suggest that the frequency of bingeing and purging does not appear to differ between those who dieted or binge ate first (Bulik et al., 1997; Haiman & Devlin, 1999). Both groups have also been found to have comparable fears of becoming "fat" and have body dissatisfaction (Mussell et al., 1997), suggesting similar levels of psychopathology and symptomatology. One difference was noted in relation to the BMI of those who binge ate prior to dieting as these individuals were consistently found to have a higher BMI than those who dieted first, suggesting a resemblance to BED (Haiman & Devlin, 1999). In general, those with BED typically have a higher BMI than those with BN. It is also suggested that obesity onset in BED appears to occur earlier than obesity in the non-BED population suggesting some differences between the characteristics of those who are obese and those with BED (Yanovski, 2003). In

relation to those who are obese without BED, the onset of obesity appears to be more heterogeneous, occurring at a wide range of ages.

There is also a difference between BN and BED concerning the impact of onset of dieting versus bingeing on the clinical presentation of the disorder. In BN, it seems to make little difference whether the patient commenced dieting or binge eating first (Haiman & Devlin, 1999) while in BED it has been found to make a significant difference, as those who binged first tended to be in early adolescence, compared to early adulthood for the diet-first group (Spurrell et al., 1997). This suggests that there is earlier onset of BED in the binge first group.

This suggests that the findings for the course of these two disorders appear to be similar to those of BN, with the exception of the delay in those with BED reaching full diagnostic criteria for an eating disorder. One possible explanation for the delay in meeting criteria for BED is that these individuals met criteria for eating disorder NOS prior to that of BED. It is also worth noting that individuals who are diagnosed with eating disorders frequently switch between diagnoses showing fluidity between diagnoses (Bulik, Sullivan, & Kendler, 2000; Fairburn et al., 2003; Fairburn & Harrison, 2003; Williamson et al., 2004) which may explain how eating disorders such as BN and BED progress.

Findings about differences in the age of onset of binge eating versus dieting prior to the development of BN also lead to questions about why some individuals go on to engage in purging behaviours and others do not. Research exploring this has found several features distinguishing those who purge and those who do not; namely disinhibition, hunger and dietary restraint. For example, it has been found

that obese women with BED experience higher levels of disinhibition and hunger

than obese women without BED, but both groups have similar low levels of dietary

restraint (Yanovski et al., 1993), which suggests that low levels of dietary restraint

are implicated in the development of BED, and high levels in BN as research has

consistently identified that BN involves high levels of dietary restraint (Lowe et al.,

1996; Stice, 1998; Stice, Killen, Hayward, & Taylor, 1998).

Another stark difference in the course of BN and BED, is the response to

treatment as there appears to be a relatively fast recovery time for those with BED

through treatment (Brody, Masheb, & Grilo, 2005). BN also tends to respond well to

treatment and it is recognised that periods of remission longer than one-year are

associated with a better long-term prognosis (APA, 2000; Herzog et al., 1991). By

contrast to those with BED who experience relatively few residual symptoms

following treatment, those who have "recovered" from BN tend to continue

experiencing residual symptoms, implying the persistence of a subclinical form of

this disorder over time (Herzog et al., 1991). This finding is also a likely reflection

of the fact that individuals with eating disorders tend to migrate between different

the different eating disorder diagnoses over time (Fairburn & Harrison, 2003).

2.3.5. Comorbidity of Bulimia Nervosa and Binge Eating Disorder

Examining the comorbidity between BN and BED also allows for

identification of similarities and differences between the two disorders. A number of

studies have examined the extent of comorbidity in the eating disorders with both

BN and BED linked to a range of Axis I and II psychopathology. The comorbid

psychopathology of each of these disorders will first be reviewed separately.

BN has been specifically linked with a range of Axis I psychopathology and

depressive symptomatology (Brewerton et al., 1995; Crow, Zander, Crosby, &

Mitchell, 1996; Garfinkel et al., 1995; Zaider, Johnson, & Cocknell, 2002). Anxiety

disorders have also been linked with BN (Garfinkel et al., 1995) and there are

suggestions that BN is strongly related to obsessive compulsive disorder (Bulik,

Beidel, Duchmann, Weltzin, & Kaye, 1992; Formea & Burns, 1995; Hsu, Kaye, &

Weltzin, 1993; Kaye, Bulik, Thornton, Barbarich, & Masters, 2004; Rubenstein,

Pigott, L'Heureux, Hill, & Murphy, 1992).

One specific review of links between BN and other psychopathology found

that individuals with BN have a threefold increase in the lifetime occurrence of a

major depressive disorder and at least a doubling of the rate of anxiety disorders

(Garfinkel et al., 1995). In addition, this study found that individuals with BN have

significantly higher rates of social and specific phobias, agoraphobia, panic disorder

and generalised anxiety disorder than control participants. BN was also linked with

significantly higher lifetime prevalence rates of alcohol dependence, childhood

sexual abuse, parental disharmony, and parental psychopathology than comparison

groups. Another interesting finding was the distinction made between individuals

with purging and non-purging BN, with the BN purge type found to have extremely

high rates of comorbidity for depression, anxiety disorders and alcohol abuse, as

well as an earlier age of onset while; the BN non-purge type also displayed high

levels of psychopathology (but less so than the purge type). Together these findings

provide support for individuals with BN experiencing high levels of comorbidity with other Axis I disorders.

The comorbidity between BN Axis II disorders has also been examined while controlling for the presence of comorbid depression (Carroll, Touyz, & Beaumont, 1996). This review found that there were differences in the comorbidity for Axis II disorders with BN depending on whether depression also featured. Specifically, almost half of the depressed BN group met criteria for at least one Axis II disorder, compared with approximately a third of the non-depressed BN group and a limited number of the non-eating disordered control group. This suggests that individuals with BN have increased comorbidity with Axis II disorders and that this association cannot be attributed to the presence of coexisting depression.

Individuals with BED have also been found to have significantly higher rates of lifetime Axis I comorbidity compared with non-BED obese individuals (Marcus et al., 1990; Mussell et al., 1995; Wilfey, Friedman et al., 2000; Yanovski et al., 1993). Major depressive disorder is suggested as the most common disorder associated with BED, with comorbidity estimated in around half those with BED (Mussell et al., 1995; Wilfey, Friedman et al., 2000; Yanovski et al., 1993). Comorbidity findings for BED have however been somewhat inconsistent, as some research reports no differences in the lifetime prevalence of Axis I disorders between obese BED and obese non-BED participants (Brody et al., 1994; Ricca et al., 2000). One possible explanation is that these studies have tended to focus on overweight participants seeking weight loss treatment programs, and these individuals may not be representative of the general BED population. This has been

clarified by a study examining comorbidity in BED utilising comprehensive

exclusion criteria with participants meeting full (preliminary) diagnostic criteria for

BED (Wilfey, Friedman et al., 2000). This study found that individuals with BED

had extremely high rates of lifetime Axis I disorders, with the most common

comorbid diagnosis for mood disorders, with almost two thirds of the participants

experiencing a comorbid mood disorder, the most common of which was found to

be major depressive disorder. This study also found that Axis I disorders were not

associated with binge eating severity suggesting that eating symptomatology may

not interact with the eating disorder diagnosis to influence the presence of other

comorbid problems.

The lack of correlation between Axis I general psychopathology and levels

of eating disorder symptomatology suggests that although comorbid eating

pathology may be an associated clinical feature of BED, binge eating in BED is not

simply a variant of another disorder, such as depression (Wilfey, Friedman et al.,

2000). This suggestion has been supported by a retrospective study of individuals

with BED of whom half the sample reported a history of clinical depression and the

age of onset of binge eating appeared to precede the onset of the first depressive

episode (Mussell et al., 1995).

Significant comorbidity with Axis II diagnoses has also been found to be

associated with BED. It appears that Cluster B and Cluster C disorders are more

prevalent among BED than non-BED individuals (Specker, de Zwaan, Raymond, &

Mitchell, 1994; Yanovski et al., 1993) and unlike Axis I psychopathology, Axis II

psychopathology has been found to be associated with more severe binge eating and

overall eating pathology when baseline measures were taken (Wilfey, Friedman et al., 2000) suggesting that the symptomatology of BED may be more severe when occurring in the context of a personality disorder (Wilfey, Friedman et al., 2000).

The level of comorbid symptomatology between BN and BED has also been examined. Generally, individuals with BN have higher levels of symptomatology than obese individuals with BED (Crow et al., 1996; Prather & Williamson, 1988). Individuals with BN purging type have also been found to have more severe general psychiatric symptoms and poorer social adjustment than individuals with BED (Hay & Fairburn, 1998). This suggests that purging may be indicative of higher impairment or psychopathology. It has also been found that females with BN have higher levels of depressive symptomatology than females with BED (Crow et al., 1996) and that the severity of symptomatology escalates with the severity of binge eating (de Zwaan & Mitchell, 1992). These findings suggest that BED may be less severe in terms of comorbidity, psychopathology and symptomatology than BN although this has been clarified by a study which found the severity of eating disordered symptoms rather than the diagnoses of BN versus BED per se is what contributes to greater comorbidity, psychopathology and symptomatology.

When comorbidity in BED is examined in relation to obesity, studies have generally found conflicting results, reflecting heterogeneity of the obese population. One consistent finding is that obese non-BED individuals have lower levels of symptomatology than individuals with BED who are obese (Marcus et al., 1990; Molinari, Ragozzini, & Morosin, 1997; Robins et al., 1984; Yanovski et al., 1993; Zimmerman & Coryell, 1989). These studies found that the levels of comorbidity for

obese non-BED groups are consistent with the general population suggesting that BED is distinct from obesity.

A number of similarities and differences are noted in the symptomatology of individuals with BN and BED. A difference in the level of dietary restraint is the most common finding with higher levels of restraint found in BN than in BED (Wilfey, Schwartz, Spurrell, & Fairburn, 2000). It has also been noted that OW individuals have lower dietary restraint relative to individuals with BN (Wilfey, Schwartz et al., 2000). One interesting finding is that weight and shape concern has been found to be similar for individuals with BN and BED and low for individuals who are OW (Striegel-Moore et al., 2001; Wilfey, Schwartz et al., 2000). This is significant given the lack of inclusion of the overconcern of eating, weight and shape in the diagnostic criteria for BED.

Other differences between BN and BED have been identified by research using a common measure of eating disorders, the Eating Disorder Inventory II (EDI-II) (Garner, 1991). Generally individuals with BN have significantly higher scores on the affective and cognitive attributes of this inventory than individuals with BED (Raymond et al., 1995). Individuals with BED have been found to have a lower Drive for Thinness, suggesting they may experience less anxiety about their eating patterns and weight, feel less guilty about being overweight and are less preoccupied with their eating behaviour than individuals with BN (Raymond et al., 1995). By contrast individuals with BED have higher scores on Body Dissatisfaction measures than individuals with BN, suggesting they are aware of their body size (Raymond et al., 1995) and also providing some evidence for possible overconcern with shape

and weight. Individuals with BED score similarly on Perfectionism scales to individuals with BN, suggesting some similarities in the core psychopathology of BED and BN (Pratt, Telch, Labouvie, Wilson, & Agras, 2001; Raymond et al., 1995). Finally, individuals with BN have been found to indicate higher feelings of Ineffectiveness, Interpersonal Distrust and Interoceptive Awareness (Raymond et al., 1995).

2.4 SUMMARY

Studies to date have identified a range of factors that distinguish BN from BED and BED from obesity, although a number of similarities between these disorders have been identified providing some support for the notion that BN and BED could be described by one transdiagnostic cognitive behavioural theory of eating disorders. It is also important to note that definitions of the characteristics of BN and BED are based on specific behavioural and psychological factors, with some shared characteristics as well as characteristics which distinguish the two disorders. The plethora of evidence suggesting BN and BED share similar characteristics raises the question as to whether the differences between these conditions are significant enough to result in distinct theories regarding the maintenance of these conditions or whether the two could be adequately described by one theory.

Further similarities between BN and BED have been noted in terms of demographic characteristics and these disorders have similar prevalence rates in the general community although when the prevalence rates are examined for the at-risk groups, the prevalence rates increase. The at-risk group for BN is young females,

whereas for BED, the at-risk group is obese females in early adulthood. BN and

BED also differ in the age of onset, with BN occurring at an earlier age. In addition,

despite each disorder involving dieting or binge eating preceding the onset of

diagnosis; dieting first is more common in BN and binge eating first is more

common in BED. There is also evidence to suggest that general psychopathology

and symptomatology are most evident in BN and lowest in obesity, with BED being

in between the two. This suggests that BN and BED are either distinct disorders but

may be explained by one all encompassing theory or, that BN and BED are related

aspects of one disorder with different temporal manifestations, explained by one

theory.

CHAPTER 3

EATING BEHAVIOUR AND THE FEATURES OF EATING

DISTURBANCE AND DISORDER

3.1 INTRODUCTION

A key question of this thesis is whether BN, BED and obesity represent distinct conditions and differing factors explain the onset and maintenance of each or whether similar processes operate between these disorders, thus making it more feasible to classify them by an omnibus theory and consider them one condition with different presentations. One way to examine this is through a review of frameworks which attempt to separate eating disorders from normal eating and from eating disturbance, such as the continuum theory. The continuum theory is an exploratory framework that examines eating on a behavioural continuum and incorporates normal, disturbed and disordered eating, thereby allowing for comparisons and contrasts of BN and BED to be made. The concepts of the continuum theory also provide a mechanism for establishing whether BED is a form of eating disorder, similar to that of BN through comparisons of the two conditions made quantitatively and qualitatively.

The major theories regarding the development of BN originate from the restraint theory, while for BED; theories of obesity are also relevant. Examining the nature of restraint theory and theories of obesity is helpful in assisting the understanding of the differences between disturbed and disordered eating. It also helps in understanding the features of both BN and BED that have been further developed by cognitive behavioural theories (see Chapter 4).

3.2 THE CONTINUUM FRAMEWORK OF EATING BEHAVIOUR

The continuum framework suggests processes that distinguish normal and disturbed eating from disturbed and disordered eating, thereby allowing exploration of the similarities and differences between BN and BED. It comes in two main forms, the continuity model and the discontinuity model (although both are essentially similar). The main concept underpinning this framework is that eating behaviour occurs on a continuum, with anchors at either end symbolising normal eating at one end and the extreme dieting and weight control behaviour associated with clinical eating disorders at the other (Hsu, 1990; Polivy & Herman, 1987; Stice et al., 1998). Between these anchors are believed to lie the state of being OW and the dietary behaviours of the anchors, including binge eating and dietary restriction.

This conceptualisation suggests a continuum progressing from normal eating, disturbed eating, subthreshold disorders to full syndrome disorders and is compatible with the continuity perspective of the continuum frameworks (Hsu, 1990; Polivy & Herman, 1987). This would suggest that the features of these eating behaviours differ quantitatively, ranging form normal to pathological eating. In this sense, those with eating disorders are considered to be at the far end of the continuum of eating pathology. The same variables differentiating noneating disordered individuals from subthreshold individuals are also considered to differentiate subthreshold from those with full syndrome forms of the disorder. Another conceptualisation suggests that the continuum of eating behaviour is determined by qualitative differences between individuals with normal, disturbed and disordered eating and those individuals with normal and disturbed eating are

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clustered together and are distinct from those with disordered eating. This perspective is consistent with the discontinuity model of continuum frameworks.

A number of problems have been identified in the use of the continuum theory of eating behaviour. These include the fact that the continuum theory does not include AN or eating disorder NOS despite the theory often being described as a general theory of eating behaviour. This suggests that continuum theory is not able to adequately test the similarities and differences of all eating disorders, however for the purposes of this thesis, which focuses on BN and BED, the continuum theory does provide some useful insights as it does primarily focus on the phenomena of binge eating.

Another problem with the continuum theory is that the continuums vary in the descriptors used for the anchors used at either end of the continuum and more substantially the type of anchors at either end. The most problematic aspect appears to be that the descriptors at either end are distinctly different in some cases, with one end described by weight (e.g. as in individuals who are normal weight) and the other end of the continuum described by behaviour (e.g. as in individuals with disordered eating). This raises questions about whether continuums reflect a constant scale or whether points on the continuum reflect qualitatively different characteristics. One solution to this is to provide multiple continuums to describe eating behaviour or to provide a three-dimensional eating continuum. This could include a continuum (or dimension) for weight, one for level of dietary restraint and one for binge eating or compensatory behaviours.

3.2.1 Continuum Theory and Binge Eating Disorder

Despite the problems identified in the use of continuum theory to explain dietary behaviour or eating disorders, this theory does have implications regarding whether BED should be placed between disturbed and disordered eating (supporting the continuity perspective) or with disordered eating and separate from normal and disturbed eating (supporting the discontinuity perspective). If the continuity perspective is supported then this would imply that BED has a number of features which are distinct and separate from BN and that these disorders are not adequately described by inclusion in one omnibus theory. However, if the discontinuity model is supported, then this would imply that similar features are exhibited by BN and BED and that it may be possible to describe both of these disorders adequately by one theory.

A number of studies have examined the features of BED and suggested that obese binge eaters are a distinct subgroup in the obese population who exhibit high levels of pathology related to both dieting attitudes, eating behaviour (Fitzgibbon, Sanchez-Johnsen, & Martinovich, 2003; Marcus et al., 1990; Marcus, Wing, & Hopkins, 1988) and psychiatric symptoms (Spitzer et al., 1993; Telch & Agras, 1994; Yanovski et al., 1993). This would suggest that BED is a form of disordered eating which should be clustered with other disordered eating, supporting the discontinuity perspective. This contrasts with the findings of one study which found that individuals with BED had higher levels of psychopathology than obese binge eaters but less than those with sub- or full-threshold BN supporting the continuity perspective (Fitzgibbon et al., 2003).

The contradiction in the findings of these studies suggests further examination is required. It also indicates that investigation of the location of BED on the continuum of eating behaviour might have implications regarding whether BED is an eating disorder in its own right, or an extension of the behaviour of individuals who are OW. If BED is found to lie on the continuum in closer proximity to individuals whom are OW or obese, then it is more likely that BED should be considered a form of disturbed but not disordered eating. However, if BED is found to lie on the continuum at a point closer to other eating disordered behaviour, namely BN, then it is more likely that BED shares similar characteristics to BN and this implicates a range of other maintenance and development factors in BED. This can be established through further examination of the similarities and differences bewteen the two eating disorders. If the two are found to be more similar than dissimilar, this would also imply that as BN and BED share similar characteristics, they may be adequately described by one omnibus theory.

3.3 THEORIES OF DIETARY BEHAVIOUR

Another way to establish the similarities and differences in the eating behaviour of those with BN and BED is to examine the processes involved in general dietary behaviour. A range of theories have been developed in order to explain the behaviour of individuals who are obese (Pirke & Laessle, 1993; Rodin, 1981; Rodin, Elman, & Schachter, 1974; Ruderman, 1986; Schachter, 1968, 1971) and to explain how disturbed (Habke, Hewitt, & Flett, 1999; Herman & Mack, 1975; Herman & Polivy, 1980; Ruderman, 1986) and disordered eating (Bennett &

Cooper, 1999; Castonguay, Eldredge, & Agras, 1995; Charpentier, 1998; Fairburn et al., 2003) develops and is maintained.

3.3.1 Theories of Obesity

As the dietary behaviour of individuals with BED has been often compared to that involved in those who are OW or obese, it is important to consider the processes involved in the aetiology and maintenance of obesity. Two main theories have been developed to explain the development of obesity; the internal-external theory (Schachter, 1968, 1971) and the set-point theory (Nisbett, 1972).

The internal-external theory has received little support and suggests that eating behaviour is internally controlled or responsive to internal physiological cues such as the sensations of hunger and satiety for NW individuals and externally controlled or responsive to seeing, smelling or tasting food as well as the time of day for OW individuals (Herman & Mack, 1975; Pirke & Laessle, 1993; Ruderman, 1986). According to the internal-external theory, OW individuals are generally more responsive to environmental cues than NW individuals, meaning that when environmental cues are salient and compelling, they tend to lead to eating for those who are OW but not for someone who is NW (Ruderman, 1986).

A number of problems have been identified with the internal-external theory (Schachter, 1968, 1971), including difficulty operationalising the definition and features of internal and external cues and difficulties describing the features that constitute a cue as being salient and compelling (Leon & Leon, 1983; Rodin, 1981). As a result of these operational problems, this led to suggestions that there are few

differences in the eating behaviour of those who are NW and OW according to the internal-external distinction and that this account was too simplistic (Rodin, 1981).

Consequently, the internal-external theory (Schachter, 1968, 1971) was enhanced by the proposal of a "set point" model of obesity (Nisbett, 1972). This model was developed to explain the external responsiveness of OW and NW individuals (Ruderman, 1986) so that some of the earlier but problematic aspects of the internal-external theory could be better understood. The set-point theory indicates that NW and OW individuals have differing, biologically determined set-points for their weight (Herman & Mack, 1975; Pirke & Laessle, 1993). This theory suggests that dieting results in a reduction of the size (not the number) of fat cells, and includes a corresponding increase in behaviour that is designed to bring the body back to the set-point (Herman & Mack, 1975). This implies that that the behavioural characteristics of those who are OW (i.e. externality) are not the cause of them being OW but are instead a consequence of biological deprivation due to both dieting and dietary restraint, with OW individuals having higher than average set-points (Ruderman, 1986).

The set-point theory (Nisbett, 1972) has the advantage of being able to explain the dietary behaviour of individuals who are either OW or NW and has achieved more support than the internal-external theory (Schachter, 1968, 1971). Although both theories suggest that OW and NW individuals differ in their responsiveness; the set-point theory suggests that an individual's weight should also be considered.

These theories of obesity are relevant in providing an understanding of the different dietary processes involved in being OW as opposed to those with clinical eating disorders. This distinction enables BED to be established as an eating disorder in its own right, rather than a variation of behaviour of those who are OW.

3.3.2 The Problem of Dietary Restraint

Dietary restraint is believed to be the most common disturbance of eating and is a feature of individuals with normal, disturbed and disordered eating (Freeman & Gil, 2004; Heatherton & Baumeister, 1991; Heatherton, Polivy, & Herman, 1991; Herman & Mack, 1975; Kirkley, Burge, & Ammerman, 1988; Pirke & Laessle, 1993). Restrained eating refers to conscious efforts to restrict food intake in order to prevent weight gain or to promote weight loss (Pirke & Laessle, 1993). Due to these efforts, one of the main features of restrained eaters is that they attempt and often fail many diets (Heatherton, Herman, Polivy, King, & McGree, 1988; Ricciardelli & Williams, 1997).

Partly due to its definition but also perhaps as dietary restraint is seen so broadly in the population, the term dietary restraint is often used interchangeably with other terms, including dieting and dietary restriction. This has resulted in some operational difficulties with the concept and inconsistencies between research results. Although many restrained eaters classify themselves as currently dieting, it is also possible to score highly on measures of restraint while not currently dieting (Ricciardelli & Williams, 1997). These individuals would be characterised by intention to diet or avoiding of particular foods while continuing to consume a

relatively stable caloric diet. As a result, the body weight of individuals high in

dietary restraint can be either NW or OW by objective standards, depending on the

degree of dieting or restriction. Restriction is the more severe form of dietary

restraint, involving true physiological under-eating and is a key feature of AN and

BN (less common in BED, though these individuals tend to have higher restraint

than those who are OW). As a result of these conceptual difficulties, it is

recommended that research using the term dietary restraint also report the weight

and dieting or restriction status of the participants.

Theoretical models have been developed in order to describe the underlying

constructs of dietary restraint and to predict dietary behaviour in a variety of

individuals, including those with eating disorders, those who are OW and those who

are NW; all of whom may or may not be dieting or engaged in dietary restriction.

These models include restraint theory, the disinhibition model of restraint and the

boundary model of restraint. Understanding the factors involved in restraint theory

provides a way of establishing how and why the eating patterns of OW individuals

differ from those who are NW, as well as from those with eating disorders thereby

allowing exploration of the similarities and differences between different eating

behaviours, including those involved in BN and BED.

3.3.2.1 Restraint Theory

Restraint theory is built upon the early theories of obesity which drew

attention to the role of attempting to limit food intake in determining eating patterns

(Herman & Mack, 1975). This theory suggests that the differences in eating

behaviour of those who are OW and those who are NW can be explained by more frequent limiting of dietary behaviour in OW persons; a difference that is also evident between NW persons who restrain their eating and those who are unrestrained (Herman & Mack, 1975). This explains how both NW and OW individuals can experience similar levels of dietary restraint as some NW individuals may be maintaining their weight below the set-point due to dietary restraint and this may result in similar behaviour to those who are OW and below set-point. This implies that rather than body weight, it is the degree to which an individual engages in dietary restraint that determines eating behaviour. This theory also explains how individuals who are NW and OW can both respond to external stimuli by overeating (Herman & Mack, 1975).

The original theory of restraint (Herman & Mack, 1975) has been elaborated to include hypotheses concerning the relationship between patterns of food intake of OW and NW individuals (Herman & Polivy, 1980). These hypotheses suggest that eating patterns are influenced by the balance between the physiological factors directly contributing to a desire for food intake and to the efforts made to resist the desire (Herman & Polivy, 1980). Restrained eating in this sense is referred to as the cognitively mediated effort used to resist the desire for food intake (Ruderman, 1986).

There were two main hypotheses that came out of the elaboration of restraint theory. The first, known as the disinhibition hypothesis, relates to the observation that restrained eaters engage in dietary behaviour characterised by episodes of dietary restriction, followed by episodic overindulgence, or binge eating and

suggests that certain disinhibitors lead to a temporary break-down in the dietary self

control of restrained eaters in order to result in overeating or binge eating (Herman

& Polivy, 1980). These disinhibitors have been found to be consistent across

normal, disturbed and disordered eating and are identified as being cognitive,

emotional and pharmacological in nature. Cognitive disinhibitors include thinking

patterns such as "I've blown it now, I might as well continue to eat" and are

commonly referred to as an all-or-nothing response (Herman & Mack, 1975).

Emotional disinhibitors include strong emotional states, such as anxiety or

depression, believed to work by temporarily overwhelming restrained eaters, thereby

decreasing their motivation to diet (Polivy & Herman, 1983) and pharmacological

disinhibitors include sedating and relaxing substances, such as alcohol, which can

interfere with self-control (Ruderman, 1986).

Following research on dietary restraint and disinhibition, the boundary

model of restraint (Herman & Polivy, 1984) was developed to further account for

the processes involved in the counterregulation of eating. This model proposes that

biological pressures work to maintain food consumption within a certain range

which generally succeeds as the aversive consequences of hunger typically result in

food consumption being kept above a minimal level and the aversive consequences

of satiety keep it below a maximum level (Herman & Polivy, 1984). According to

the boundary model, the area between the boundaries of hunger and satiety is termed

the range of biological indifference and is where psychological factors have the

greatest impact on the regulation of food intake resulting in regulatory or

counterregulatory behaviour (Herman & Polivy, 1984).

The boundary model suggests that the regulatory processes controlling food consumption in restrained and unrestrained eaters differs on a number of aspects. The first difference is that the zone of biological indifference is believed to be wider in restrained eaters than unrestrained eaters (Herman & Polivy, 1984). Also, as restrained eaters are believed to have lower hunger boundaries and higher satiety boundaries than unrestrained eaters, this means that it takes greater food deprivation for them to report hunger and greater consumption for them to report satiety (Herman & Polivy, 1984). In addition, restrained eaters are believed to create a self-imposed boundary between their hunger and satiety boundaries to mark their maximum consumption (Herman & Polivy, 1984). Consequently, when a restrained eater transgresses this self-imposed boundary, they tend to eat until they reach the satiety boundary, leading to overindulgence (Herman & Polivy, 1984).

The boundary model (Herman & Polivy, 1984) has been used to explain the behaviour of eating disordered individuals as well as those who are restrained and unrestrained eaters suggesting that the processes of dietary restraint across these conditions are similar. Further, according to this model, the only difference between binge eaters and restrained eaters is the amount of food intake once they have broken their diets. This is because while restrained eaters will typically stop eating once they reach their satiety level, binge eaters will tolerate the discomfort of going beyond the satiety limit and only stop eating once they have reached physiological capacity (Herman & Polivy, 1984).

The boundary model of eating (Herman & Polivy, 1984) extends the restraint hypothesis (Herman & Polivy, 1980) in several says. Firstly, it explicitly addresses

the role of physiological factors in regulating eating. It also points out the factors that control the termination of eating as well as those that result in the initiation of eating. The boundary model also allows for the consideration of disordered eating patterns such as those in BN and BED however it does not account for why binge eaters regularly transgress the satiety boundary or provide an explanation for the development of the disorders. Interestingly however, the boundary model also fails to include an explanation for the behaviour of individuals who are OW but although an explicit explanation is not given, the boundary model would suggest that the behaviour of those who are OW would be explained by the counterregulatory mechanisms evident in restrained eaters (Ruderman, 1986).

3.3.3 Theory of Binge Eating

Binge eating is the common feature identified in diagnostic criteria for BN and BED and has been described separately by theories of these disorders as well as in general theories of binge eating. Although a range of theories have been developed in order to explain binge eating, the most widely used model of binge eating is the escape model (Heatherton & Baumeister, 1991) of eating. Escape theory is an important general theory of eating behaviour as it also has implications for individuals who are OW or obese and occasionally engage in binge eating as well as providing a comprehensive explanation for binge eating within the eating disorders.

Escape theory (Heatherton & Baumeister, 1991) suggests that individuals engage in binge eating in order to escape negative affect as a result of experiencing

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high levels of self awareness. This suggests that one of the central components of the escape model is the cognitive narrowing that results from a reduction of self awareness (Baumeister, 1990). It is this escape from negative affect that is believed to precipitate a cascade of self defeating behaviours, including (but not exclusively) binge eating. Binge eating is believed to occur as a result of efforts to escape from unpleasant feelings where the process of cognitive narrowing disinhibits the usual inhibitions around food making the susceptible person more willing to break their dietary rules (Blackburn, Johnston, Blampied, Popp, & Kallen, 2006). This is also believed to facilitate further escape through narrowing attention further to the actions and sensations involved with eating. With additional cognitive narrowing prior inhibitions around eating are also disinhibited and eating escalates into a full blown binge episode (Blackburn et al., 2006) implying that binge episodes are a result of the escape from negative affect through cognitive narrowing, rather than a cause of cognitive narrowing (Heatherton & Baumeister, 1991).

The escape model (Heatherton & Baumeister, 1991) also proposes that other factors such as perfectionism and self esteem have a mediating role in binge eating behaviour. This is supported by research which has found a strong association between perfectionism and binge eating (Fairburn, Cooper, Doll, & Welch, 1999; Fairburn et al., 1998) as well as the mediating role of self-esteem and anxiety in the maintenance of perfectionism (Pratt et al., 2001; Vohs, Bardone, Joiner Jr., Abramson, & Heatherton, 1999). There is also evidence to suggest that binge eating is associated with low levels of self-esteem (Eldredge, Wilson, & Whaley, 1990) although it is less clear whether this lowered self -esteem is accompanied by a

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heightened sense of self focus as suggested by the escape model (Striegel-Moore, Silberstein, & Rodin, 1993). Another finding in relation to self-esteem is that not all forms of emotional distress trigger binge eating, rather only those which threaten self esteem (Heatherton & Baumeister, 1991; Heatherton, Herman, & Polivy, 1991).

Negative affect has also been found to be a salient predictor of bulimic behaviours (Stice, 1998) and binge eating in OW women (Agras & Telch, 1998) supporting the view that escape from negative affect also features across normal, disturbed and disordered eating. In addition, the relationship between escape from negative affect and binge eating has been found to be mediated by a tendency to use disengagement as a method of coping (Henderson & Huon, 2002) which supports the suggestions from the escape model. Together, these findings suggest that a range of other factors, including negative affect, low self-esteem and perfectionism may play a role in the processes of binge eating. These have been incorporated into the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), described in Chapter 4.

Research has also supported the escape model's (Heatherton & Baumeister, 1991) predictions in relation to cognitive processes, namely the cognitive narrowing. It has been found that binge eaters are characterised by a greater level of dichotomous thinking than control subjects (Paxton & Diggens, 1997) and have been found to demonstrate eating patterns indicative of a mood state in which meaningful thought is blocked (Blackburn et al., 2006). This suggests that cognitive characteristics are key aspects of binge eating. It has also been suggested that individuals with eating disorders tend to use more avoidant coping strategies than

controls (Ball & Lee, 2000) implying that binge eaters may have an escape-prone personality characterised by cognitive avoidance.

Although there appears to be substantial support for the escape model (Heatherton & Baumeister, 1991) being a way of describing the processes in binge eating, little attention has been paid to the processes that lead to actual bingeing. Two studies however, have suggested that avoidant coping predicts bingeing depending on the level of negative affect (Blackburn et al., 2006; Paxton & Diggens, 1997) and this is consistent with the predictions of the escape model. Perfectionism has also been found to be strongly related to aversive self awareness and this in turn, is suggested to predict negative affect (Blackburn et al., 2006). Together these findings suggest some support for additional factors in the aetiology and maintenance of binge eating as described by the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003).

Research has also shown that increasing levels of pathology from obese non-binge eaters to individuals with BN (as demonstrated by continuity models of eating behaviour) suggest a pattern consistent with the escape model (Fitzgibbon et al., 2003), implying links between these theories. For example, one study found that the need to escape self-awareness increases linearly from obese non-bingers, subthreshold BED, BED, subthreshold BN to BN (Fitzgibbon et al., 2003), a finding that suggests purging may serve as an extension of the escape from self awareness. This study further found that interceptive awareness decreases as eating pathology worsens, suggesting that individuals with eating disorders may experience an

increased need to focus outside themselves. This is an interesting finding and has

implications for the nature of cognitive bias as discussed in Chapter 5.

3.4 SUMMARY

In summary, continuum theories attempt to explain the progression of dietary

changes across normal, disturbed and disordered eating and include indicators for

weight, dietary restriction and binge eating. Eating continuums differ quantitatively

and qualitatively with each having implications for the location of eating disorders

such as BN and BED along the continuum. They also have implications as to

whether BN and BED should be considered similar and thereby be adequately

explained by one theory or whether they are distinct and should be examined

separately.

A range of theories have also been developed in order to explain the eating

disturbance of those who engage in dietary restriction, who are actively dieting and

who may or not be OW as well as binge eating. These highlight the basic processes

involved in dietary behaviour, including how dietary restraint can be broken and

lead to subsequent binge eating in individuals who have normal, disturbed and

disordered eating. As binge eating is highly relevant to both BN and BED, the

concepts involved in the development and maintenance of binge eating are also

important to consider when examining the similarities and differences in BN and

BED.

The main advantage of the continuum theory is that it provides a framework

for distinguishing BED as an eating disorder in its own right, rather than a type of

behaviour similar to that in those who are OW or obese. Restraint theory explains

some of the processes involved in the maintenance and breakdown of dietary

restraint, a key feature particularly in BN but possibly also involved in BED.

Theories of obesity provide a basis of comparison for the behaviour of individuals

with BED. Theories of binge eating are particularly useful for understanding the

processes involved in the development and maintenance of this behaviour, a key

feature of both BN and BED. These theories provide a baseline for examining the

features relevant to an omnibus theory of eating disorders.

CHAPTER 4

THE NEED FOR A TRANSDIAGNOSTIC THEORY OF EATING

DISORDERS

4.1 INTRODUCTION

The transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) suggests that all eating disorders, including BN and BED, share similar maintenance mechanisms and can be explained by one omnibus theory. This is a different approach to the previously utilised theories of eating disorders, which tend to separate AN, BN and eating disorder NOS (including BED). The transdiagnostic cognitive behavioural theory is essentially an enhanced cognitive behavioural theory of eating disorders, extending on previous theories by proposing four additional maintaining mechanisms that work together with the core psychopathology of eating disorders. These additional maintaining mechanisms include the influence of severe perfectionism (clinical perfectionism), the impact of unconditional and pervasive negative self-esteem (core low self-esteem), difficulty in coping with adverse mood states (mood intolerance) and the influence of interpersonal and developmental difficulties (interpersonal difficulties). The core psychopathology includes a patient's dysfunctional scheme for self-evaluation (overconcern with eating, shape and weight), dietary restraint, various forms of weight control behaviour (including weight and body checking and avoidance, preoccupation with thoughts about eating, shape and weight) and compensatory behaviours.

The development of a transdiagnostic cognitive behavioural theory for eating disorders (Fairburn et al., 2003) has been proposed to enhance understanding the nature and treatment of eating disorders. This research aims to examine whether BN and BED can be understood through the transdiagnostic theory and whether the four

additional maintaining mechanisms proposed are evident across both of these eating disorders.

4.2 COGNITIVE BEHAVIOURAL THEORY OF EATING DISORDERS

The transdiagnostic theory is derived essentially from the original cognitive behavioural theories of BN (Fairburn, 1981; Fairburn, Cooper, & Cooper, 1986; Fairburn, Marcus et al., 1993), and more recently BED (Castonguay et al., 1995). Despite the significant proportion of those with eating disorders being classified under eating disorder NOS; no theoretical account prior to the transdiagnostic cognitive behavioural theory appears to have attempted to explore this subgroup.

Although prior to the development of the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), the maintenance factors of AN, BN and BED were described separately, what is most interesting about these theories is not what marks these eating disorders as separate but how similar the processes described by each of the theories are. This suggests that the transdiagnostic cognitive behavioural theory of eating disorders may be able to replace previously separate theories and subsequent treatments of eating disorders. Another aim of this theory is to provide more comprehensive treatment to those with eating disorders through the inclusion of the four additional maintaining mechanisms, clinical perfectionism, core low self esteem, mood intolerance and interpersonal difficulties.

4.2.1 Cognitive Behavioural Theory of Bulimia Nervosa

Central to the cognitive behavioural theory of BN is that a dysfunctional

scheme for self-evaluation results in some people adopting particular eating disorder

features. These include: strict and rigid dietary rules, weight control behaviours,

body avoidance and body checking, as well as preoccupation with thoughts of

eating, shape and weight. Together these features are believed to maintain the eating

disorder (Byrne & McLean, 2002; Fairburn, 1981; Fairburn et al., 1986; Fairburn et

al., 2003; Fairburn, Marcus et al., 1993). A more recent reconceptualisation also

includes self-esteem, suggesting that overconcern with eating, shape and weight

combined with self-esteem further maintains eating disorders (Byrne & McLean,

2002). This addition highlights the relevance in exploring additional maintenance

mechanisms in eating disorders.

Cognitive behavioural theory proposes that binge eating is the only feature of

eating disorders not related to the dysfunctional scheme for self evaluation (Fairburn

et al., 2003). Instead, binge eating is believed to be a consequence of dietary

restraint, as individuals with BN tend to adopt multiple rigid, inflexible and highly

specific dietary rules about the way they should eat (Fairburn et al., 2003). As a

result of the inflexibility of these rules, minor (and almost inevitable) lapses are

believed to result in an all-or-nothing reaction where attempts to control eating are

abandoned, resulting in a cascade of uncontrolled eating or a bingeing episode,

usually perceived by the individual to indicate a lack of self-control (Byrne &

McLean, 2002; Fairburn et al., 2003). This is believed to lead to a highly distinctive

pattern of eating in which sustained dietary restraint is repeatedly interrupted by

episodes of binge eating thereby magnifying the core psychopathology underlying the eating disorder, by intensifying the focus on control of eating, shape and weight and encouraging further dietary restraint (Fairburn et al., 2003).

The cognitive behavioural theory of BN also suggests that binge eating is more likely to occur in response to an acute change in mood (usually adverse mood states) as well as adverse day-to-day events which works to interrupt dietary restraint (Fairburn et al., 1986). In this sense, binge eating is believed to distract the patient from their negative mood state as well as from thinking about their difficulties. The role of mood states has been recently emphasised by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003).

The final maintaining factor from the original cognitive behavioural models of BN is that of compensatory purging (including induced vomiting, laxative, diuretic and diet pill misuse and excessive exercise) in response to binge eating. Compensatory purging is believed to occur to assist in coping with the effects of binge eating and subsequent feelings of loss of control by reducing anxiety about potential weight gain, disrupting the learned satiety that regulates food intake and reinforcing reduced anxiety over possible weight gain (Wilson, Fairburn, & Agras, 1997b).

According to the cognitive behavioural model of BN, the consequence of sustained dietary restriction followed by binge eating and purging is significant distress which further lowers self-esteem and enhances concerns about eating, shape and weight, thereby encouraging the conditions that will inevitably lead to further

dietary restraint and binge eating and resulting in the perpetuation of a binge-purge

cycle (see Figure 2).

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        ┌─────────────────────────────────────────┐
        │  Over-evaluation of control over eating, │
        │  shape or weight                          │
        └─────────────────────────────────────────┘
              ▲                    │
              │                    ▼
              │         ┌───────────────────────────────────┐
              │    ──▶  │ Strict dieting; non-compensatory   │
              │         │ weight-control behaviour           │
              │         └───────────────────────────────────┘
              │                    │
              │                    ▼
┌─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─┐           ┌──────────────────┐
│ Events and associated│    ──▶    │   Binge eating   │
│ mood change          │           └──────────────────┘
└─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─┘                    ▲│
                                   ┌──────────────────────────┐
                                   │ Compensatory vomiting/    │
                                   │ laxative misuse           │
                                   └──────────────────────────┘
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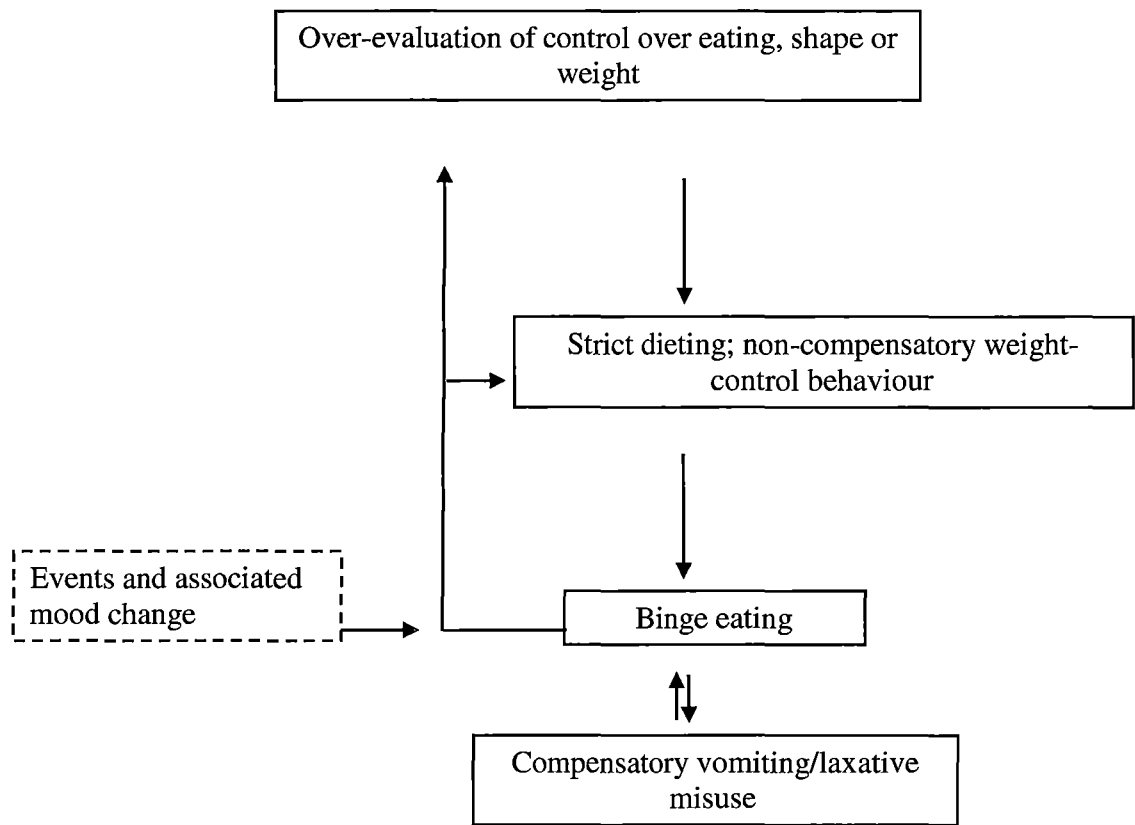
Figure 2. A schematic representation of the cognitive behavioural theory of the

maintenance of bulimia nervosa (reproduced from Fairburn et al, 2003).

4.2.2 Cognitive Behavioural Theory of Binge Eating Disorder

The cognitive behavioural theory of BED (Castonguay et al., 1995) is based

on that of BN as well as the escape model of bingeing (Heatherton & Baumeister,

1991) and research on obesity (Stunkard, 1959). This theory suggests that as for BN,

in BED there is a dysfunctional scheme for self-evaluation including overconcern

with weight and shape which interacts with low self-esteem and negative affect to result in three distinct pathways to binge eating (Castonguay et al., 1995). Unlike in BN, overconcern with eating and purging does not appear to maintain the processes in BED.

In BED, the first pathway to binge eating is from self-esteem to overconcern with weight and shape. Although not often recognised as a feature of BED, this is believed to lead to a form of dietary restraint and subsequent binge eating through similar processes to that in BN (Castonguay et al., 1995). The second pathway is directly from low self-esteem to negative affect suggesting that in individuals with BED, binge eating can occur without directly influencing what is commonly referred to as the core psychopathology of eating disorders (Castonguay et al., 1995). The third pathway is a variation on the second, where overconcern with weight and shape mediates low self-esteem to produce negative affect (Castonguay et al., 1995).

The cognitive behavioural theory of BED suggests that the binge cycle is maintained by low self-esteem, dietary restraint and negative affect, as well as overconcern with weight and shape (Castonguay et al., 1995). These feedback pathways are depicted in Figure 3.
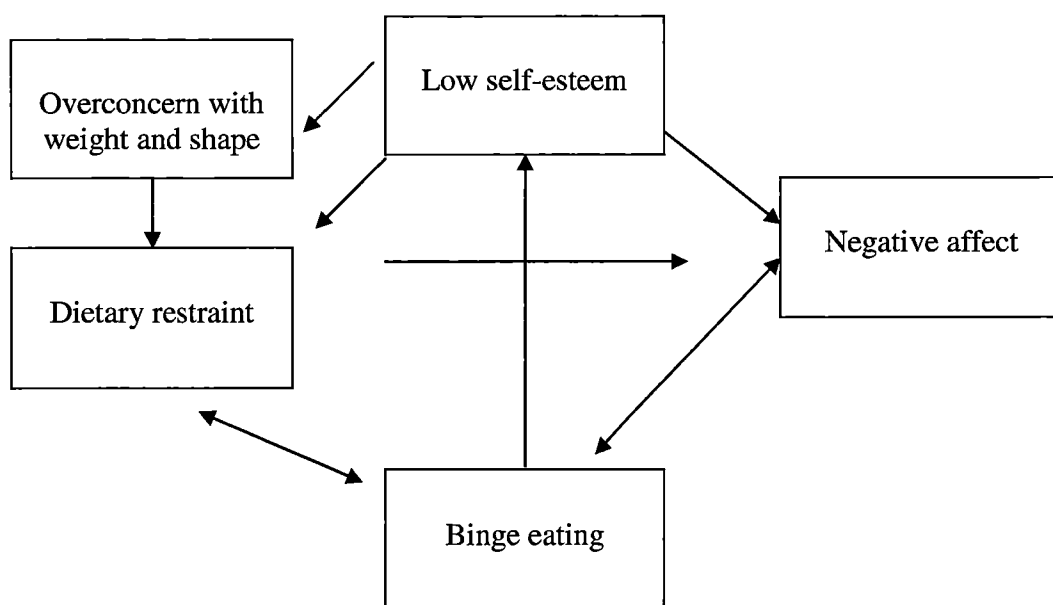
Figure 3. The proposed cognitive behavioural model of the maintenance of BED

(reproduced from Castonguay et al., 1995)

4.3 TRANSDIAGNOSTIC COGNITIVE BEHAVIOURAL THEORY OF

EATING DISORDERS

The transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) is

essentially an extension of the cognitive behavioural theory of BN which

incorporates features of other eating disorders (including AN, eating disorder NOS

and BED) as well as four additional maintaining mechanisms. The transdiagnostic

cognitive behavioural theory of eating disorders suggests that all eating disorders

share the same distinct core psychopathology expressed by similar attitudes and

behaviour. This theory also suggests that unique features are present across different

diagnoses while only the degree that core psychopathology is present varies between

diagnoses. This theory extends previous theories by proposing the role of clinical

perfectionism, core low self-esteem, mood intolerance and interpersonal difficulties in maintaining the core psychopathology.

As seen in Figure 4, the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) proposes that core low self-esteem directly influences an individual's dysfunctional scheme for self-evaluation resulting in dietary restraint and other weight-control behaviours. As discussed, the main difference between BN and BED is not the presence or absence of purging but the degree to which each of these features is present.

One of the distinct features of the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) concerns the dysfunctional scheme for self-evaluation. Like previous conceptualisations, this includes over-evaluation of eating, shape and weight (and their control), while proposing another process, the over-evaluation of achieving perfection (also known as clinical perfectionism). This feature is believed to input into both over-evaluation of eating, shape and weight as well as other areas of the individual's life. It is then proposed that both of these contribute to dietary restraint, dietary restriction and weight control behaviour.

The transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003)includes mood intolerance as a feature that influences both binge eating and subsequent compensatory behaviours in a similar way to previous models. The fourth of the maintaining factors, interpersonal difficulties is believed to have a direct influence on all parts of the maintenance of eating disorder psychopathology.

DYSFUNCTIONAL SCHEME FOR SELF-EVALUATION

Over-evaluation of eating, shape and weight and their control

Over-evaluation of achieving "PERFECTIONISM"

CORE LOW SELF-ESTEEM

L I F E

MOOD INTOLERANCE

Strict dieting and other weight-control behaviour

(Achieving in other domains)

Binge eating

Compensatory vomiting/laxative misuse
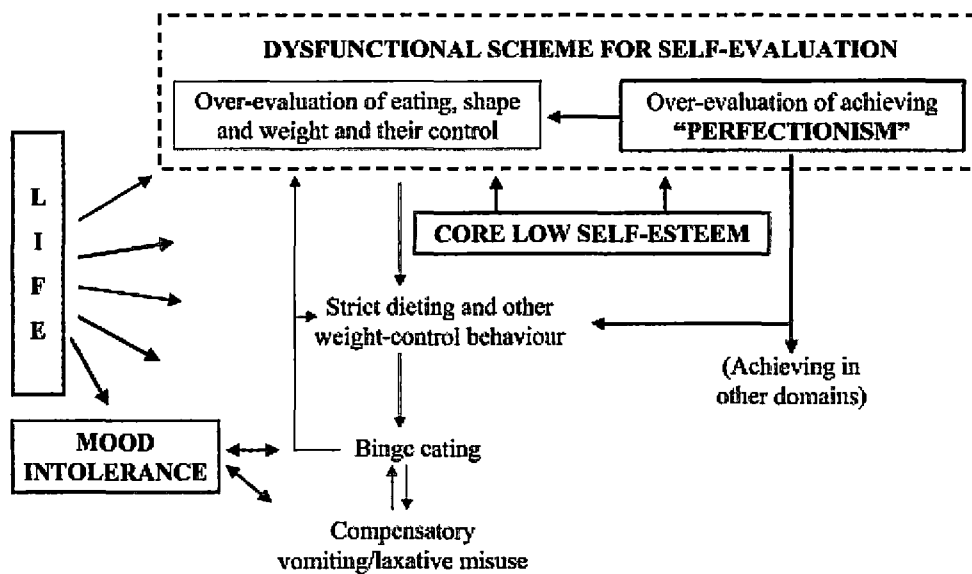
Figure 4. A schematic representation of the 'transdiagnostic' theory of the maintenance of eating disorders. 'Life' is shorthand for interpersonal life (reproduced from Fairburn et al, 2003)

The transdiagnostic model (Fairburn et al., 2003) implies that there are different pathways for each eating disorder and that the features described are similar enough to be represented by a composite figure, though not necessarily present in all individual cases. According to this theory, common eating disorder symptomatology across BN and BED includes the dysfunctional scheme for self-evaluation (over-concern with eating, shape and weight and in some cases, achieving perfection), dietary restraint (though this is a feature of debate), binge eating and in some cases, low self-esteem, mood intolerance and interpersonal difficulties. In BN, the cycle is extended to include compensatory purging. The subsequent attitudes and behaviours of both BN and BED are believed to result in a magnification of the core

psychopathology contributing to the eating disorder, thereby intensifying the focus on control of eating, shape and weight and encouraging further dietary restraint and bingeing.

4.4 THE ADDITIONAL MAINTAINING MECHANISMS OF EATING DISORDERS

Although additional maintaining mechanisms described in the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) have been recognised in previous conceptualisations of eating disorders, the inclusion of these within one theory for all eating disorders is a new approach. The role of each of the maintaining mechanisms will be discussed separately with particular emphasis on BN and BED.

4.4.1 Clinical Perfectionism

Clinical perfectionism is the first maintenance factor identified by the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) and is defined as a type of perfectionism in which standards are higher than the usual extreme ones as seen in those with perfectionistic tendencies. Although perfectionism and the interaction between perfectionism and the control of eating, shape and weight have been recognised as a common feature of individuals with eating disorders, clinical perfectionism is viewed as part of the overall dysfunctional scheme for self-evaluation to the extent that self-worth is entirely based on setting and achieving demanding goals (Fairburn et al., 2003). This is not limited to eating disordered

behaviour but extends to all aspects of a person's life and involves striving hard to achieve what the person views as exacting high standards. In this sense, clinical perfectionism is unique among other kinds of perfectionism where the person still sets and judges themselves by high standards. In clinical perfectionism, these standards tend to be dysfunctional and are characterised by deteriorating performance as the individual strives to do better; and always sensing that they are not doing well enough.

Clinical perfectionism has a range of consequences. In the eating disorder domain, the impact is that these patients experience an extreme fear of failure (i.e. a fear of overeating, "fatness" or weight gain); they also may demonstrate the cognitive features of frequent or selective attention to performance (e.g. repeated weight checking, calorie-counting); and they experience substantial levels of self criticism due to their negatively biased appraisals of performance (Fairburn et al., 2003). The consequence is increased determination to meet desired goals (i.e. to control eating, shape and weight), thereby maintaining the eating disorder and resulting in an obstacle to change (Fairburn et al., 2003).

Although clinical perfectionism in eating disorders has not been extensively researched (with the exception of the research from the transdiagnostic model) the presence of various forms of perfectionism in eating disorders has been well established, even after weight restoration in underweight patients (Bastiani, Rao, Weltzin, & Kaye, 1995; Halmi et al., 2000; Kaye, Gendall, & Strober, 1998; Slade, 1982; Srinivasagam et al., 1995; Szabo & Terre-Blanche, 1997). Further, there has also been a suggestion that perfectionism is a specific risk factor in the development

of eating disorders (Shafran, Cooper, & Fairburn, 2002) such as BN (Fairburn,

Welch, Doll, Davies, & O'Conner, 1997) and AN (Fairburn, Shafran, & Cooper,

1999) but this has not been established for BED (Fairburn et al., 1998). This has led

to the suggestion that perfection is a specific risk and maintenance factor in eating

psychopathology (Stice, 2001; Vohs et al., 1999; Vohs et al., 2001).

4.4.1.1 Perfectionism and Eating Disorders

While perfectionism has also been proposed as one of the factors that

specifically contributes to the psychopathology of BN (Fairburn et al., 2003; Franco-

Paredes, Mancilla-Diaz, Vazquez-Arevalo, Lopez-Aguilar, & Alvarez-Rayon,

2005), it appears that perfectionism in BED has been less well established. Studies

investigating perfectionism in BED have suggested that these patients experience

similar levels of perfectionism to those with BN (de Zwaan et al., 1993; Pratt et al.,

2001; Raymond et al., 1995) although one study found no difference in the level of

perfectionism of those with BED in comparison to OW and non-eating disordered

individuals (Kuehnel & Wadden, 1994).

Perfectionism is believed to maintain the core psychopathology of BN by

interacting with the standards of self-evaluation. In these individuals self-evaluation

is suggested to be dependent on perceived success at meeting goals or personal

standards achieved in the domain of overeating, shape or weight. This means that

when these individuals experience the sensation that they have not been achieving

their standards (e.g. as a result of overeating or breaking a dietary rule), this can

result in frustration and feelings of ineffectiveness, thereby resulting in attempts to

be more strict with themselves due to fear of receiving a negative evaluation

(Franco-Paredes et al., 2005). It has also been suggested that perfectionism can

predict the presence of AN, BN and BED (Bulik et al., 2003; Fairburn, Cooper et al.,

1999; Fairburn et al., 1998; Fairburn et al., 1997) and eating disordered

symptomatology (Holston & Cashwell, 2000) such as that present in women who

perceive themselves as being overweight (Joiner, Heatherton, Rudd, & Schmidt,

1997).

As there have been different approaches to defining perfectionism, different

types of perfectionism have been linked to different symptomatology in eating

disorders. For example, self-oriented perfectionism has been linked with extreme

dietary restriction, body dissatisfaction, drive for thinness, ineffectiveness and

dieting (Ashby, Kottman, & Shoen, 1998); while socially-prescribed perfectionism

has been found to be related to dietary restriction, concerns about being thin,

disordered eating patterns, body image avoidance, poor self-esteem and the

development of bulimic symptoms (Hewitt, Flett, & Ediger, 1995; Stice, 2001; Vohs

et al., 1999; Vohs et al., 2001).

Perfectionism has also been found to mediate between other characteristics

common in eating disorders, such as poor self-esteem, self-efficacy and body

dissatisfaction (Bardone-Cone, Abramson, Vohs, Heatherton, & Joiner Jr., 2006;

Ruggiero, Levi, Ciuna, & Sassaroli, 2003; Shaw, Stice, & Springer, 2004; Vohs et

al., 1999; Vohs et al., 2001). In general, those with perfectionistic standards and low

self-esteem are suggested to experience greater eating disordered symptoms

(Cervera et al., 2003; Denoma et al., 2005; Joiner et al., 1997; Vohs et al., 1999;

Vohs et al., 2001) suggesting a potential role of other maintaining mechanisms in eating disorders.

It is important to note that clinical perfectionism is a distinct type of perfectionism, not multidimensional in nature but relating to a certain kind of psychopathology found to be evident in those with eating disorders (and very probably evident across other disorders). As clinical perfectionism is a distinct construct, it is difficult to compare the results of studies using multidimensional measures. At this stage, the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) and the cognitive behavioural model of perfectionism (Shafran et al., 2002) appear to best describe the processes involved by the concept of clinical perfectionism. This also means that at this stage, clinical perfectionism may be difficult to measure but can be defined by clinical judgement.

4.4.2 Core Low Self-Esteem

Core low self-esteem is defined as an unconditional and pervasive negative view of the self, seen as part of permanent identity (Fairburn et al., 2003). In this sense, core low self-esteem could also be defined as "no self-esteem" and goes beyond the normal definition of low self-esteem. This is an important distinction and appears to be a unique feature to the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) involving the perception that the individual is the worst of the worst rather than having a general sense of self dislike. The core low self-esteem in some individuals with eating disorders is believed to interact with the other eating disorder psychopathology thereby resulting in increased focus on over-

concern with eating, weight and shape. This is suggested to function as a mechanism for survival as the patient is doing something that they value. The downside is that it further perpetuates the core low self-esteem due to enhancing the pervasive negative view of the self (Fairburn et al., 2003).

Another consequence of core low self-esteem is that treatment of patients with this core maintaining mechanism is more difficult due to the particular nature of their thoughts, beliefs and feelings. In these patients, negative judgements (such as the belief that they are completely worthless, cannot change and do not deserve to change) occur regardless of how they perform thereby obstructing treatment due to a sense of hopelessness about their capacity to change (Fairburn et al., 2003).

As with clinical perfectionism, apart from the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003), the term core low self-esteem is relatively new and does not appear to have been researched or described by other literature. This suggests again, that beyond clinical definitions, core low self-esteem is not easily measured and it may be beneficial to develop standardise measurement tools for assessing both core low self-esteem and clinical perfectionism.

Clarifying the association between core low self-esteem and BN and BED may be useful in determining how self-esteem interacts with eating disorders. Highlighting similarities or differences between BN and BED in the characteristics of associated core low self-esteem may also provide some useful information as to whether these two conditions can be adequately described by one theory. Further the role of low self-esteem in eating disorders has been highlighted by a range of previous research (Grilo, Masheb, Brody, Burke-Martindale, & Rothschild, 2005;

Gual et al., 2002; Ross & Wade, 2004; Sassaroli & Ruggiero, 2005) and it has

consistently found that low self-esteem has an important role in the possible

development and maintenance of eating disorders (Mendelson, McLaren, Gauvin, &

Steiger, 2002).

4.4.2.1 Low Self-Esteem and Eating Disorders

As has been suggested, self-esteem (along with perfectionism) is one of the

most frequently quoted psychological predisposing characteristics to an individual

developing an eating disorder (Button, Sonuga-Barke, Davies, & Thompson, 1996;

Fairburn et al., 2003; Fairburn, Shafran et al., 1999; Fairburn et al., 1997; Sassaroli

& Ruggiero, 2005; Vitousek & Hollon, 1990) and it has even been suggested that

low self-esteem may be a necessary prerequisite to the development of an eating

disorder (Silverstone, 1992). This has been supported by both clinical observations

as well as subsequent epidemiological studies indicating associations between low

self-esteem and a higher risk of eating disorders (Button et al., 1996; Geller,

Cockell, & Goldner, 2000; Lilenfeld et al., 1998; Walters & Kendler, 1995).

While core low self-esteem has a specific clinical meaning, low self-esteem

is generally viewed as indicating a poor subjective perception of one's qualities.

Core low self-esteem is suggesting to take this a step further, where the individual's

subjective perception of the self is so low, that it is poorer than poor (although this is

difficult to assess presently), and exists across all aspects of the self. General

definitions of self-esteem also include both self-relevant beliefs (e.g. "I am

competent/incompetent"), associated self-relevant emotions (e.g. triumphant/despair,

pride/shame) and is expressed in behaviour (e.g. confidence/caution, assertive/submissive). Further, self-esteem can be construed as an enduring personality trait characteristic (i.e. trait self-esteem) or a temporary psychological condition (i.e. state self-esteem) and can apply to one dimension (e.g. "I am worthless at losing weight") or have a global extent ("I am a worthless person"). In this sense, core low self-esteem would be seen as involving encompassing self-relevant beliefs, emotions and behaviours and would be construed as an enduring trait that is global.

Low self-esteem has been specifically linked with over-concern with eating, shape and weight and dietary restraint in cognitive behavioural theories of BN (Byrne & McLean, 2002; Jacobi, Paul, De Zwaan, Nutzinger, & Dahme, 2004; Kugu, Akyuz, Dogan, Ersan, & Izgic, 2006). This has been supported by a study which found low self-esteem mediates overvalued ideas about body weight and shape and dietary restraint, binge eating and compensatory purging (Wade & Lowes, 2002). Low self-esteem has also been linked with perfection and low self-efficacy to result in binge eating (Bardone-Cone et al., 2006; Bardone, Perez, Abramson, & Joiner Jr., 2003; Etringer, Altmaier, & Bowers, 1989; Franks & Marolla, 1976; Garner & Garfinkel, 1997; Gormally, Black, Daston, & Rardin, 1982; Schneider, O'Leary, & Agras, 1987; Striegel-Moore, Silberstein, Frensch, & Rodin, 1989; Tafarodi & Milne, 2002; Tafarodi & Swann, 1995; Vohs & Heatherton, 2001; Vohs et al., 2001; Wilson, Fairburn, & Agras, 1997a). This suggests that low self-esteem may be a feature of both BN and BED. It has also been identified that low self-

esteem persists in those with BN even after controlling for negative affect (Jacobi et al., 2004).

As mentioned, for BED there is research linking binge eating to low self-esteem (Grilo, Wilfley, Brownell, & Rodin, 1994) even after other factors such as depression are controlled for (Jacobi et al., 2004). Mediating factors such as perfection have also been associated with low self-esteem in BED (Denoma et al., 2005; Dunkley, Blankstein, Masheb, & Grilo, 2006; Joiner et al., 1997; Vohs et al., 1999; Vohs et al., 2001). Depression has also been found to mediate the relationship between self-criticism and overconcern with shape and weight in those with BED (Dunkley & Grilo, 2006; Grilo et al., 2005) suggesting an association between negative affect and low self-esteem (Hrabosky, Masheb, White, & Grilo, 2007).

In a study that combined individuals with BN and BED, it was found that that those with eating disorders had lower self-esteem than controls without eating disorders (Kugu et al., 2006). This suggests some support for the suggestion that those with BED share similar difficulties with self-esteem as those with BN. It has also been suggested that specific features of BED are more likely to be associated with low self-esteem, namely those individuals who also have greater difficulty in tolerating strong mood states (Peterson, Miller, Crow, Thuras, & Mitchell, 2005). This is an interesting finding that warrants further exploration as it has implications for the presence of "mood intolerance" in individuals with eating disorders as suggested by the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003). This finding also confirms the predictions of the cognitive behavioural model of

BED proposing low self-esteem in BED leads to negative affect (Castonguay et al., 1995).

Low self-esteem has been linked with dietary restraint and the over-concern with shape and weight (Fairburn & Cooper, 1989; Killen et al., 1996; Ross & Wade, 2004). It has also been linked to other aspects of disturbed eating, such as individuals who are high in dietary restraint and those high in body dissatisfaction (Grilo et al., 2005; McFarlane, McCabe, Jarry, Olmsted, & Polivy, 2001; Ross & Wade, 2004).

Together these findings suggest that low self-esteem may play role in the development and maintenance of eating disorders. The nature of core low self-esteem requires further investigation as this construct is slightly different and it is proposed as a key maintaining factor evident in a proportion of individuals with eating disorders and may further obstruct these individuals ability to make change (Fairburn et al., 2003). It is also worth considering whether the concept of core low self-esteem is necessary (or a useful addition), given the well established links between low self-esteem and eating disorders.

4.4.3 Mood Intolerance

Mood intolerance is the third additional maintenance factor proposed for inclusion in an enhanced cognitive behavioural theory (Fairburn et al., 2003). This theory suggests that intolerance to strong emotions (both aversive and positive) is one of the contributing factors to binge eating, compensatory behaviours and other dysfunctional mood regulatory behaviours (e.g. substance abuse). These behaviours

are believed to occur in an attempt to reduce the mood state, thereby alleviating the distress associated and maintaining the recurrence of the strategy. Although the influence of emotional states has been well been recognised by past researchers as having a significant role in eating disorders (Heatherton & Baumeister, 1991; Wilson, 1999b), the transdiagnostic cognitive behavioural theory builds on past research by including the concept of mood intolerance in an overall theory that attempts to explain all eating disorders.

As mood intolerance is believed to result in particular eating disorder behaviours, namely binge eating, compensatory purging and in some cases, other dysfunctional mood regulatory behaviours, this suggests that the concept of mood intolerance has particular relevance to BN and BED. This suggests that it is important to consider how individuals with BN and BED cope with different emotional states. The transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) suggests that these individuals would experience problems coping with strong negative emotions, such as depression, sadness, anxiety, boredom, or anger as well as strong positive emotions, such as being excited.

The transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) implies that dysfunctional mood modulatory behaviour is utilised by patients with eating disorders in an attempt to neutralise mood states. This means that eating disorder behaviours such as vomiting, intense exercise and binge eating may regulate mood by reducing the individual's awareness of the triggering mood state (and associated cognitions) and neutralising the experience but with a personal cost. This personal cost refers to the acts used to modulate mood and can also include acts

of self-harm (e.g. by cutting, pinching or burning themselves) or substance abuse as these also work to rapidly reduce tension providing instant reinforcing gratification (Fairburn et al., 2003). The function of these behaviours as a form of dysfunctional mood modulatory behaviour in eating disorders has been supported by a range of research which suggest that they can exist in isolation or as part of comorbid borderline personality disorder (Claes, Vandereycken, & Vertommen, 2001; Holderness, Brooks-Gunn, & Warren, 1994; Paul, Schroeter, Dahme, & Nutinger, 2002).

At this stage, the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) does not offer an opinion as to whether individuals with eating disorders experience unusually intense mood states or whether they are especially sensitive to them, or both. It also remains unclear whether the intense mood state results in behaviours such as binge eating or these individuals experience generally intense moods and sometimes binge eat (Greeno, Wing, & Shiffman, 2000). This distinction is important as treatment approaches would be quite different depending on the type of mood disturbance.

A key characteristic of mood intolerance is cognitive amplification (Fairburn et al., 2003). This process is believed to enhance the responses to initial mood changes through cognitions relating to the perception that the individual cannot cope or stand the emotion any longer. The transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) proposes that this results in thoughts, feelings and behaviours that further intensify the initial mood state and build up to encourage a need to engage in dysfunctional mood modulatory behaviour, thereby reinforcing the

cognitions and subsequent behaviours. This would suggest that dysfunctional

behaviours occur as a result of the cognitive processes that follow intense emotions,

clarifying the nature of mood intolerance and implying treatment strategies should

focus on assisting the individual reduce the impact of their intense emotions.

4.4.3.1 Mood Intolerance and Eating Disorders

The role of emotions and mood states in eating disorders has been

highlighted by a range of previous research (Agras & Telch, 1998; Blackburn et al.,

2006; Heatherton & Baumeister, 1991; Paxton & Diggens, 1997; Stice, 1998) and

has been included in early cognitive behavioural models of BN (Wilson, 1999b) and

BED (Castonguay et al., 1995). It has also been well recognised that adverse mood

states can trigger binge eating episodes as a function of the interruption of dietary

restraint (Fairburn et al., 1986) as well as to escape unpleasant affect (Heatherton &

Baumeister, 1991). This suggests that there is a complex relationship between

emotional states and binge eating (Fairburn et al., 2003) as there are several

pathways contributing to binge eating, one being that of intense emotions and the

other, the dietary restraint pathway (Stice et al., 2001).

The role of negative emotions in binge eating for both BN and BED has been

well recognised and particular emotional states such as those in depression

(Abraham & Beumont, 1982; J. Cooper et al., 1988; Costanzo, Musante, Friedman,

Kern, & Tomlinson, 1999; Elmore & de Castro, 1990; Hsu, 1990; Johnson &

Larson, 1982; Lingswiler, Crowther, & Stephens, 1989; Steinberg, Tobin, &

Johnson, 1990), anxiety (Abraham & Beumont, 1982; Herman, Polivy, Lank, &

Heatherton, 1987; Meyer, Waller, & Walters A, 1998), anger (Hsu, 1990; Meyer et al., 1998) and boredom (Abraham & Beumont, 1982; Meyer et al., 1998; Stickney, Miltenberger, & Wolff, 1999) have been the most common emotions associated with binge eating. Other emotions such as guilt and shame, disgust, loss of confidence, hopelessness, empty feelings and helplessness (Sanftner, Barlow, Marschall, & Rangney, 1995; Tachi, Murakami, Murotsu, & Washizuka, 2001) have also been identified.

With each of these emotions, the intensity of the emotional state has generally been found to both decrease and increase following a binge, suggesting that in some instances, binge eating may function to ameliorate intense mood states (Kaye, Gwurtsman, George, Weiss, & Jimerson, 1986) while other dysfunctional mood modulatory behaviours may occur in instances where binge eating does not alleviate the mood state. This suggests that across the binge-purge cycle there may be a differential effect of mood modulatory behaviour on emotional states.

Research which has focused on changes across the binge-purge cycle has generally found that negative affect can be elevated prior to binge eating, during binge eating and after binge eating (Powell & Thelen, 1996). Following compensatory purging (otherwise known as dysfunctional mood modulatory behaviour), it has been found that some negative emotions (including guilt, disgust, hostility and depression) remain elevated, while others (e.g. anxiety and a sense of being out of control) decrease (Abraham & Beumont, 1982; J. Cooper et al., 1988; Hsu, 1990; Johnson & Larson, 1982; Powell & Thelen, 1996). An intensification of negative affect following binge eating and purging (Abraham & Beumont, 1982; J.

Cooper et al., 1988; Johnson & Larson, 1982; Lingswiler et al., 1989; Powell & Thelen, 1996; Rosen, Leitenberg, Fondacaro, Gross, & Willmuth, 1985) has also been found, suggesting that the nature of mood intolerance in eating disorders is a complex one.

It is also possible that individuals with BED differ from those with BN, as there is no compensatory purging in BED. Those with BED tend to binge more frequently than those with BN, where there are typically sustained periods of dietary restraint (or restriction) between binge episodes. The nature of mood intolerance could explain how some individuals with BED continue binge eating, as it may function to temporarily alleviate intense emotions whereas those with BN are able to reduce the intensity of their emotional state by purging.

In addition to changes in emotional states across the binge purge cycle, it has been found that individuals with BN tend to experience more negative moods before binge eating than before normal eating (Powell & Thelen, 1996). In BED, additional factors such as feelings of lack of control over eating, being at home and being alone were also implicated in binge eating (Greeno et al., 2000). This suggests negative affect has a similar effect on binge eating in BN and BED (Eldredge & Agras, 1996).

While the role of negative mood states and binge eating is well established, the role of positive mood states and overeating or binge eating has been less well researched and is a relatively new concept in the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003). Studies that have investigated the relationship between positive mood and food intake have found that positive

emotions such as joy are associated with hedonic eating; or eating for pleasure

(Macht, 1999). A tendency to eat more healthy foods when feeling positive emotions

has also been identified (Lyman, 1982). Binge eating has been found to be

associated with positive emotions such as energy and excitement and purging has

been found to lead to an experience of being calm and feeling pleasurable (J. Cooper

et al., 1988). It should be noted that research has failed to find an association

between overeating and positive moods (Lowe & Fisher, 1983), although the

transdiagnostic cognitive behavioural theory would suggest that positive mood states

may play a role in maintaining some eating disordered behaviours. This suggests

that the role of positive moods in triggering eating disordered behaviours requires

further research. As with negative emotions, the effect of positive emotions in BN

and BED may be distinct or similar.

Overall these findings suggest that there is a strong link between different

emotions and problems with eating. It has been found that a variety of emotions can

precipitate both binge eating and compensatory purging, highlighting a potential role

for mood intolerance in the maintenance of eating disorders.

4.4.4 Interpersonal Difficulties

The transdiagnostic cognitive behavioural theory of eating disorders

(Fairburn et al., 2003) suggests that in some eating disorder cases interpersonal

difficulties interact with the core eating disorder psychopathology and impair the

ability of the these individuals to participate in treatment. Although the presence of

interpersonal difficulties in eating disorders has been long recognised, the actual

problems that arise from interpersonal difficulties have only recently been

incorporated into a cognitive behavioural theory of the maintenance of eating

disorders.

The terms implied by interpersonal difficulties are defined broadly. Problems

in family dynamics are among the characteristics covered by this term and is well

established as playing a role in both the development and maintenance of eating

disorder psychopathology, particularly for children and adolescents (Garfinkel et al.,

1983; Minuchin, Rosman, & Baker, 1978; Pike & Rodin, 1991; Steiger, Liquornik,

Chapman, & Hussain, 1991). The role of family functioning for adults with eating

disorders is less clear, as the family tends to play a more significant role in the lives

of children and adolescents. It is likely that the problems in interpersonal

interactions from childhood and adolescent are likely to contribute to and continue

into adulthood for those with eating disorders, however this requires further

investigation.

Early research focusing on family therapeutic orientation reported that

certain family patterns were over represented in families with AN (Minuchin et al.,

1978). This suggested that certain family problems are more likely to contribute to

eating disorders and led to research attempting to discover the characteristics of

these families in order to determine whether family patterns are a cause or an effect

of an eating disorder (Garfinkel et al., 1983).

Subsequent research suggested that family dynamics and family interaction

styles have an important role in both the development and maintenance of eating

disorders (Pike & Rodin, 1991; Steiger et al., 1991). Interaction styles in families of

diet-restricting children differed from interaction styles of families of binge eating

children: high scores on rigidity and enmeshment characterised the former families,

but high scores on hostility or incohesion the latter (Steiger et al., 1991). Other

research, however, suggested that families of children who binge and restrict, share

similar characteristics, with both having high scores on incohesion (Waller, Slade, &

Calam, 1990). Additional research has suggested that coming from a more cohesive

family may lead to better eating attitudes as food is less likely to be used as a coping

strategy for negative feelings (Johnson, Brownell, St. Jeor, Brunner, & Worby,

1997). Overall this research suggests the interaction style of families may be

involved in the maintenance of eating disorders but exactly how is unknown.

The impact of problems in family dynamics appears to be most relevant for

younger patients with eating disorders, where family tensions can intensity

resistance to eating due to the need for control, which in the individual with an

eating disorder, becomes misplaced as a need for dietary control (Fairburn et al.,

2003; Fairburn, Shafran et al., 1999; Hanna & Bond, 2006). It has also been found

that family conflict and criticism from parents when growing up can influence the

level of impairment experienced by individuals with eating disorders in later stages

of the disorder (Wade et al., 2006).

Particular interpersonal environments and increased sensitivity to

interpersonal interaction are also suggested to play a role in maintenance of eating

disorders (Fairburn et al., 2003). The transdiagnostic cognitive behavioural theory

(Fairburn et al., 2003) suggests that certain interpersonal environments (e.g. in

families where one individual already has an eating disorder and in occupations

where there is pressure to remain thin such as dancers or models) magnify concerns about eating, shape and weight thereby encouraging the maintenance of these concerns.

One example of an interpersonal environment which can assist in maintaining an individual's eating disorder is when either parent of the patient also has an eating disorder, symptomatology of an eating disorder or high body dissatisfaction (Agras, Bryson, Hammer, & Kraemer, 2007; Bissett, Meyer, & Haycraft, 2006). This is supported by research which has found a link between the dietary attitudes of mothers and their children (Sherwood & Neumark-Sztainer, 2001; Stein et al., 2006) as well as research which has found that messages from any family member, including fathers and siblings can contribute to the development of eating disordered psychopathology (Hanna & Bond, 2006).

Other environments and particular occupations can also influence dietary behaviour and contribute to the onset and maintenance of eating disorders (Fairburn et al., 2003). Several occupations are well known for their influence on shape and weight concerns. A range of research suggests that ballet dancers experience a heightened risk of developing an eating disorder relative to their non-dancing peers (Abraham, 1996; Braisted, Mellin, Gong, & Irwin, 1985; Neumarker, Bettle, Neumarkker, & Bettle, 2000) and that this may be a function of both environmental and genetic risk (Thomas, Keel, & Heatherton, 2005). Similarly the interpersonal environments of non-professional performers of sports that emphasise thinness and muscularity (e.g. gymnastics, ballet, running, body building and skating) have been implicated in the development of high body dissatisfaction and inappropriate eating

attitudes and behaviours (Ravaldi et al., 2003). Finally, it is also suggested that modelling may increase concerns about weight and shape and contribute to the onset and maintenance of eating disorders (Fairburn et al., 2003).

Adverse interpersonal events have also been found to be a common precipitant and trigger to binge eating episodes (Fairburn et al., 2003). This has been particularly highlighted for individuals with a diagnosis of BED, where factors relating to interpersonal relationships, moods and thoughts are cited as more influential in precipitating binge eating rather than other psychological factors (Arnow, Kenardy, & Agras, 1992). Further research on the impact of interpersonal problems in BED has suggested that interpersonal difficulties are significantly correlated with the severity of binge eating but not with being OW (Telch & Agras, 1994). This suggests that the experience of BED is distinct from that of being OW or obese, highlighting the specific function of interpersonal difficulties in maintaining eating disordered psychopathology.

The transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) also links long-term interpersonal difficulties to poor self-esteem, predicting that patients with eating disorders strive harder to achieve their goals (such as goals in controlling eating, shape and weight). It is also suggested that those with eating disorders who have more disturbed interpersonal functioning have a limited response to treatment in comparison to those with good interpersonal functioning (Agras et al., 2000).

Another finding in relation to the interpersonal functioning of individuals with eating disorders is that those with BN can experience increased sensitivity to

social interactions (Steiger, Gauvin, Labalpurwala, Seguin, & Stotland, 1999).

Interestingly, it has been found that those with eating disorder NOS have fewer

symptoms of disturbed interpersonal relationships than individuals with BN

(Broberg, Hjalmers, & Nevonen, 2001), suggesting less severity of interpersonal

sensitivity in this group. Research has also identified that interpersonal distrust is a

common feature of eating disorders (Simmons, Smith, & Hill, 2002; Strober, 1991)

although this is also believed to depend on whether the patient also has low self-

esteem (Sassaroli & Ruggiero, 2005).

While interpersonal problems in AN and BN have been relatively well

explored, little is known about the relationship between interpersonal problems and

BED (Eldredge, Locke, & Horowitz, 1998). Research focusing on BED has found

links between binge eating and adverse interpersonal interactions (Arnow et al.,

1992; Brown et al., 2003; Telch & Agras, 1994) and has also found that individuals

with BED experience a higher prevalence of impaired relations with people as well

as work impairments due to being upset about weight and eating, than non-bingeing

obese individuals (Spitzer et al., 1993).

Further research exploring interpersonal problems in BED has focused on the

prevalence of personality disorders among those with BED (as compared to

subclinical or non-bingeing obese individuals) with findings indicating that those

with BED have a higher lifetime prevalence of borderline and avoidant personality

disorder (Yanovski et al., 1993). This suggests that these individuals have more

long-term difficulties in their interactions with others and is supported by research

suggesting that individuals with BED who adopt more avoidant strategies are likely

to experience more difficulty with treatment than those who do not (Eldredge et al., 1998). Overall, this suggests that BED is associated with interpersonal distress that is similar in nature to BN.

Together, these findings highlight that interpersonal difficulties are a common feature across eating disorder psychopathology. This suggests that interpersonal difficulties in BN and BED should be examined further, in order to investigate the feasibility of including this feature in theoretical models about the maintenance of eating disorder psychopathology.

4.5 SUMMARY

In summary, the main theory for understanding the maintenance of BN and BED is cognitive behavioural theory, which has recently been enhanced by the suggestion that transdiagnostic processes operate across these disorders. The transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) proposes that all eating disorders share similar characteristics, including a dysfunctional scheme for self-evaluation (the characteristic overconcern with shape and weight), dietary restraint, dietary restriction and binge eating. It is suggested that these features are present to different extents in both BN and BED. In addition, four maintaining mechanisms are proposed and are supported by reviews of past research investigating the nature of these mechanisms in eating disorders (Fairburn et al., 2003). This suggests that clinical perfectionism, core low self-esteem, mood intolerance and interpersonal difficulties are key features of eating disorders and require further research to improve conceptualisations of BN and BED. If the

transdiagnostic cognitive behavioural theory for BN and BED holds, then this could

mean that future theory and treatment practices could be shifted to view eating

disorders through one omnibus theory.

Overall, the transdiagnostic cognitive behavioural theory of eating disorders

(Fairburn et al., 2003) appears to provide a useful explanation for the maintenance of

a broad range of eating disorders, highlighting the possible need to review the

classification of eating disorders (i.e. the futility in classifying eating disorders

separately). This would also have important implications for the treatment of eating

disorders.

CHAPTER 5

COGNITIVE FEATURES OF EATING DISORDERS

5.1 INTRODUCTION

The transdiagnostic cognitive behavioural theory of eating disorders proposes that eating disorders are essentially cognitive disorders (Fairburn et al., 2003) highlighting the importance of investigating of the cognitive features of eating disorders. The key cognitive maintaining mechanism of the transdiagnostic cognitive behavioural theory include a dysfunctional scheme for self-evaluation which comprises overconcern with eating, shape and weight as well as overconcern with achieving perfection. Other cognitive features of interest include the cognitive processes involved in binge eating, compensatory purging and the four additional maintenance mechanisms (i.e. clinical perfectionism, mood intolerance, interpersonal difficulties and core low self-esteem) such as overconcern with eating, shape and weight.

Attentional bias has been well recognised as having a key role in the maintenance of eating disordered psychopathology and has featured in theories of eating disturbance and disorder (Castonguay et al., 1995; Fairburn, 1981; Fairburn et al., 2003; Fairburn, Shafran et al., 1999; Heatherton & Baumeister, 1991). Despite the recognised significance of attentional bias in eating disorders, research about its role and the findings of studies vary greatly. The cognitive features of the transdiagnostic model include overconcern with eating, shape and weight and overconcern for achieving perfectionism require further examination. They also warrant examination across BN and BED which is the focus of this research.

Studies which have examined attentional bias in eating disorders using the modified Stroop task (the main method of examination), are now recognised as

inferior to those using various visual probe tasks (MacLeod & Mathews, 1988; Posner et al., 1980), a more recently developed methodology. The visual probe method is now recognised as a superior measure of selective attention and research utilising this task in eating disorders has found attentional bias effects where those with eating disorders display selective attention towards information relating to "fatness" and avoidance of information relating to "thinness" (Reiger et al., 1998; Shafran et al., 2007). This suggests differential processing of information in those with eating disorders, where selective attention is directed towards eating disorder-congruent information and away from incongruent information. Similar results have been found for those high in body dissatisfaction, restrained eaters and individuals scoring high on measures of eating disorder symptomatology, although fasting has been found to enhance the results (Boon et al., 2000; Placanica et al., 2002; Smith & Rieger, 2006). The findings from these studies suggest that those with eating disorders and those with concerns about eating, shape and weight may have particular biases in the processing of information. This provides some support for cognitive behavioural approaches to eating disorders. No studies appear to have examined attentional bias relating to perfectionism so far, however this feature warrants investigation due to the proposition of the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). Developing a better understanding of the cognitive features of eating disorders will help with a better understanding of the relationship between BN and BED and may assist with treatment of these problems.

5.2 COGNITIVE BIAS IN EATING DISORDERS

Although the theories relating to eating disturbance and disorder were extensively reviewed in Chapters 3 and 4, the cognitive features of these theories will be briefly revisited as they relate to attentional bias and selective processing of information. The findings of research investigating cognitive bias in eating disorders has generally supported theoretical models, with the exception that there has been no research relating to overconcern with achieving perfectionism.

It is fairly well established that cognitive bias plays an important role in theoretical models and the treatment of eating disorders (Shafran et al., 2007) and one of the central features of all cognitive behavioural models of eating disorders is that these individuals selectively attend to (or selectively process) information that is consistent with their eating disordered psychopathology. The kind of information that has special importance is that regarding fatness and thinness, dieting and control of food intake generally, body weight and shape, and in some individuals, achieving perfectionism. Cognitively based models also suggest that the selective attention applied to this type of information directly contributes to the other features of eating disorders, including dietary restriction, dietary restraint, binge eating and compensatory purging thereby maintaining the eating disorder (Castonguay et al., 1995; Fairburn, 1981; Fairburn et al., 2003; Fairburn, Shafran et al., 1999). Despite the important role that attentional bias plays in cognitive behavioural theories of eating disorders (including the transdiagnostic theory), this area has been somewhat neglected and the majority of research appears to have focused on other aspects of cognitive behavioural models.

Selective processing of information has also been implicated in maintaining

eating problems such as that in binge eating (Heatherton & Baumeister, 1991). This

has implications for BED, as these individuals have been mostly neglected in

research examining attentional bias in eating disorders. The escape model

(Heatherton & Baumeister, 1991) suggests that individuals binge eating occurs in an

attempt to divert attention away from personal threats (McManus et al., 1996;

Quinton, 2004; Waller & Meyer, 1997). This suggests that in both BN and BED,

binge eating may occur due to cognitive appraisals of information considered

threatening.

One account of information processing biases in eating disorders suggests

that they are the result of "maladaptive schemata" associated with food, shape,

weight and self and that these schemas distort the way that these patients with eating

disorders perceive and interpret their experiences (Vitousek & Hollon, 1990). This

suggests that patients with eating disorders demonstrate faster processing of food

and weight-related information and have enhanced memory for the same kind of

information.

The overall effect of cognitive bias in relation to eating, shape, weight and

perhaps perfectionism related information is that those with eating disorders would

respond much more quickly to and recall more cues in their environment that relate

to food, shape, weight and perfectionism information. Evidence of this would

provide support for the core maintaining mechanism proposed by the transdiagnostic

cognitive behavioural theory of eating disorders (Fairburn et al., 2003), namely,

over-concern with eating, shape, weight and their control as well as over-concern for achieving perfectionism.

In addition to the findings that those with eating disorders demonstrate selective attention towards disorder salient information, there has been another finding that those with eating disorders show hypervigilance to (i.e. orientation towards) and avoidance from (i.e. orientation away from) disorder salient information in the same way as those with anxiety disorders (Ben-Tovim & Walker, 1991; Reiger et al., 1998). This has a variety of clinical implications and can explain a range of features of eating disorders, including selective attention and avoidance of specific, disliked body parts when looking at one's shape in the mirror (Freeman et al., 1991); body shape and weight avoidance or obsessive checking (Fairburn et al., 2003); selective attention to body sensations, like the body "wobbling" (Fairburn et al., 2003); body size over-estimation (Fairburn, Shafran et al., 1999) and selective attention to information that is misinterpreted as indicating "fatness" (Fairburn et al., 2003). These features further enhance over-concern with weight and shape, perpetuating eating disorder psychopathology.

Cognitive bias has been examined in both attention and memory as each are suggested to act as maintenance processes in the psychopathology of eating disorders such as BN and BED (Lee & Shafran, 2004). These biases have been consistently found in various emotional disorders including anxiety disorders, such as panic disorder (Clark, 1988), social phobia (Clark & McManus, 2002), specific phobias (Thorpe & Salkovskis, 1997), posttraumatic stress disorder (McNally, English, & Lipke, 1993), obsessive compulsive disorder (Rachman, 1997) and

depression (Bradley, Mogg, & Lee, 1997). Comparable biases have been observed in individuals with eating disorders (Ainsworth, Waller, & Fennedy, 2002; Faunce, 2002; Huon, 1995; Williamson et al., 1999).

Cognitive bias in eating disorders was first recognised by research regarding body image disturbances and perceptual distortion (Slade, 1985) and was followed by self-report investigations of the (irrational or maladaptive) beliefs about eating, shape and weight held by individuals with eating disorders (Williamson et al., 1999). It is only recently that the laboratory methods of cognitive psychology have been utilised to study the predictions of cognitive behavioural theories of eating disorders and cognitive bias has been examined in relation to attention and memory (Israeli & Stewart, 2001).

Experimental cognitive paradigms hold several advantages over earlier methods as they are based on overt and measurable behaviour in response to controlled laboratory stimuli as opposed to retrospective and subjective self reporting (Israeli & Stewart, 2001; Williamson et al., 1999). Self reported data is also recognised as notoriously unreliable in those with eating disorders (Fairburn, Cooper, Cooper, McKenna, & Anastasiades, 1991) as eating disordered individuals are prone to deliberately distorting their responses (Vitousek & Hollon, 1990). Experimental tasks also hold the advantage that participants are generally unaware of how their cognitive functioning impacts their behaviour (Faunce, 2002) and they allow for the testing of specific hypotheses derived from the cognitive models of eating disorders (Faunce, 2002). The only noted criticism of these approaches is that they lack ecological validity (Shafran et al., 2007). Overall, experimental cognitive

paradigms allow the cognitive processes underlying eating disorders to be better

understood (Vitousek & Hollon, 1990).

5.2.1 Memory Bias in Eating Disturbance and Disorder

Although memory bias is recognised as one of the cognitive processes

involved in eating disorders, few studies appear to have examined it. Those which

have find that patients with a range of eating disorders tend to recall more 'fatness'

related words than those without eating disorders, including those high in body

dysphoria and normal controls (Sebastian, Williamson, & Blouin, 1996). Enhanced

recall for weight and food related information in those with eating disorders has also

been found (King, Polivy, & Herman, 1991) suggesting that there is an inherent

cognitive bias in eating disorders that results in the selective recall of information

consistent with the eating disorder psychopathology.

While the majority of studies appear to examine explicit memory, one study

of those with AN examined implicit memory using a word completion task and

found that more word stems were completed when the AN related words were

primed (Hermans, Pieters, & Eelen, 1998). This study suggested that there is not a

clear implicit memory bias in AN, but the results were clarified by the use of a cued

recall test of explicit memory. In this instance, an explicit memory bias for AN

related words was found (Hermans et al., 1998) supporting the findings of other

explicit memory research (Hunt & Cooper, 2001; King et al., 1991; Sebastian et al.,

1996). It is worth noting that Hermans et al.'s findings were limited by a small

sample of six people with AN, which makes it difficult to generalise from these

results. Overall these findings suggest that further research is required to clarify the presence of memory bias in eating disorders and to examine the possible difference between implicit and explicit memory bias.

Recognition memory has also been examined in eating disorders. One study indicated that there was no difference in the recognition of previously presented food or weight related words for those with AN (Channon, Hemsley, & De Silva, 1988). This suggests that enhanced recognition memory for eating disorder congruent information may not be a key cognitive feature of eating disorders, however requires further investigation.

Memory bias in BN has been investigated using a directed forgetting task where memory for different word types presented on a previously completed computer task (including words relating to food, weight and shape and control words) was explored (Woodard, 2005). This study found that the proportion of eating disorder related words remembered on the directed forgetting task was not significantly higher for participants with eating disorders.

A possible confounding effect of depression and hunger has also been found. For example, it has been found that individuals with BN and those with depression demonstrate a recall bias towards positive and negative food, weight and shape related words when compared to emotional words but not when compared to neutral nouns (Hunt & Cooper, 2001). This bias was also found to be related to hunger, suggesting that hunger and depression may enhance recall for certain kinds of information and this may not be exclusive to those with eating disorders.

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Memory bias has also been observed in nonclinical samples. For example, a specific explicit memory bias for "fatness" words was found in people with body dysphoria compared with normal controls (Baker, Williamson, & Sylve, 1995). Those high in body dysphoria have also been found to have particular difficulty with thinness words, seen as evidence of an encoding error where these individuals have difficulty imagining themselves as thin (Baker et al., 1995). Although mood has been found to confound results in samples with eating disorders, a negative mood induction was not found to affect the results of the above study. Another study using a nonclinical sample left high and low body dysphoric participants in an office for 45 seconds and later asked them to recall objects (either food items, body items or items not characteristic of an office) in the room (Watkins, Martin, Muller, & Day, 1995). This study found that individuals high in body dysphoria recalled more body-related items than people with low dysphoria did; however, no group differences were found in recall of other items, suggesting a memory bias for information congruent with beliefs. The results of these studies suggest evidence of a memory bias for food and weight related information in nonclinical as well as clinical samples.

A number of problems are identified in research regarding memory biases in eating disorders. These include failure to control for the valence of the words used in studies or participants' level of depression, suggesting that some findings may indicate that participants were biased towards negative words in general, rather than for stimuli relevant to their concerns (Hunt & Cooper, 2001; Sebastian et al., 1996). Another problem is that hunger may also have influenced results (Hunt & Cooper,

2001) and should be controlled for. Finally, some studies have included very small participant numbers, resulting in a sample size not large enough to draw conclusions (King et al., 1991). Nevertheless, this body of research suggests that there is evidence of a memory bias towards eating disorder congruent information in those with eating disorders.

5.2.2 Attentional Bias in Eating Disturbance and Disorder

More common than research on memory bias is research regarding attentional bias and selective distraction. It is also worth noting that the term attentional bias has been used in varying ways by researchers and is often used interchangeably with a related term, selective distraction. It should be noted that the two are distinct, though related constructs (Eysenck, 1992). Attentional bias can be defined as "a discrete change in the direction in which a person's attention is focused so that he/she becomes aware of a particular aspect of his/her stimulus environment (Williams, Mathews, & MacLeod, 1996) (p.73). It involves preferential processing of emotionally salient stimuli in situations where emotionally salient and neutral stimuli are presented concurrently (Eysenck, 1992). Selective distractibility on the other hand, occurs when the performance of a task is disrupted by concurrent presentation of task irrelevant information (Faunce, 2002). This thesis focuses on the concept of attentional bias.

Attentional bias has been measured two main ways. The original method is known as the modified Stroop task, however recent research is employing the visual probe task. The latter task is suggested to be a more discriminating measure of

attentional bias (Faunce, 2002). The findings of research using these tasks allows for exploration of the cognitive features of the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) and helps us with our primary concern with the relationship between BN and BED.

5.2.2.1 The Modified Stroop Task and Eating Disorders

The Stroop task (Stroop, 1935) was originally developed as a task which presented participants with words and shapes written on large cards in different coloured ink. On one card, colour words were presented in incongruent colours (e.g. the word "red" was written in blue ink). On the second card, coloured squares were employed instead of colour words. The participants were requested to name the colour of each stimulus as quickly as possible. Stroop found that participants took longer to colour name the words printed in the incongruent colours than the coloured squares.

This task was modified in the 1980s to measure the difference between naming latencies of emotional and control stimuli and the difference was believed to indicate attentional bias in emotional disorders. This was initially explored in anxiety and depressive disorders, with the variation of colour naming anxiety or depression relevant words in addition to control words. Findings from these studies indicated that participants were slower to name the colour of a word associated with concerns relevant to their clinical condition (Williams et al., 1996). This was proposed as support for the notion of privileged attention to stimuli congruent to emotional disorders. The success of the modified Stroop task as a measure of

attentional bias in anxiety and mood disorders subsequently led to its application in individuals with eating disorders (Faunce, 2002).

The use of the modified Stroop in eating disorders is almost identical to that in anxiety and mood disorders; the reaction times for colour naming of eating disorder salient stimuli (e.g. "fat") are compared with the colour naming of non-words (e.g. "blop") or the colour naming of control words (e.g. "chair") (Lee & Shafran, 2004). Although this was the first way the modified Stroop task was used in eating disorders, the methodology for the modified Stroop has varied since its introduction in two main respects; the nature and presentation of stimuli and the measurement of reaction times (Lee & Shafran, 2004).

Studies of those with eating disorders have generally found evidence of a Stroop interference effect for food, body, shape and weight related words in both AN and BN. In AN, the effect appears to be more robust for food words (Ben-Tovim & Walker, 1991; Ben-Tovim, Walker, Fok, & Yap, 1989; M. Cooper & Todd, 1997; Ganley, 1988; Green, McKenna, & DeSilva, 1994; Jones-Chesters, Monsell, & Cooper, 1998; Long, Hinton, & Gillespie, 1994; Perpina, Hemsley, Treasure, & DeSilva, 1993) while in BN, the effect appears to be more robust for body shape and weight words (M. Cooper & Fairburn, 1992; Davidson & Wright, 2002; Fairburn et al., 1991). In BN, there has also been evidence of a Stroop interference effect for general threat words (McManus et al., 1996). There are no findings in relation to BED.

There is also evidence of a Stroop interference effect for food words in nonpathological dieters, restrained eaters and those high in drive for thinness (M.

Cooper & Fairburn, 1992; Francis, Stewart, & Hounsell, 1997; Green & Rogers, 1993; Huon & Brown, 1996; Overduin, Jansen, & Eilkes, 1997; Perpina et al., 1993); however this effect is not consistent (Black, Wilson, Labouvie, & Heffernan, 1997; Jansen, Huygens, & Tenney, 1998; Lee & Shafran, 2004; Mahamedi & Heatherton, 1993; Ogden & Greville, 1993; Sackville et al., 1998). Little evidence supports a Stroop interference effect for body shape and weight words in restrained eaters (M. Cooper & Fairburn, 1992; Jansen et al., 1998; Overduin, Jansen, & Louwerse, 1995); however, there is evidence of an effect in subclinical eating disordered individuals (Dobson & Dozois, 2004).

Research using the modified Stroop task has not found evidence of selective attention for food and body shape and weight words when these words are presented outside of awareness in either those with eating disorders such as AN (Sackville et al., 1998) or in highly restrained eaters (Jansen et al., 1998). This suggests that attentional bias may occur in a later stage of information processing than has been observed for threat related words in anxiety disordered individuals (Williams, Watts, MacLeod, & Mathews, 1997) and suggests that individuals with eating disorders show both content and processes different to anxiety related attentional biases (Faunce, 2002).

Hunger and depression are two variables found to influence the results of Stroop studies. Findings relating to attentional biases for food related stimuli in nonclinical fasted samples have shown that those who are fasted show greater Stroop interference for food-related words than nonfasting controls (Channon & Hayward, 1990). This suggests that hunger enhances Stroop effects for all

participants and highlights the importance of controlling for the level of hunger.

Finally, some studies have found that enhanced Stroop interference effects are found in those with depressive symptoms (Jones-Chesters et al., 1998; Lovell et al., 1997). This suggests that both hunger and depression should be included as possible confounding factors in studies utilising the modified Stroop.

Studies using the modified Stroop task have varied on a number of dimensions. One of the main ways these studies vary is by the nature and presentation of word stimuli, with some studies mixing word categories (e.g. food, shape and weight stimuli) together while others present them separately by word type (M. Cooper & Todd, 1997). Generally studies which have separated food and eating words from body shape and weight words have produced inconsistent findings (M. Cooper & Todd, 1997). Some studies present the words visually either on computer screens or cards, while others use pictorial adaptations (Faunce, 2002; Pishyar, Harris, & Menzies, 2004; Walker et al., 1995). Stroop studies also vary in how they measure reaction times, with some studies using stopwatches (Ben-Tovim et al., 1989), while others use keyboard activated equipment (Davidson & Wright, 2002) and voice-activation equipment (Jones-Chesters et al., 1998). The many variations in the presentation of the modified Stroop task limit the comparability of detailed findings in research presented.

In addition to variations regarding the actual task, the participant samples in research using the modified Stroop task have also varied. Some studies have included inpatients and outpatients with both AN and BN (Ben-Tovim & Walker, 1991; Ben-Tovim et al., 1989; Black et al., 1997; Carter, Bulik, McIntosh, & Joyce,

2000; Channon et al., 1988; M. Cooper & Fairburn, 1992, 1994; M. Cooper & Todd, 1997; Davidson & Wright, 2002; Fairburn et al., 1991; Green et al., 1999; Green et al., 1994; Jones-Chesters et al., 1998; Long et al., 1994; Lovell et al., 1997; McManus et al., 1996; Mendlewicz, Nef, & Simon, 2001; Perpina et al., 1993; Perpina, Leonard, Treasure, Bond, & Banos, 1998; Sackville et al., 1998; Walker et al., 1995); but none with BED or a specific group with eating disorder NOS. Other research has utilised the modified Stroop task with nonclinical eating abnormalities (Green & Rogers, 1993; Jansen, Merckelbach, Oosterlaan, Tuiten, & Van Den Hout, 1988; Seddon & Waller, 2000; Waller, Watkins, Shuck, & McManus, 1996) and those who have recovered from eating disorders (Lovell et al., 1997). Nonclinical samples have usually been female and have included samples with high and low restraint individuals (Green & Rogers, 1993), females with high and low drive for thinness (Ben-Tovim & Walker, 1991), 'normal' and symptomatic dieters (M. Cooper & Fairburn, 1992), nonclinical samples with high versus low bulimic attitudes (Waller et al., 1996) and undergraduate students (Green et al., 1999). One interesting findings from modified Stroop studies has been differences in attentional bias between different eating disorders and between nonclinical participants. Broadly speaking this methodologically varied literature suggests that a more discriminate measure of attentional bias may be required in order to adequately detect biases in those with eating disorders.

Only a few published studies appear to have explored the nature of attentional biases in eating disorders using tasks other than the Stroop. This is problematic as over recent years, the modified Stroop task has been criticised as a

weak test of attention due to the fact that delayed colour-naming latencies can be a result of either an individual's attention being directed towards or away from the disorder relevant stimulus words (Reiger et al., 1998). In addition, it has been recognised that the Stroop task may not actually be measuring attentional bias, but selective distractibility. This means that it is difficult to interpret findings from Stroop studies and they may have only indirectly examined the hypothesis that clinical subjects tend to directly attend to disorder relevant stimuli (Faunce, 2002).

As a result of criticism in the use of the Stroop, it was suggested over a decade ago that the "eating disorder field lags consistency behind research in the affective and anxiety disorders in the maturity of [its] questions and techniques" (Vitousek & Orimoto, 1993, p. 207). It is also worth noting that anxiety researchers have been more recently utilising the visual probe task to research attentional bias and have developed sophisticated models to account for the effects found (Mogg & Bradley, 1998; Williams et al., 1997). This research has also evolved to explore the etiology of attentional biases, the role of state and trait variables and the role of strategic and automatic processes (Mogg & Bradley, 1998). This suggests that consideration of these processes is necessary to ensure that the conceptual and methodological advances of emerging anxiety research are not ignored by researchers investigating attentional bias in eating disorders (Faunce, 2002).

5.2.2.2 Visual Probe Tasks and Eating Disorders

As indicated, the shift in the methodology for investigating attentional bias in eating disorders has meant that the modified Stroop task has been replaced by the

visual probe task (Boon et al., 2000; Faunce, 2002; Lee & Shafran, 2004; MacLeod, Mathews, & Tata, 1986; Placanica et al., 2002; Reiger et al., 1998; Shafran et al., 2007; Smith & Rieger, 2006). The traditional form of this task involves pairs of stimuli (e.g. a threat word and a neutral word) being briefly presented on a computer screen and immediately followed by a dot (the probe) in the previous location of one of the words. Upon detecting the probe, participants are required to respond as quickly as possible either verbally or by pressing a key. The rationale is that response latencies to probes will be reduced if they occur in an attended, rather than unattended, region on the screen (Posner et al., 1980). Faster responses are suggested to indicate that attention is directed towards the word (where the probe was located) and slower responses suggesting attention is directed away. This has implications for selective processing of information by attention. Some variations of the task have been made, including the use of an arrow in place of the dot, as was employed by this research.

The visual probe task is believed to provide a methodologically stronger test of attentional bias than the modified Stroop task as it has the advantage of being able to detect whether or not attention is directed toward or away from a given class of stimulus words (Placanica et al., 2002). It achieves this by requiring participants to attend simultaneously to two separate stimuli, rather than different attributes of the same stimuli, as in the modified Stroop task. As the two word stimuli are spatially separate in the visual probe task, the speed of response to a probe stimulus which subsequently replaces one of the two word stimuli allows one to infer whether attention is preferentially directed toward or away from target words. This attribute

is required to adequately test the predictions of cognitive models of eating disorders; particularly those relating to over-concern of eating, shape and weight as well as perfectionism (Fairburn et al., 2003; Vitousek & Hollon, 1990; Vitousek & Orimoto, 1993). Limitations with this task include that it is difficult to establish whether attention is drawn towards threatening information or whether there is actually difficulty disengaging attention from threatening information (Derryberry & Reed, 2000; Fox, Russo, Bowles, & Dutton, 2001; Mathews & MacLeod, 2002; Shafran et al., 2007).

As indicated, the visual probe task was initially and extensively used in anxiety disorders, with studies finding that anxious individuals are faster to respond to probes replacing threat stimuli than neutral stimuli, consistent with the notion that such people demonstrate an attentional vigilance for threat (MacLeod et al., 1986; Mogg & Bradley, 1998, 1999). There has also been evidence of attention being directed away from threat words in some anxious individuals (Chen, Elhlers, Clarke, & Mansell, 2002; Mathews & MacLeod, 2005) suggesting both hypervigilance and avoidance responses within anxiety disorders.

Further, research utilising the visual probe methodology to assess attentional bias has investigated both conscious (i.e. supraliminal) and unconscious (i.e. subliminal) processing of information, including the use of backward masking (Ioannou, Mogg, & Bradley, 2004; Mogg, Bradley, Miles, & Sixon, 2004). This research has found that the processing bias for threat stimuli continues to be evident even when the awareness of the stimuli is restricted by the use of brief masked visual displays or is presented subliminally (Mogg & Bradley, 1998; Mogg et al.,

2004). These findings provide strong evidence for an attentional bias towards

negative and threatening information in both preconscious and strategic processing

in people with anxiety disorders (Mogg & Bradley, 1998) and suggest that these

factors should be considered in research utilising the visual probe task in eating

disorders.

Only a limited number of studies appear to have utilised the visual probe

methodology to investigate attentional bias in eating disorders. Two of these studies

have utilised samples of those with eating disorders (Reiger et al., 1998; Shafran et

al., 2007) and three other studies have utilised nonclinical samples (Boon et al.,

2000; Placanica et al., 2002; Smith & Rieger, 2006). The first study investigated

attentional bias to positive and negative body and emotion words in females with

BN, AN and controls (Reiger et al., 1998). Findings were that those with AN and

BN selectively directed their attention toward negative body shape words and away

from positive body shape words, supporting cognitive theories which suggest that

those with eating disorders preferentially process schema congruent information (i.e.

information consistent with fatness) and resist counter schematic information (i.e.

information consistent with thinness) (Vitousek & Hollon, 1990). This is an

interesting finding, suggesting that there may be differences in the information

processing for individuals with eating disorders depending on the valence of the

information presented. This is also an effect that would not have been detectable

using the modified Stroop task as the Stroop task does not allow researchers to

determine the direction of attention, while the visual probe does allow this

distinction. The study also found that individuals with AN have a tendency to direct

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attention toward positive emotion words whereas those with BN directed their attention away from these words, suggesting a differential effect of attentional bias between eating disorders. The influence of food words on attention was not explored in this study.

The most recent study (which includes two parts) conducted to investigate attentional bias in individuals with eating disorders utilised a pictorial form of the visual probe task for those with AN, BN, eating disorder NOS, BED and control participants as well as those high in anxiety (Shafran et al., 2007). The pictures utilised in this study included positive and negative pictures relating to eating, shape and weight information. The first part of this study indicated that individuals with eating disorders are faster to respond to probes consistent with negative stimuli regarding eating and neutral weight stimuli, while they are slower to respond to positive eating stimuli. No effect was found in shape stimuli in the first part of the study; however in the second part of the study the above results were supported with the exception that there was also an attentional bias effect found in relation to negative and neutral shape stimuli (although this effect was weaker). This suggests partial support for privileged detection of shape information in individuals with eating disorders and support for an attentional bias towards food and weight related information for those with eating disorders. This study also provides support for the use of pictorial forms of the visual probe task, which is an important finding that may enhance ecological validity. It appears to have been the first study to include patients with BED (despite the small numbers of those with BED).

Studies with nonclinical participants have included those who are restrained and unrestrained (Boon et al., 2000), high and low on the EDI-II (Garner, 1991) and fasted and nonfasted (Placanica et al., 2002) and those high and low in body dissatisfaction (Smith & Rieger, 2006). The first of these studies did not find evidence for attention or avoidance of food and weight related information on the visual probe in restrained eaters, although in a follow-up recognition task, it did find that restrained eaters require greater time to recognise food words than neutral words (Boon, Stroebe, Schut, & Ijntema, 2002). This suggests that restrained eaters do experience difficulty in processing eating related information but that restrained eaters may initially shift attention toward words to then subsequently shift their away (to avoid the words), resulting in a zero net effect (Boon et al., 2000). The results also suggest that the attentional bias effect may be specific to individuals with clinical eating disorders.

The next study utilising the visual probe in relation to eating and shape information compared fasted and nonfasted individuals who scored high and low on the Eating Disorder Inventory Two (EDI-II) (Garner, 1991) as well as a non clinical group (Placanica et al., 2002). This study found that fasting increases attentional bias to high calorie food words for all individuals, but high EDI-II scorers were also found to have attentional bias towards low calorie food words when nonfasted. This suggests that there may be attentional bias for high calorie bingeing when hungry and low calorie food selections when less hungry. This suggests that under certain conditions, nonclinical eating symptomatology can lead to attentional bias.

The most recent study conducted on nonclinical participants utilised a sample of those high in body dissatisfaction and found support for an attentional bias towards shape and weight related information but not negative emotional words (Smith & Rieger, 2006). This study also demonstrated that enhancing body dissatisfaction results in enhanced attentional bias to negative shape and weight words only.

Together these studies support the notion of attentional bias to food, weight and shape related information in eating disorders although findings are inconsistent in nonclinical individuals. The studies also highlight the role of preferential processing of information congruent with the eating disorder with differential attentional focus towards, and avoidance of, particular kinds of information. These studies have important implications in supporting the primary notion of cognitive behavioural theories of eating disorders, that is, overconcern with eating, shape and weight and their control (and in addition, overconcern with perfectionism) as suggested by more recent theories. They also provide evidence that cognitive processes contribute to the overall maintenance of eating disorders and have implications for treatment approaches.

5.2.3 Methodological Concerns in Attentional Bias Research

A number of methodological concerns are identified with previous research and these may account for some of the discrepancies in research findings. The main problem is that the majority of studies rely on the modified Stroop task, which is increasingly recognised as not a valid measure of attentional bias (Faunce, 2002).

Varying samples of participants, combining word stimuli and problems with the characteristics of word stimuli may also have resulted in studies which are not directly comparable. These limitations challenge the interpretations of previous research and question our understanding of cognitive processing in eating disorders (Cassin & von Ranson, 2005).

Aside from the problems inherent in the modified Stroop task, a major complication in attentional bias research is that studies tend not to distinguish participants with different eating disorders, nor sub- and non-clinical behaviours, although differential effects of attentional bias have been found for each. For example, a recent meta-analysis of Stroop performance, found that there is evidence for an attentional bias towards food related words in AN and towards body related words in BN (Dobson & Dozois, 2004). These findings are inconsistent across studies, and effect sizes are often small to moderate. There also appears to be little evidence of a consistent attentional bias in sub- and non-clinical, dieting samples when utilising the modified Stroop task (Faunce, 2002).

These findings may be clarified through employment of the visual probe task. It is also important to clarify whether attentional bias towards food and shape and weight related information is a feature exhibited across clinical, subclinical and nonclinical participants. Another issue is whether individual eating disorders involve distinct attentional bias characteristics, or whether eating disorders share similar information processing biases. This would also have implications for the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003).

A number of methodological problems have been noted as inherent in attentional bias research. Problems with word stimuli including the lack of standardisation of word lists may account for a large proportion of the limitations of research (Cassin & von Ranson, 2005). Many studies use short word lists, with some having as few as five words repeated multiple times, making it difficult to determine whether attentional bias results from a certain word being preferentially processed due to familiarity as a result of repetitive priming or due to congruence with the individuals pre-existing schema (Ben-Tovim et al., 1989; Cassin & von Ranson, 2005; M. Cooper, Clarke, & Fairburn, 1993; M. Cooper & Fairburn, 1992). There has also been inconsistency in the types of words used (Mahamedi & Heatherton, 1993), with several studies using more general food words (e.g. food, dinner, baker) as opposed to high calorie or forbidden food words (e.g. chips, cream, cake) (Channon et al., 1988; Long et al., 1994; Lovell et al., 1997; Ogden & Greville, 1993; Perpina et al., 1993).

Many studies do not report whether word lists were matched for usage frequency, familiarity, word length, or number of syllables (Huon & Brown, 1996; Perpina et al., 1993); which may result in differential processing speed for different words and subsequently confound the attentional bias index (Cassin & von Ranson, 2005). This is particularly problematic, as it has been found that words which are more familiar to participants may produce a greater degree of interference (Warren, 1972, 1974). The usual solution to this is to match words using usage norms (Kucera & Francis, 1967). However, it should be noted that this is also of questionable validity as the usage frequency of the spoken word is often different to written

words, on which frequency norms are based (Huon, 1995). A further complicating factor is that even if target and control words are accurately matched for usage frequency, individuals with eating disorders would be expected to have a higher subjective usage frequency for food, body shape and weight words due to the nature of their symptomatology (Jones-Chesters et al., 1998). One way for further research to overcome this difficulty may be to employ a pictorial version of the tasks as developed by previous research (Shafran et al., 2007; Walker et al., 1995) however it would be worth comparing the results of studies using words to pictures in order to determine whether the pictorial method is in fact, superior.

Another problem is that researchers tend to combine word stimulus types. The result is heterogeneous word lists which combine stimuli relating to food, weight and shape making it difficult for researchers to assess which category of word stimuli gives rise to the effects found. The results from research which has combined word stimuli has been inconsistent, with some researchers finding attentional biases to food, shape and weight stimuli and others not. Studies that combine word stimuli tend to find results that are more consistent (M. Cooper, Anastasiades, & Fairburn, 1992; Fairburn et al., 1991) than studies that have used separate word categories (Ben-Tovim & Walker, 1991; Long et al., 1994; Perpina et al., 1998; Reiger et al., 1998). In general, research suggests that individuals with eating disorders show attentional bias to food stimuli more consistently than attentional bias to body image stimuli (Reiger et al., 1998).

As well as combining word categories, research has also tended to combine word types. This could be seen as particularly problematic with body shape and

weight related words, where researchers tend to combine trait adjectives where there is already negative emotional valence attached (e.g. "fat", "flabby") with nouns referring to parts of the body (e.g. "hips," "stomach"). Again, this results in it being difficult to distinguish the effects of word types in attentional bias scores. It may also account for some of the discrepancies in previous research in relation to attentional bias and body image stimuli with both eating disorders and non-clinical eating behaviour (Channon et al., 1988; Perpina et al., 1998). As a result of the negative valence that is automatically associated with many body image adjectives this may cause schematic activation to occur more quickly, masking the influence of cognitive processing due to eating disordered behaviour. It could be argued that stimuli including body image nouns would differentiate the cognitive processing of eating disordered behaviour more readily as a consequence of the need for interpretation of the noun as either positive or negative. This is an important limitation of previous research as it could be argued that a majority of women have schemas which contain words such as "fat" resulting in these adjectives activating their schemas more quickly. Words such as "hip" could require more elaborated knowledge structures relating to specific self-schema around body image, meaning that these words may be only activated in individuals with eating disorders, while body image adjectives may be activated in both individuals with eating disorders and those with non clinical eating behaviour.

Likewise, different combinations of control words have resulted in methodological difficulties with previous research. Many studies have failed to control for the homogeneity of word sets (Channon et al., 1988; M. Cooper et al.,

1992; M. Cooper et al., 1993; M. Cooper & Fairburn, 1994; M. Cooper & Todd, 1997; Fairburn et al., 1991; Huon & Brown, 1996; Mahamedi & Heatherton, 1993; Ogden & Greville, 1993; Perpina et al., 1993) with results finding inconsistent attentional bias effects. This is important as recent research has found attentional bias effects after controlling for homogeneity with control words (Green, Elliman, & Rogers, 1996; Jones-Chesters et al., 1998; Lovell et al., 1997; Stewart & Samoluk, 1997). This supports the notion that attentional bias is more than just a product of the priming effects of a homogenous category of words.

The majority of previous research investigating attentional bias in eating disorders has also utilised word lists which focus exclusively on negatively valenced body related information (i.e. words connoting a fat physique), which limits the ability to understand information processing in eating disorders (Cassin & von Ranson, 2005; Reiger et al., 1998). Using negatively valenced words also makes it unclear to what extent similar effects may be apparent for food and body shape and weight words of positive valence. It is also inconsistent with theoretical models of eating disorders, which suggest that resistance to counter schematic information is a key characteristic of eating disorders (Vitousek & Hollon, 1990). This is an important limitation of previous research as the few studies that have investigated both positively and negatively valenced word lists have found that there is differential processing of this information (Reiger et al., 1998; Sackville et al., 1998). Further, individuals with eating disorders, restrained eaters and unrestrained eaters may respond differently to positively and negatively valenced stimuli.

The differential effects of word valence have been implicated in body image adjective and noun word categories, however there are similar issues with food words. Most researchers have combined different types of food words (Channon et al., 1988; Fairburn et al., 1991) or used words that are presumed to have negative affective valence for individuals with eating disorders or who are on diets. Some of these words include high fat foods, "forbidden foods," or words typically associated with binge eating (Formea & Burns, 1996; Green et al., 1994). Others have included words that relate to meals such as "dinner," or "diet" (Channon et al., 1988). These studies have tended to find consistent results with attentional bias for food related words in clinical participants but there are inconsistent findings in non clinical participants. Some studies have found Stroop effects for food words in restrained eaters with forbidden food words (Green & Rogers, 1993; Stewart & Samoluk, 1997), however other studies have failed to find differences between those who are high and low in dietary restraint using more neutral or more general selections of food words such as "baker," "dinner," or "sandwich." This suggests that the activation of schemas related to food may be more strongly related to foods which have affective valence or which are more salient to the individual.

Other studies investigating the effects of both positively and negatively valenced words have utilised emotional words as well as words relating to eating disordered stimuli (Sackville et al., 1998). This has allowed for the differential effects of semantic homogeneity, emotional valence and target word stimuli to be identified. It also suggests the influence of specific word types on attentional bias requires further investigation.

Another important methodological consideration for attentional bias tasks is that clinical patients tend to show poor levels of concentration (Garfinkel & Garner, 1982). This is often particularly the case for individuals with eating disorders, who experience physiological effects of starvation (Vitousek & Orimoto, 1993). However, rather than being a potential confound, the poor concentration of individuals with eating disorders may instead increase the error variance and consequently the Type II error rate in research (Faunce, 2002).

Hunger has been shown to have a mediating role in attentional bias and several studies have demonstrated that unrestrained eaters who are deprived of food also exhibit attentional bias to food words and that attentional bias increases as food deprivation increases in highly restrained individuals (Channon & Hayward, 1990; Green et al., 1996). This raises questions as to whether attentional bias in eating disordered persons is merely a function of food deprivation, as food deprivation has been shown to increase preoccupation with food in normal weight individuals without any history of eating disorders (Channon & Hayward, 1990).

The effect of food deprivation on attentional bias in eating disordered individuals however is presently unclear. It has been suggested that attentional bias in individuals with AN is related to the starvation process. This suggestion came from findings for delayed colour naming of food related words to a greater extent in individuals at the more extreme end of the AN weight range (Channon et al., 1988) and findings that the size of the colour naming impairment for body related words decreases as a function of weight gain and improvement in psychopathology (Green et al., 1999). However, it has also been found that impairments in food related

colour naming vary as a function of self-reported hunger level in individuals with AN, with the most hungry subjects displaying the smallest Stoop effect for colour naming food words (Green et al., 1996). This suggests that the subjective feeling of hunger mediates attentional bias in AN, (however it is worth noting that these findings are in the opposite direction to what would be expected).

Two studies employing the visual probe task have demonstrated the role of hunger in attentional bias (Mogg, Bradley, Hyare, & Lee, 1998; Placanica et al., 2002). The first examined food related attentional biases in hungry students, instructing half of the participants to fast from the time of their last evening meal until the time of the experiment the following afternoon and the other half to eat as usual (Mogg et al., 1998). Rather than including fasting instructions as the independent variable, they assessed students' self-reported hunger levels and then divided subjects into groups on the basis of these hunger ratings. They believed that the hunger ratings would give a more direct measure of the participants' motivational state than would reliance on the fasting instructions. The results were that hungry participants showed an attentional bias towards food related words whereas participants reporting low levels of hunger showed no such bias. Attentional bias for food related words was found to be significantly predicted by subject hunger ratings. To extend these findings, another study assessed attentional biases for food and body shape and weight words in individuals scoring high versus low on the Drive for Thinness and Body Dissatisfaction subscales of the EDI-II (Placanica et al., 2002). They found that fasting increased attentional bias towards high calorie food words across all subjects, replicating the first results. Furthermore

they found that high EDI-II scorers also showed an attentional bias towards low calorie food words, but only when nonfasted. These findings suggest that the food related attentional biases observed in eating disordered individuals are not simply a product of chronic hunger.

While these studies have made some promising advances, there is yet to be a study that has been able to separate the influence of hunger and eating disorder pathology in determining attentional biases for food related words. This is an important consideration as some (Stewart & Samoluk, 1997) argue that restraint status is a better predictor of Stroop interference for food words than whether or not a participant had fasted (although it is important to recognise that this suggestion was based on a study that required their fasting participants to fast for six hours as opposed to 24 hours in other studies) suggesting that these findings may simply reflect inadequate operationalisation of the independent variable. It is also worth considering that fasting conditions as an independent variable may not represent the best index of hunger, suggesting that further research is needed to elucidate the role of hunger and eating disorder pathology in determining the magnitude of food, body, shape and weight related attentional biases.

Despite the methodological and participant related problems reviewed, research generally suggests evidence of an attentional bias existing in individuals with eating disorders. However, these effects are less clear in individuals with sub-clinical eating disorders, or with varying levels of dietary restraint as well as within non-clinical participants. The food related word attentional bias seems to be a more consistent finding than the body related word attentional bias with individuals with

eating disorders. Importantly, the effect for food related words is also seen in non clinical participants and thus it does not differentiate individuals with clinical eating disorders and controls.

5.3 FURTHER RESEARCH WITH THE VISUAL DOT PROBE IN EATING DISORDERS

While a small proportion of cognitive bias research has been completed on individuals with eating disorders, recent research is beginning to provide some promising results with general support for the notion of the role of the dysfunctional scheme for self-evaluation as proposed by the transdiagnostic cognitive behavioural models of eating disorders (Fairburn et al., 2003). Despite a significant number of eating disorder related Stroop studies to date, there continues to remain a lack of theoretical clarity regarding the processes operating within the task. While there has been some variation in the findings of this research, it has generally indicated that individuals with eating disorders display an attentional preference for eating, shape and weight related words over other words. These biases have also been noted in other samples such as restrained eaters, dieters and women with a high drive for thinness.

The boundaries of attentional biases in eating disorders are yet to be established. For instance, few eating disorder studies have examined attentional biases for words other than negatively valenced words and it is suggested that failure to explore selective processing of positively valenced food, body shape and weight words is a significant limitation of the research conducted to date (Vitousek &

Orimoto, 1993). Examination of differences in attentional bias based on word valence is likely to be a fruitful avenue for further research given the findings of attentional bias toward negative body shape words but away from positive body shape words in eating disorder patients (Reiger et al., 1998) and the evidence of higher Stroop interference effects for high calorie food words than low calorie food words in individuals with AN (Sackville et al., 1998).

Further refining the specificity of stimuli used in attentional bias studies may also help to identify information processing differences between individuals with AN and BN as well as the most recently introduced eating disorder category, BED. Indeed, research has detected trends for individuals with AN to direct their attention towards positively valenced emotion words and for individuals with BN to direct their attention away from such words (Reiger et al., 1998). It has also been recommended that researchers investigate attentional biases for other classes of words (e.g. achievements and sex related words) which may be relevant to eating disorder pathology as there is already some evidence to suggest that both individuals with BN and nondisordered participants who score high on the EDI-II Bulimia scale show Stroop interference for self directed ego threats (e.g. failure, stupid etc.) (McManus et al., 1996; Waller et al., 1996). The relevance of perfectionism related words has been highlighted by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) and also warrants exploration. The relative input of state and trait variables in determining the magnitude of attentional biases in eating disordered individuals also remains unexamined.

The association between information processing biases and eating disorders has been clearly demonstrated by a variety of different tasks, for both memory and attention. Clinically, this has important implications for the disorders in terms of their maintenance. For example, one can see how selective attention towards eating, shape and weight related stimuli may contribute to preoccupation with, and overevaluation of these concerns. Despite these obvious implications, almost no research within the field of eating disorders has been carried out to examine causality in this connection. Research has indicated that attentional biases are elevated in individuals with eating disorders, and some research has even indicated that such biases may decline as a function of treatment and reduced symptomatology. However, these associations are not sufficient to establish a causal role for biases in these disorders.

Recent research in the field of anxiety has addressed the issue of causality by experimentally manipulating attentional biases to emotional stimuli using a modified visual probe task (Mathews & MacLeod, 2002). These results have supported the notion that attentional biases play a causal role in anxiety (in the form of emotional reactions to a stress task) and the authors of this study have developed a paradigm whereby attentional biases towards anxiety related stimuli are enhanced or lessened. It has also been suggested that attentional biases may have causal effects on vulnerability to anxiety via their influence on how significant events are processed (Mathews & MacLeod, 2002). Such work could be extended to patients with eating disorders to examine the specificity of such a mechanism.

It has also been suggested that enhancements in treatment approaches to eating disorders could eventuate as a result of attentional bias research (Lee & Shafran, 2004) as a better understanding of the maintenance factors in eating disorders may allow for better treatment targets and techniques. This would reinforce the need for basic research including the broad spectrum of individuals who present for treatment of eating disorders, not just those with AN and BN.

Individuals with BED appear to have been neglected in recent research. The inconsistencies between the findings of individuals with different diagnostic classifications (M. Cooper & Todd, 1997; Perpina et al., 1993) and the call for a transdiagnostic approach to eating disorders that supersedes the specific eating disorder diagnoses (Fairburn et al., 2003) are additional reasons why it may be clinically useful to consider looking at cognitive biases in people with any clinical eating disorder rather than restricting the research to specific diagnostic groups.

Another important consideration is that research be ecologically valid. "Real world" studies are likely to be more representative of the way attentional biases operate in the lives of participants, as opposed to computer tasks. One possibility is that computer tasks contain relevant pictorial stimuli to enhance their ecological validity. In addition, attentional bias research is more likely to lead to clinical advances if they can identify causality. Manipulation of such biases (e.g. by increasing/decreasing selective attention to body parts) will give an indication of the impact of such a bias on the maintenance of the eating disorder, then this knowledge can be translated into novel clinical interventions (for example to help the person

look at all of themselves in the mirror as opposed to specific disliked body parts), to be used alongside existing treatments.

This area of research has immense clinical importance, in that selective attention may be one way in which eating disordered symptomatology is maintained (Fairburn et al., 2003). The visual probe task and the modified Stroop task are unlikely to have widespread diagnostic utility, but such tasks can help illuminate the general nature of cognitive processes in psychopathological conditions and in so doing may provide valuable clues to their aetiological or maintaining role in eating disorders. This in itself justifies the continuing research efforts in this area.

Overall it appears that the visual probe task has emerged as a useful alternative to the Stroop task to examine attentional biases in eating disorders. While studies examining information processing biases in clinical eating disorders have been somewhat sparse, there is at the very least, evidence that the task is sensitive to clinical severity, with biases noted in clinical cases but not in restrained eaters. Further work needs to be carried out with this alternative technique, with greater emphasis placed on increasing the ecological validity of stimuli used (Lee & Shafran, 2004). Further research using word stimuli that meet the characteristics of the criticisms above should be considered and it would also be worthwhile for studies to examine a broader spectrum of eating disorders including BED as this group has been relatively neglected. This may also assist in answering questions about whether eating disorders share transdiagnostic processes, particularly in relation to overconcern with eating, shape and weight (and their control) as well as achieving perfectionism.

5.4 SUMMARY

Selective attention of eating, shape and weight related information (and more recently perfectionism related information) is a key feature identified by most major theories of eating disorder and has been investigated through a variety of paradigms, the most common being the modified Stroop task and more recently, the visual probe task. Further, information processing in eating disorders has been researched using a variety of cognitive paradigms including the Stroop and visual probe task, as well as other paradigms relating to different aspects of information processing such as memory and judgement bias. The status of research at present is that the visual probe test is believed to be the most effective method for investigating information processing biases which maintain clinical disorders such as eating disorders.

CHAPTER 6

STUDY 1

TRANSDIAGNOSTIC FEATURES OF EATING DISORDERS

6.1 INTRODUCTION STUDY 1

This chapter examines demographics, eating symptomatology and

psychopathology, features of perfectionism, low self-esteem, mood intolerance and

interpersonal difficulties in BN, BED, OW and NW groups. Chapter 2 provides a

more detailed review of the literature relevant to the demographics of BN, BED and

obesity and the differences in symptomatology, psychopathology and comorbidity of

these conditions. Chapter 3 provides some background information about theories of

eating behaviour, including concepts relevant to eating disorders and Chapter 4

provides a detailed review of the major theory of eating disorders; including the

extension and new transdiagnostic cognitive behavioural theory of eating disorders

(Fairburn et al., 2003) which proposes four additional mechanisms operate to

maintain eating disorder psychopathology. A brief summary of the information from

Chapters 2, 3 and 4 is provided by this introduction.

Although BN and BED share the common feature of binge eating, there are a

number of differences noted between the disorders. Different demographic features

are found, as those individuals with BED tend to have a later age of onset than those

with BN (Bulik et al., 1997; Spurrell et al., 1997). Another difference is that while

those with BN tend to be normal weight or slightly overweight, those with BED tend

to be obese or OW (Rand & Kuldau, 1990). Further, BN and BED appear to have

similar rates of prevalence in the community, they differ in their at-risk groups, as

young adolescent females are most at-risk of developing BN while those at-risk of

developing BED are slightly older (Spitzer et al., 1992; Yanovski et al., 1993).

Finally, individuals with BED are more likely to have a history of unstable weight

and binge eating prior to meeting criteria for BED, while those with BN tend to have

a history of dieting prior to meeting criteria for BN (Haiman & Devlin, 1999;

Spurrell et al., 1997).

In relation to comorbidity, both BN and BED appear to have a high degree of

comorbidity with depressive and anxiety disorders (Castonguay et al., 1995;

Garfinkel et al., 1995), although there is some evidence to suggest that individuals

with BN have a higher degree of comorbidity than those with BED (Crow et al.,

1996; Prather & Williamson, 1988). It has also been suggested that rather than

diagnosis (i.e. BN or BED), it is the severity of eating disorder symptomatology that

has the greatest influence on comorbidity (Telch & Agras, 1994). This raises the

question of whether the eating disorder diagnosis or variations in the severity of

commonly based symptoms has the greatest influence on comorbidity.

These findings may be clarified by research examining eating

symptomatology and psychopathology in BN and BED. The majority of these

studies have utilised the Eating Disorder Examination (EDE) (Fairburn & Cooper,

1993) and Eating Disorder Inventory-II (EDI-II) (Garner, 1991). The EDE has been

found to discriminate between BN, BED and obese non-BED individuals and

suggests that individuals with BN generally have higher levels of restraint than those

with BED (Castonguay et al., 1995; Marcus, Smith, & Santelli, 1992), although they

still experience preoccupation and distress over eating and attempts at dieting

(Spitzer et al., 1992). Although the EDE identifies weight and shape concern as a

feature in both BN and BED, there are mixed results regarding whether this feature

is evident to a lesser extent in BED (Marcus et al., 1992; Spitzer et al., 1993). On the

EDE, those with BED have also been found to score higher on eating, shape and weight concern than obese non-BED individuals (Wilfey, Schwartz et al., 2000). Overall results of the EDE suggest that those with BN experience higher degree of concern with eating (and dietary restraint), shape and weight than those with BED.

Results from the EDI-II (Garner, 1991) also suggest that individuals with BN have higher scores on all subscales. The one exception has been the body dissatisfaction subscale, where individuals with BED have been found to rate higher than those with BN (Raymond et al., 1995). It has also been shown that individuals with BED rate higher on the EDI-II than obese non-BED individuals (Fichter, Quadfieg, & Brandl, 1993). This suggests some evidence for a continuity of eating symptomatology across these groups with those with BED generally having less severe symptomatology than those with BN. It also implies that those with BED may not experience the same degree of psychopathology as other eating disorders and may have implications for the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003).

Concepts from continuum theories of eating, dietary restraint, obesity and binge eating describe similar processes operating across eating disorders such as BN and BED. The continuum theory suggests that individuals with BN or BED both experience greater symptomatology than those with disturbed eating (the discontinuity model), however this theory has another variation that suggests that the level of symptomatology in BN and BED may be further distinguished (as in the continuity model). This means that continuum theory provides a framework which assists in distinguishing BED as an eating disorder in its own right, and can assist in

determining whether those with BED demonstrate less severity of symptoms and psychopathology than those with BN.

The most well recognised theory of eating disorders is cognitive behavioural theory. This theory proposes that a series of mechanisms operate to maintain eating disorder psychopathology, including overconcern with eating, shape and weight, dietary restraint, binge eating and compensatory purging. Recently, this theory was extended to include the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) which proposes that four additional mechanisms operate to maintain the core characteristics of eating disorders. This includes the influence of severe perfectionism (clinical perfectionism), the impact of unconditional and pervasive negative self-esteem (core low self-esteem), difficulty in coping with adverse mood states (mood intolerance) and the influence of interpersonal and developmental difficulties (interpersonal difficulties). Each of these mechanisms has been examined to some extent in recent literature and has been implicated as related to eating disorder symptomatology.

As research suggests that eating disorders have both shared and distinctive features, further examination of the symptomatology and psychopathology of BN and BED may assist in establishing whether one of these disorders is associated with a greater severity of symptoms. Alternatively it could determine whether the two share similar features that could be described by one theory, as is suggested by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). The aim of the current study is to compare samples of individuals with BN and BED, with samples who are OW and NW on demographics, measure of eating

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psychopathology and symptomatology and measures of the four additional

maintaining mechanisms proposed by the transdiagnostic cognitive behavioural

theory of eating disorders (Fairburn et al., 2003). This research aims to complete

these comparisons within one sample to assist with some of the conflicting findings

from previous research. These comparisons aim to provide evidence regarding

whether BED should be classified as an eating disorder (rather than eating

disturbance) which shares transdiagnostic processes with BN. Both qualitative and

quantitative characteristics of BN and BED will be examined to determine whether

these two disorders are quite distinct or whether they are different forms of the same

disorder.

This study also aims to investigate related aspects of two of the

transdiagnostic maintenance mechanisms (Fairburn et al., 2003) of core low self-

esteem and clinical perfectionism, as these constructs have not been linked to

established and well validated research tools and will focus on the constructs of

perfectionism and low self-esteem. The overall aim of this study is to determine

whether predictions from the transdiagnostic cognitive behavioural theory of eating

disorders are upheld in both BN and BED. If those predictions hold it would be

expected that individuals with BN and BED would share similar eating disordered

features.

A series of hypotheses was formulated, based on previously presented

literature:

1. The BED group would be more similar to the BN group than to the OW non-BED group, reflecting that those with BED experience a level of impairment similar to that of other eating disorders.

2. The BN group was expected to have the highest level of dietary restraint, eating concern, shape and weight concern, followed by the BED group and then the OW, non-BED and NW non-eating disordered groups, indicating that there is a distinction between BN and BED.

3. The NW non-eating disordered group was expected to have the lowest symptomatology, indicating a continuum of symptomatology from non eating disorder to eating disorder psychopathology.

4. The BED group would be similar to the BN group in terms of the level of eating symptomatology and the OW non-BED group and the NW non-eating disorder group will have similar low levels of symptomatology.

5. Both the BN and BED groups were expected to have similar levels of difficulty in tolerating mood changes and problems in their interpersonal lives, low levels of self-esteem and high levels of perfectionism.

6. The OW non-BED group and NW non-eating disordered groups were expected to have the similar low levels of mood intolerance, interpersonal difficulties, perfectionism and higher levels of self-esteem.

6.2 METHOD STUDY 1

6.2.1 Participants

Seventy-five females aged 18 to 30 participated in this investigation. They were divided into four groups including two groups who met DSM-IV (APA, 2000) criteria for BN and BED. Twenty females were classified with BN and 15 with BED. Allocation was based on an initial phone interview (Appendix C) which was used to ascertain basic details regarding the frequency and duration of problematic eating behaviour, as well as scores from a clinical questionnaire, the Eating Disorder Examination Questionnaire (EDE-Q) (Fairburn & Wilson, 1994). Group allocation for the BN and BED groups were based on items 13-18 from the EDE-Q, as these items outline frequency of binge eating, overeating and purging and provided details on the frequency of binge eating, as well as the presence or absence of purging. The third and fourth groups comprised females who did not have an eating disorder and acted as control groups. This included 20 NW females with a BMI (Keys et al., 1972) between 18.5 and 24.9 and 20 OW (but not obese) females with a BMI of greater than 25.0 (Keys et al., 1972). The NW and OW groups were allocated based on the indication of a level of non-clinical results on the clinical diagnostic questionnaire as well as their BMI.

An intensive design was adopted and participants from this study also completed Study 3. As a result, this method section also contains some information pertaining to the method section for Study 3. Participants were from a variety of backgrounds and recruitment included one advertisement in the University of Tasmania health centre and advertisement in the local newspaper. Additional

advertising was done through the University of Tasmania psychology undergraduate program where several psychology lectures displayed experiment's advertisement (amongst advertisements for other experiments). The experiment was also detailed on the University of Tasmania's psychology "participate in experiments" webpage. Approximately 10 additional paper advertisements were displayed on noticeboards around the campus of the University of Tasmania. No participant who contacted to participate in the experiment declined to participate upon obtaining further information however some participants were declined from participating by the researcher once group numbers were achieved for the various groups.

The study received ethics approval from the Tasmanian Social Sciences Human Research Ethics Committee. Information sheets were provided to all participants, and a statement of informed consent was signed before participation in the study. The information sheet and consent form are presented in Appendices A and B.

6.2.2 Materials

This study utilised a variety of materials including questionnaires to confirm the presence or absence of an eating disorder, to assess eating disorder symptomatology and a measure of dietary restraint. Other questionnaires were based on the factors proposed in the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), including perfectionism, mood intolerance, interpersonal difficulties and low self esteem.

6.2.2.1 Eating Related Scales

These questionnaires were concerned specifically with aspects of eating

behaviour. The Eating Disorder Examination Questionnaire (EDE-Q) (Fairburn &

Wilson, 1994) is a 26-item self-report measure of eating disorder psychopathology

and is based on the 12th edition of the Eating Disorder Examination (EDE) (Fairburn

& Cooper, 1993). The EDE is an investigator-based interview and is considered the

instrument of choice for the assessment and diagnosis of eating disorders (Garner,

2002). The EDE-Q is also recognised as a comprehensive assessment of the

psychopathology of eating disordered behaviour and is frequently used in both

clinical and community investigations of eating disorders due to the ease of

administration in comparison to the EDE (Peterson et al., 2007).

The EDE-Q measures eating behaviour as well as cognitive processes and

attitudes over the previous 28 days. It provides four subscales: restraint (a measure

of attempts to restrict food intake to influence shape and weight), shape concern (a

measure of concern for an individual's body shape), weight concern (a measure of

concern for an individual's body weight) and eating concern (a measure of concern

for an individual's eating behaviour). The EDE-Q also assesses the frequency of

behaviours including binge eating (objective and subjective, with loss of control as a

separate feature) and inappropriate compensatory purging (self-induced vomiting,

laxative, diuretic and diet pill misuse as well as excessive exercise). Although it is

widely used for BN, it has been empirically supported to measure symptomatology

in BED (Goldfein, Delvin, & Kamenetz, 2005)

The EDE-Q has good reliability and validity, and has been used in both

descriptive studies and in research on treatment (Eldredge & Agras, 1996; Reas,

Grilo, Masheb, & Wilson, 2005; Safer, Agras, Lowe, & Bryson, 2004). The

psychometrics of the EDE-Q show that the scale has good internal consistency and a

range of studies have found that the EDE-Q has a Cronbach's alpha coefficient of

between 0.73 and 0.93 (Luce & Crowther, 1999; Mond, Hay, Rogders, Owen, &

Beumont, 2004). High reliability has also been found for the individual subscales,

with restraint as 0.70; eating concern, 0.73; shape concern 0.83 and weight concern

0.72 (Peterson et al., 2007).

The EDE-Q has been found to have high temporal stability when assessing

the attitudinal features of eating disordered psychopathology and these features are

resistant to change over a one-year period (Mond, Hay, Rodgers, Owen, & Beumont,

2004). The temporal stability for items addressing eating disorder behaviours (e.g.

objective and subjective binge eating, vomiting, laxative use etc.) was lower,

although this is likely to reflect trait variation and measurement error (Mond, Hay,

Rodgers et al., 2004).

The EDE-Q has also been found to have good concurrent validity and

acceptable criterion reliability when measured against the EDE (Mond, Hay,

Rogders et al., 2004). Scores on individual items of the EDE-Q were found to be

higher than those of the EDE although correlations between the EDE-Q and EDE

subscales range from 0.68 for eating concern to 0.78 for shape concern with

correlations also noted for frequency of binge episodes, both objective and

subjective (Mond, Hay, Rodgers et al., 2004), suggesting good concurrent validity.

The EDE-Q was also found to have sensitivity (0.83) and specificity (0.96) in identifying individuals with eating disorders, suggesting acceptable criterion validity.

While further research is required to examine the factor structure of the EDE-Q, research on the exploratory factor loadings of the EDE-Q has supported the restraint and eating concern subscales. It has been suggested that the shape and weight concern subscales may load on one factor, with the exception of the items focusing on the importance of weight and shape in self-evaluation and preoccupation with shape and weight (Peterson et al., 2007).

The Eating Disorder Inventory Two (EDI-II) (Garner, 1991) is a 64-item self-report measure designed to assess psychological, cognitive and behavioural characteristics common in eating disorders. Although the EDI-II has now been replaced by the EDI-III, this inventory was not yet available at the commencement of this study and the EDI-II remains a good tool for the purposes of this research. The EDI-II consists of eight subscales: drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, and maturity fears. These eight subscales are the same as those reported in the original inventory, which was published in 1983 (Garner, Olmstead, & Polivy, 1983). The inventory also includes provisional subscales, which consist of 27 additional items that provide scores for three additional subscales: asceticism, impulse regulation, and social insecurity. Each of the 90 items of the EDI-II has six possible answers – "always," "usually," "often," "sometimes," "rarely" and "never." The range of scores for each subscale varies, with higher scores indicating greater

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symptomatology. The EDI-II is suggested to be a useful tool for baseline measurement, for planning in treatment and monitoring progress, and as a screening tool for researchers as it is easy to administer and has been shown to be effective in detecting subclinical eating disorders (Garner, 1991).

The EDI-II has shown moderate to high internal consistency for individuals with BN and BED with Cronbach's alpha coefficients ranging from 0.68 to 0.93 for the first eight subscales, and 0.55 to 0.80 for the last three provisional subscales (Garner, 1991; Tasca, Illing, Lybanon-Daigle, Bissada, & Balfour, 2003). The EDI-II has also been found to have good test-retest reliability (r= .67 to .82) after 16 weeks for both BN and BED (Tasca et al., 2003) suggesting good temporal stability. High concurrent, predictive, discriminant and construct validity has also been identified, with the EDI-II constructs believed to measure what they are expected to for both BN and BED (Garner, 1991; Tasca et al., 2003). Overall, the results of these studies suggest the EDI-II has good psychometric properties and is valid for use in BED.

The Revised Restraint Scale (Herman & Polivy, 1980) is an 11-item self-report measure that assesses dietary restraint due to concerns with body shape/weight and the consequence of dietary disinhibition. Higher scores on the Revised Restraint Scale indicate higher restraint. The Revised Restraint Scale provides an overall measure of restraint, as well as scores for two subscales, the concern for dieting and weight fluctuation subscale. The Revised Restraint Scale was used in addition to the restraint measure of the EDE-Q as this is the most

commonly used measure of dietary restraint and contains multiple dimensions of restraint (Gorman & Allison, 1995).

The Revised Restraint Scale is reported to have good internal consistency, with Cronbach's alpha coefficients generally exceeding 0.75 on the whole scale (Gorman & Allison, 1995). As would be expected, the Cronbach's alpha coefficients on the two subscales have been found to be lower, ranging from 0.66 to 0.71 on the weight fluctuation subscale and 0.70 to 0.80 on the concern for dieting subscale (Gorman & Allison, 1995). The Revised Restraint Scale is reported to have satisfactory levels of test-retest reliability and construct, criterion and concurrent validity (Heatherton et al., 1988).

6.2.2.2 Perfectionism

As no measures have been developed to assess clinical perfectionism as defined by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003); this research reviewed the nature of perfectionism in BN and BED through yeo available measurement tools: a measurement of multidimensional perfectionism, The Multidimensional Perfectionism Scale (Hewitt, Flett, Turnball-Donovan, & Mikail, 1991) and a measure of perfectionistic thoughts, the Perfectionistic Cognitions Inventory (Flett, Hewitt, Blankstein, & Gray, 1998). Both of these tools are well established research tools for the concept of perfectionism and allow for perfectionism to be examined in relation to BN and BED.

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The Multidimensional Perfectionism Scale (Hewitt et al., 1991) is a 45-item

self-report measure of trait perfectionism based on a multidimensional

conceptualisation of perfectionistic behaviour. The Multidimensional Perfectionism

Scale incorporates intrapersonal and interpersonal dimensions, as well as

motivational, behavioural, cognitive and social facets of perfectionistic behaviour. It

provides three subscales: a measure of self-oriented perfectionism (requiring the self

to be perfect), other-oriented perfectionism (requiring others to be perfect), and

socially prescribed perfectionism (the perception that others require the self to be

perfect).

The Multidimensional Perfectionism Scale has been found to have good

internal consistency across its subscales, with internal consistency ratings

coefficients varying for the self-oriented perfectionism subscale from 0.84 to 0.90;

the other-oriented perfectionism subscale from 0.74 to 0.83 and the socially

prescribed perfectionism subscale from 0.80 to 0.87 (Hewitt et al., 1991). Internal

consistency has been found to be comparable for both community and clinical

samples. Test-retest reliability has been found to 0.88 for self-oriented

perfectionism, 0.85 for other-oriented perfectionism and 0.75 for socially prescribed

perfectionism over a three month period (Hewitt et al., 1991). The Multidimensional

Perfectionism Scale has been found to have adequate construct, criterion and

discriminant validity (Hewitt et al., 1991). A number of studies have supported the

validity of the scale and have supported the factor structure of the subscales (Flett,

Hewitt, Blankstein, & Koledin, 1991; Hewitt & Flett, 1991).

The Perfectionistic Cognitions Inventory (Flett et al., 1998) is a 25-item self-report questionnaire that assesses perfectionism as a personality construct. The Perfectionistic Cognitions Inventory examines the frequency of a person's perfectionistic cognitions or rumination over mistakes (Flett, Greene, & Hewitt, 2004). It is based on the reasoning that perfectionistic individuals sense a discrepancy between how they would like to be (i.e. their ideal self) and how they currently are (i.e. their actual self) and that that the person's goal compared to high ideals, results in the individual experiencing automatic thoughts relating to perfectionistic themes (Flett et al., 2004; Flett et al., 1998).

The Perfectionistic Cognitions Inventory is reported to have good reliability, with Cronbach's alpha coefficients ranging from 0.96 in student samples to 0.94 in psychiatric samples (Flett et al., 1998). It is also reported to have good test-retest reliability, concurrent validity and a principal components analysis indicated that the Perfectionistic Cognitions Inventory is a unidimensional scale (Flett et al., 1998).

The Perfectionistic Cognitions Inventory could be considered as related to the construct of clinical perfectionism, where thoughts of perfectionism dominate. Although clinical perfectionism is not multidimensional, an understanding of some of the well established features of perfectionism in BN and BED is beneficial in advancing knowledge for theory and therapy. The use of these tools means that the results from this study relate to the construct of perfectionism rather than clinical perfectionism.

6.2.2.3 Mood Intolerance

The Inventory of Altered Self-Capacities (Briere, 2000) is a 63-item self-report inventory investigating difficulties in the areas of relatedness, identity and affect regulation. This inventory is based on the concept of self-capacities and includes concepts relating to mood intolerance. To measure mood intolerance, the section on affect regulation, which measures the ability to control and tolerate strong (especially negative) affect without resorting to avoidance strategies was used in this research.

Three subscales of the Inventory of Altered Self-Capacities (Briere, 2000) are used to provide a measure of affect regulation: affect skills deficit (5-items), affect instability (4-items) and tension reduction activity (9-items). These items are likely to measure mood intolerance as described by the transdiagnostic cognitive behavioural model of eating disorders (Fairburn et al., 2003). These items appear to match this concept as according to the Inventory of Altered Self-Capacities the subscales make up an "affect control" dimension that appears to be a similar concept to mood intolerance.

The three subscales used in this study measure different aspects of affect regulation. The affect skills deficit subscale is believed to assess deficits of affect control underlying affect dysregulation. The affect instability subscale measures the processes of rapidly changing mood. The tension reduction activity subscale evaluates a person's tendency to react to internal states and affect with externalising behaviours to distract, soothe or reduce internal distress.

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The reliability alpha coefficients of the affect control dimension in community and clinical samples were found to range from 0.78 to 0.95 suggesting high internal reliability and consistency (Briere & Rundz, 2002). The affect control dimension was also found to have acceptable construct, convergent and discriminant validity (Briere, 2000). The Inventory of Altered Self-Capacities is in the early stages of research although it has shown promise in the investigation of affect dysregulation in trauma (Briere, 2006). It does not appear to have been used in an eating disordered population at present, although is likely to be a useful measure as mood intolerance often describes a proportion of individuals with eating disorders who have had traumatic experiences which could be investigated by the Inventory of Altered Self Capacities.

An additional questionnaire was developed using Visual Analogue Scales (See Appendix D) to investigate the meaning of mood intolerance as outlined by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). Visual Analogue Scales have been commonly utilised in research and are considered to be valid, have good reliability, moderate distribution-based responsiveness and good anchor-based responsiveness in comparison to multi-item questionnaires which suggests that this is a respectable measurement tool (de Boer et al., 2004; Rushford, 2006). The Visual Analogue Scales for this study included 10 statements with anchors at either end of a 10cm line stating "not at all true of me" to "very true of me". These statements were developed specifically using the transdiagnostic model's description of mood intolerance. Examples of the statements included: "I don't like to focus on my feelings," and "when I have strong emotions I

feel that I can't cope with them" (see Appendix D). This questionnaire was found to have a Cronbach's alpha coefficient of 0.93 suggesting high reliability. The Interclass Correlation was found to be 0.58 suggesting that the items were moderately correlated.

6.2.2.4 Interpersonal Difficulties

Another subscale of the Inventory of Altered Self-Capacities (Briere, 2000) was used to assess interpersonal difficulties due to this subscale specifically relating to the concept of interpersonal difficulties in the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). The interpersonal conflicts (9-items) subscale measures the extent to which an individual reports problems in their interpersonal relationships as well as a tendency to engage in chaotic, emotionally upsetting, and sometimes short-lived relationships. The reliability alpha coefficients for the interpersonal conflicts subscale have been found to vary from 0.88 to 0.93 for clinical and non-clinical samples and the subscale was found to have acceptable construct, convergent and discriminant validity (Briere & Rundz, 2002).

Again, an additional questionnaire was developed using Visual Analogue Scales to investigate interpersonal difficulties specifically as defined by the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) as no questionnaire was found to specifically assess this construct in the literature (see Appendix E). These Visual Analogue Scales included 11 statements again with anchors at either side of a 10cm line stating "not at all true of me" to "very true of

me." The statements were developed specifically using the transdiagnostic cognitive behavioural theory's description of interpersonal difficulties and complimented that of the description of the Inventory of Altered Self-Capacities measure. Examples of the statements included "I feel as though there is conflict in my relationships with other people (e.g. other family members, co-workers, and friends)" and "I am more likely to manage my weight and shape (e.g. by restricting my diet, vomiting, using laxatives, diuretics, diet pills, or exercising) when I am having trouble in my relationships" (see Appendix E). This questionnaire was found to have a Cronbach's alpha coefficient of 0.96 suggesting high reliability. The Interclass Correlation was found to be 0.66 suggesting the items were moderately correlated.

6.2.2.5 Low Self-Esteem

The concept of core low self-esteem has not been linked to any particular measurement device and there appears to be no current measurement tool available to measure core low self-esteem as defined by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). As a consequence, this research utilised a well used and validated instrument for measuring self-esteem in eating disorders and will focused on the concept of low self-esteem in both BN and BED.

The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a 10-item self-report inventory that indicates the level of an individual's beliefs and attitudes regarding general self worth. Higher scores indicate higher self-esteem. The Rosenberg Self-

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Esteem Scale is the most widely used measure of self-esteem and is well supported

for use in measuring self-esteem in eating disorders (Dunkley & Grilo, 2006; Geller

et al., 1998; Gual et al., 2002; Hrabosky et al., 2007; Mendelson et al., 2002; Polivy,

Heatherton, & Herman, 1988; Preusser, Rice, & Ashby, 1994; Ross & Wade, 2004;

Silverstone, 1992).

The Rosenberg Self-Esteem Scale has been found to have acceptable

reliability, with Cronbach's alpha coefficients ranging from 0.77 to 0.87 (Morey &

Kurtz, 1995). It has also been found to have acceptable internal consistency, test-

retest reliability, construct and convergent validity with self-esteem assessed by

structured interviews, observer ratings, clinician ratings and peer ratings (Griffiths et

al., 1999; Rosenberg, 1965).

6.2.2.6 Additional Equipment

Additional materials for this section of the experiment were digital scales and

measuring tape for calculation of BMI.

6.2.3 Procedure

Studies 1 and 3 were jointly approval by the Tasmanian Social Sciences

Human Research Ethics Committee. The procedure for these studies is reported

together as the studies were completed using the same group of participants but the

results of these studies will be reported separately. This procedure is broken down

into tasks prior to the experimental session (most of Study 1) and tasks during the experimental session (remainder of Study 1 and all of Study 3) and is outlined in Table 2 below.

Table 2

Procedure for Study 1 and 3

Stage in Study	Tasks	Study Number
Participant registers interest in study and has a phone interview to screen for group membership	Sent information package with information sheet and initial questionnaires • Eating Disorder Inventory Two • Revised Restraint Scale • Multidimensional Perfectionism Scale • Perfectionistic Cognitions Inventory	Study 1
Experimental Session	Informed consent	Study 1 and 3
	Completes remaining questionnaires • Eating Disorder Examination Questionnaire • Rosenberg Self-Esteem Scale • Inventory of Altered Self-Capacities (Affect Regulation and Interpersonal Difficulties Subscales) • Visual Analogue Scales • State Trait Anxiety Inventory	Study 1
	Completes modified visual probe task • Food words • Body shape and weight words • Perfectionism words	Study 3
	Debriefing	Study 1 and 3

Participants who registered interest in the study were sent an information package to complete at home prior to the experimental session. This package included the information sheet, the EDI-II, Revised Restraint Scale, Multidimensional Perfectionism Scale and Perfectionistic Cognitions Inventory and instructions on completion of the questionnaire package (for those instructions, see Appendix F). An appointment was also made for the experimental session (i.e. the modified visual probe task and further questionnaires for both Study 1 and 3) at the University laboratory.

At the start of the experimental session, participants were provided with another information sheet to reiterate the focus of the study and requirements of participation and were invited to ask any questions before the experimental session commenced. They then signed a statement of informed consent (Appendix B). During this session, the remaining questionnaires for Study 1 and computer tasks for Study 3 were completed.

The remaining questionnaires for Study 1 included the EDE-Q, Rosenberg Self-Esteem Scale, Inventory of Altered Self-Capacities subscales for Mood Intolerance and Interpersonal Difficulties, Mood Intolerance Visual Analogue Scales, Interpersonal Difficulties Visual Analogue Scales and State Trait Anxiety Inventory (see Chapter 8 for details on the latter inventory). These questionnaires were used as fillers between the modified visual probe tasks for Study 3 and also functioned to provide participants with a break between computer tasks.

All questionnaires, including those completed by participants at home, were administered in a counterbalanced order. Current height and weight was measured at the conclusion of the experimental session and from this, BMI was calculated. At the end of the session, participants were debriefed and given the opportunity to ask questions about the experiment.

6.2.4 Design and Data Analysis

The study compared the four groups (BN, BED, OW and NW) on a range of different questionnaires in order to describe the characteristics and maintenance factors of individuals with and without eating disorders. Assignment to the BN and BED groups relied on clinical diagnoses based on responses to the relevant questionnaires. Dependent variables were responses to the questionnaires. One way Analysis of Variance (ANOVA) using SPSS was utilised to analyse the data where a single scale was used as the dependent measure and REGWQ post hoc tests, at the .05 level of significance, were used to examine the between group differences where ANOVA produced a significant F value. Multivariate Analysis of Variance (MANOVA) was utilised where the subscales of a measure could be combined based on their theoretical constructs using Wilks' Lambda. In this instance, individual between subjects ANOVAs followed by REGWQ post-hoc tests were used to further investigate significant effects. Power analysis, including effect sizes (Cohen's d values) and post hoc power analyses of group differences were conducted to determine whether the lack of difference between clinical groups had

been influenced by group size. All power analyses were conducted at the power level of 0.8 with the .05 level of significance.

6.3 RESULTS STUDY 1

The complete statistical outputs for all analyses are presented in Appendix G (on the attached CD).

6.3.1 Participant Characteristics

This section contains information regarding participant characteristics and the results for questionnaires pertaining to the psychopathology and symptomatology and the core maintaining mechanisms of eating disorders. This section is also relevant for Study 3 and will not be repeated.

6.3.1.1 Age and BMI

The means and standard errors for age and BMI for the four groups are summarised in Table 3.

Table 3

Means and standard errors for age and BMI for the BN, BED, OW and NW groups

Group	Age		BMI	
	Mean	Standard Error	Mean	Standard Error
BN	23.80	(0.98)	22.99	(0.96)
BED	24.27	(1.13)	29.52	(1.11)
NW	21.70	(0.98)	22.06	(0.96)
OW	25.50	(0.98)	29.76	(0.96)

This data was analysed using a one-way ANOVA to assess for any significant differences between the groups and to confirm group membership for the NW and OW groups. There were no significant effects for age between the four groups, $F(3, 75) = 2.62, p > .05$, observed power 0.62 indicating that the groups share similar ages (for means and standard errors refer to Table 3). A post hoc power analysis indicated that the magnitude of the effect size of age, between the BN and BED groups, was 0.1. In order to find a significant difference at the power level of 0.8, a sample of 1364 per group would have been required. In addition, it was found that age was not correlated with the dependent variables (for Study 1 or 3) which indicates that age was not related to (and therefore likely to affect) the results.

There was however a significant difference between the groups in BMI, $F(3. 75) = 17.42 = p < .001$, observed power 1.00 and follow-up REGWQ post hoc

analyses with Bonferroni adjustments indicated that the OW and BED group had a significantly higher BMI than the NW and the BN group, as would be expected. This also indicates that the OW and BED group were adequately matched for weight, as were the BN and NW groups. This finding confirms that the OW and NW groups were well matched control groups based on BMI.

6.3.2 Eating Related Scales

6.3.2.1 Eating Disorder Examination Questionnaire

The means and standard errors for each group on the subscales of the EDE-Q are summarised in Table 4.

Table 4

Means and standard errors for each of the subscales of the EDE-Q for BN, BED,

OW and NW groups

Subscale of the EDE-Q	BN		BED		NW		OW	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Restraint	4.33	(0.28)	3.39	(0.32)	1.44	(0.28)	1.60	(0.28)
Eating Concern	3.76	(0.26)	3.59	(0.31)	0.58	(0.26)	1.21	(0.26)
Shape Concern	4.76	(0.27)	4.56	(0.31)	2.06	(0.27)	4.23	(0.27)
Weight Concern	5.08	(0.31)	4.93	(0.36)	1.87	(0.31)	3.21	(0.31)

These scores show that the BN and BED groups had the highest mean for each of the EDE-Q subscales, followed by the OW group and the NW group. There were significant differences between the groups on all of the subscales, Wilks' Lambda = 13.32, $F(12, 180.20) = 13.32$, $p < .001$. Individual between subjects ANOVAs and REGWQ post hoc tests were conducted and are summarised in Table 5.

Table 5

MANOVA and post hoc analyses results for the comparisons between groups for the

subscales of the EDE-Q

Subscale of the EDE-Q	*F* value (df=3, 71)	*MSE*	*P*	Differences	Observed Power
Restraint	115.75	38.58	<.001	BN, BED > OW, NW	1.00
Eating Concern	149.63	49.88	<.001	BN, BED > OW, NW	1.00
Shape Concern	91.31	30.44	<.001	BN, BED, OW > NW	1.00
Weight Concern	133.09	44.36	<.001	BN, BED > OW > NW	1.00

In addition, a post hoc power analysis indicated that the magnitude of the

effect size for the eating concern, shape concern and weight concern scales were all

small. For eating concern, there was a non significant difference in the sample of 0.1

and in order to find a significant difference at the power level of 0.8, 757

participants would have been required per group. For shape concern, there was a non

significant difference in the sample of 0.2 and in order to find a significant

difference at the power level of 0.8, 571 participants would have been required per

group. For weight concern, there was also a non significant difference in the sample

of 0.1 and to find a significant difference at the power level of 0.8, 1349 participants

would have been required per group. By contrast, a large effect size of 0.8 was

found for the restraint, although there was a non significant difference in the sample. In order to detect a significant difference at the power level of 0.8 only 28 participants per group would have been required. This suggests that larger group numbers would have detected a difference between those with BN and BED on restraint, with those with BN being shown to have higher restraint than those with BED.

These findings indicate that although the BN and BED groups had significantly higher scores on the restraint than the OW and NW groups, a significantly higher restraint score would have been found for those with BN in comparison to those with BED had there been more participants in the study. With regards eating concern, the BN and BED group had significantly higher scores than the OW and NW groups. The BN, BED and OW group had significantly higher shape concern than the NW group and the BN and BED group had significantly higher weight concern than the OW group, who in turn had significantly higher weight concern than the NW group. These findings indicate that individuals with BN and BED have similar levels of eating concern, shape concern and weight concern in comparison to those who are OW and NW. The findings suggest that those with BN may have higher restraint than those with BED, however this requires further examination; both of the eating disorder groups had significantly higher restraint than the OW and NW groups.

6.3.2.2 Eating Disorder Inventory Two

Raw scores from the EDI-II were converted to standard scores using the Nonpatient College Female normative data. The means and standard errors are seen in Table 6.

Table 6

Means and standard errors for the subscales of the EDI-II for the BN, BED, OW and NW groups

	BN		BED		NW		OW	
Subscale of the EDI-II	*M*	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Drive for Thinness	15.85	(1.00)	15.40	(1.16)	2.45	(1.00)	3.15	1.00
Bulimia	11.10	(0.85)	10.47	(0.98)	1.30	(0.85)	1.30	(0.85)
Body Dissatisfaction	19.90	(1.73)	21.20	(1.99)	8.65	(1.73)	18.85	(1.73)
Ineffectiveness	15.40	(1.37)	13.40	(1.58)	3.15	(1.37)	2.25	(1.37)
Perfectionism	12.80	(1.06)	10.20	(1.22)	4.75	(1.06)	4.65	(1.06)
Interpersonal Distrust	8.05	(0.99)	7.40	(1.14)	2.05	(0.99)	1.15	(0.99)
Interoceptive Awareness	15.50	(1.14)	14.47	(1.32)	2.90	(1.14)	2.60	(1.14)
Maturity fears	7.75	(0.99)	7.93	(1.15)	2.55	(0.99)	2.65	(0.99)
Asceticism	9.50	(0.76)	10.00	(0.88)	3.70	(0.76)	1.95	(0.76)
Impulse Regulation	9.55	(0.76)	11.00	(1.07)	2.00	(0.92)	1.25	(0.92)
Social Insecurity	10.35	(0.92)	10.00	(1.06)	3.20	(0.92)	3.00	(0.92)

These scores suggest that the BN and BED groups had the highest mean for each of the subscales, followed by the OW group and the NW group. There were significant differences between the groups for all of the subscales, Wilks' Lambda = 0.12, $F(33, 180.42) = 5.81$, $p < .001$. Individual between subjects ANOVAs and REGWQ post hoc tests were conducted and are summarised in Table 7. These findings show that the BN and BED groups had significantly higher scores than the OW and NW groups on all of the subscales of the EDI-II with the exception of Body Dissatisfaction where the BN, BED and OW groups had significantly higher scores than the NW group. There was a similar level of psychopathology for BN and BED groups across symptomatology of the EDI-II.

Table 7

MANOVA and post hoc analyses results for the comparisons between groups for the subscales of the EDI-II

Subscale of the EDI-II	*F* value (*df*= 3, 71)	*MSE*	*P*	Differences	Observed Power
Drive for Thinness	51.41	1030.78	<0.01	BN, BED > NW, OW	1.00
Bulimia	38.95	566.08	<0.01	BN, BED > NW, OW	1.00
Body Dissatisfaction	10.59	631.54	<0.01	BN, BED, OW > NW	0.99
Ineffectiveness	23.79	886.82	<0.01	BN, BED > NW, OW	1.00
Perfectionism	14.42	322.99	<0.01	BN, BED > NW, OW	1.00
Interpersonal Distrust	12.34	240.89	<0.01	BN, BED > NW, OW	1.00
Interoceptive Awareness	36.23	945.80	<0.01	BN, BED > NW, OW	1.00
Maturity fears	8.63	170.23	<0.01	BN, BED > NW, OW	0.99
Asceticism	26.38	306.24	<0.01	BN, BED > NW, OW	1.00
Impulse Regulation	27.07	462.36	<0.01	BN, BED > NW, OW	1.00
Social Insecurity	18.75	314.15	<0.01	BN, BED > NW, OW	1.00

In addition, a post hoc power analysis of the subscales of the EDI-II indicated that the effect size for differences between the BN and BED groups for all subscales with the exception of the perfectionism subscale were small. For the drive for thinness subscale, there was a non significant difference in the sample of 0.1 and in order to find a significant difference at the power level of 0.8 1551 participants would have been required per group. For the bulimia subscale, there was a non significant difference in the sample of 0.2 and in order to find a significant difference at the power level of 0.8, 572 participants per group would have been required. For the body dissatisfaction subscale, there was a non significant difference in the sample of 0.1 and in order to find a significant difference at the power level of 0.8, 551 participants per group would have been required. For the ineffectiveness subscale, there was a non significant difference in the sample of 0.3 and in order to find a significant difference at the power level of 0.8, 148 participants would have been required per group. For the interpersonal distrust subscale, there was a non significant difference in the sample of 0.2 and in order to find a significant difference at the power level of 0.8, 728 participants per group would have been required. For the drive interoceptive awareness subscale, there was a non significant difference in the sample of 0.2 and in order to find a significant difference at the power level of 0.8, 386 participants would have been required per group. For the maturity fears subscale, there was a non significant difference in the sample of <0.1 and in order to find a significant difference at the power level of 0.8, 9555 participants per group would have been required. For the asceticism subscale, there was a non significant difference in the sample of 0.2 and

in order to find a significant difference at the power level of 0.8, 729 participants per group would have been required. For the social insecurity subscale, there was a non significant difference in the sample of 0.1 and in order to find a significant difference at the power level of 0.8, 2166 participants per group would have been required. For the impulse regulation subscale, there was a non significant difference between the BN and BED groups of 0.4 but to find a significant difference at the 0.8 level, 108 participants would have been required per group.

Although not at the 0.8 level, a post hoc power analysis indicated that for the perfectionism subscale, there was a non significant difference between the BN and BED groups of 0.6 meaning that to find a significant difference, 53 participants would have been required per group. This suggests that although both eating disorder groups had significantly higher scores than the OW and NW groups for the perfectionism subscale, greater group numbers may have detected a difference showing that those with BN have higher scores on the perfectionism subscale of the EDI-II than those with BED.

6.3.2.3 Dietary Restraint

The means and standard errors for each group for the overall and subscales of the Restraint Scale are seen in Table 8.

Table 8

Means and standard errors for the subscales and total score of the Restraint Scale

for BN, BED, OW and NW groups

	BN		BED		NW		OW	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Total Restraint	28.50	(1.25)	27.33	(1.36)	12.65	(1.06)	18.05	(0.75)
Concern for Dieting	17.10	(0.87)	15.47	(1.05)	7.40	(0.85)	9.60	(0.43)
Weight Fluctuations	11.40	(0.75)	11.47	(0.77)	5.25	(0.57)	8.65	(0.39)

These scores suggest that the BN and BED groups have the highest scores for the total restraint score and concern for dieting and weight fluctuations subscales followed by the OW and NW groups. Individual one-way ANOVAs indicated that there were significant differences between the groups for the total score and both subscales and were followed up by REGWQ post hoc tests. The results of these are summarised in Table 9.

Table 9

MANOVA and post hoc analyses results for the comparisons between groups for the

total score and subscales of the Restraint Scale

Restraint Scale	*F* value (*df*=3, 71)	*MSE*	*P*	Differences	Observed Power
Total Restraint	48.13	1096.78	< .001	BN, BED > OW > NW	1.00
Concern for Dieting	34.06	412.08	< .001	BN, BED > OW, NW	1.00
Weight Fluctuations	25.17	163.35	< .001	BN, BED > OW > NW	1.00

In addition, a post hoc power analysis of the difference between those with

BN and BED on the Restraint Scale suggested that the effect size for the total

restraint score and the score for the weight fluctuation subscale was small. There

was a non significant difference in the sample of 0.2 for the total restraint score and

in order to find a significant difference at the 0.8 level, 339 participants per group

would have been needed. There was also a non significant difference in the sample

of <0.1 for the weight fluctuations subscale and in order to detect a significant

difference at the 0.8 level, 32 208 participants per group would have been needed.

By contrast, the effect size for the concern for dieting subscale was approaching medium but there was a non significant difference between BN and BED on the concern for dieting subscale of 0.4, while 94 participants per group would have led to a significant difference at the power level of 0.8 being detected, where those with BN may have been found to have higher concern for dieting than those with BED.

Overall, these findings indicated that the BN and BED group had the significantly higher total restraint scores than the OW individuals, who had higher dietary restraint than NW individuals. Those with BN and BED had similar scores on concern for dieting, which were significantly higher in comparison to OW and NW individuals (although a larger sample may have shown that those with BN had higher concern for dieting than those with BED). Those with BN and BED also had similar scores for weight fluctuation, which were significantly higher than those who were OW, with the NW group having the lowest score. There was a similar pattern of dietary restraint for those with BN and BED.

6.3.3 Perfectionism Related Scales

6.3.3.1 Multidimensional Perfectionism Scale

The means and standard errors for each group on the subscales of the Multidimensional Perfectionism Scale are seen in Table 10.

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Table 10

Means and standard errors for each of the subscales of the Multidimensional

Perfectionism Scale for BN, BED, OW and NW groups

Multidimensional Perfectionism Subscales	BN		BED		NW		OW	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Self-Oriented	94.75	(3.60)	80.27	(4.16)	63.60	(3.60)	68.85	(3.60)
Other-Oriented	58.80	(2.87)	61.20	(3.32)	53.15	(2.87)	56.10	(2.88)
Social-Oriented	75.40	(3.42)	67.00	(3.95)	49.55	(3.42)	51.95	(3.42)

These scores suggest that the BN and BED groups had the highest mean for the self- and social-oriented perfectionism subscales, followed by the OW group and the NW group, with little difference between the groups for other-oriented perfectionism. There were significant differences between the groups on all of the subscales, Wilks' Lambda = 0.55, $F(9, 168.08) = 5.20$, $p < .001$. Individual between subjects ANOVAs and REGWQ post hoc tests were conducted and are summarised in Table 11.

Table 11

MANOVA and post hoc analyses results for the comparisons between groups for the

subscales of the Multidimensional Perfectionism Scale

Multidimensional Perfectionism Subscale	*F* value (*df*=3, 71)	*MSE*	*P*	Differences	Observed Power
Self-Oriented	14.59	3790.42	<.001	BN > BED, OW > NW	1.00
Other-Oriented	1.30	213.95	0.28	BN = BED = OW = NW	0.33
Social-Oriented	12.71	2977.88	<.001	BN, BED > NW, OW	1.00

Post hoc power analysis indicated that the BN and BED groups had a non significant difference of 0.2 for the other-oriented perfectionism subscale and that 451 participant per group would have been required to detect significant differences at the 0.8 power level. The social-oriented perfectionism subscale showed a medium effect size of 0.6 and to detect significant differences at the 0.8 level, 50 participants would have been required per group. A large effect size of 0.9 was found for the self-oriented perfectionism group, however significant differences had already been found, with the BN group shown to have significantly higher perfectionism than the BED group.

These findings show that the BN group had significantly higher self-oriented perfectionism than the BED and OW group, who had significantly higher self-oriented perfectionism than the NW group. The BN and BED groups were significantly higher than the OW and NW groups on social oriented perfectionism. Post hoc analysis showed that there were no significant differences between the groups on other-oriented perfectionism and post hoc power analysis suggested that larger group numbers may have resulted in some differences between BN and BED with regards to social-oriented perfectionism, being detected. Overall, the results suggest that those with BN and BED share perfectionistic characteristics but there may be some differences between those with BN and BED, as those with BN may have higher features of perfectionism than those with BED.

6.3.3.2 Perfectionism Cognitions Inventory

A one-way ANOVA indicated that there were significant differences between the four groups on the Perfectionistic Cognitions Inventory, $F(3, 71) =$ 38.22, $p < .001$, observed power 1.00. Post hoc analyses indicated that the BN ($M =$ 114.25, $SE = 3.21$) and BED ($M = 105.00$, $SE = 3.70$) group had significantly higher scores on the Perfectionistic Cognitions Inventory than the NW ($M = 80.80$, $SE =$ 3.21) and OW ($M = 71.25$, $SE = 3.21$) groups. A post hoc power analysis indicated that although there was a non significant difference of 0.7 between the BN and BED groups on the Perfectionistic Cognitions Inventory, with 38 participants per group a significant difference at the power level of 0.8 may have been detected, with those with BN possibly found to have higher scores than those with BED. These results

indicate that eating disordered participants experienced a significantly higher number of perfectionistic thoughts than control participants. Although those with BN and BED were found to share similarly high levels of perfectionistic thoughts a greater sample size may have detected differences between the groups.

6.3.4 Mood Intolerance

6.3.4.1 Inventory of Altered Self-Capacities – Affect Control

Raw scores form the Inventory of Altered Self-Capacities were calculated and the means and standard errors of these scores are seen in Table 12.

Table 12

Means and standard errors for the subscales of the Inventory of Altered Self-Capacities for the BN, BED, OW and NW groups

Inventory of Altered Self-Capacities Subscale	BN		BED		OW		NW	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Affect Dysregulation	16.55	(0.72)	16.67	(0.83)	9.65	(0.72)	9.5	(0.72)
Affect Skills Deficit	15.50	(0.64)	14.40	(0.74)	7.85	(0.64)	6.60	(0.64)
Affect Instability	23.35	(0.88)	20.60	(1.01)	11.95	(0.88)	11.70	(0.88)

These scores suggest that the BN and BED groups had the highest mean for each of the subscales, followed by the OW group and the NW group. There were significant differences between the groups for all of the subscales, Wilks' Lambda = 0.24, $F(9, 168.08) = 15.04$, $p < .001$. Individual between subjects ANOVAs and REGWQ post hoc tests were conducted and are summarised in Table 13.

Table 13

MANOVA and post hoc analyses results for the comparisons between groups for the subscales of the Inventory of Altered Self-Capacities

Inventory of Altered Self-Capacities Subscale	F value ($df=3, 71$)	MSE	P	Differences	Observed Power
Affect Dysregulation	29.97	307.18	<.001	BN, BED > NW, OW	1.00
Affect Skills Deficit	47.78	387.57	<.001	BN, BED > NW, OW	1.00
Affect Instability	44.67	687.90	<.001	BN, BED > NW, OW	1.00

Post hoc analyses showed that the BN and the BED group had significantly higher scores on all of the subscales than the NW and OW groups however post hoc power analyses indicated that there was a non significant difference found for the affect dysregulation subscale of <0.1 and in order to find a significant difference

between the BN and BED groups at the 0.8 power level, 11 305 participants per group would have been required. There was also a non significant difference between the BN and BED groups on the affect skills deficit subscale and in order to detect a significant difference at the 0.8 power level, 107 participants per group would have been required. By contrast, larger sample sizes may have detected differences for the affect instability subscale as the magnitude of the effect size was 0.7, suggesting that only 32 participants per group would have detected differences showing the BN group to have higher scores than the BED group. These results indicate that participants with either eating disorder had significantly more problems with what can be described as mood intolerance than control participants. Again, this emphasises that individuals with BN and BED share a range of characteristics regarding toleration of mood states.

6.3.4.2 Visual Analogue Scales – Mood Intolerance

Raw scores from the Visual Analogue Scales were calculated. The means and standard errors are seen in Table 14.

Table 14

Means and standard errors for the subscales of the Visual Analogue Scales of mood

intolerance for the BN, BED, OW and NW groups

VAS Statements	BN		BED		OW		NW	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
I don't like to focus on my feelings	67.75	(5.67)	61.80	(6.54)	36.15	(5.67)	36.15	(5.67)
I find it easy to tolerate changes in my mood	82.90	(4.27)	64.20	(4.92)	40.70	(4.26)	49.75	(4.26)
I have difficulty tolerating strong negative emotions	77.05	(5.48)	60.53	(6.33)	45.45	(5.48)	56.15	(5.48)
I have difficulty tolerating strong positive emotions	59.55	(5.28)	59.67	(6.09)	25.10	(5.28)	20.25	(5.28)
I find it easy to express strong emotions	75.60	(4.07)	66.33	(4.70)	25.95	(4.07)	34.00	(4.07)
When I have strong emotions I must do something to change how I feel	60.65	(5.08)	71.00	(5.87)	35.40	(5.08)	46.75	(5.08)
I am too aware of changes in my mood	71.45	(5.07)	60.73	(5.86)	43.20	(5.07)	47.50	(5.07)
I don't think I have especially strong mood states	81.50	(4.90)	70.47	(5.66)	42.20	(4.90)	54.55	(4.90)
When I have strong emotions I feel that I can't cope with them	71.55	(5.65)	58.20	(6.52)	31.10	(5.65	43.00	(5.65)
Strong emotions make it difficult for me to cope with everyday things	73.05	(4.74)	56.53	(5.47)	28.35	(4.74)	33.05	(4.74)

These scores suggest that the BN and BED groups had the highest mean for each of the subscales, followed by the OW group and the NW group. There were significant differences between the groups for all of the subscales, Wilks' Lambda = 0.19, $F(30, 182.66) = 4.54$, $p < .001$. Individual between subjects ANOVAs and REGWQ post hoc tests were conducted and are summarised in Table 15.

Table 15

MANOVA and post hoc analyses results for the comparisons between groups for the

Visual Analogue Scales of mood intolerance

VAS Statements	*F* value (*df*=3, 71)	*MSE*	*P*	Differences	Observed Power
I don't like to focus on my feelings	8.34	5352.10	<.001	BN, BED > NW, OW	0.99
I find it easy to tolerate changes in my mood	18.55	6746.17	<.001	BN > BED > NW, OW	1.00
I have difficulty tolerating strong negative emotions	5.74	3448.00	.001	BN, BED > NW, OW	0.94
I have difficulty tolerating strong positive emotions	15.39	8562.17	<.001	BN, BED > NW, OW	1.00
I find it easy to express strong emotions	33.96	11257.03	<.001	BN, BED > NW, OW	1.00
When I have strong emotions I must do something to change how I feel	11.48	5927.03	<.001	BN, BED > NW, OW	0.99
I am too aware of changes in my mood	6.36	3267.90	.001	BN, BED > NW, OW	0.96
I don't think I have especially strong mood states	12.21	5873.55	<.001	BN, BED > OW > NW	1.00
When I have strong emotions I feel that I can't cope with them	9.62	6134.52	<.001	BN, BED > OW > NW	0.99
Strong emotions make it difficult for me to cope with everyday things	19.15	8593.97	<.001	BN, BED > NW, OW	1.00

Post hoc analysis indicated that, overall, the BN and BED groups had significantly more problems in mood intolerance as measured by the Visual Analogue Scales than the NW and OW. However, post hoc power analysis indicated varying effect sizes for the magnitude of the difference between the BN and BED groups. A small effect size was found for Questions 1 and 4. For question 1, a non significant difference in the sample of 0.2 was found and in order to detect a significant difference at the 0.8 power level, 285 participants per group would have been required. For question 4, a non significant difference in the sample of <0.1 was found and in order to detect a significant difference at the 0.8 power level, 608 454 participants per group would have been required.

Medium effect sizes were detected for Questions 5, 6, 7, 8 and 9. For question 5, a non significant difference of 0.6 was detected, however only 50 participants would have been required per group in order to detect a significant difference at the 0.8 power level between those with BN and BED. For question 6, a non significant difference of 0.5 was detected, however only 76 participants would have been required per group in order to detect a significant difference at the 0.8 power level between those with BN and BED. For question 7, a non significant difference of 0.5 was detected, however only 71 participants would have been required per group in order to detect a significant difference at the 0.8 power level between those with BN and BED. For question 8, a non significant difference of 0.5 was detected, however only 62 participants per group would have been required in order to detect a significant difference at the 0.8 power level between those with BN and BED. For question 9, a non significant difference of 0.5 was detected, however

only 57 participants per group would have been required in order to detect a significant difference at the power level of 0.8 between those with BN and BED.

A large effect size was detected for Questions 3 and 10. For question 3, a non significant difference of 0.7 was detected, however only 35 participants would have been required per group in order to detect a significant difference at the power level of 0.8 between those with BN and BED, with those with BN found to have a higher score. For question 10, a non significant difference of 0.8 was detected, however only 26 participants would have been required in order to detect a significant difference between those with BN and BED, with those with BN found to have a higher score.

Overall, these results suggest that those with eating disorders do have higher mood intolerance problems than those without eating disorders. Differences between those with BN and BED may have been detected with larger sample sizes and this may have shown the BN group to generally have higher scores than the BED group.

6.3.5 Interpersonal Difficulties

6.3.5.1 Inventory of Altered Self Capacities – Interpersonal Conflicts

A one-way ANOVA indicated that there were significant differences between the four groups on the Inventory of Altered Self-Capacities subscale measuring interpersonal conflicts, $F(3, 71) = 14.68, p < .001$, observed power 1.00. Post hoc analyses indicated that the BN ($M = 24.65, SE = 1.65$) and BED ($M = 25.07, SE = 1.35$) groups had significantly higher scores of interpersonal conflict

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than the NW ($M = 16.50$, $SE = 1.17$) and OW ($M = 17.20$, $SE = 1.17$) groups. A post

hoc power analysis of the BN and BED groups found that there was a non

significant difference in the sample of <0.1 and in order to find a significant

difference at the power level of 0.8 between these two groups you would have

required 3642 participants per group. This indicates that eating disordered

participants experienced significantly higher interpersonal conflicts (or interpersonal

difficulties) than control participants. It also indicates that individuals with BN and

BED share similar levels of interpersonal conflict.

6.3.5.2 Visual Analogue Scale – Interpersonal Difficulties

Raw scores from the Visual Analogue Scales of interpersonal difficulties

were calculated. The means and standard errors are seen in Table 16.

Table 16

Means and standard errors for the Visual Analogue Scales of interpersonal

difficulties for the BN, BED, OW and NW group

VAS Statements	BN		BED		OW		NW	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
I feel as though there is conflict in my relationships with other people (e.g. other family members, co-workers, and friends)	52.00	(5.92)	54.47	(6.84)	31.00	(5.92)	36.30	(5.92)
In general, I feel that I don't have many close relationships	75.60	(6.13)	71.07	(7.07)	23.75	(6.13)	44.65	(6.13)
I feel as though I have little support from other people in my life	64.55	(5.22)	61.80	(6.03)	21.30	(5.22)	31.50	(5.22)
I feel as though I don't have much control over my interpersonal relationships	65.05	(4.81)	61.20	(5.55)	18.70	(4.81)	32.75	(4.81)
I feel as though I have had trouble in my relationships with others for a long time (more than a few weeks/months)	57.30	(6.31)	56.80	(7.29)	20.60	(6.31)	35.60	(6.31)
I feel pressured to be thin by what the people in my life say and do	70.65	(4.95)	72.33	(5.72)	23.05	(4.95)	33.60	(4.95)
I am more likely to manage my weight and shape (e.g. by restricting my diet, vomiting, using laxatives, diuretics, diet pills, or exercising) when I am having trouble in my relationships	83.45	(5.39)	68.80	(6.23)	20.50	(5.39)	37.10	(5.39)

Table 16 cont.

Means and standard errors for the Visual Analogue Scales of interpersonal difficulties

for the BN, BED, OW and NW group cont.

VAS Statements	BN		BED		OW		NW	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
I am more likely to binge-eat when I am having trouble in my relationships	84.05	(5.29)	75.67	(6.11)	16.55	(5.29)	35.75	(5.29)
When things go wrong between me and other people I am more likely to focus on managing my weight and shape	85.95	(4.78)	75.67	(5.52)	16.55	(4.78)	35.75	(4.78)
I've missed out on some of the normal opportunities/challenges of growing up because of the concern with my weight and shape (e.g. dating, finishing school, getting a job, or moving out of home)	81.10	(6.52)	73.53	(7.53)	10.90	(6.52)	29.70	(6.52)
I need to keep as slim as possible because of the kinds of work or activities that I do	65.30	(4.70)	51.27	(5.43)	13.10	(4.70)	17.50	(4.70)

These scores suggest that the BN and BED groups had the highest mean for each of the subscales, followed by the OW group and the NW group. There were significant differences between the groups for all of the subscales, Wilks' Lambda =

0.19, $F(33, 180.42) = 4.12$, $p < .001$. Individual between subjects ANOVAs and

REGWQ post hoc tests were conducted and are summarised in Table 17.

Table 17

MANOVA and post hoc analyses results for the comparisons between groups for the

Visual Analogue Sales of interpersonal difficulties

VAS Statements	F value ($df=3$, 71)	MSE	P	Differences	Observed Power
I feel as though there is conflict in my relationships with other people (e.g. other family members, co-workers, and friends)	3.50	2454.54	.02	BN = BED = NW = OW	0.76
In general, I feel that I don't have many close relationships	14.92	11201.92	<.001	BN, BED > NW > OW	1.00
I feel as though I have little support from other people in my life	16.28	8873.48	.001	BN, BED > NW, OW	1.00
I feel as though I don't have much control over my interpersonal relationships	20.64	9532.22	<.001	BN, BED > NW, OW	1.00
I feel as though I have had trouble in my relationships with others for a long time (more than a few weeks/months)	7.50	59.78. 45	<.001	BN, BED > NW > OW	0.98

Table 17 cont.

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Table 17 cont.

MANOVA and post hoc analyses results for the comparisons between groups for the

Visual Analogue Sales of interpersonal difficulties cont.

VAS Statements	F value $(df=3, 71)$	*MSE*	*P*	Differences	Observed Power
I feel pressured to be thin by what the people in my life say and do	24.27	11908.85	<.001	BN, BED > NW, OW	1.00
I am more likely to manage my weight and shape (e.g. by restricting my diet, vomiting, using laxatives, diuretics, diet pills, or exercising) when I am having trouble in my relationships	27.68	16090.47	.001	BN, BED > NW, OW	1.00
I am more likely to binge-eat when I am having trouble in my relationships	30.48	17041.60	<.001	BN, BED > NW > OW	1.00
When things go wrong between me and other people I am more likely to focus on managing my weight and shape	45.14	20623.01	<.001	BN, BED > NW > OW	1.00
I've missed out on some of the normal opportunities/challenges of growing up because of the concern with my weight and shape (e.g. dating, finishing school, getting a job, or moving out of home)	25.81	21954.85	<.001	BN, BED > NW, OW	1.00
I need to keep as slim as possible because of the kinds of work or activities that I do	28.54	12604.82	<.001	BN, BED > NW, OW	1.00

These results indicated that overall, the BN and BED groups had significantly more interpersonal difficulties as measured by the VAS than the NW and OW groups. A post hoc power analysis indicated some medium effect sizes between the BN and BED groups, suggesting that that larger sample sizes may have detected some differences. For instance, on question 2, a non significant difference in the sample of 0.5 was found and in order to find a significant difference at the 0.8 level, only 62 participants per group would have been required. For question 6, a non significant difference in the sample of 0.6 was found and in order to find a significant difference at the 0.8 level, only 45 participants per group would have been required. For question 8, a non significant difference in the sample of 0.5 was found and in order to find a significant difference at the 0.8 level, only 68 participants per group would have been required. Finally, for question 10, a non significant difference in the sample of 0.7 was found and in order to find a significant difference at the 0.8 level, only 36 participants per group would have been required.

By contrast, for questions 1, 3, 4, 5, 7, and 9, larger participant numbers per group would have been unlikely to result in differences between those with BN and BED being detected as the effect sizes between the groups were small. For question 1, a non significant difference in the sample of 0.1 was found and in order to find a significant difference at the 0.8 level, 1806 participants per group would have been required. For question 3, a non significant difference in the sample of 0.1 was found and in order to find a significant difference at the 0.8 level, 1133 participants per group would have been required. For question 4, a non significant difference in the

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sample of <0.1 was found and in order to find a significant difference at the 0.8 level, 50 064 participants per group would have been required. For question 5, a non significant difference in the sample of <0.1 was found and in order to find a significant difference at the 0.8 level, 2729 participants per group would have been required. For question 7, a non significant difference in the sample of 0.4 was found and in order to find a significant difference at the 0.8 level, 124 participants per group would have been required. Finally, for question 9, a non significant difference in the sample of 0.3 was found and in order to find a significant difference at the 0.8 level, 233 participants per group would have been required.

Overall these results show that the BN and BED groups demonstrated similar levels of interpersonal difficulties for the majority of questions, however larger sample sizes may have detected some differences in the nature of interpersonal difficulties between the two groups. Both the eating disorder groups shared higher interpersonal difficulties than those without eating disorders.

6.3.6 Core Low Self Esteem

6.3.6.1 Rosenberg Self Esteem Scale

A one-way ANOVA indicated that there were significant differences between the four groups on the Rosenberg Self-Esteem Scale, $F(3, 71) = 109.68, p < .001$, observed power 1.00. Post hoc analyses indicated that the BN ($M = 15.35, SE = 0.84$) and BED ($M = 15.27, SE = 0.97$) groups had significantly lower self-esteem than the NW ($M = 30.65, SE = 0.84$) and OW ($M = 31.60, SE = 0.84$) groups. A post

hoc power analysis also indicated that there was a non significant difference

between those with BN and BED of <0.1 and that 34 675 participants per group

would have been required in order to detect a significant difference at the 0.8 level.

This indicates that eating disordered participants experienced significantly lower

self-esteem than control participants did.

6.4 DISCUSSION STUDY 1

The aim of this study was to examine the similarities and differences in

psychopathology and symptomatology between BN and BED to determine whether

BED is closer to eating disorder than to eating disturbance and to determine whether

the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al.,

2003) is able to adequately describe all eating disorders. Support for the

transdiagnostic cognitive behavioural theory would be indicated by findings that BN

and BED share similar levels of difficulty with the core eating disorder features as

well as the additional features of clinical perfectionism, mood intolerance,

interpersonal difficulties and core low self-esteem. Individuals with BN were

compared to those with BED, an OW non-eating disordered group and a NW non-

eating disordered group. These differences were explored through the completion of

various clinical questionnaires relating to demographics, the psychopathology and

symptomatology of eating disorders, as well as the additional proposed maintaining

mechanisms. Unfortunately, questionnaires relating to the constructs of clinical

perfectionism and core low self-esteem as they are described by the transdiagnostic

cognitive behavioural theory are yet to be developed.

6.4.1 Demographic Variables in Bulimia Nervosa and Binge Eating Disorder

In relation to demographic variables, this study found no differences between the ages of participants in any of the groups suggesting these participants are directly comparable. This is not a common finding in research conducted on BN and BED as generally, BED groups are found to be older than other groups including those with BN, a finding well supported in the literature (Brody et al., 1994; de Zwaan & Mitchell, 1992; Mussell et al., 1995; Rand & Kuldau, 1990; Ricca et al., 2000; Spurrell et al., 1997). The finding that the OW control participants were similar in age to other participants is also not a common finding, as research generally suggests that the age of onset of being OW or obese is variable (O'Neil et al., 1981; Wing, P., Epstein, Scott, & Ewing, 1985). Possible explanations for these findings are that the ages of participants in this study were too restricted by the recruiting criteria to detect age related differences and if the age range were extended, these differences might be apparent. The finding for OW participants may be accounted for by the fact that participants in this study were OW and not generally obese. Another possible explanation is that the BED participants in this study were somewhat atypical or that the findings reflect the fluidity of the eating disorder population. However, it is also worth noting that the lack of age differences in this study means that actual group differences, rather than age related ones, can be examined.

In relation to BMI, the significant group differences are in the direction of what would be expected given the definitions of group membership. The BN group engaged in characteristic dietary restriction and purging to compensate for episodic

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binge eating, and therefore would be expected to be in the NW range. The similar

BMI result for the BED and OW group suggests that different forms of eating are

possible contributors to the weight status of both of these groups, those with BED

engaging in characteristic binge eating episodes and those who were OW possibly

engaged in more generalised overeating. This is a finding consistent with previous

research (Pincus & First, 1999).

6.4.2 Eating Related Psychopathology and Symptomatology

6.4.2.1 Dietary Restraint in Bulimia Nervosa and Binge Eating Disorder

In regard to the diagnostic features of eating disorders, this study indicated

that individuals with BN and BED share similar high levels of eating concern, shape

concern and weight concern. These findings are consistent with that of previous

research (Marcus et al., 1992; Spitzer et al., 1993). Although those with BN and

BED were initially seen as having similar levels of dietary restraint by this study, a

post hoc analysis indicated that greater sample numbers may have shown that those

with BN would have had higher dietary restraint than those with BED. This would

have been consistent with previous research (Marcus et al., 1992; Striegel-Moore et

al., 2001; Wilfey, Schwartz et al., 2000) and with diagnostic criteria for BED (which

excludes dietary restraint). According to previous research, those with BED are

expected to show an eating pattern of consistent eating throughout the day with food

choices similar to those who are OW or obese (i.e. overeating), while those with BN

tend to display periods of dietary restriction with extreme dieting.

Although larger sample sizes may have detected differences, the finding of similar high dietary restraint in the BED group to the BN group in this study can highlight conceptual problems with the term dietary restraint. The terms "dietary restraint" and "dieting" are often used interchangeably by researchers, so that some individuals score highly on dietary restraint while not behaviourally dieting (Ricciardelli & Williams, 1997). An example of this kind of dietary restraint would be those individuals who choose to be on a liquid diet and will not consume any foods that are not liquid. These individuals may "graze" on liquids throughout the day, including high energy drinks, resulting in no weight loss but a high score on dietary restraint. Likewise, the group with BED participating in this study could have had a cognitive intention or cognitive rule relating to their engagement in dietary restriction, resulting in similar high dietary restraint scores to those with BN. This does not imply that the eating behaviour itself was similar for the two groups but that the cognitive intention or rules relating to dietary intake may have been present within both groups.

This study also found that the dietary restraint of those with BED and OW differed, a finding that is not consistent with previous research which has generally indicated that both of these groups place relatively less importance on dietary restraint (Eldredge & Agras, 1996; Wilfey, Schwartz et al., 2000). This research suggests that those with BED and BN share similar eating disorder processes and that these processes are markedly different from those involved in individuals without eating disorders.

The presence of high dietary restraint in the BED group also has implications for the age of onset of binge eating in BN and BED, as it has been consistently reported that individuals with BN binge in response to a failure of restraint (Stice, Ozer, & Kees, 1997). The onset of binge eating in BED has been found to be more complicated, as other factors such as low self-esteem and negative affect are also suggested to influence binge eating (Castonguay et al., 1995). These findings, together with the findings from this study, suggest that in addition to the core features of eating disorders (such as dietary restraint), other factors may play a role in the maintenance of eating psychopathology. This provides some evidence for the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) as those with BED in this study were found to share a high level of dietary restraint to those with BN, while greater dietary restraint in BN would be expected by comparison to those with BED with greater sample numbers. This suggests that the transdiagnostic behavioural theory goes some way to explain eating disordered behaviour in both BN and BED, with regards to the presence of dietary restraint. The core psychopathology described by the transdiagnostic cognitive behavioural theory can be used to describe the behaviours evident and does not imply that the same intensity of experience would be evident across eating disorders. This means that the transdiagnostic cognitive behavioural theory does not suggest that all eating disorders share all of the features to exactly the same extent as described in the theory. Rather the transdiagnostic cognitive behavioural theory suggests that individuals with eating disorders share similar processes that can be described by one theory, and that each individual with an eating disorder may exhibit just the core

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features or may experience one or more of the additional maintaining mechanisms and that each person would experience these features to varying degrees.

6.4.2.2 Weight and Shape Concern in Bulimia Nervosa and Binge Eating Disorder

The similarly high levels of weight and shape concern found in individuals with BN and BED in this study are consistent with previous research (Striegel-Moore et al., 2001; Wilfey, Schwartz et al., 2000). This is an interesting finding as despite individuals with BED being significantly heavier (in terms of weight) than those with BN, the groups shared similar levels of weight and shape concern. This provides some evidence that those with BN and BED share similar types and levels of psychopathology and can be described and related to each other within one theory.

Another remarkable finding is that the OW group also demonstrated a concern for shape similar to both BN and BED and similar concerns for weight as those with BED. One possible explanation for this is that the OW group are demonstrating a possibly realistic focus on their shape and weight, while the BN group's higher level of weight and shape concern may be reflective of a more pathological concern, given that their BMI being is the normal range. The similar levels of weight and shape concern for individuals with BED and those that are OW suggest that these groups both share concerns about their shape and weight. It also suggests that the characteristics of those with BED places these individuals at higher risk. These findings are also suggestive of an eating disorder rather than an extreme form of dietary behaviour.

The NW and OW groups did not differ in terms of their dietary restraint or eating concern although there was a slight concern with shape and weight in these groups (but to a lesser extent than those with BN and BED). The lack of concern about eating, dietary restraint and relatively less weight and shape concern in these groups most likely reflects the absence of eating disturbance and a realistic acceptance of the shape and weight concern within the non-eating disorder groups.

6.4.2.3 Eating Disorder Symptomatology in Bulimia Nervosa and Binge Eating Disorder

In relation to eating disorder symptomatology, it was found that the BN and BED group shared similarly higher levels of drive for thinness, bulimia, ineffectiveness, interpersonal distrust, interoceptive awareness, maturity fears, asceticism and social insecurity than those who were OW or NW. One exception was for body dissatisfaction, of which the OW group was found to have similar high levels of body dissatisfaction to the BN and BED group. This is a common finding in the literature as body dissatisfaction has been found to be high in a variety of nonclinical samples (Garfinkel et al., 1992; Pietrowsky, Straub, & Hachl, 2003). Other exceptions were detected when analysis showed that larger sample sizes would have probably detected a difference between those with BN and BED for perfectionism (albeit both groups would have had a significantly higher score than those who were OW and NW).

The findings for the Drive for Thinness subscale indicated that both individuals with BN and BED experience a high degree of concern about being thin

and losing weight. This suggests that although individuals with BED tend to be overweight, they continue to experience a degree of concern that is distinct from individuals who are overweight and do not have an eating disorder. This finding contradicts the findings of some previous research, which has suggested that individuals with BED tend to experience less Drive for Thinness than those with BN (Raymond et al., 1995). Differences in the participant sample may be responsible for differences between the results of these studies, however the finding of high drive for thinness in BED by this study may support the notion of similar characteristics being evident across eating disorders, thereby providing support for the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003).

There were also no significant differences between individuals with BN and BED in relation to the subscale of Bulimia. This subscale includes a range of information relevant to binge eating and purging behaviour and has been reported to be able to discriminate well between individuals with BN and those with restrained eating (Wilson & Smith, 1989). These findings suggest that individuals with BED share similar levels of concern relating to binge eating to those with BN, however the results for purging are somewhat unclear as this subscale includes items relating to purging, which would suggest that those with BN would be expected to have higher scores. This finding could be clarified by future research, as no other studies appear to have specifically commented on the bulimia subscale of the EDI-II and its application to BED.

The results for the Ineffectiveness, Interpersonal Distrust and Interoceptive Awareness subscales indicated that individuals with BN and BED experienced

similar high levels on each of these scales. This also contradicts the results of some

previous research as individuals with BN have been found to indicate higher feelings

of ineffectiveness, interpersonal distrust and interoceptive awareness (Raymond et

al., 1995). Differences between the current study and previous findings may be

explained because of different participant samples. Again, these differences may

also reflect the fact that eating disorders share similar processes although they may

be evident to different extents within different individuals, consistent with the

transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al.,

2003).

The results of the Perfectionism scale indicated that although individuals

with BN and BED both experienced high levels of perfectionism, greater participant

numbers may have shown that those with BN experienced higher levels of

perfectionism than those with BED. Previous research does suggest that

perfectionism is a characteristic of both BN and BED (Pratt et al., 2001; Raymond et

al., 1995). It is worth noting that this difference would have only been detected with

a significantly larger sample size and it is unclear whether such a sample size would

result in clinically meaningful results. Nevertheless, the difference between the

levels of perfectionism in BN and BED generally requires further research and is

also commented on in section 6.4.3.1.

On the final subscales of the EDI-II, it was found that individuals with BN

and BED shared similar concerns with the Maturity Fears, Asceticism, Impulse

Regulation and Social Insecurity subscales. This suggests that those with BN and

BED do share similar features and provides some support for the transdiagnostic

cognitive behavioural theory of eating disorders (Fairburn et al., 2003).

The OW and NW groups shared similar nonclinical characteristics on all

scales, with the exception of Body Dissatisfaction where the OW participants

resembled those with BN and BED. This is a well recognised finding as body

dissatisfaction is a feature of non-clinical samples as well as clinical samples

(Pietrowsky et al., 2003; Ricciardelli & McCabe, 2000; Wardle, Waller, & Fox,

2002). Further, the similarity in body dissatisfaction of those who are OW to those

with eating disorders most probably reflects a realistic awareness of their higher

body weight relative to the NW group. The lack of any other difference between the

OW and NW groups supports the proposition that the OW and NW groups are at a

non-disturbed end of the eating continuum.

Overall, the results from the EDI-II indicate that individuals with BN and

BED shared similar high levels of eating disorder symptomatology while the NW

and OW control groups shared similar low levels of symptomatology. These results

suggest some support for transdiagnostic cognitive behavioural theory of eating

disorders (Fairburn et al., 2003). This implies that BN and BED may be related

conditions that can be described under one eating disorder theory and that the two

may not need to be separately classified. The results also suggest that BED is more

likely to be located at disordered end of the eating continuum, sharing characteristics

to those in BN than those of OW. The characteristics of those who are OW and NW

suggest that these individuals sit at the non-disturbed end of the eating continuum,

with the exception of high body dissatisfaction being evident in those who are OW. Again, these results provide support for an omnibus theory of eating disorders.

6.4.3 Additional Maintaining Mechanisms of Eating Disorders

6.4.3.1 Perfectionism in Bulimia Nervosa and Binge Eating Disorder

As there are no specific measurement tools developed to assess clinical perfectionism as it is described in the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), this study assessed perfectionism within BN and BED. This means that the results of this section do not necessarily extend to clinical perfectionism as it is defined and does not include the core feature of clinical perfectionism where the person continues to strive despite adverse consequences.

Perfectionism was found to be a key feature of both BN and BED, a finding that is consistent with previous research (de Zwaan et al., 1993; Fairburn et al., 2003; Franco-Paredes et al., 2005; Pratt et al., 2001; Raymond et al., 1995). Overall, the multidimensional measure of perfectionism indicated that individuals with BN and BED experience varying degrees of perfectionism depending on which dimension is being explored. In relation to self-oriented perfectionism, individuals with BN were found to have the highest level, followed by those with BED and those who were OW, then individuals who were NW. This indicates that individuals with BN may experience a greater tendency towards expecting themselves to achieve high standards, however those with BED and those who were OW were also found to have high self-oriented perfectionism. This possibly reflects that there are some concerns with achievement in individuals with BED and OW although they

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are not as significant as in BN. These findings are consistent with the findings of

previous research suggesting that self-oriented perfectionism is a common feature of

eating disorders (Ashby et al., 1998; Hewitt et al., 1995; Holston & Cashwell, 2000;

Stice, 2001; Vohs et al., 1999; Vohs et al., 2001).

In relation to other-oriented perfectionism, no group differences were found

between those with BN, BED and those who are OW or NW. This suggests that

these groups share similar levels of perfectionism where others are concerned. In

relation to other-oriented perfectionism, no group differences were found between

those with BN, BED and those who are OW or NW. This suggests that these groups

share similar levels of perfectionism where others are concerned. The results for

social-oriented perfectionism however, indicated that although individuals with BN

and BED share a high concern that others expecte them to be perfect larger groups

numbers may have detected differences between these groups; again suggesting that

those with BN may have greater concerns about this than those with BED. Both the

eating disordered groups however appear to have greater concerns than those who

were OW and NW, as these groups demonstrated scores in the normal range. These

findings are consistent with the findings of previous research, which suggests that

those with eating disorders are often concerned about the opinions of others (Hewitt

et al., 1995; Stice, 2001; Vohs et al., 1999; Vohs et al., 2001) and this result in

striving to change dietary behaviour or increasing concern with eating, shape and

weight however it is unclear whether overall those with BN have greater

perfectionistic concerns than those with BED.

As perfectionism can be defined both multidimensionally and unidimensionally, another measure of perfectionistic cognitions was included in the study as a way of demonstrating the cognitive style of individuals with BN and BED in relation to those who were OW or NW. This indicated that although those with eating disorders share high numbers of perfectionistic thoughts when compared to non-eating disordered individuals, those with BN could have had higher perfectionistic thoughts should greater sample sizes have been used. This suggests that perfectionistic thinking is a common feature of all eating disorders however BN and BED may be distinguished by the level of perfectionistic thoughts (which are likely to be higher in those with BN). Overall, this supports the notion that perfectionism is a key characteristic of eating disorders (including both BN and BED) and is consistent with previous research findings that those with BN and BED both experience high levels of perfectionism (de Zwaan et al., 1993; Pratt et al., 2001; Raymond et al., 1995). These findings suggest that BN and BED may be distinguished by levels of perfectionism, with higher perfectionism more common in BN than BED. These findings also suggest that the nature of clinical perfectionism warrants further investigation. It is possible that this features is also more common in those with binge-purge eating disorders than purely binge eating disorders. This means that purging may be linked with perfectionism (however this suggestion requires further investigation).

These findings support those of previous research linking perfectionism to specific eating disorders (Bulik et al., 2003; Fairburn, Cooper et al., 1999; Fairburn et al., 1998; Fairburn et al., 1997) as well as specific eating disorder

symptomatology (Ashby et al., 1998; Hewitt et al., 1995; Holston & Cashwell, 2000; Stice, 2001; Vohs et al., 1999; Vohs et al., 2001). This suggests that the nature of perfectionism in its extension by the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) to clinical perfectionism requires further examination. The specific and unique features of clinical perfectionism that may warrant assessment include the belief that nothing is good enough, the focus on always seeking to do it better, the nature of dysfunctional standards and the key feature that performance deteriorates as a result of the clinical perfectionism.

6.4.3.2 Low Self-Esteem in Bulimia Nervosa and Binge Eating Disorder

This study also explored low self-esteem, however did not specifically address the term "core low self-esteem" which is slightly different in nature and refers to lower than low self-esteem which has yet to be quantified. The study found that low self-esteem is a common feature of BN and BED and those with these eating disorders experience significantly lower self-esteem than those who are OW or NW. This finding is consistent with previous findings (Button et al., 1996; Fairburn et al., 2003; Fairburn, Shafran et al., 1999; Fairburn et al., 1997; Grilo et al., 2005; Gual et al., 2002; Mendelson et al., 2002; Ross & Wade, 2004; Sassaroli & Ruggiero, 2005; Silverstone, 1992; Vitousek & Hollon, 1990) and is important as it implies that low self-esteem may directly contribute to the maintenance of some of the psychopathology of eating disorders. It also provides some support for the notion of low self-esteem being considered within theories of all eating disorders. This notion has been suggested in previous cognitive behavioural theories of both BN

(Byrne & McLean, 2002) and BED (Castonguay et al., 1995) and extended by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003).

Previous research has supported the notion of low self-esteem contributing to the maintenance of eating disorders as low self-esteem has been linked to the overconcern with shape and weight evident in BN (Byrne & McLean, 2002) and to binge eating in BED (Grilo et al., 1994). Further, low self-esteem has been found to have a mediating role with perfectionism in BED (Dunkley et al., 2006). This study supports these findings suggesting that low self-esteem is a clear feature of both BN and BED. Further research is required to investigate the nature of core low self-esteem, as it is described in the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) once measurement tools are established. Examination of how core low self-esteem differs from low self-esteem may be worthwhile.

6.4.3.3 Mood Intolerance in Bulimia Nervosa and Binge Eating Disorder

This study also indicated that mood intolerance is a common feature in individuals who have BN and BED and that these groups share similar high levels of concern with tolerating mood states in comparison to those who are OW or NW. It is unclear whether greater participant numbers may have detected clinically meaningful differences between those with BN and BED, as very large sample sizes were required in order to detect significant differences. However, further research with larger sample sizes may show that those with BN, for the most part, to

experience greater problems with mood intolerance than those with BED. The results did indicate that those with both BN and BED were found to experience a higher level of difficulty with affect regulation and emotional control than those without eating disorders. This suggests that individuals with eating disorders are more susceptible to experiencing mood swings, problems in inhibiting or expressing anger and other strong emotions and a relative inability to move out of dysphoric states without demonstrating externalising or internalising behaviours such as vomiting, exercising or binge eating. These findings are consistent with research indicating that mood states have a significant role in eating disorders (Agras & Telch, 1998; Blackburn et al., 2006; Heatherton & Baumeister, 1991; Paxton & Diggens, 1997; Stice et al., 1998; Wilson, 1999a) and that intolerance to emotions has a specific effect on dietary restraint, binge eating and purging (Powell & Thelen, 1996). Further, the role of emotional states in eating disorders was highlighted by early cognitive behavioural models of BN (Wilson, 1999b) and BED (Castonguay et al., 1995). This suggests that the transdiagnostic cognitive behavioural model may extend and clarify the role of mood intolerance in eating disorders (Fairburn et al., 2003). The results also suggest that those with BN and BED may experience differences in their experience of emotional states, and that although explained by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), there may be differences in the level of mood intolerance experienced between different eating disorders (specifically those with binge-purge patterns are likely to experience higher problems with moods than those with just binge patterns).

The study also identified that individuals with eating disorders also experience a high degree of difficulty in focusing on their feelings, tolerating changes in their mood, tolerating strong emotions (positive or negative), expressing strong emotions, being too aware of their mood states, feeling like they cannot cope with their mood states and feeling that they must do something to change how they feel. This links to the findings of other studies that negative and positive emotions can trigger binge eating and compensatory purging (Abraham & Beumont, 1982; J. Cooper et al., 1988; Hsu, 1990; Johnson & Larson, 1982; Powell & Thelen, 1996).

Together, these results suggest that individuals with BN and BED both experience difficulties with mood intolerance and that certain features of eating disorders such as vomiting, exercising and binge eating may be employed to help regulate mood states. This provides support for mood intolerance as an additional maintaining mechanism for eating disordered psychopathology and indicates that it may be more difficult to treat these individuals due to the complex nature of their difficulties.

It is important to note that these results should be interpreted with caution, as similar to the limitation for the results of perfectionism there is no actual measure of mood intolerance as described by the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003). It is also acknowledged that the transdiagnostic cognitive behavioural theory describes many of the features evident in those with emotional dysregulation difficulties similar to that in borderline personality disorder. This study utilised subscales of a measure assessing affect regulation as part of an overall inventory of "self capacities", known as the Inventory of Altered Self-Capacities

(Briere, 2000), which is designed to assess how a person accomplishes a sense of personal identity and self awareness, control and tolerate strong (especially negative) affect and forms and maintains meaningful relationships. These characteristics are likely to be similar to those evident in individuals with eating disorders who exhibit "mood intolerance." It is also worth considering whether these individuals also require additional assessment domains given the nature of their difficulties.

Given the nature of mood intolerance as described by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), it is likely that further research is required to confirm its role in maintaining a proportion of individuals with eating disorders and whether certain features are more likely to be associated with its development. One area that may provide directions for research is that of dialectical behaviour therapy (Wiser & Telch, 1999), in which a specific focus is on affect regulation, described similarly to that of mood intolerance. A further understanding of mood intolerance as it applies to eating disorders is also likely to assist in enhancing development of the theory of the aetiology and maintenance of eating disorders as well as with treatment of these often treatment resistant individuals.

6.4.3.4 Interpersonal Difficulties in Bulimia Nervosa and Binge Eating Disorder

This study also explored how interpersonal difficulties can interact with eating disorders to obstruct change and found that significant features of interpersonal difficulty are evident in individuals with BN and BED in comparison to those who are OW or NW. More specifically, those with BN and BED were found

to have similarly high levels of difficulty in their relationships with others (including friendships, work or school related relationships) in the most part, although it is again unclear whether larger participant numbers would have resulted in clinically meaningful differences being found between those with BN and those with BED. The nature of difficulties in relationships can be clarified by the results of previous research suggesting that problems in family relationships are implicated in eating disorders, particularly for children and adolescents (Garfinkel et al., 1983; Minuchin et al., 1978; Pike & Rodin, 1991; Steiger et al., 1991). These findings were also replicated with the Inventory of Altered Self-Capacities (Briere, 2000), through part of the subscale that measures one's ability to maintain meaningful relationships, focusing on the extent to which an individual experiences problems in their relationships and/or may be involved in chaotic, emotionally upsetting and, at times, short-term relationships with others.

In addition, this study also found that individuals with BN and BED, as opposed to those who were OW or NW, had similarly high levels of concern with a range of interpersonal difficulties. These included: feeling that they did not have as much control over their interpersonal relationships; and feeling as though they had little support from other people in their life; and feeling as though they had missed out on some of the opportunities/challenges of growing up because of concern about their weight or shape (e.g. dating, finishing school, getting a job, or moving out of home). These particular features appear to have been relatively neglected by research to date and are possible areas for future research.

In addition, individuals with BN and BED were found to have similarly high concern with a range of additional interpersonal areas, and those who were OW to have higher concern than those who were NW. These included: feeling as though they had experienced trouble in their relationships with others for a long time (i.e. more than a few weeks/months); and feeling as though they were more likely to binge eat when they were having trouble in their relationships. Interpersonal conflict and adverse interpersonal events have been linked with binge eating by previous research (Arnow et al., 1992; Telch & Agras, 1994) and are likely to be a significant maintenance factor in eating disorders.

Had larger participant numbers been used, differences may have been detected between those with BN and BED on the interpersonal issues relating to: feeling as though they were more likely to focus on managing their weight and shape (e.g. by restricting their diet, binge eating, vomiting, using laxatives, diuretics or diet pills or exercising) when they were having trouble in their relationships; feeling as though they did not have as many close relationships with others; and feeling as though they were more likely to focus on their weight and shape when things go "wrong" between themselves and others. The results that would have been expected would have been that those with BN may have experienced higher concerns than those with BED. It is unclear whether these differences are clinically significantly, as there is no available measurement tool to measure the range of interpersonal difficulties in eating disorders as described in the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003), however further research may further clarify these possible differences.

Overall, these results suggest that individuals with BN and BED both experience problems in their interpersonal lives, which could be linked to their eating disorders. The transdiagnostic cognitive behavioural theory (Fairburn et al., 2003) suggests that problems in interpersonal life can have an impact on all areas of eating disorder, including dietary restraint and dietary restriction, low self-esteem, mood intolerance, binge eating and compensatory purging. In this sense, the influence of problems in interpersonal life can be difficult to establish and predict. It does appear that there are some key features of the interpersonal difficulties of eating disorders and this includes the influence of interpersonal conflict and role confusion.

The result for interpersonal difficulties should also be interpreted with caution as, similar to the limitation for the results of perfectionism and mood intolerance; there is no actual measure of interpersonal difficulty as described by the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003). The description of interpersonal difficulty as described by the transdiagnostic theory is also very broad and covers a variety of interpersonal domains. This may mean that while an individual experiences high concern in one area (e.g. interpersonal conflict) they may not experience interpersonal difficulties in another area (e.g. lack of meaningful relationships); however both domains individually would be likely to indicate high concern with interpersonal difficulties as an additional maintaining mechanism for the individual's eating disorder. This makes it difficult to measure interpersonal difficulties as an overall maintaining mechanism for eating disorders. However it enhances the importance of individualised formulations and treatment plans for

individuals with eating disorders, as not all maintaining mechanisms need to be present for an individual to experience greater difficulty obstructing change.

Given the broad nature of interpersonal difficulties as described by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), it is likely that further research is required to confirm their role in maintaining a proportion of individuals with eating disorders and whether certain features are more likely to be associated with its development. It is likely that one area of promise is research on interpersonal psychotherapy for eating disorders (Fairburn, 1997), as this therapy focuses exclusively on the interpersonal domain. Further understanding the nature of interpersonal difficulties in eating disorders will assist in enhancing developing the theory of the aetiology and maintenance of eating disorders as well as with the treatment of these often treatment resistant individuals.

6.5 SUMMARY STUDY 1

In summary, this study indicated that there are few distinct differences between individuals with BN and BED, and that these disorders share similar features, including high eating, shape and weight concern and high eating disorder symptomatology. The samples in this study shared similar demographic profiles as the age of participant groups was directly comparable. Those with BED had a higher BMI than those with BN (as would be expected in terms of their eating and weight management behaviour). On specific measures of perfectionism, mood intolerance, interpersonal difficulties and self-esteem, the BN and BED group shared a high levels of symptomatology in contrast to the NW and OW groups however some

differences may have been obtained should larger sample numbers have been used, with those with BN sometimes having greater difficulties than those with BED This suggests that the BN and BED group share a mostly similar level of eating disordered psychopathology, including with overconcern with eating, shape and weight. Individuals with BED were also found to show a level of psychopathology similar to other eating disorders, while those who were OW or obese were characterised by a lack of psychopathology. It also suggests that some features may further distinguish BN and BED but this can still be described by one theoretical model that includes a core set of features, that may (or may not be, as in the case of the additional maintaining mechanisms) be present to varying extents.

Overall, this study found support for the notion that BN and BED could be adequately described within one theory and that these conditions may represent varieties of the same eating disorder, with different behavioural features and similar psychopathological features. This has implications for the diagnostic process and subsequent treatment of these eating disorders as it suggests that all currently recognised eating disorders may be closely enough related, not to require an explanation as completely distinct phenomena, but be described within a common theory and potentially treated by a common treatment approach.

CHAPTER 7

STUDY 2

MEMORY BIAS IN DISTURBED EATING

7.1 INTRODUCTION STUDY 2

The role of memory bias towards eating, shape, weight and perfectionism related information in disturbed eating is explored in this chapter. Chapter 3 provides a review of the theories relating to disturbed eating, including dietary restraint and binge eating. Chapter 4 provides an overview of theories of eating disorder and a new conceptualisation of eating disorders, the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003). Chapter 6 provides an overall review of the literature regarding information processing biases within eating disturbance and eating disorders. The highlights of these chapters are presented by this introduction.

Examination of cognitive biases (in the form of memory bias) could assist in determining the similarities and differences between disturbed and disordered eating. This is important, as it has been recognised that disturbed eaters, like those with disordered eating, also have concerns about eating, shape and weight, a feature of the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). Investigating this process in disturbed eating is important as it may assist in understanding eating, shape and weight concerns in disordered eaters.

Theories relating to eating disturbance suggest that those high in dietary restraint are often preoccupied with their eating, shape and weight in a similar way to those with eating disorders, though to a lesser extent. This suggests that those with eating disturbance may demonstrate some of the same information processing characteristics for food and body related material as those with eating disorders. It may also mean that those with dietary restraint may demonstrate a similar bias in the

memory of information relating to eating, shape and weight and perfectionism to those with eating disorders.

Research investigating memory bias in people with disturbed eating has generally compared individuals high in dietary restraint with those suffering from eating disorders and has suggested that both of these groups show biases in memory towards food, weight and shape words (Hunt & Cooper, 2001; King et al., 1991; Sebastian et al., 1996). The recall of food related words is suggested to be a function of hunger in both restrained eaters and those with BN (Hunt & Cooper, 2001) while recall for body related words has been found to be similar for those with BN and those with high concerns about their bodies (Sebastian et al., 1996). This has been supported by research on participants without clinical eating disorders but high in body dysphoria (Watkins et al., 1995) and has not been found to increase with a negative mood induction (Baker et al., 1995). There is also some evidence that individuals high in body dysphoria have difficulty with the recall of thinness related words, which may suggest that these individuals experience an encoding error because they have difficulty imagining themselves as thin (Baker et al., 1995).

In addition to recall bias, it has also been found that those high in body shape concern experience recognition memory bias for words relating to body size and food (Fuller, Williamson, & Andersen, 1995). By contrast, those with eating disorders have been found to demonstrate no differences in the forgetting of words relating to food and body relative to controls (Woodard, 2005). This suggests that the nature of memory bias may differ between groups and certainly requires further investigation.

These findings also suggest some evidence for a memory bias in those with disturbed eating but research investigating this has used varying participant groups. This suggests that examination of the potential for a memory bias of food and body related information in those with disturbed eating but varying on weight and whether or not they are currently dieting is important, as it is likely to clarify features of memory bias in disturbed eaters. This may also lead to some support for the notion that eating, shape, weight and perfectionism based information is heightened in those with food, weight and shape concerns such as those in clinical eating disorders.

Examining the features of eating disturbance rather than the diagnostic category of eating disorders allows for detection of whether cognitive processes, such as memory bias, may contribute to clinical eating disorders. As features of eating disorders are less easily manipulated or investigated with a clinical group, this suggests a rationale for examining a non-clinical sample first.

Use of a non-clinical sample will add to research as it is possible to examine whether the processes in memory bias differ between restrained eaters and those who are dieting, something which has not been examined by previous studies. A difference between these participant groups may reveal why some studies detect memory biases and others do not given that previous research lacks a comprehensive examination of different kinds of disturbed eating.

Accordingly, the aim of this study was to test memory bias for food, shape and weight and perfectionism related information in individuals who are not eating disordered but who vary on weight, restraint and diet status. This study investigated

information processing biases in individuals with eating, shape and weight concerns so that attentional bias could be subsequently examined in those with clinical eating disorders in order to test the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). This study also aimed to investigate cognitive biases in a non clinical population using a distinct cognitive task.

In addition, this study investigated whether differences between dietary restraint (i.e. cognitions relating to rules about dietary habits) and dieting (i.e. behavioural changes as a result of ideas about dietary habits) could be identified, and whether these differences, if present, are reflected differently with relation to cognitive biases. It was hypothesised that:

1. Restrained eaters and those who are currently dieting would show similar memory bias with greater recall of food, shape, weight and perfectionism information while unrestrained eaters and those not dieting would show no memory bias.

2. Those who are NW and those who are OW would not demonstrate a memory bias towards food, shape, weight and perfectionism related information, as weight is not predicted to have a direct impact on cognitive bias.

3. Negatively valanced food, shape, weight and perfectionism related words would be recalled more than positively valanced words for all participants.

7.2 METHOD STUDY 2

7.2.1 Participants

Eighty females between the age of 18 and 30 participated in this investigation and were recruited from the University psychology undergraduate program. Participants were divided into eight groups ($n = 10$) on the basis of their weight status (i.e. whether they were NW or OW), restraint status (i.e. whether they were restrained in their eating or not) and diet status (i.e. whether they were currently dieting or not). Participants with a BMI between 18.5 and 24.9 were classified as NW, while participants with a BMI above 25.0 were classified as OW (Keys, Fidanza, Karvonen, Komura & Taylor, 1972). Restrained eaters were those who scored above 16 on the Revised Restraint Scale (Herman & Polivy, 1980), while non-restrained eaters were those who scored 16 or below. This criteria is consistent with that used in previous research (King et al., 1991). Diet status was classified by asking participants to identify whether they considered themselves to be currently and actively dieting to lose weight.

7.2.2 Materials

7.2.2.1 Revised Restraint Scale

The Revised Restraint Scale (Herman & Polivy, 1980) was described in the method section of Study 1 (see Section 6.2.2.1). In this study, additional questions were added to the Revised Restraint Scale to ascertain participants' self-reported height and weight. Questions also covered whether the participants were currently and actively dieting to lose weight as well as whether they had in the past or were

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currently experiencing an eating disorder (see Appendix J). The additional questions pertaining to active dieting were added to the end of the Revised Restraint Scale in order to capture those participants who had behaviourally adjusted their eating habits (as the Revised Restraint Scale only captures cognitions about eating habits).

7.2.2.2 Word Lists

Word lists were created and used across all experimental studies (i.e. Studies 2 and 3) for all participants (Appendix K). The lists included 20 each of food nouns, body nouns, body adjectives and perfectionism adjectives. These were matched to respective control words for word length, frequency of occurrence and part of speech (noun or adjective) using word lists (Kucera & Francis, 1967) and formed word category sets. Neutral control word lists also comprised of words belonging to the same semantic category for each list and included 20 each of furniture nouns, garden nouns, garden adjectives, and geographical adjectives respectively.

Within each word set, the 20 stimulus words for each category (except for control words) included two subcategories. For food nouns, 10 word pairs contained high calorie, high fat food nouns (e.g. cake, chips) and 10 word pairs contained low calorie, low fat food nouns (e.g. celery, lettuce) each matched with furniture nouns (e.g. desk, chair). For body nouns, 10 word pairs contained high fat body nouns (e.g. hips, stomach) and 10 word pairs contained low fat body nouns (e.g. finger, nose) each matched with garden nouns (e.g. flower, lawn). For body adjectives, 10 word pairs contained high fat body adjectives (e.g. fat, chubby) and 10 word pairs

contained low fat body adjectives (e.g. slim, thin) each matched with garden adjectives (e.g. grown, ripe). For perfectionism adjectives, 10 word pairs contained high perfectionism adjectives (e.g. perfect, competent) and 10 word pairs contained low perfectionism adjectives (e.g. mistaken, last), each matched with garden adjectives (e.g. scented, fertile). The word sets were presented in a block order, as recommended in previous research (Holle, Nelly, & Heimburg, 1977) and the presentation order of blocks was randomised across all experiments.

7.2.2.3 Experimental Equipment

The words within each block for the memory experiment were presented in a random order and played to participants on a cassette tape at the speed of one word every two seconds. The recording was made on high quality sound equipment and audible to all participants. Each word was played once and participants recalled the words in writing.

7.2.3 Procedure

The study received ethics approval from the Tasmanian Social Sciences Human Research Ethics Committee. Information sheets were provided to all participants, and written informed consent was obtained before participation in the study with the opportunity to ask questions. The information sheet and consent form are presented in Appendices G and H.

The Revised Restraint Scale and dietary behaviour questions were completed by participants prior to attending the University for the memory task. The memory

task was conducted in groups of up to 20 participants and the room was arranged for

privacy of responses and to minimise distraction from other participants. The

recorded word lists were presented and participants were instructed to recall, in any

order, as many of the words from the list as they could. Each word list was allocated

approximately four minutes for response times and instructions. In scoring

responses, no penalties were applied to repeats, inclusions, exclusions or

misspelling. This experimental session was approximately 30 minutes in duration,

and participants were debriefed at the conclusion of the session and invited to ask

questions.

7.2.4 Design and Data Analysis

The study utilised four separate 2 [Weight Status: normal weight,

overweight] × 2 [Restraint Status: not restrained, restrained] × 2 [Diet Status: not

dieting, dieting] × 3 (Word Type: target 1, target 2, neutral) mixed factorial designs.

Word type was a within subjects factor and comprised four word categories,

including the food nouns category (high fat high calorie food, low fat low calorie

food, furniture), body nouns category (high fat body parts, low fat body parts,

garden), body adjectives category (high fat, low fat, garden) and perfectionism

adjectives category (high perfectionism, low perfectionism, geography). Dependent

variables were the number of words correctly recalled for each word category.

Data from all measures was then analysed using a 2 [Weight Status: normal

weight, overweight] × 2 [Restraint Status: not restrained, restrained] × 2 [Diet

Status: not dieting, dieting] × 3 (Word Type: target 1, target 2, neutral) Mixed Factor

Analysis of Variance (ANOVA) using SPSS. Profile analysis was reported for the within subjects factors in order to avoid the problem of sphericity. The .05 level of significance was used to examine the between group differences where ANOVA produced a significant F value. Separate Univariate ANOVA and REGWQ post hoc tests and T-tests with Bonferroni adjustments were conducted to follow-up significant effects.

7.3 RESULTS STUDY 2

The complete statistical outputs for all analyses are presented in Appendix L (on the attached CD).

7.3.1 Participant Characteristics

The means and standard deviations for age and BMI of the eight groups are presented in Tables 18 and 19. These tables indicate that the groups shared similar ages, with the main difference being for BMI, as would be expected, for the OW and NW groups.

Table 18

Means and standard deviations for age of the groups varying on weight status, restraint status and diet status

Weight Status	Restraint Status	Diet Status	Mean Age	Standard Deviation
Normal Weight	Not Restrained	Not Dieting	18.70	0.82
		Dieting	18.20	2.30
	Restrained	Not Dieting	19.00	0.94
		Dieting	19.80	2.20
Overweight	Not Restrained	Not Dieting	18.90	0.99
		Dieting	19.20	1.23
	Restrained	Not Dieting	18.70	1.06
		Dieting	18.80	1.03

Table 19

Means and standard deviations for BMI of the groups varying on weight status,

restraint status and diet status

Weight Status	Restraint Status	Diet Status	Mean BMI	Standard Deviation
Normal Weight	Not Restrained	Not Dieting	20.96	1.82
		Dieting	20.94	1.64
	Restrained	Not Dieting	21.22	1.74
		Dieting	20.88	1.22
Overweight	Not Restrained	Not Dieting	28.54	2.58
		Dieting	28.35	1.26
	Restrained	Not Dieting	26.96	1.09
		Dieting	29.48	3.90

This data was analysed using a 2 [Weight Status: normal weight, overweight]

× 2 [Restraint Status: not restrained, restrained] × 2 [Diet Status: not dieting, dieting]

between subjects ANOVA for age and BMI.

7.3.1.1 Age

There was no significant effect in age for weight status, $F(1, 72) = 0.01$, $p = .94$; restraint status, $F(1, 72) = 1.03$, $p = .31$; or diet status, $F(1, 72) = 0.30$, $p = .94$; indicating that the groups are comparable (for means and standard deviations refer to Table 18). Similarly, there were no significant interactions between these variables.

7.3.1.2 BMI

There were no significant differences in BMI with restraint status, $F(1, 72) = .02$, $p = .89$; or diet status, $F(1, 72) = 1.09$, $p = .30$; however, as would be expected, the overweight group was found to have a significantly higher BMI than the normal weight group, $F(1, 72) = 244.93$, $p < .001$ (for means and standard deviations refer to Table 19). There were also no significant interactions between these variables.

7.3.2 Dietary Restraint

7.3.2.1 Revised Restraint Scale

The mean and standard deviation for each group on the total restraint score are presented in Table 20. Means and standard deviations for the concern for dieting and weight fluctuations subscales of the Revised Restraint Scale are presented in Tables 21 and 22 respectively. Overall, these means confirm that those categorised as restrained eaters had higher restraint scores than the other groups.

Table 20

Means and standard deviations for the total restraint score (RS) of the groups

varying on weight status, restraint status and diet status

Weight Status	Restraint Status	Diet Status	Mean Total RS	Standard Deviation
Normal Weight	Not Restrained	Not Dieting	11.40	3.81
		Dieting	11.20	3.12
	Restrained	Not Dieting	23.40	3.24
		Dieting	22.40	3.27
Overweight	Not Restrained	Not Dieting	11.60	2.37
		Dieting	11.90	2.58
	Restrained	Not Dieting	21.70	2.63
		Dieting	23.10	3.11

From Table 20, the scores suggest that dietary restrained participants had significantly higher overall restraint scores than non-restrained participants, $F(1, 72) = 267.16$, $p < .001$. There were no significant differences in the total restraint score for diet status, $F(1, 72) = .03$, $p = .86$; or weight status, $F(1, 72) = .001$, $p = .97$. There were no significant interactions between these variables. This indicates that restraint scores were determined primarily by restraint status rather than diet or weight status and provides support for the notion that dietary restraint and dieting are separate constructs.

Table 21

Means and standard deviations for the concern for dieting (CD) subscale for the

groups varying on weight status, restraint status and diet status

Weight Status	Restraint Status	Diet Status	Mean CD	Standard Deviation
Normal Weight	Not Restrained	Not Dieting	7.20	3.12
		Dieting	6.80	1.62
	Restrained	Not Dieting	14.10	2.33
		Dieting	12.30	1.77
Overweight	Not Restrained	Not Dieting	6.60	1.90
		Dieting	7.50	2.12
	Restrained	Not Dieting	12.70	2.16
		Dieting	12.10	2.73

From Table 21, the means suggest that dietary restrained participants had significantly higher concern for dieting scores than non-restrained participants, $F(1, 72) = 129.76$, $p < .001$. There were no significant differences in the concern for dieting score for diet status, $F(1, 72) = .88$, $p = .35$; or weight status, $F(1, 72) = .55$, $p = .46$, indicating that concern for dieting was affected by restraint status and not the participants' diet or weight status.

Table 22

Means and standard deviations for the weight fluctuation (WF) subscale for the

groups varying on weight status, restraint status and diet status

Weight Status	Restraint Status	Diet Status	Mean WF	Standard Deviation
Normal Weight	Not Restrained	Not Dieting	4.20	1.48
		Dieting	4.40	1.96
	Restrained	Not Dieting	8.20	2.66
		Dieting	10.10	2.13
Overweight	Not Restrained	Not Dieting	5.00	2.00
		Dieting	4.40	1.71
	Restrained	Not Dieting	8.80	2.04
		Dieting	10.40	2.07

From Table 22, the means suggest that dietary restrained participants had significantly higher weight fluctuation scores than non-restrained participants, $F(1, 72) = 115.27$, $p < .001$. There were no significant differences in the concern for dieting score for diet status, $F(1, 72) = 2.91$, $p = .09$; or weight status, $F(1, 72) = .88$, $p = .35$. There were no significant interactions between these variables. This indicates that weight fluctuation was affected by restraint status and not the participants' weight or diet status.

7.3.3 Memory Bias for Food Nouns

The memory bias data for the food nouns was analysed using a 2 [Weight

Status: normal weight, overweight] × 2 [Restraint Status: not restrained, restrained]

× 2 [Diet Status: not dieting, dieting] × 3 (Food Noun Type: high fat/calorie, low

fat/calorie, furniture nouns) mixed factor ANOVA.

There was a significant main effect for the overall memory recall of food

nouns type, Wilks' Lambda = .45, $F(2, 71) = 42.89$, $p < .001$, indicating greater

recall for high fat/calorie words ($M = 7.03$, $SE = 0.52$), than low fat/calorie words

($M = 6.24$, $SE = 0.14$) with less recall of furniture words ($M = 4.71$, $SE = 0.19$).

There was a significant main effect for restraint status, $F(1, 71) = 4.15$, $p = .045$,

indicating that restrained eaters ($M = 6.18$, $SE = 1.30$) recalled more food nouns than

non-restrained eaters ($M = 5.80$, $SE = 1.30$). No other main effects were significant.

A significant interaction between the overall recall of food noun type and restraint

status was also found, Wilks' Lambda = .72, $F(2, 71) = 13.99$, $p < .001$ and is

presented in Figure 5.
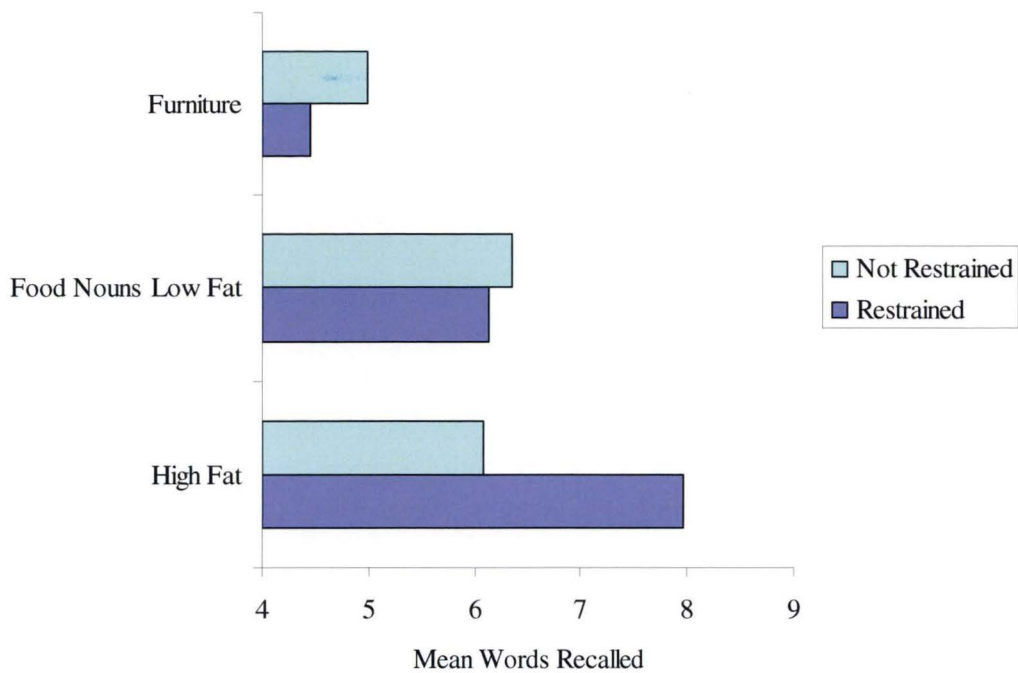
Figure 5. Mean number of food nouns of different types recalled for individuals with high and low dietary restraint.

This interaction was followed up with separate one-way ANOVAs for restrained and non-restrained groups. Restrained eaters demonstrated a significant effect in mean recall of food nouns of different types, $F(2, 78) = 8.22, p = .001$. Paired samples t-tests indicated that restrained eaters recalled more food words than furniture words, with greatest recall of high fat and high calorie food words and the least recall of furniture words. These results can be seen in Table 23.

Table 23

Paired samples t-tests for memory bias of food words of different types for

restrained eaters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance P
High fat –	7.98	0.22	5.59 (39)	<.001
Low Fat	6.13	0.22		
High Fat –	7.98	0.22	9.52 (39)	<.001
Furniture	4.45	0.26		
Low Fat –	6.13	0.22	5.54 (39)	<.001
Furniture	4.45	0.26		

A significant effect across the mean number of food nouns recalled was also found for non-restrained eaters, $F(2, 78) = 55.13$, $p < .001$. Paired samples t-tests indicated that unrestrained eaters recalled more food words than furniture words, with greatest recall of high fat and high calorie food words and the lowest recall of words. These results can be seen in Table 24.

Table 24

Paired samples t-tests for memory bias of food words of different types for

unrestrained eaters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance P
High fat –	6.08	0.23	-0.76 (39)	.045
Low Fat	6.35	0.23		
High Fat –	7.08	0.23	3.11 (39)	.004
Furniture	4.98	0.28		
Low Fat –	6.35	0.23	3.83 (39)	<.001
Furniture	4.98	0.28		

Further, independent samples t-tests with a Bonferroni adjustment indicated

that the restrained eaters (M = 7.98, SE = 0.22) recalled significantly more high

fat/calorie food nouns than non-restrained eaters (M = 6.08, SE = 0.23), t(78) = -

5.98, p <.001. There were no significant differences between restrained (M = 6.13,

SE = 0.22) and non-restrained (M = 6.35, SE = 0.23) eaters in recall of low fat

/calorie food nouns, t(78) = 0.70, p = .49; or for furniture nouns (restrained, M =

4.45, SE = 0.26; not restrained, M = 4.97, SE = 0.28), t(78) = 1.38, p = .17. This

indicates that restrained eaters have a greater tendency towards memory bias then

unrestrained eaters, in favour of high fat/calorie food nouns.

A significant interaction between the overall recall of food nouns and diet status was also found, Wilks' Lambda = .70, $F(2, 71) = 15.58$, $p < .001$, and is presented in Figure 6.
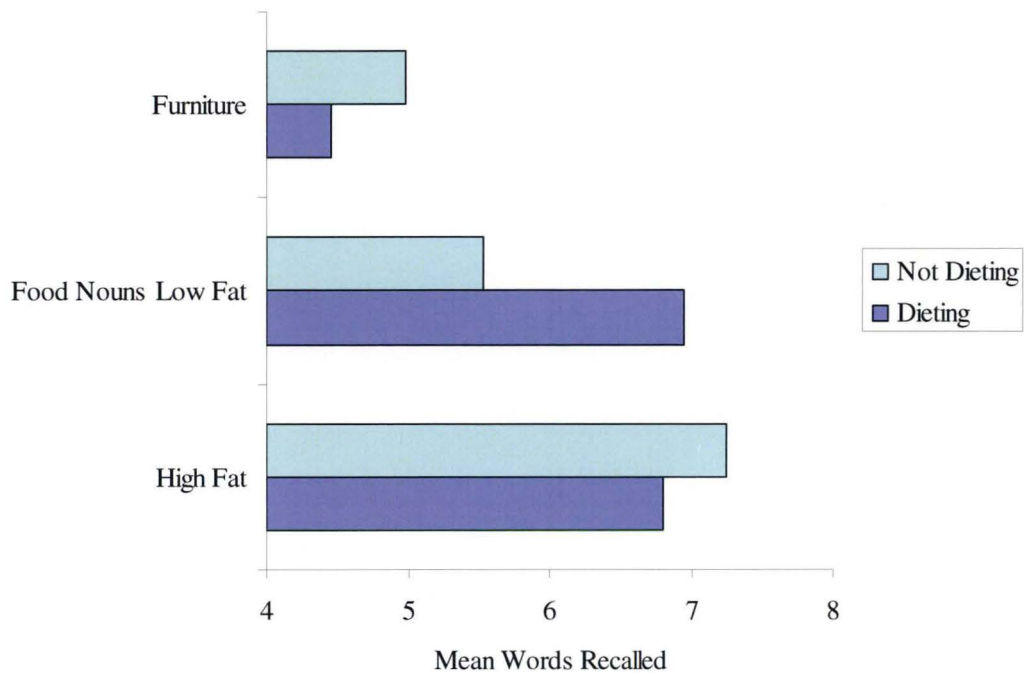
Figure 6. Mean number of food nouns of different types recalled for individuals who are and are not dieting.

This interaction was followed up with one-way ANOVAs separately for dieting and not dieting groups. A significant effect was found for those who were dieters, $F(2, 78) = 30.66$, $p < .001$. Paired samples t-tests indicated that there was no significant difference in recall of high versus low fat and calorie food words across dieters, although both types of food words were recalled better than furniture words. These results can be seen in Table 25.

Table 25

Paired samples t-tests for memory bias of food words of different types for dieters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance P
High fat –	6.80	0.30	-0.37 (39)	.711
Low Fat	6.95	0.20		
High Fat –	6.80	0.30	5.91 (39)	<.001
Furniture	4.45	0.24		
Low Fat –	6.95	0.20	9.78 (39)	<.001
Furniture	4.45	0.24		

A significant effect across the mean number of food nouns recalled was also found for non-dieters, $F(2, 78) = 22.21$, $p < .001$. Paired samples t-tests revealed that non-dieters had greatest recall for high fat and high calorie foods, followed by low fat and low calorie foods, with no significant difference in recall of low fat and low calorie food and furniture words. These results can be seen in Table 26.

Table 26

Paired samples t-tests for memory bias of food words of different types for non-dieters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance P
High fat –	7.25	0.23	5.64 (39)	<.001
Low Fat	5.53	0.20		
High Fat –	7.25	0.23	5.37 (39)	<.001
Furniture	4.98	0.30		
Low Fat –	5.53	0.20	1.68 (39)	.102
Furniture	4.98	0.30		

Further, independent samples t-tests with a Bonferroni adjustment indicated that the dieters ($M = 6.95$, $SE = 0.20$) recalled significantly more low fat/calorie food nouns than the non-dieters ($M = 5.53$, $SE = 0.20$), $t(78) = -5.06$, $p < .001$. There were no significant differences between dieters ($M = 6.80$, $SE = 0.30$) and non-dieters ($M = 7.25$, $SE = 0.23$) found for recall of high fat/calorie food nouns, $t(78) = 1.18$, $p = .24$; or for furniture words (dieters, $M = 4.45$, $SE = 0.24$; not dieters, $M = 4.97$, $SE = 0.30$), $t(78) = 1.38$, $p = .17$. This indicates that dieters show a favour of both types of food words (in comparison to the memory bias for high fat/calorie food nouns in restrained eaters).

No significant interactions were found between food recall and weight status, nor where there any higher order interactions. Overall, these results suggest that food noun recall is differentially affected by restraint status and diet status, with restrained eaters recalling higher fat and calorie food words most and furniture words least, while dieters recall both higher and lower fat and calorie food words more than furniture words. This distinction is possibly influenced by the behavioural aspect of dietary restraint versus dieting, as individuals high in dietary restraint may not be actually dieting (as demonstrated by their behaviour). Once dieting, an individual may specifically focus on information relevant to their behaviour; which in the case of dieters would include information consistent with low fat and calorie foods. Similarly for those high in dietary restraint, concern for high fat and calorie food related information is congruent with their concerns.

7.3.4 Memory Bias for Body Nouns

The memory bias data for the body nouns was analysed using a 2 [Weight Status: normal weight, overweight] × 2 [Restraint Status: not restrained, restrained] × 2 [Diet Status: not dieting, dieting] × 3 (Body Nouns: high fat body parts, low fat body parts, garden nouns) mixed factor ANOVA.

There was a significant main effect for the body nouns factor, Wilks' Lambda = .31, $F(2, 71) = 80.03$, $p < .001$. This was followed up with paired samples t-tests with a Bonferroni adjustment, which indicated that high fat body nouns ($M = 7.39$, $SE = 0.15$) were recalled significantly more than low fat body nouns ($M = 5.13$, $SE = 0.17$), $t(79) = 9.26$, $p < .001$, which in turn were recalled significantly

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more than garden nouns ($M = 4.40$. $SE = 0.17$), $t(79) = 3.47$, $p = .001$. High fat body nouns were also recalled significantly more than garden nouns, $t(79) = 12.07$, $p < .001$. These differences are presented in Figure 7.
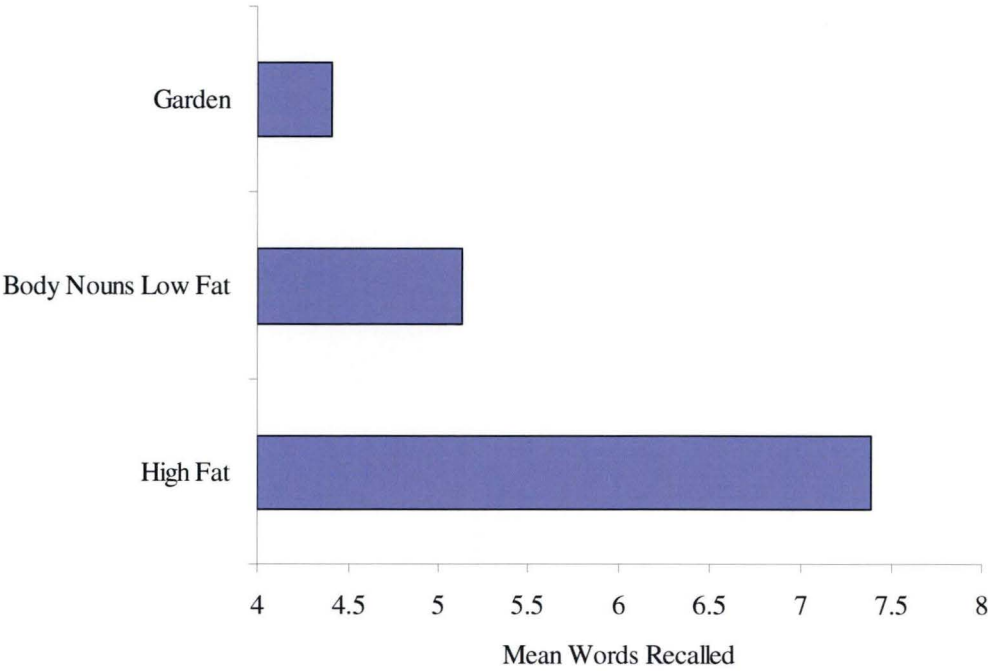
Figure 7. The mean number of body nouns of different types recalled.

No other significant main effects or interactions were found. This indicates that although there is an overall tendency for high fat body nouns to be recalled more than low fat body nouns and garden nouns, this effect is not mediated by group membership (i.e. weight status, restraint status, or diet status).

7.3.5 Memory Bias for Body Adjectives

The memory bias data for the body adjectives was analysed using a 2 [Weight Status: normal weight, overweight] × 2 [Restraint Status: not restrained, restrained] × 2 [Diet Status: not dieting, dieting] × 3 (Body Adjectives: high fat body words, low fat body words, garden adjectives) mixed factor ANOVA.

There was a significant main effect of the overall memory recall of body adjectives, Wilks' Lambda = .25, $F(2, 71) = 104.64$, $p < .001$, indicating that the number of adjectives recalled significantly decreased from high fat ($M = 7.51$, $SE = 0.18$), to low fat body adjectives ($M = 6.58$, $SE = 0.15$) and then to garden adjectives ($M = 3.75$, $SE = 0.21$). There was also a significant main effect for restraint status, $F(1, 72) = 23.49$, $p = < .001$, indicating that restrained eaters ($M = 6.43$, $SE = 0.11$) recalled significantly more body adjectives than non-restrained eaters ($M = 5.68$, $SE = 0.11$). No other main effects were significant.

A significant interaction between body adjectives type and restraint status was also found, Wilks' Lambda = .68, $F(2, 71) = 16.83$, $p < .001$ and is presented in Figure 8.
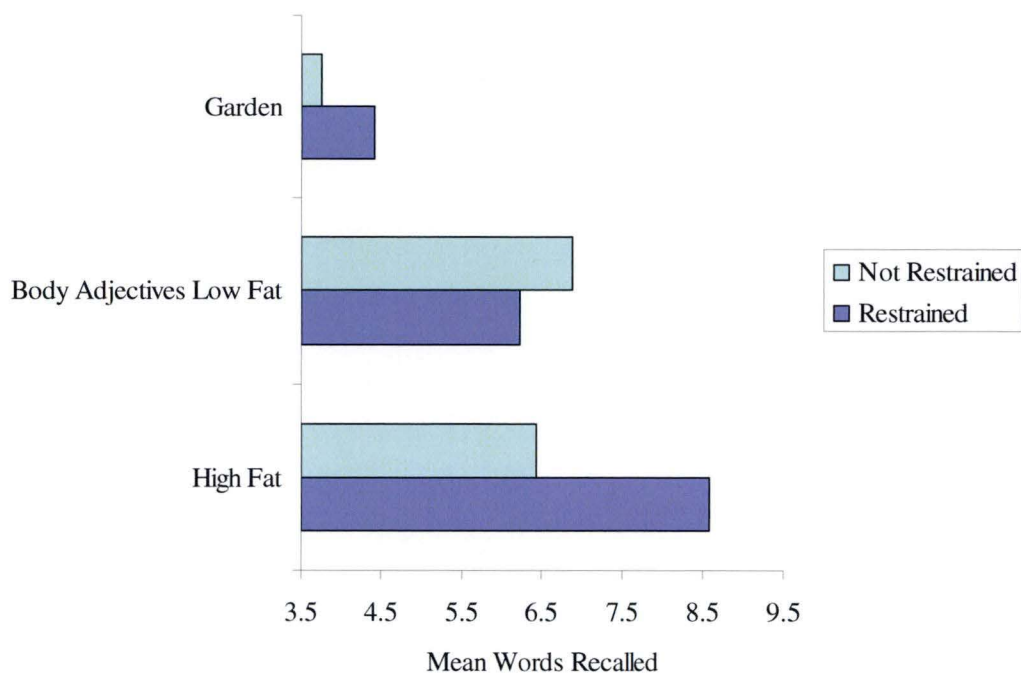
Figure 8. Mean number of body adjectives of different types recalled for individuals with high and low dietary restraint.

This interaction was followed up with separate one-way ANOVAs for the restrained and non-restrained groups. A significant effect was found for the restrained eaters, $F(2, 78) = 75.13, p < .001$. Paired samples t-tests revealed that restrained eaters recalled high fat body adjectives the most and garden adjectives the least. These results can be seen in Table 27.

Table 27

Paired samples t-tests for memory bias of body adjectives of different types for

restrained eaters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance P
High fat –	8.60	0.22	6.95 (39)	<.001
Low Fat	6.28	0.21		
High Fat –	8.60	0.22	10.84 (39)	<.001
Garden	4.40	0.24		
Low Fat –	6.28	0.21	6.21 (39)	<.001
Garden	4.40	0.24		

A significant effect was also found for non-restrained eaters, $F(2, 78) =$ 39.11, $p < .001$. Paired samples t-tests indicated no significant differences in recall of high versus low fat body adjectives, although body adjectives of both types were recalled significantly more than garden adjectives by unrestrained eaters. These results can be seen in Table 28.

Table 28

Paired samples t-tests for memory bias of body adjectives of different types for

unrestrained eaters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance P
High fat –	6.43	0.30	-0.76 (39)	.291
Low Fat	6.88	0.24		
High Fat –	6.43	0.30	3.11 (39)	<.001
Garden	3.75	0.20		
Low Fat –	6.88	0.24	3.83 (39)	<.001
Garden	3.75	0.20		

Further independent samples t-tests with a Bonferroni adjustment indicated that the restrained eaters (M = 8.60, SE = 0.22), recalled significantly more high fat body adjectives than non-restrained eaters (M = 6.43, SE = 0.30), t(78) = -5.88, p <.001. There were no significant differences between restrained (M = 6.28, SE = 0.21), and non-restrained (M = 6.88, SE = 0.24), eaters in recall of low fat body adjectives, t(78) = 1.88, p = .06; or for garden adjectives (restrained, M = 4.40, SE = 0.24; not restrained, M = 3.75, SE = 0.19), t(78) = -2.15, p = .04. Thus restrained eaters but not unrestrained eaters have selective recall of body adjectives highly associated with fat.

A significant interaction between body adjectives type and diet status was also found, Wilks' Lambda = .81, $F(2, 71) = 8.33$, $p = .001$, and is presented in Figure 9.

Figure 9. Mean number of body adjectives of different types recalled for individuals who are and are not dieting.

This interaction was followed up with separate one-way ANOVAs for dieting and non-dieting participants. A significant main effect was found for the dieters, $F(2, 78) = 39.11$, $p < .001$. Paired samples t-tests indicated no significant differences in recall between high and low fat body adjectives across dieters, although body adjectives of both types were recalled significantly better than garden adjectives. These results can be seen in Table 29.

Table 29

Paired samples t-tests for memory bias of body adjectives of different types for

dieters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance P
High fat –	7.20	0.34	0.15 (39)	.878
Low Fat	7.13	0.22		
High Fat –	7.20	0.34	7.55 (39)	<.001
Garden	3.98	0.26		
Low Fat –	7.13	0.22	9.93 (39)	<.001
Garden	3.98	0.26		

A significant effect was also found for non-dieters, $F(2, 78) = 55.81, p <$

.001. Paired samples t-tests indicated significant differences in recall of the different

types of body adjectives, with the greatest recall for high fat adjectives, and the least

recall for garden adjectives. These results can be seen in Table 30.

Table 30

Paired samples t-tests for memory bias of body adjectives of different types for non-

dieters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance P
High fat –	7.83	0.28	5.64 (39)	<.001
Low Fat	6.03	0.20		
High Fat –	7.83	0.28	5.37 (39)	<.001
Garden	4.18	0.21		
Low Fat –	6.03	0.20	1.68 (39)	<.001
Garden	4.18	0.21		

Further, independent samples t-tests with a Bonferroni adjustment indicated that dieters ($M = 7.13$, $SE = 0.22$) recalled significantly more low fat body adjectives than the non-dieters ($M = 6.03$, $SE = 0.20$), $t(78) = -3.65$, $p <.001$. There were no significant differences between dieters ($M = 7.20$, $SE = 0.34$) and non-dieters ($M = 7.83$, $SE = 0.28$) in recall of high fat body adjectives, $t(78) = 1.43$, $p = .16$; or garden adjectives (dieters, $M = 3.98$, $SE = 0.23$; non-dieters, $M = 4.18$, $SE = 0.21$), $t(78) = 0.64$, $p = .52$. Thus dieters had a memory bias favouring low fat body adjectives (in contrast to those high in dietary restraint, whose memory bias favoured high fat body adjectives).

No significant interaction was found between body adjective type and weight status, nor were any higher order interactions significant. Overall, these results suggest that body adjective recall is differentially affected by restraint status and diet status, with restrained eaters recalling more high fat body adjectives, while dieters recall more low fat body adjectives. These results are consistent with those from the food nouns, suggesting a possible impact of actual behaviour on memory bias for food nouns and body adjectives. The results of this study also suggest that the use of body adjectives as opposed to body nouns may be responsible for the memory bias effect in previous research, and that the noun-adjective distinction may be important.

7.3.6 Memory Bias for Perfectionism Adjectives

The memory data for the perfectionism adjectives was analysed using a 2 [Weight Status: normal weight, overweight] × 2 [Restraint Status: not restrained, restrained] × 2 [Diet Status: not dieting, dieting] × 3 (Perfectionism Adjectives: high perfectionism words, low perfectionism words, geography adjectives) mixed factor ANOVA.

There was a significant main effect for perfectionism adjectives type, Wilks' Lambda = .83, $F(2, 71) = 7.35$, $p = .001$. The number of adjectives recalled decreased from low perfectionism ($M = 4.81$, $SE = 0.17$), to high perfectionism ($M = 4.50$, $SE = 0.13$) to the geography words ($M = 3.84$, $SE = 0.16$). No other main effects were significant.

A significant interaction between perfectionism adjectives type and restraint status was also found, Wilks' Lambda = .85, $F(2, 71) = 6.20$, $p = .003$, and is presented in Figure 10.
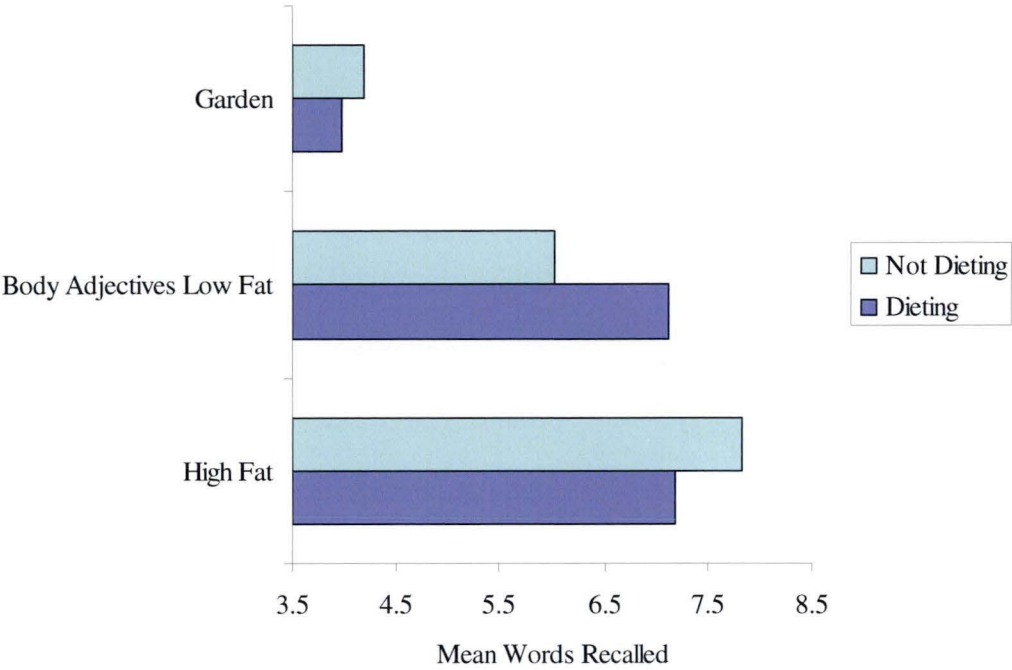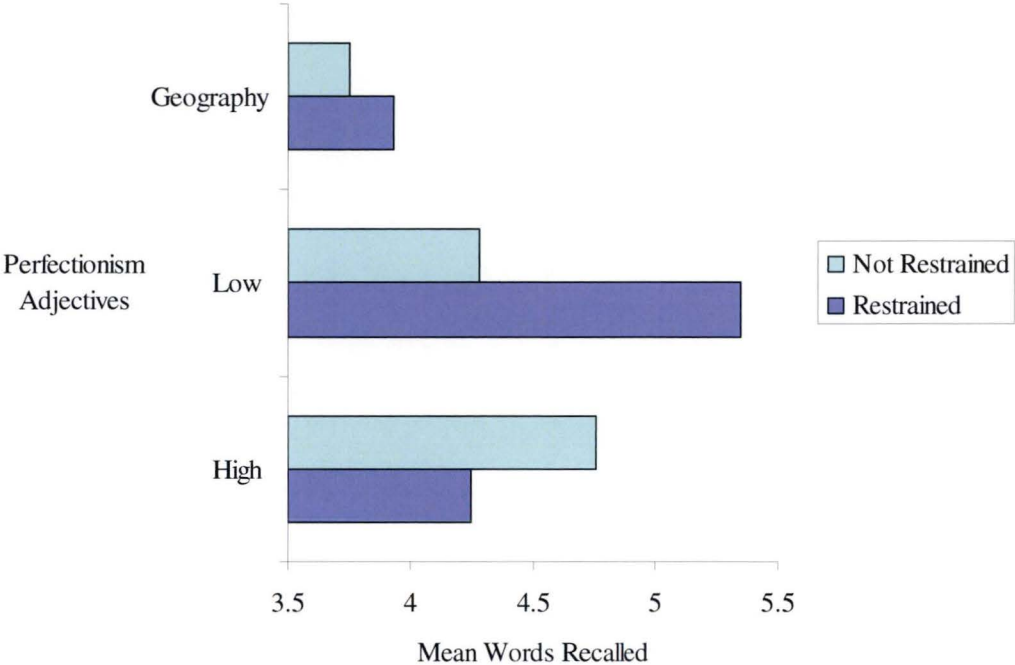

Figure 10. Mean number of perfectionism adjectives of different types recalled for individuals high and low in dietary restraint.

This interaction was followed up with separate one-way ANOVAs for restrained and non-restrained groups. A significant effect was found for restrained eaters, $F(2, 78) = 12.08$, $p < .001$. Paired samples t-tests revealed the recall of perfectionism words for restrained eaters found there were significant differences in recall of high versus low perfectionism adjectives, as well as between low perfectionism adjectives and geography adjectives. There were no differences

between high perfectionism adjectives and geography adjectives. These results can

be seen in Table 31.

Table 31

Paired samples t-tests for memory bias of perfectionism adjectives of different types

for restrained eaters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance P
High –	4.25	0.17	-3.53 (39)	.001
Low	5.35	0.23		
High –	4.25	0.17	1.33 (39)	.190
Geography	3.93	0.19		
Low –	4.25	0.24	4.11 (39)	<.001
Geography	3.93	0.19		

No significant differences in the mean number of perfectionism adjectives

recalled were found for non-restrained eaters, $F(2, 78) = 3.52$, $p = .037$. Paired

samples t-tests indicated no significant differences in recall of high versus low

perfectionism adjectives but a significant difference was found between high

perfectionism adjectives and geography adjectives. These results can be seen in

Table 32.

Table 32

Paired samples t-tests for memory bias of perfectionism adjectives of different types

for unrestrained eaters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance P
High –	4.75	0.23	1.40 (39)	.170
Low	4.28	0.24		
High –	4.75	0.23	2.63 (39)	.012
Geography	3.75	0.25		
Low –	4.28	0.24	1.29 (39)	.206
Geography	3.75	0.25		

Further, independent samples t-tests with a Bonferroni adjustment indicated that the restrained eaters (M = 5.35, SE = 0.23), recalled significantly more low perfectionism adjectives than non-restrained eaters (M = 4.28, SE = 0.24), t(78) = -3.25, p = .002. There was no significant difference between restrained (M = 4.25, SE = 0.17), and non-restrained (M = 4.75, SE = 0.23), eaters in recall of high perfectionism adjectives, t(78) = 1.74, p = .09; or for geography adjectives (restrained, M = 3.93, SE = 0.19; not restrained, M = 3.75, SE = 0.25), t(78) = -0.56, p = .57. Thus restrained eaters have a bias for recalling low perfectionism words compared with non-restrained eaters.

A significant interaction between overall recall of perfectionism adjectives and diet status was also found, Wilks' Lambda = .92, $F(2, 71) = 3.14$, $p = .049$, and is presented in Figure 11.
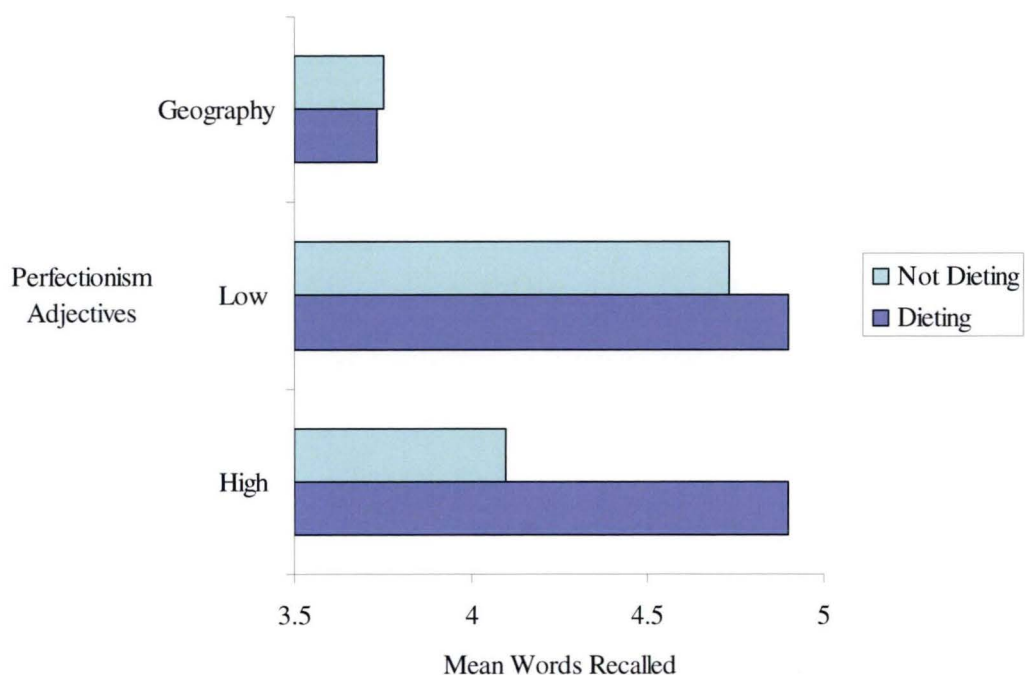
Figure 11. Mean number of perfectionism adjectives of different types recalled for individuals who are and are not dieting.

This interaction was followed up with separate one-way ANOVAs for dieting and non-dieting groups. A significant effect was found across the mean number of perfectionism adjectives recalled for those who were dieting, $F(2, 78) = 9.85$, $p < .001$. Paired samples t-tests comparing the recall of perfectionism words for dieters yielder no significant difference in recall of high versus low perfectionism adjectives, although they had significantly better recall of both high

and low perfectionism adjectives than of geography adjectives. These results can be seen in Table 33.

Table 33

Paired samples t-tests for memory bias of perfectionism adjectives of different types for dieters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance *P*
High –	4.90	0.18	0.00 (39)	1.000
Low	4.90	0.21		
High –	4.90	0.18	4.47 (39)	<.001
Geography	3.73	0.20		
Low –	4.90	0.21	3.67 (39)	.001
Geography	3.73	0.20		

No significant effect was found for non-dieters, $F(2, 78) = 2.25, p = .117$. Paired samples t-tests comparing the recall of perfectionism words for non-dieters confirmed the lack of findings. These results can be seen in Table 34.

Table 34

Paired samples t-tests for memory bias of perfectionism adjectives of different types for non-dieters

Recall of Word Pair	Mean	Standard Error	T value (df)	Significance *P*
High –	4.10	0.21	-1.73 (39)	.091
Low	4.73	0.28		
High –	4.10	0.21	0.42 (39)	.677
Geography	3.95	0.24		
Low –	4.73	0.28	1.76 (39)	.085
Geography	3.95	0.24		

Further, independent samples t-tests with a Bonferroni adjustment indicated that the dieters (M = 4.90, SE = 0.18) recalled significantly more high perfectionism adjectives than the non-dieters (M = 4.10, SE = 0.21), $t(78)$ = -2.87, p = .005. There were no significant differences between dieters (M = 4.90, SE = 0.21) and non-dieters (M = 4.72, SE = 0.28) for recall of low fat perfectionism adjectives, $t(78)$ = -0.50, p = .62; or for geography adjectives (dieters, M = 3.73, SE = 0.20; non-dieters, M = 3.95, SE = 0.24), $t(78)$ = 0.73, p = .47. Thus dieters had a greater tendency than no-dieters to recall high perfectionism adjectives (as opposed to those high in dietary restraint who had a tendency to recall low perfectionism adjectives).

No significant interactions were found between weight status and either the dieting or the adjective type factor, now where there any significant higher order interactions.

Overall, these results suggest that perfectionism adjective recall is differentially affected by restraint status and diet status, with restrained eaters recalling more low perfectionism adjectives (e.g. "mistake") overall, while dieters recall more high perfectionism adjectives (e.g. "perfect") overall. These results are consistent with those found from the food nouns and body adjectives suggesting possible congruence with behaviour, as was found with the food nouns and body adjectives (but not body nouns).

7.4 DISCUSSION STUDY 2

The primary aim of this study was to examine the presence of a memory bias in individuals with disturbed eating who varied in terms of weight, eating restraint (low versus high) and current diet status (dieting versus not dieting). Memory bias was explored for food, body (or shape and weight) and perfectionism related words. For each of these word types there was a manipulation relevant to the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). Thus, food nouns were subdivided into high and low fat and calorie food nouns; body noun were subdivided into high and low fat body nouns; body adjectives were subdivided into high and low fat body categories; and perfectionism adjectives were subdivided into high and low perfectionism categories. In each case, a third category of neutral words was juxtaposed. The secondary aim of this study

was to determine support for the presence of a cognitive bias (memory bias) for the stimuli developed for subsequent use in a clinical population with a different cognitive task to investigate potential attentional bias.

This study also investigated whether differences between dietary restraint (i.e. cognitions relating to rules about dietary habits) and dieting (i.e. behavioural changes as a result of ideas about dietary habits) could be identified, and whether these differences, if present, are reflected differently with relation to cognitive biases. As no tools were identified by the researchers that could distinguish between these concepts, additional questions were added to the measure of dietary restraint (a cognitive measure) to assess whether the participants were also behaviourally acting in a way in accordance with their dietary rules. As indicated in Chapter 3, Section 3.3.2 dietary restraint and dieting are related concepts, often used interchangeably by literature however this study focuses on the differences between dietary cognitions (as in dietary restraint) and behaviourally changing habits (dieting).

7.4.1 Demographic Variables in Disturbed Eating

In relation to demographic variables, this study found no differences between the groups in age. This finding is significant as it has been found that cognitive style in maladaptive psychological responses differs across the ages (DeFrias & Schaie, 2001; Kordacova & Kondas, 1998; Mazure & Maciejewski, 2003) and a significant age difference could have confounded the results of the memory bias due to the cognitive nature of this task.

In regard to BMI, there were no differences between participants high or low

in dietary restraint or between those currently dieting or not dieting. This indicates

that BMI was not a confound with the other factors of the design and suggests that

BMI as such, is not associated with dietary restraint or dieting. Furthermore, and not

withstanding conceptual difficulties that have been identified between dietary

restraint and dieting, it was also found that there was no association between

restrained eating and current dieting status.

7.4.2 Memory Bias for Food Related Information in Disturbed Eating

The results of this study provide evidence for food related recall bias in

disturbed eaters consistent with previous recognition biases found in individuals

with body shape concerns (Fuller et al., 1995). Other studies, however, have

reported recognition bias towards food words only in disordered (and not disturbed)

eaters (King et al., 1991) and some have found recognition bias not food words but

to other eating disorder relevant stimuli (Watkins et al., 1995). Evidently, the results

of studies investigating memory bias in disturbed eating are not consistent and

further examination is warranted to determine the cognitive features evident in

disturbed eaters.

This study also found that memory for food related information is

differentially influenced by an individual's level of dietary restraint and whether or

not they are currently dieting but is not influenced by their BMI. The results

indicated that individuals high in dietary restraint had greater memory bias for food

words associated with higher calorie or fat content while individuals who were

dieting had greater memory bias for food words associated with lower calorie or fat

content. This finding is interesting and appears not to have been reported previously

but is consistent with findings that individuals with clinical eating disorders (such as

AN and BN) preferentially process schema congruent information (i.e. information

consistent with fatness) and resist counter-schematic information (i.e. information

consistent with thinness) (Reiger et al., 1998).

The present results would suggest that those high in dietary restraint

probably have schemas incorporating information concerned with weight and shape

(i.e. that they are fat and should avoid high calorie and fat foods). As a result of such

schemas, these individuals may also attend to and recall information from their

environment that is consistent with salient beliefs about the self thereby leading to

avoidance (reflected by lack of recall) of information that is inconsistent with these

beliefs (i.e. in this case, information associated with low calorie and fat foods). This

is an important research finding and may assist in further understanding the

cognitive processes involved in dietary restraint.

Although these results appear consistent with some previous research

relating to clinical eating disorders, there are some inconsistencies in the research, as

another study has reported that there is a mediating effect of fasting that increases

attentional bias towards high calorie food words for those with both disturbed and

disordered eating (Placanica et al., 2002). That study assessed attentional bias (not

memory bias) and found that those who scored high on a measure of eating disorders

symptomatology (the EDI-II) had an attentional bias towards high calorie bingeing

when they were hungry and low calorie foods when less hungry (Placanica et al.,

2002). Although assessing a different aspect of cognitive bias, the results of

Placanica et al's study suggest that the results from the present study could have

been influenced by hunger as some participants may have fasted for some time,

resulting in a tendency to remember information that is consistent with their

schemas (i.e. high calorie and high fat foods). For restrained eaters, such fasting

might, for example, have involved delayed eating (a common dietary rule).

Consequently, these participants would be likely to recall information schematically

associated with high fat and calorie foods. For participants who were dieting, there

may have been regular eating so that these participants were less hungry and recalled

information consistent with their schemas (i.e. low calorie and low fat foods). This

conclusion however is extremely tentative and further research is required as the

nature of dieting behaviour or dietary restriction was not fully determined by this

study.

The findings for individuals who were dieting were in contrast to those who

were high in dietary restraint; these individuals displayed a memory bias for low

calorie and low fat food words not to high calorie and high fat food words. These

results may be consistent with previous findings of preferential processing for

schema congruent information (Reiger et al., 1998), and that under certain

conditions, nonclinical eating symptomatology can lead to cognitive biases

(Placanica et al., 2002). In addition, it is possible that dieting individuals have

decided to engage in behaviour based on their concern for their weight and shape; in

doing so activating schemas congruent with their behaviour with schema-congruent

memory resulting. This might explain the contrast in this study between individuals high in dietary restraint and those who are currently dieting.

7.4.3 Memory Bias for Body Related Information in Disturbed Eating

This study also investigated memory bias for information relating to body shape and weight through body features (i.e. body nouns) and body descriptors (i.e. body adjectives). This proved a useful distinction as there proved to be an overall tendency for all experimental groups to recall more body features where fat is typically deposited (such as the stomach and thighs) than body features where little fat is deposited (such as the fingers and toes). It was also found that body features in general were recalled more than neutral control words, which suggests that the body is schematically salient for most people.

In relation to body descriptors, the findings were similar to those about food related information where high fat body descriptors (e.g. fat, massive) were better recalled by those high in dietary restraint and low fat body descriptors (like low calorie or fat food nouns) were better recalled by individuals who were dieting. The possible mechanism for this is likely to be similar to that for food related information and to suggest preferential processing for schema congruent information.

The results of this study are consistent with previous research on recall bias for fat and thin in NW and body dysphoric participants (Baker et al., 1995). That study found these recalled significantly more fat words and fewer thin words than low body dysphoric participants, and the results were also not influenced by mood.

That research led to the suggestion that those high in body dysphoria had difficulty with thinness associated words, which was seen as evidence of an encoding error making it difficult for these participants to see themselves as thin. In the present study, evidence of a memory bias in restrained eaters towards negative body descriptors (e.g. fat) could carry a similar implication. By contrast, a memory bias towards positive body adjectives (e.g. thin) in those who were dieting could reflect that these individuals find it easy to see themselves as thin.

Previous research regarding memory bias appears to has mostly examined persons with disordered eating and has generally found support for a body related memory bias (Hunt & Cooper, 2001; King et al., 1991; Sebastian et al., 1996). These studies generally suggest that those with eating disorders have higher recall of fatness related information, although there is increasing evidence for such as memory bias in those who are preoccupied by body size and shape (Lee & Shafran, 2004; Williamson, 1996). The present findings suggest that there may also be a differential effect of dieting and restrained eating on the recall of body related information.

7.4.4 Memory Bias for Perfectionism Related Information in Disturbed Eating

This study also examined memory bias towards perfection related information, again finding a differential memory bias in persons high in dietary restraint and those currently dieting. Individuals high in dietary restraint preferentially recalled information consistent with the belief that they were imperfect in some way (e.g. words such as "incompetent" and "mistake") implying

that they felt dissatisfied with themselves. By contrast, those who were dieting recalled more information consistent with perfection (e.g. words including "perfect" and "flawless") suggesting that they were more satisfied with themselves. This is possibly also explicable as preferential processing of schema congruent information, as with the findings for food and body words.

There appears to be no previous studies examining cognitive bias for perfection related information in those with disturbed or disordered eating although links between perfectionism and disordered eating are well established (Franco-Paredes et al., 2005) and one form of perfectionism (i.e. clinical perfectionism) is now considered to play a maintaining role in eating disordered psychopathology (Fairburn et al., 2003). Hence perfectionism too may influence disturbed eating and contribute to cognitive bias in disturbed eaters.

It is also worth noting that the word set for perfectionism in this study could also be viewed as indicating self-directed ego threats or failure to achieve, rather than perfectionism, per se. A comprehensive word set to assess this cognitive feature would facilitate better research.

7.5 SUMMARY STUDY 2

In summary, the results of the memory bias study indicate that restraint and diet (but not weight) status contribute to biased recall of information relating to food nouns, body adjectives (but not body nouns) and perfectionism adjectives. Overall, these results suggest that all individuals high in dietary restraint have biased recall of information within their environment pertaining to high fat and high calorie food

information, high fat body descriptors and information relating to mistakes and imperfection. This suggests recall congruent with their specific concerns or self-schemas. In restrained eaters, this suggests that there is an attentional focus on desire to lose weight, desire to avoid high calorie and fat food words, discomfort with current body parts and the perception that they may not be perfect resulting in preferential recall of information consistent with those beliefs.

Those who identified themselves as currently dieting and who have decided to adopt weight-reducing behaviours showed the opposite pattern, with biased recall favouring information associated with low fat and calorie foods, low fat body descriptors and imperfection which may assist in them maintaining their dieting. This also suggests a schema-congruent recall as these individuals are likely to be eating low fat foods because of their diet and would be more likely to be focusing on being thinner and to feel competent.

These findings highlight possible distinctions in these two populations. The first is that dieters are in pursuit of a positive outcome and are action oriented to their current task (i.e. dieting) while those who are high in dietary restraint may be more alert to possible threats and anxious about being wrong or failing, consequently being more avoidant. It also suggests that dietary restraint may be more risky in terms of vulnerability to eating disorders than dieting. However, this requires further exploration and some of the suggestions made in relation to these findings can only be tentative.

These results suggest that the differences between dietary restraint and dieting should be acknowledged in ongoing research into disturbed eating and that

they have implications for clinical practice. Development of an instrument to distinguish these two dietary behaviours would be beneficial, as this may further investigation of differences between the two groups.

The results also have implications for the cognitive behavioural theory of eating disorders, which suggests that overconcern with shape and weight is a key feature in the maintenance of eating disordered psychopathology. In addition, these results also provide evidence that perfectionism may play a key cognitive role in maintaining disturbed eating. This has implications for the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) which suggests that a particular kind of perfectionism (i.e. clinical perfectionism) is a factor maintaining eating disordered psychopathology. These findings suggest that further research is required in a clinical population to determine the nature of cognitive bias and that assessment of cognitive bias should be conducted using other methods.

CHAPTER 8

STUDY 3

ATTENTIONAL BIAS IN EATING DISORDERS

8.1 INTRODUCTION STUDY 3

The role of attentional bias towards eating, shape, weight and perfectionism related information in eating disorders is explored in this chapter. Chapter 5 provides an overall review of theory underpinning the concept of cognitive bias in eating disorders, including the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). Chapter 6 provides an overall review on the literature regarding information processing biases in eating disorders, specifically those relating to attentional bias. Chapter 7 provides the results of a study examining one form of cognitive bias, memory bias in eating disturbance. These results allowed the features of problematic eating to be examined before exploring them in clinical eating disorders. An overall summary of these chapters is presented by this introduction.

The transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) proposes that key features maintain all eating disorders and that four additional maintaining mechanisms operate for those with eating disorders to further obstruct change. These include clinical perfectionism, core low self-esteem, mood intolerance and interpersonal difficulties. One of the core features of eating disorders, the dysfunctional scheme for self-evaluation, highlights the role of cognitive bias in eating disorders. In persons with eating disorders, this includes features such as overconcern with eating, shape and weight and, a new feature introduced by the transdiagnostic cognitive behavioural theory, overconcern with achieving perfectionism. As assumptions regarding the treatment of those with eating disorders are made on theories of the maintenance of eating disorders, this

suggests that empirical investigation of overconcern with eating, shape and weight and achieving perfectionism in those with eating disorders is an important area for further research (as sound treatments are based on sound theories).

Despite evidence of overconcern with particular kinds of information in eating disorders, there has been limited investigation of attentional bias in this group. Most research has used a methodology known as the modified Stroop task, finding evidence of Stroop interference for words and pictures relating to eating and shape (Green et al., 1999; Lovell et al., 1997; Sackville et al., 1998; Walker et al., 1995) and this has been viewed as evidence for attentional bias. Persons with eating disorders have also shown Stroop interference from words of a generally threatening nature, particularly when they relate to aspects of the self (e.g. "failure") (McManus et al., 1996; Waller & Meyer, 1997). This suggests that those with eating disorders also selectively attend to threatening information.

Despite these findings, the modified Stroop (as a measure of attentional bias) has been consistently criticised (Dobson & Dozois, 2004; Lee & Shafran, 2004) and more recent research on attentional biases has utilised the visual probe task as a superior measure of selective attention (MacLeod & Mathews, 1988; Posner et al., 1980) as it offers the advantage of being able to detect whether attention is directed towards or away from the target stimuli. Research using this task has found evidence of an attentional bias, with eating disordered individuals exhibiting selective attention to information relating to "fatness" and avoidance of information relating to "thinness" (Reiger et al., 1998; Shafran et al., 2007). These studies indicate that

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those with eating disorders experience this attentional response with food, weight and shape related information (Reiger et al., 1998; Shafran et al., 2007).

Similar results have been found for those high in body dissatisfaction, restrained eaters and individuals high on eating disorder symptomatology, although fasting has been found to enhance (i.e. increase) the results (Boon et al., 2000; Placanica et al., 2002; Smith & Rieger, 2006). Overall, these results suggest particular biases in information processing, although these effects differ depending on whether the stimulus information is consistent with the beliefs and aspirations of these individuals (e.g. fatness versus thinness). These findings have also extended from those studies of other cognitive biases, including those of non-clinical eating disturbance.

So far, few studies have investigated eating disorders using the visual probe methodology and only one, which included only six participants, has examined BED (Shafran et al., 2007). Given that this methodology has identified differences between AN and BN there may well be differences between BN and BED. Also, as BED is identified as an eating disorder in need of more research, this suggests further investigation of BED is warranted. Such investigation will also help to establish whether BED does in fact have a distinct cognitive profile from BN (as identified by the visual probe methodology), or whether these two disorders are similar, thus supporting the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003).

There is also no published research on cognitive bias in processing perfectionism related information. This is important as the transdiagnostic cognitive

behavioural theory of eating disorders (Fairburn et al., 2003) suggests that overconcern for achieving perfection may, for some people, work together with the overall dysfunctional scheme for self-evaluation (in addition to overconcern with eating, shape and weight) to maintain eating disorder psychopathology.

One problem with the visual probe methodology is that it is difficult to establish whether attention is being drawn towards threat or whether there is difficulty disengaging attention from the threatening information (Derryberry & Reed, 2000; Fox et al., 2001). This could also mean that there may be differences in selective attention based on level of awareness of stimuli. Further, research on anxiety disorders utilising the visual probe task has demonstrated that there may be both hypervigilance and avoidance responses to threatening information, which could equally apply to eating disorders (McManus et al., 1996; Quinton, 2004; Waller & Meyer, 1997). Differences in the processing of threatening information have also been noted when information is presented subconsciously (i.e. subliminally) versus consciously (i.e. supraliminally) (Mogg et al., 2004). This has not been investigated in eating disorders either.

The aim of this study was to extend the findings of Study 2 in relation to memory bias in disturbed eating and to study any attentional bias for information regarding food, shape, weight and perfection in individuals with BN and BED. Overconcern with these matters is a key characteristic in the maintenance of eating disorders and this study examined them as they relate to the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). This study also aimed to examine the cognitive characteristics of those with BN and BED and

to distinguish whether they demonstrate hyperattention to, or avoidance of, disorder salient information. A further aim of this study was to determine whether attentional bias to eating, weight and shape and perfectionism related information is specific to individuals with eating disorders or, like the effect found for memory bias, is evident in OW and NW individuals, and if so, whether this attentional bias is greater for individuals with eating disorders by comparison to OW and NW individuals.

It was hypothesised that:

1. Across each task attentional biases for eating, shape and weight and perfectionism stimuli would be present and stronger in those with BN and BED, while those who are OW or NW would show no such effect.

2. It was also predicted that those with BN and BED would demonstrate greater attention towards disorder salient information at subthreshold presentations and greater attention and avoidance of disorder salient information at suprathreshold presentations, while those who are OW or NW who would show no such effect.

3. It was predicted that individuals with BN and BED would demonstrate similarly high levels of avoidance of counter schematic information and hyperattention towards preferred schematic information than individuals who are OW or NW, who would show no attentional bias effect.

8.2 METHOD STUDY 3

8.2.1 Participants

The seventy-five participants from Study 1 also completed Study 3. Details can be found in Section 6.2.1.

8.2.2 Materials

8.2.2.1 Questionnaires

The State-Trait Anxiety Inventory (STAI) (Speilberger, Gorsuch, & Lushene, 1970) was employed to check any confounding impact of anxiety on the modified visual probe task. This comprised two 20-item self-report questionnaires and assesses state (STAI-S) and trait (STAI-T) anxiety. The STAI-S measures how participants feel "now, at this moment" and the STAI-T measures how participants "generally feel."

The STAI has excellent internal consistency (average 0.89) and test-retest reliability (average $r = 0.88$) at multiple time intervals, although the STAI-S has lower temporal stability (average $r = 0.70$) this lower reliability is unsurprising given the nature of the construct (Barnes, Harp, & Jung, 2002). The overall measure is also reported to have adequate convergent and discriminant validity with other measures of state and trait anxiety. (Speilberger, 1983).

Additional Visual Analogue Scales of anxiety (Appendix M) were administered to assess any anxiety differences between the experimental tasks, and to minimise any influence of anxiety on the computer task. Further Visual Analogue

Scales of subjective hunger as well as questions about recent dietary behaviour and any current medications were also obtained (Appendix N). These were used to rule out hunger as another possible confounding variable.

8.2.2.2 Word Stimuli

The stimulus words from Study 2 (see Section 7.2.2.2) were used in the modified visual probe task with the exception that the words in this study were set in pairs (Appendix O) each comprising both a target word and a neutral (control) word. Word pairs were similarly matched for word length, frequency of occurrence and part of speech (noun or adjective) using word lists (Kucera & Francis, 1967).

The modified visual probe task was presented on a computer with a 15-inch colour monitor using Microsoft Windows 2000. Reaction times (in milliseconds) were recorded by the arrow keys on the computer keyboard.

8.2.3 Procedure

The initial procedure for Study 3 can be found in section 6.2.3 (see also Table 2 in that section). An intensive design was adopted for Studies 1 and 3. Specific details on the procedure for the modified visual probe task can be found in this section. It should be noted that the modified visual probe task took place during the experimental session at the University, where eight separate tasks were interspersed with the questionnaires outlined in Study 1 and Visual Analogue Scales of anxiety.

8.2.3.1 Trial Task

Prior to the first modified visual probe task, an initial trial of the task was presented in order for all participants to familiarise with the task and to establish the individuals threshold for masked subthreshold presentations. The trial task consisted of 10 masked neutral words (Appendix P) which were displayed on the monitor at an initial masked subthreshold duration of 17ms, followed by an arrow facing either right or left. Participants were instructed to press the corresponding arrow on the keyboard if they could read the word. If they could not read the word and did not press the arrow key, after 3000ms, the same word appeared again on the screen, this time with the duration increasing by 17ms until the arrow key was pressed. Once participants pressed the arrow key (signalling that they could read the word), the next word in the word set appeared on the screen (participants repeated the process for all 10 words). Following this, the average response time, indicating at what duration a participant could detect the masked words, was displayed. The duration 17ms below this became the individual's masked subthreshold stimulus duration. No participant's masked subthreshold was over 34ms, the lowest being 17ms.

8.2.3.2 Task Instructions

After completing the trial task the participants carried out the eight experimental modified visual probe tasks. During each, they were instructed to fixate on a cross in the centre of the screen and then to read each word pair silently as they appeared, while also attending to the words, as these words would be needed in a later task.

Participants were instructed to watch for the presentation of a horizontal arrow appearing in centre-screen and pointing left or right, immediately following the word pairs. Upon detection of the arrow, they were instructed to press the corresponding arrow on the keyboard as quickly as possible while avoiding mistakes using the corresponding index finger.

8.2.3.3 Modified Visual Probe Task

Each modified visual probe task began with a central fixation cross. This was followed by a set of word pairs from one category presented at a masked threshold of 17ms or 34ms (depending on the individual masked threshold detected during the trial task) and for suprathreshold tasks, 1000ms. The participants completed the tasks for each set of word categories at both thresholds and the order of presentation for word category and threshold was randomised across participants. As previously indicated, questionnaires from Study 2 and the Visual Analogue Scale anxiety ratings were used as fillers between tasks to minimise fatigue. Participants were also given a break of approximately 15 minutes half way through the experiment.

All words were presented in capital letters and in bold white font against a black background. The words in each pair were displayed in the centre of the screen, one directly above the other, and 5cm apart. As with the memory task, there were 20 word pairs for each category in each task. Each word pair occurred four times and order of presentation was randomised. For every word pair, each word appeared equally often in the upper and lower positions and each word was followed equally often by the arrow probe. The arrow probe remained on the screen until a keyboard

response had been recorded. For each, the probe detection time (i.e. discrimination latency; 1 ms accuracy) was recorded. Shorter discrimination latencies to target words (i.e. a faster response to the probe when it is in the same location as the target words than when it is in the same location as the neutral words) meant enhanced attention for the target words. Prolonged discrimination latencies to target words (i.e. slower response to the probe when it is in the same location as the target words than when it is in the same location as the neutral words) meant avoidance of the target words.

A constant interval separated the termination of the word pair display and the presentation of the visual probe (i.e. arrow). The visual probe appeared in the same location as either the top or bottom word in each word pair. Participants sat in a position that gave a visual angle of approximately 4° between the central fixation cross and the centre of the stimulus.

At the end of the session, participants completed the rating scales for word category and valence. They were also asked whether they were aware of or understood subliminally presented words. Participants were then debriefed and given the opportunity to ask questions about the experiment.

8.2.4 Design and Data Analysis

The study utilised four separate 4 (Participant Group: bulimia nervosa, binge eating disorder, normal weight, overweight) × 2 (Word Type: target 1, target 2,) x 2 (Threshold: subliminal, supraliminal) mixed factorial designs for each of the four word categories. The four word categories were Food Nouns (high fat and high

calorie food, low fat and low calorie food, furniture), Body Nouns (high fat body

parts, low fat body parts, garden), Body Adjectives (high fat, low fat, garden) and

Perfectionism Adjectives (high perfectionism, low perfectionism, geography). Filler

(neutral control) words matched for word length, frequency of occurrence and part

of speech (noun or adjective) using word lists (Kucera & Francis, 1967) were used

as control words however, they were not included in the analysis due to the

computation of the attentional bias index.

Data for each word category was then analysed separately using a 4

(Participant Group: bulimia nervosa, binge eating disorder, normal weight,

overweight) x 2 (Word Type: target 1, target 2) x 2 (Threshold: subliminal,

supraliminal) Mixed Factor ANOVA using SPSS. Profile analysis was reported for

the within subjects factors to avoid the problem of sphericity. The .05 level of

significance was used to examine the between group differences when ANOVA

produced a significant F value. Separate univariate ANOVAs and subsequent

REGWQ and t-tests (using Bonferroni adjustments) were used to break down

significant interactions.

The four groups differed significantly on their anxiety levels. As anxiety

levels are suggested to affect performance on the visual probe task (Lee & Shafran,

2004). The STAI-S score was included as a covariate to partial out any effect of

state anxiety on participants' performance.

Reaction time outliers (i.e. values below 100ms and above 1500ms were

excluded from the data analysis. These are similar exclusion criteria to those

employer in previous research (Placanica et al., 2002; Reiger et al., 1998).

Participant's median reaction times were computed rather than means, to further reduce the impact of outliers, as is also consistent with previous research (Placanica et al., 2002).

The dependent variable was an attentional bias index for each participant using the median reaction time values that were computed for each of the four presentation conditions: LT/UP, UT/UP, LT/LP, UT/LP (U = upper position, L = lower position, T = target word, P = probe). For example, LT/UP signifies trials in which the target word in the word pair appeared in the lower position and the probe appeared in the upper position. To calculate the index, the most commonly used attentional bias formula was applied (MacLeod & Mathews, 1988): [(UP/LT – UP/UT) + (LP/UT – LP/LT)] ÷ 2. This index was calculated for each word category at both masked subthreshold and suprathreshold presentations tasks.

8.3 RESULTS STUDY 3

The complete statistical outputs for all analyses are presented in Appendix Q (on the attached CD).

8.3.1 Participant Characteristics

8.3.1.1 Hunger

A one-way ANOVA was used to assess differences in subjective hunger ratings between the groups. No effects were significant, $F(3, 71) = 2.04, p = .12$

indicating that group differences in hunger were not confounded with attentional bias.

8.3.2 The Influence of Anxiety

8.3.2.1 State-Trait Anxiety Inventory

A one-way ANOVA indicated the four groups differed in state anxiety, $F(3, 71) = 939.37$, $p < .001$. Post hoc analyses indicated that the BN ($M = 51.25$, $SE = 2.64$) and BED ($M = 48.40$, $SE = 3.05$) groups had significantly higher state anxiety than the NW ($M = 35.55$, $SE = 2.64$) and OW ($M = 33.15$, $SE = 2.64$) groups. Consequently state anxiety was included as a covariate when analysis the attentional bias data.

Similarly, a one-way ANOVA indicated significant differences between the four groups on trait anxiety, $F(3, 71) = 1789.69$, $p < .001$. Post hoc analyses indicated that the BN ($M = 63.80$, $SE = 2.26$) and BED ($M = 55.40$, $SE = 2.61$) group had significantly higher trait anxiety than the NW ($M = 38.50$, $SE = 2.26$) and OW ($M = 41.05$, $SE = 2.26$) groups. Thus eating disordered participants were significantly higher in trait anxiety than control participants. Trait anxiety was not included as a covariate in later attentional bias tasks as it would be current anxiety that could be seen to influence performance. When analysed, the state anxiety covariate was not significant in any analysis, thus indicating that state anxiety did not affect participants' performance on the modified visual probe task.

8.3.2.2 Visual Analogue Scale of Anxiety

The means and standard deviations for the Visual Analogue Scales of anxiety used to indicate the overall level of anxiety between the attentional bias tasks are presented in Table 35.

Table 35

Means and standard errors for each of the Visual Analogue Scales anxiety measure for BN, BED, OW and NW groups

	BN		BED		NW		OW	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Anxiety Rating 1	44.90	(5.51)	40.67	(6.36)	17.65	(5.51)	19.20	(5.51)
Anxiety Rating 2	46.65	(5.10)	43.73	(5.89)	16.00	(5.10)	22.15	(5.10)
Anxiety Rating 3	47.80	(5.19)	39.20	(6.00)	17.65	(5.19)	17.40	(5.19)
Anxiety Rating 4	45.35	(4.82)	36.00	(5.56)	15.00	(4.82)	20.85	(4.82)
Anxiety Rating 5	44.30	(4.46)	32.73	(5.16)	16.20	(4.46)	14.10	(4.46)
Anxiety Rating 6	39.40	(4.56)	28.67	(5.26)	13.75	(4.56)	14.70	(4.56)
Anxiety Rating 7	34.10	(4.32)	28.00	(4.99)	12.75	(4.32)	12.00	(4.32)
Anxiety Rating 8	36.75	(4.85)	29.20	(5.60)	14.70	(4.85)	15.40	(4.85)

The means in Table 35 suggest that both eating disorder groups shared similar higher levels of anxiety than the non-eating disordered groups. This was explored using an overall 4 × 8 mixed factor ANOVA and REGWQ post hoc tests to examine the overall differences. These results are summarised in Table 36 and indicate that there were significant differences between the groups on all measures, with the eating disordered participants sharing similar higher levels of anxiety at each measure of anxiety.

Table 36

Results of one-way ANOVA for group differences in anxiety ratings over time

	F value (df=3, 71)	*MSE*	*P*	Differences
Anxiety Rating 1	6.33	3843.26	.001	BN, BED > OW, NW
Anxiety Rating 2	8.60	4462.42	< .001	BN, BED > OW, NW
Anxiety Rating 3	8.57	4610.57	< .001	BN, BED > NW, OW
Anxiety Rating 4	7.94	3684.96	< .001	BN > BED > OW, NW
Anxiety Rating 5	10.13	4038.78	< .001	BN > BED > NW, OW
Anxiety Rating 6	7.14	2966.22	< .001	BN, BED > OW, NW
Anxiety Rating 7	6.37	2380.67	.001	BN, BED > NW, OW
Anxiety Rating 8	4.87	2285.84	.004	BN, BED > OW, NW

8.3.3 Exclusions from Analysis

As reaction time outliers (i.e. values below 100ms and above 1500ms) and errors were excluded from the data analysis, a series of 2 × 2 (word category × presentation) chi-square analyses were completed on each category (i.e. food nouns, body nouns, body adjectives, perfectionism adjectives) at both subthreshold and suprathreshold presentations to investigate whether the groups differed significantly in the number of items excluded from the analysis. No chi-square analyses were significant, indicating that there were no significant differences in the proportion of exclusions made under any category at subliminal or supraliminal presentations (see Table 37).

Table 37

Chi-square analysis indicating exclusions for each word category and stimulus

presentations

Category	Stimulus Presentation	Degrees of Freedom df	Chi-Square Value	Significance p
Food Nouns	Subliminal	27	28.13	.404
	Supraliminal	30	22.61	.831
Body Nouns	Subliminal	36	36.05	.466
	Supraliminal	27	34.40	.155
Body Adjectives	Subliminal	33	26.91	.764
	Supraliminal	33	42.16	.132
Perfectionism Adjectives	Subliminal	30	35.03	.241
	Supraliminal	33	23.83	.879

8.3.4 Attentional Bias for Food Related Information

Attentional bias for the visual probe task with food nouns and control (i.e. furniture) nouns as stimuli will be presented in this section.

8.3.4.1 Attentional Bias for Food Nouns

There was a significant main effect for the threshold of word presentation, Wilks' Lambda = .92, $F(1, 69) = 5.71$, $p = .02$ with greater attentional bias at subthreshold than suprathreshold presentations. There was also a significant main effect for food nouns, Wilks' Lambda = .94, $F(1, 69) = 4.34$, $p = .04$ and it was found that there were significant differences in attentional bias scores between participant groups, $F(1, 69) = 8.62$, $p = <.001$ with overall greater attentional bias indices for the eating disorder groups as compared to the control groups.

Significant interactions were found between the threshold of word presentation and participant group factors, Wilks' Lambda = .81, $F(3, 69) = 5.37$, $p = .002$, and between the food words and participant group factors, Wilks' Lambda = .99, $F(3, 69) = 3.08$, $p < .001$. A significant three-way interaction between the threshold of word presentation, food word and participant group was also found, Wilks' Lambda = .85, $F(3, 69) = 4.22$, $p = .008$ (Figures 12 and 13).

8.3.4.1.1 High Fat Food Nouns
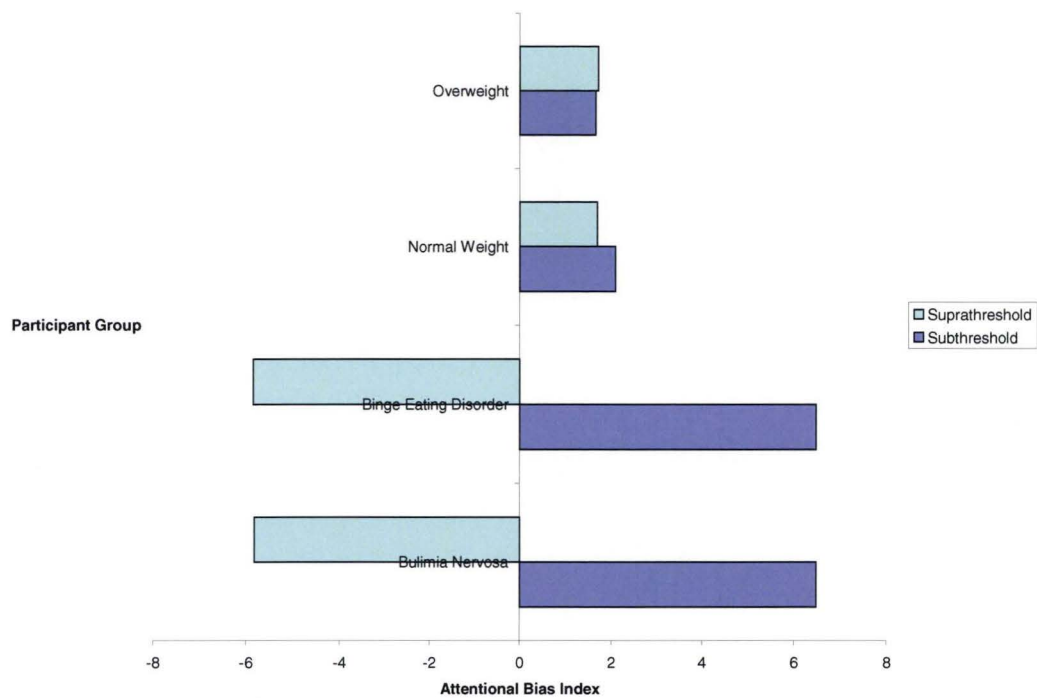
Figure 12. Attentional bias index of individuals with BN and BED and those who are NW and OW to high fat food nouns at each stimulus duration

The three way interaction was followed up with one-way ANOVAs separately for subthreshold and suprathreshold presentations, followed by REGWQ post hoc tests. When presentation was subliminal, attentional bias was positive for all groups (i.e., high fat food nouns received attentional preference) and a significant effect was found, $F(3, 71) = 6.59$, $p = .001$: individuals with BN ($M = 6.48$, $SE = 1.09$) and those with BED ($M = 6.48$, $SE = 1.18$) had greater attentional bias than those who were NW ($M = 2.09$, $SE = 1.07$) or OW ($M = 1.66$, $SE = 1.06$). Thus the eating disorder groups attended more to high fat words at subthreshold presentation than individuals without eating disorders.

A significant effect was also found for high fat food nouns at suprathreshold presentation, $F(3, 70) = 6.67$, $p = .001$. Those with BN ($M = -5.82$, $SE = 1.32$) and those with BED ($M = -5.84$, $SE = 1.44$) showed a negative attentional bias, and this was significantly lower than for individuals who were NW ($M = 2.25$, $SE = 1.29$) or OW ($M = 2.30$, $SE = 1.28$). Thus, when stimulus duration was long enough for awareness of the content, the attention of participants with eating disorders was directed away from high fat food nouns, unlike that of individuals without eating disorders, and significantly so.

In addition, paired samples t-tests comparing attentional bias at subthreshold and suprathreshold presentations for each participant group found that only the BN and BED groups demonstrated significant threshold differences. Individuals who were NW and OW had almost identical low positive attentional bias at both stimulus durations. These effects are presented in Table 38.

Table 38

Paired samples t-tests for attentional bias of high fat words subliminally and

supraliminally for individuals with BN and BED and those who are NW and OW

|	Mean	Standard Error	T value (df)	Significance P
BN	9.49	2.53	3.75 (19)	.001
BED	10.13	2.22	4.57 (14)	< .001
NW	0.13	0.95	0.01 (18)	.989
OW	-0.46	0.66	-0.70 (19)	.491

8.3.4.1.2 Low Fat Food Nouns
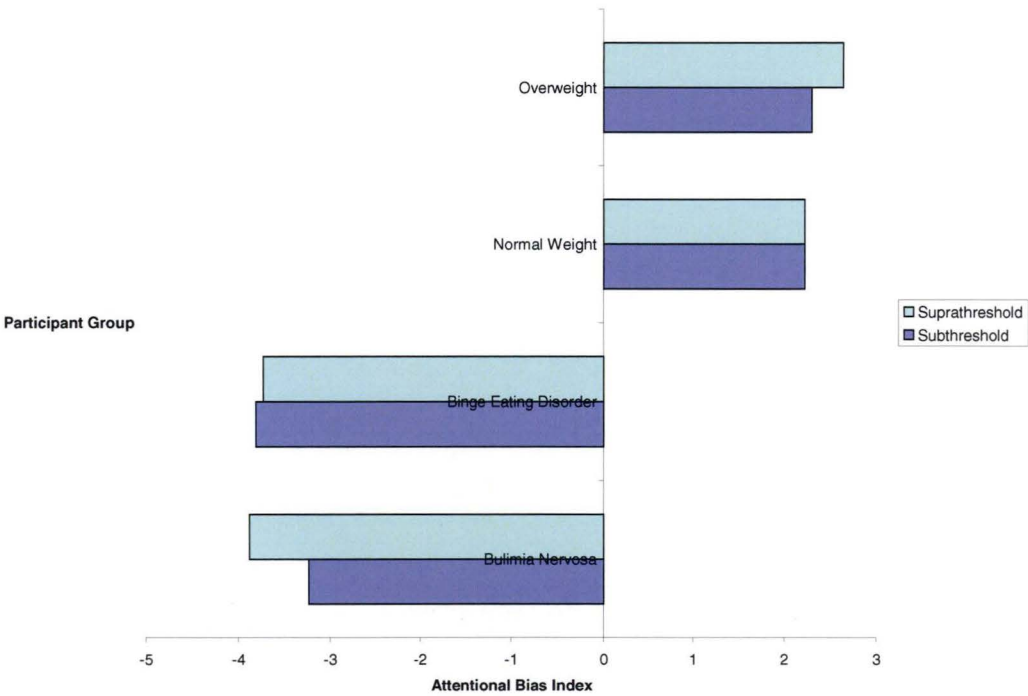
Figure 13. Attentional bias index of individuals with BN and BED and those who

are NW and OW to low fat food nouns at each stimulus duration

The interaction presented in Figure 13 was followed up with one-way

ANOVAs separately for subthreshold and suprathreshold presentations, followed by

REGWQ post hoc tests. A significant difference was found between participant

groups at subliminal presentation, $F(3, 71) = 20.38$, $p < .001$: individuals with BN

($M = -3.23$, $SE = 1.01$) and individuals with BED ($M = -3.81$, $SE = 1.67$) displayed

negative attentional bias, and this was significantly lower than the positive

attentional bias to low fat food words observed in participants who were NW ($M =$

2.22, $SE = 1.01$) or OW ($M = 2.30$, $SE = 1.01$). Thus, the attention of those with

eating disorders was directed away from low fat words, whereas that of those

without eating disorders was directed towards such words, and the difference

between the two pairs of groups was significant.

There were no significant group differences for suprathreshold presentations

of low fat food nouns, $F(3, 71) = 7.96$, $p = <.001$ indicating that for suprathreshold

thresholds, individuals with BN (-3.88 = , $SE = 1.02$) and BED ($M = -3.73$, $SE =$

1.18) and those who are NW ($M = 2.22$, $SE = 1.02$) and OW ($M = 2.64$, $SE = 1.02$)

have similar levels of information processing for low fat food nouns when under

conscious attention.

In addition, paired samples t-tests comparing attentional bias at subthreshold

and suprathreshold presentations for each participant group found that none of the

groups demonstrated significant threshold differences in attentional bias. These

results are presented in Table 39.

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Table 39

Paired samples t-tests for attentional bias of low fat words subliminally and

supraliminally for individuals with BN and BED and those who are NW and OW

	Mean	Standard Error	T value (df)	Significance P
BN	-2.95	1.67	-1.77 (19)	.094
BED	-2.83	2.18	-1.30 (14)	.214
NW	0.27	0.94	0.28 (19)	.780
OW	-0.09	0.85	-0.10 (19)	.919

Overall, the data for food nouns indicate that the attention of individuals with eating disorders is directed differently from that of those without eating disorders, with greater attentional bias towards high fat foods and away from low fat food words for those with eating disorders. No differences were found for attentional bias between individuals with BN and those with BED or between individuals who were OW and NW in the processing of high fat words suggesting similarities in the processing of high calorie/fat food related information for these two groups. However, there were no differences in the processing of low fat food words between these groups, suggesting similarities in the processing of this kind of information between individuals with and without eating disorders.

8.3.5 Attentional Bias for Body Related Information

Attentional bias for the visual probe task with body nouns and control (i.e. garden) nouns as stimuli, and the task with body adjectives and control (i.e. garden) adjectives will be presented in this section.

8.3.5.1 Attentional Bias for Body Nouns

There were no significant main effects found for the overall influence of the threshold of word presentation, Wilks' Lambda = .98, $F(1, 69) = 1.69$, $p = .20$, for body nouns, Wilks' Lambda = .01, $F(1, 69) = 1.0$, $p = .91$, or participant group, $F(1, 69) = .03$, $p = .99$. Nor were significant interactions found between the threshold of word presentation and participant group, Wilks' Lambda = .40, $F(3, 69) = 1.00$, $p = .99$, between the body nouns and participant group, Wilks' Lambda = .1.00, $F(3, 69) = .07$, $p = .98$, or between all three factors. This suggests that body nouns may not discriminate between eating disordered and non-eating-disordered persons in attentional bias tasks. However, it cannot be assumed that the same is true of body adjectives.

8.3.5.2 Attentional Bias for Body Adjectives

There was no significant main effect for threshold of word presentation, Wilks' Lambda = 1.00, $F(1, 70) = .31$, $p = .58$. The main effect for word type approached significance, Wilks' Lambda = .95, $F(1, 70) = 3.69$, $p = .059$, indicating a trend toward differences in attentional bias between high and low fat body

adjectives. There was however a significant difference in attentional bias between participant groups, $F(1, 70) = 3.34$, $p = .02$.

No significant interactions were found between threshold of word presentation and participant group, Wilks' Lambda = 1.00, $F(3, 70) = .04$, $p = .99$, between word type and participant group, Wilks' Lambda = .90, $F(3, 70) = 2.53$, $p = .06$. However, there was a significant three-way interaction between threshold of word presentation, word type and participant group, Wilks' Lambda = .65, $F(3, 70) = 12.54$, $p = < .001$ (See Figures 14 and 15).

8.3.5.2.1 High Fat Body Adjectives
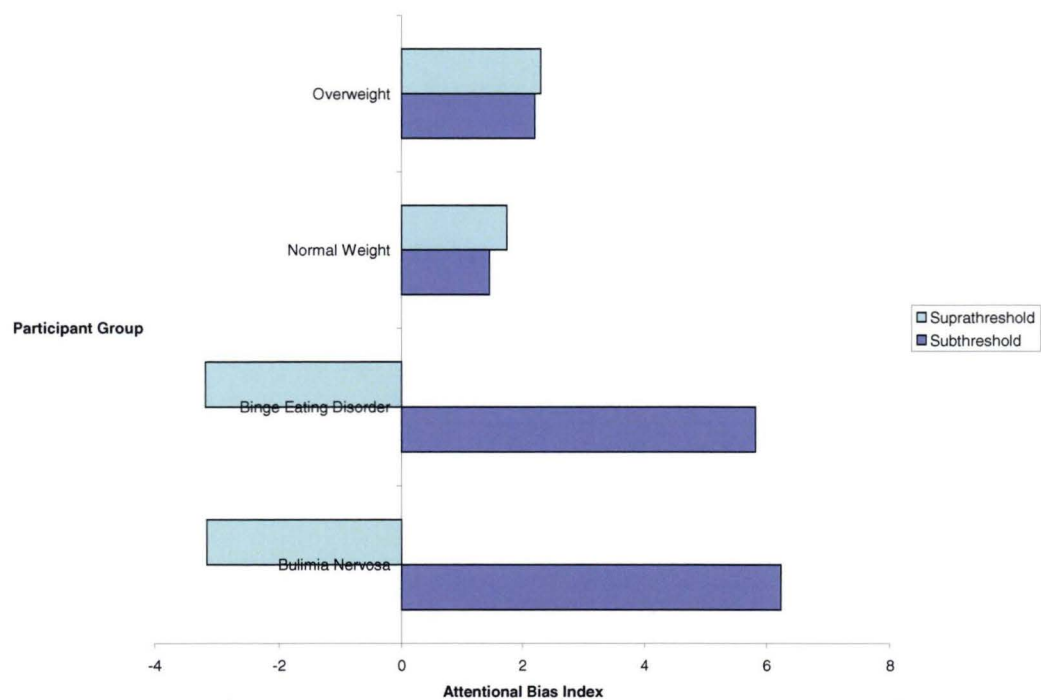
Figure 14. Attentional bias index of individuals with BN and BED and those who are NW and OW to high fat body adjectives each stimulus duration

The three way interaction was followed up with separate one-way ANOVAs for subthreshold and suprathreshold presentations, followed by REGWQ post hoc tests. In the subthreshold data, all groups showed a positive bias and there were significant differences between groups, $F(3, 71) = 100.95$, $p = <.001$: individuals with BN ($M = 6.23$, $SE = 0.82$) and those with BED ($M = 5.82$, $SE = 0.90$) showed higher attentional bias than the NW ($M = 1.45$, $SE = 0.98$) and OW ($M = 2.20$, $SE = 0.81$) participants. Thus, those with eating disorders attended more to high fat body adjectives than individuals without eating disorders.

Significant group differences also emerged in the suprathreshold data, $F(3, 70) = 5.60$, $p = .002$: individuals with BN ($M = -3.16$, $SE = 1.34$) and those with BED ($M = -3.18$, $SE = 1.47$) both showed negative bias and their mean scores were significantly lower than those of NW ($M = 1.74$, $SE = 1.27$) and OW ($M = 2.30$, $SE = 1.31$) participants. Thus, at suprathreshold presentations the attention of eating disordered participants was directed away from body adjectives more than that of those without eating disorders.

In addition, paired samples t-tests comparing subthreshold and suprathreshold presentations for each participant group yielded significant differences only for the BN and BED groups. These effects are presented in Table 40.

Table 40

Paired samples t-tests for attentional bias of high fat body adjectives subliminally and supraliminally for individuals with BN and BED and those who are NW and OW

|	Mean	Standard Error	T value (df)	Significance *P*
BN	9.39	1.64	5.72 (19)	< .001
BED	9.00	1.54	5.86 (14)	< .001
NW	-0.29	0.87	-0.33 (19)	.745
OW	-0.10	0.94	-0.11 (19)	.917

8.3.5.2.2 Low Fat Body Adjectives
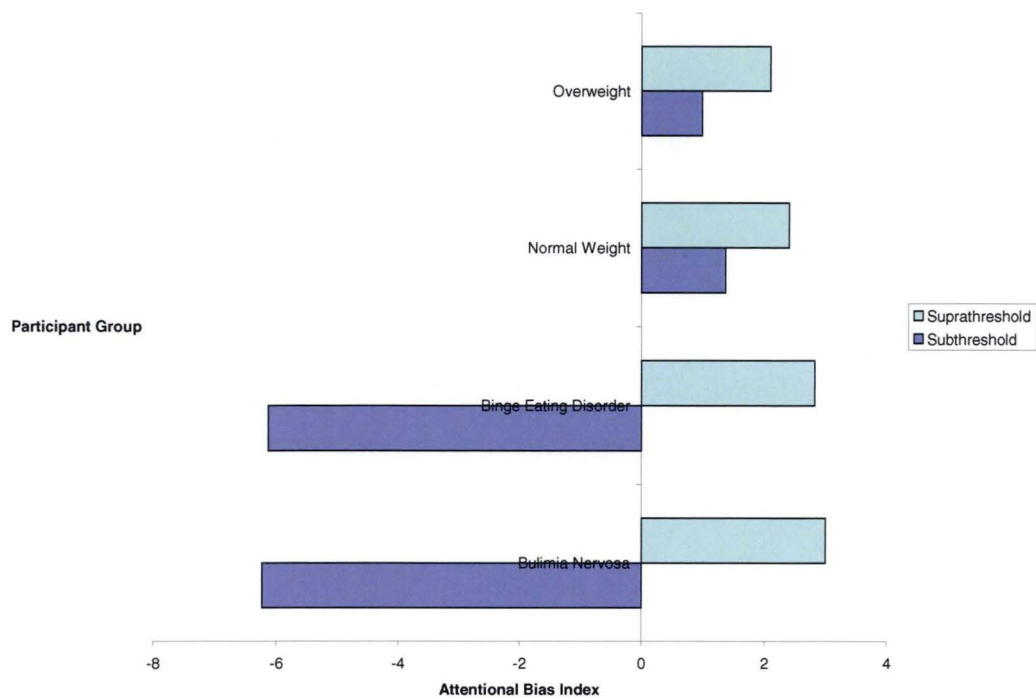
Figure 15. Attentional bias index of individuals with BN and BED and those who are NW and OW to low fat body adjectives at each stimulus duration

The interaction presented in Figure 15 was followed up with separate one-way ANOVAs for subthreshold and suprathreshold presentations, followed by REGWQ post hoc tests. A significant effect was found in the subliminal presentation data, $F(3, 71) = 20.41$, $p = <.001$, indicating that the negative attentional bias on the part of individuals with BN ($M = -6.23$, $SE = 1.00$) and those with BED ($M = -6.13$ $SE = 1.10$) was significantly different from the positive bias shown by those who were NW ($M = 1.36$, $SE = 0.96$) or OW ($M = 0.98$, $SE = 0.99$). Thus the attention of eating disordered participants was directed away from low fat body adjectives

presented at subthreshold durations, unlike that of participants without eating

disorders.

No significant effect was found for suprathreshold threshold presentation,

$F(3, 71) = 0.09$, $p = .964$. Positive bias was indicated by all four means, indicating

that the BN ($M = 3.01$, $SE =1.49$), BED ($M = 2.83$, $SE = 1.63$), NW ($M = 2.40$, $SE =$

1.42) and OW ($M = 2.09$, $SE = 1.46$) groups all showed similar levels of attention to

low fat body adjectives presented at suprathreshold durations.

In addition, paired samples t-tests comparing subthreshold and

suprathreshold presentations for each participant group found significant differences

only in the BN and BED groups. These effects are presented in Table 41.

Table 41

Paired samples t-tests for attentional bias of low fat body adjectives subliminally and supraliminally for individuals with BN and BED and those who are NW and OW

	Mean	Standard Error	T value (df)	P
BN	-9.24	3.16	-2.92 (19)	< .001
BED	-8.97	1.43	-6.29 (14)	< .001
NW	-1.26	0.96	-1.31 (19)	.206
OW	-0.73	0.62	-1.16 (19)	.260

Overall, the results for body-related words indicate that the body noun category yielded no attentional bias effect, but that attentional bias for body adjectives is significantly different for individuals with eating disorders than for those without, with attention directed towards high fat body adjectives and away from low fat body adjective words presented subliminally where participants with eating disorders are concerned, but with evidence that this is to some extent reversed at supraliminal presentation. No differences were found for attentional bias between individuals with BN and those with BED. Nor were there significant differences in attentional bias between OW and NW participants, suggesting that these two groups processing body adjectives similarly. The contrasting results for body nouns and

body adjectives indicate that these two types of words need to be kept distinct as materials in this research area.

8.3.6 Attentional Bias for Perfectionism Related Information

Attentional bias for the four groups with perfectionism adjectives and control (i.e. garden) adjectives will be presented in this section.

8.3.6.1 Attentional Bias for Perfectionism Adjectives

No significant main effect was found for threshold of word presentation, Wilks' Lambda = 0.97, $F(1, 70) = 2.07$, $p = .154$, or for participant group, $F(1, 70) = 0.92$, $p = .438$. However, there was a significant main effect for word type, Wilks' Lambda = .85, $F(1, 70) = 12.33$, $p = .001$, indicating that attentional bias differed for high fat versus low fat perfectionism adjectives..

The interaction between the threshold of word presentation and participant group was not significant, Wilks' Lambda = .99, $F(3, 70) = .22$, $p = .88$. However, there was a significant interaction between the word type and participant group, Wilks' Lambda = .69, $F(3, 70) = 10.63$, $p = <.001$. There was also a significant three-way interaction between the threshold of word presentation, word type and participant group, Wilks' Lambda = .78, $F(3, 70) = 6.53$, $p = .001$ (See Figures 16 and 17).

8.3.6.1.1 High Perfectionism Adjectives
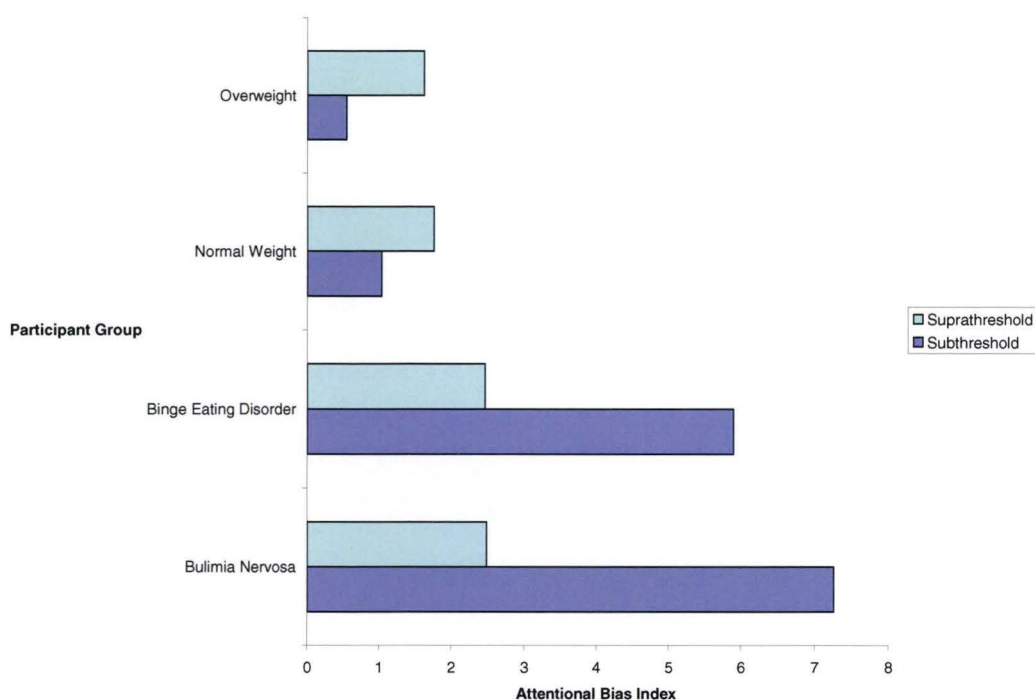
Figure 16. Attentional bias index of individuals with BN and BED and those who are NW and OW for high perfectionism adjectives at each stimulus duration

For high perfectionism adjectives, attentional bias was positive in all conditions and the three way interaction was followed up with separate one-way ANOVAs for subthreshold and suprathreshold presentations, followed by REGWQ post hoc tests. In the analysis for subliminal presentation participant groups differed significantly, $F(3, 71) = 26.79$, $p = <.001$: bias was significantly higher in individuals with BN ($M = 7.26$, $SE = 0.63$) and those with BED ($M = 5.90$, $SE = 0.69$) than in those who were NW ($M = 1.04$, $SE = 0.60$) or OW ($M = 0.55$, $SE = 0.62$). Thus, persons with eating disorders attended more than those without to high perfectionism adjectives presented at subthreshold presentations.

There was no significant effect in the data from suprathreshold presentation, $F(3, 70) = 0.004$, $p = 1.00$, indicating that the BN ($M = 2.49$, $SE = 0.86$), BED ($M = 2.47$, $SE = 0.95$), NW ($M = 1.76$, $SE = 0.82$) and OW ($M = 1.62$, $SE = 0.85$) all showed similar attentional bias.

In addition, on paired samples t-tests comparing subthreshold and suprathreshold presentations for each participant group, only the BN and BED groups demonstrated significant threshold differences, attentional bias being greater for subliminal presentation. These effects are presented in Table 42.

Table 42

Paired samples t-tests for attentional bias of high fat perfectionism adjectives subliminally and supraliminally for individuals with BN and BED and those who are NW and OW

|	Mean	Standard Error	T value (df)	Significance *P*
BN	4.86	1.07	4.53 (19)	< .001
BED	3.50	1.18	2.97 (14)	.010
NW	-0.79	0.79	-1.00 (19)	.332
OW	-1.00	0.99	-1.17 (19)	.257

8.3.6.1.2 Low Perfectionism Adjectives
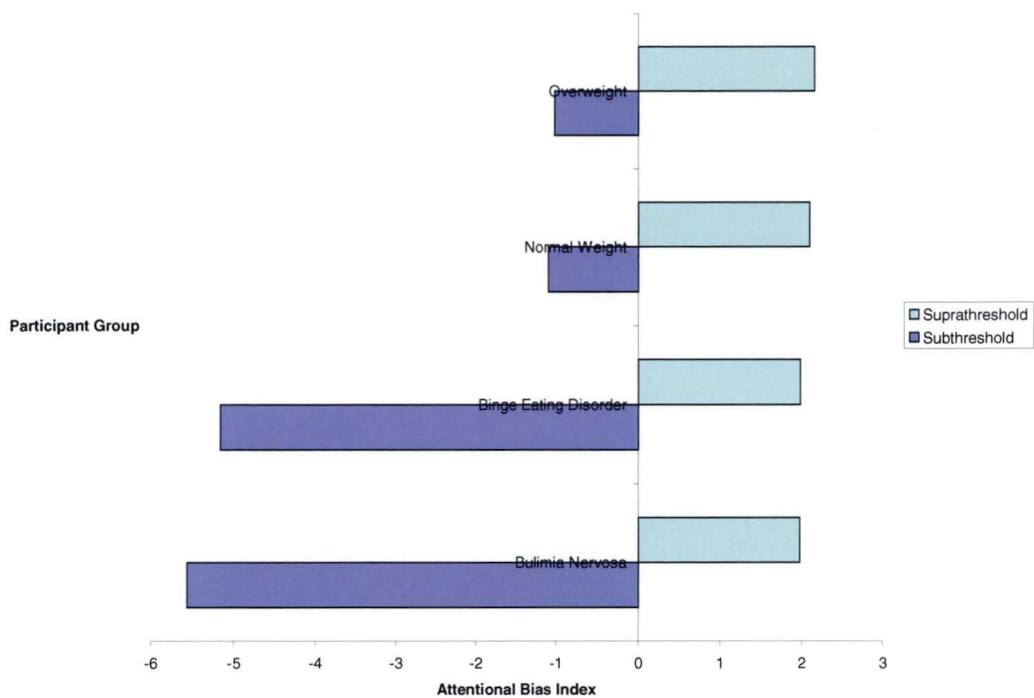
Figure 17. Attentional bias index of individuals with BN and BED and those who are NW and OW to low perfectionism adjectives for each stimulus duration

Bias was uniformly positive at suprathreshold presentation, and uniformly negative at subthreshold presentation. The interaction in Figure 17 was followed up with one-way ANOVAs separately for subthreshold and suprathreshold presentations, followed by REGWQ post hoc tests. A significant effect was found for subliminal presentation, $F(3, 71) = 20.94$, $p = <.001$: individuals with BN ($M = -5.56$, $SE = 0.59$) and individuals with BED ($M = -5.16$, $SE = 0.65$) had significantly higher negative attentional bias than individuals who were NW ($M = -1.10$, $SE = 0.56$) or who were OW ($M = -1.02$, $SE = 0.58$). Thus, the attention of those with

eating disorders was directed away from low perfectionism adjectives, unlike that of those without eating disorders.

No significant effect was found for the suprathreshold presentation data, $F(3, 71) = 0.01$, $p = 1.00$. Thus, persons with BN ($M = 1.97$, $SE = 0.94$), BED ($M = 1.98$, $SE = 1.03$), NW ($M = 2.09$, $SE = 0.89$) and OW ($M = 2.15$, $SE = 0.92$) all attended similarly to low perfectionism adjectives.

In addition, paired samples t-tests comparing subthreshold and suprathreshold presentation means for each participant group yielded a significant difference for each group, indicating positive attentional bias at suprathreshold presentation and negative bias at subthreshold presentation. These effects are presented in Table 43.

Table 43

Paired samples t-tests for attentional bias of low perfectionism adjectives subliminally and supraliminally for individuals with BN and BED and those who are NW and OW

	Mean	Standard Error	T value (df)	P
BN	-7.71	1.36	-5.66 (19)	< .001
BED	-7.27	0.98	-7.44 (14)	< .001
NW	-3.08	1.13	-2.73 (19)	.013
OW	-3.01	0.73	-4.11 (19)	.001

8.4 DISCUSSION STUDY 3

The primary aim of this study was to investigate attentional bias towards food, shape and weight related information in individuals with BN and BED in order to examine a key feature of cognitive behavioural models of eating disorders, namely overconcern with eating, shape and weight and their control. Attentional bias in this study was studied in relation to the same word categories as in the memory bias study (Study 2).

A secondary aim was to establish whether any attentional bias in individuals with BN and BED takes the form of hypervigilance for information consistent with their beliefs or avoidance of this information, and in either case under what conditions. This study also aimed to determine whether attentional bias to eating, body and perfectionism information is specific to those with clinical eating disorders, or whether like that found in memory bias, the difference is one of degree and there is greater attentional bias for individuals with eating disorders as opposed to OW or NW individuals.

8.4.1 Demographic Variables in Bulimia Nervosa and Binge Eating Disorder

The demographic characteristics of participants in this study are described in detail in Section 6.4.1. Overall, individuals with BN and BED differed little in demographic features or eating related psychopathology and symptomatology, suggesting substantial similarities between these two disorders and providing support for a transdiagnostic conceptualisation of these disorders and a theory of their development and maintenance. One demographic finding of particular interest

was comparable ages for the BN, BED, OW and NW groups. This is significant

given previous reports that cognitive style in maladaptive psychological responses

differs across the ages (DeFrias & Schaie, 2001; Kordacova & Kondas, 1998;

Mazure & Maciejewski, 2003). Another relevant demographic finding was

significant differences between the groups on trait anxiety as well as state anxiety.

This implicates anxiety as a factor that may influence cognitive findings on the

modified visual probe task and also suggests that anxiety may be a specific

comorbid feature of eating disorders.

8.4.2 Attentional Bias for Food Related Information in Bulimia Nervosa and Binge Eating Disorder

This study used the modified visual probe task to investigate the influence of

food related information on cognitive processing in those with BN and BED.

Attentional bias for food related information was found in participants with BN and

BED, but not for those who were OW or NW. This suggests a food related bias

present specifically in those with eating disorders. Further results indicated that

when information was presented subliminally, individuals with BN and BED shared

greater attentional bias towards high calorie and fat food words than towards words

reflecting low fat and calorie content. By contrast, when information was presented

above the threshold of consciousness, those with BN and BED were less attentive to

the high fat and calorie food words. The modified visual probe task is thus able to

detect, in those with BN and BED, differential processing of food words, depending

on whether information is presented within awareness for those with eating

disorders. It also suggests that conscious processes operate to avoid exposure to high fat and calorie food information despite an initial stage of preferential processing for this information.

This extends previous findings from a pictorial version of the visual probe task (Shafran et al., 2007) that individuals with AN, BN and eating disorder NOS demonstrate attentional biases for negative eating related information. This suggests that individuals with any eating disorder (including BED) have a cognitive bias towards information congruent with eating disorder concerns (i.e. information consistent with fatness in food) and adds support to the notion that all eating disorders can be subsumed by one theory as proposed in the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). Another advantage of this study greater participant numbers than Shafran et al.'s study.

Although both studies found evidence for attentional bias towards food related information in eating disorders, one notable difference is that the present research identified hyperattention towards high fat and calorie food words when information was presented below conscious awareness, whereas Shafran et al. (2007) presented stimuli only at conscious awareness. By contrast, persons with BN and BED exhibited avoidance of high fat and calorie foods when they were presented at conscious awareness in this study. One possible explanation for these results could be methodological differences, as Shafran et al. did not include subliminal presentation and used pictorial, not textual, stimuli. Although their pictorial adaptation could be argued to enhance ecological validity, an alternative possibility is that pictures require greater cognitive processing time, whereas the fact

that reading is a highly overlearned skill makes words easy to access and process, and this is an issue that itself could be examined empirically.

The evidence from this study of an initial orientation towards food related information before it comes into awareness, followed by reorientation away from information once consciously perceived, is consistent with previous findings (Boon et al., 2000; Wegner, 1994). This provides support for the notion that individuals with BN and BED attend automatically to such highly salient material as information consistent to overconcern with eating, but that, once they become aware of the content, controlled processing intervenes to censor material that could be threatening.

These findings support cognitive behavioural conceptualisations of eating disorders, which suggest that overconcern with eating is a key feature in the development and maintenance of eating disorders (Fairburn et al., 2003), or that eating-disordered persons preferentially process schema-congruent information and avoid schema-incongruent information (Vitousek & Hollon, 1990). In the present instance, schema-congruent information would favour the belief that the individual should avoid food high in fat and calorie content, resulting this information receiving greater attentional resources. It is suggested that those with BN and BED automatically and unwittingly attend to this information in subliminal processing, but allocate additional attentional resources to avoid the information when it comes into awareness.

It is possible that greater attentional bias towards high fat and calorie foods in persons with BN and BED is due to the effects of dietary restraint, as those with

BN and BED have been shown to share similarly high levels of dietary restraint. There has been some variability in the conceputalisation of dietary restraint, and it has been equated with hunger in some previous studies, which have reported greater attentional bias towards high calorie food words when an individual is hungry and to low calorie food words when the individual is satiated (Placanica et al., 2002), which implies actual physiological hunger, dietary restriction, rather than adherence to dietary rules. Another possibility is that the cognitive features of dietary restraint and restriction are similar while the behaviour for each differs. This is a possible area for future research.

This study found no differences in either hunger or dietary restraint for those with eating disorders (and similarly between those who were NW and OW). This leads to the suggestion that chronic dietary restraint may be responsible for some of the differences in processing of food related information evident between individuals with eating disorders and those without eating disorders. Specifically, it may be that there is an attentional bias towards high calorie and fat foods when an individual is high in dietary restraint as these are the foods that are most commonly associated with bingeing and tend to be avoided, while low calorie and fat foods are typically selected at other times to maintain dietary control.

Further, the results also suggested that there were no differences between individuals with BN and BED in the processing of high calorie or fat foods, or with low calorie or fat foods. This suggests that individuals with BN and BED attend similarly to these food types, which is interesting in light of suggestions that individuals with BED share similar characteristics to those who are OW or obese

(i.e. they are typically OW as a result of their eating behaviour). This research found that OW and BED individuals processed food related information differently. Those with BED showed a similar pattern to persons with an eating disorder (i.e. BN), rather than disturbed eating (i.e. OW), supporting the notion that BED should be classified as an eating disorder.

Although this study found an attentional bias for food related information in those with BN and BED, it should be noted that previous research has failed to find a significant attentional bias effect for food words using the visual probe task with non-clinical participants, namely those who are high in dietary restraint (Boon et al., 2000). Various biases have been shown in those with high bulimic attitudes (Meyer, Waller, & Watson, 2000), those with high hunger levels (Mogg et al., 1998) and those who have fasted or have high eating concerns (Placanica et al., 2002). It has also been found that individuals high in dietary restraint require less time to recognise food words than neutral words, indicating a possible memory bias (Boon et al., 2000); and high EDI-II scorers have been found to demonstrate greater attentional bias to low calorie foods when they are not fasted (Placanica et al., 2002). Because of inconsistent findings, further research with less varying research methodologies are needed to clarify the field.

In summary, these findings indicate indicate an attentional bias for food related information in both BN and BED, and this attentional bias effect differs according to whether information is presented above or below conscious awareness. Specifically, subliminal processing results in greater attentional bias towards high calorie and fat foods, while supraliminal processing results in greater attentional bias

away from high calorie and fat foods. This suggests an initial, automatic

hypervigilance towards high calorie and fat foods in cases of BN and BED, followed

by a subsequent shift to avoid this information, once conscious control can be

exerted. In relation to low calorie and fat foods, it was found that individuals with

BN and BED avoid this kind of information at both stimulus presentation levels.

Overall these results suggest support for the transdiagnostic cognitive behavioural

theory of eating disorders, (Fairburn et al., 2003) suggesting that overconcern with

eating is a key feature of eating disorders, with hypervigilance and avoidance of

high calorie and fat foods having a key role in this process. These findings also have

implications for the psychotherapy of patients with eating disorders and are

commented on in Chapter 9.

8.4.3 Attentional Bias for Body Related Information in Bulimia Nervosa and Binge Eating Disorder

This study also found significant attentional bias effects for body related

information in BN and BED, but this depended on the words used to depict this

information. Specifically, attentional bias effects were not found in BN and BED

using body nouns as stimuli; rather it was found that high fat body parts (such as

"stomach" or "thighs") were generally processed faster than what could be described

as low fat body parts (such as "finger" or "neck"). Both body part words were

processed significantly faster for all groups than matched control words.

The finding for body descriptors (i.e. body adjectives) was different, with an

attentional bias effect in BN and BED, but not in individuals who were OW or NW.

These results specifically indicated that individuals with BN and BED shared similarly greater attention towards body words that suggested "fatness" than to those suggesting "thinness" when information was presented subliminally. When information was presented supraliminally, it was found that individuals with BN and BED were less attentive to information consistent with fatness and no differences were identified for information consistent with thinness. This is consistent with the previous results of differential processing of both food and body words in individuals with BN and BED, and suggests that attentional bias effects vary according to whether information is presented subliminally or supraliminally in the visual probe task (Boon et al., 2000; Placanica et al., 2002; Reiger et al., 1998; Shafran et al., 2007; Smith & Rieger, 2006).

These findings also extend previous research on eating disorders and eating related behaviour using different forms of the visual probe task (Boon et al., 2000; Placanica et al., 2002; Reiger et al., 1998; Shafran et al., 2007; Smith & Rieger, 2006) as previous research appears almost exclusively to have examined attentional bias using suprathreshold presentations. Further, previous research has not always distinguished between body related nouns and adjectives. Overall, previous research has suggested that there is an effect for attentional bias towards shape related information in individuals with a broad range of eating disorders, including AN, BN, BED and eating disorder NOS (Shafran et al., 2007); and that individuals with eating disorders such as AN and BN are less attentive to information consistent with thinness, but more attentive to information consistent with fatness (Reiger et al., 1998). Further, it has been found that individuals who are high in body

dissatisfaction demonstrate attentional bias towards shape and weight words, although this effect was study exclusively utilised negative body shape and weight words (Smith & Rieger, 2006).

It is difficult to compare the results of the present study directly with these previous ones because previous research has exclusively utilised suprathreshold presentations. However, some of the differences between the present and previous findings could be due to the nature of the variables and the duration of presentation of word stimuli, among other methodological differences. The main difference between these and previous findings is that participants in this study were showed no attentional bias towards or away from body parts (i.e. body nouns), while a differential effect was found for body descriptors (i.e. body adjectives) with those participants with BN and BED showing greater attentional bias towards words relating to body "fatness" when they were presented below awareness and away from this information when it was presented above the awareness threshold. It is also possible that the finding of attentional bias for body descriptors but not for body parts may account for some discrepancies in previous research findings.

Overall, these findings suggest that that there is an attentional bias for body related information in both BN and BED, and that similar processes operate in both diagnostic groups. The attentional bias effect was found to be specific to words relating to body descriptors (body adjectives), rather than body parts (body nouns). The effect was also distinguished by whether information was presented subliminally or supraliminally, as subliminal processing resulted in attentional bias towards high fat body descriptors, while supraliminal processing resulted in

attentional avoidance of high fat body descriptors. As with food words, this suggests

that there is an initial automatic hypervigilance in persons with BN and BED

towards fat body descriptors, followed by avoidance of this information once it

enters awareness. In relation to thin body descriptors, participants with BN and BED

avoided this kind of information at both stimulus presentation levels.

Overall, these results are consistent with the transdiagnostic cognitive

behavioural theory of eating disorders (Fairburn et al., 2003), suggesting that

overconcern with weight and shape is a key feature of eating disorders, with

hypervigilance and avoidance of fat body descriptor having a key role in this

process. These results also have implications for theories about eating disorders and

psychotherapy of these patients and are commented on in Chapter 9.

8.4.4 Attentional Bias for Perfectionism Related Information in Bulimia Nervosa and Binge Eating Disorder

This study also found support for differential processing of perfectionism-

related information, and this depended both on the duration of stimulus presentation

information and on whether the stimulus content represented perfection or

imperfection. More specifically, when information was presented below

consciousness (i.e. subliminally), individuals with BN and BED both attended more

to words suggestive of perfection than to those suggestive of imperfection. However,

when information was presented at a duration above the conscious threshold (i.e.

supraliminally), they attended less to information suggestive of perfection while no

differences were identified for information suggestive of imperfection. This is

similar to previous results with BN and BED obtained using other word sets and subliminal or supraliminal presentation in visual probe tasks.

Previous visual probe research on attentional bias in eating disorders has not explored perfectionism, although findings from the emotional Stroop task with self-threat words could be construed as relevant in this connection. That research has found attentional bias to self-directed ego threats and words related to low self-esteem in individuals with characteristics of BN as measured by the EDI-II (Waller et al., 1996).

This research provides support for suggestions that a core feature of eating disorders is perfectionism and its maintenance through cognitive processes (Fairburn et al., 2003). Specifically, this research suggests that persons with BN and BED share similarly high concern to be perfect and in achieving. It also suggests that further clarification of perfectionism's role in maintaining eating disorders is desirable.

8.4.5 Strengths and Limitations of the Attentional Bias Study

This study had a number of strengths. Most notably, no similar study appears to have compared attentional bias at subliminal and supraliminal presentation levels in these eating disorder groups. It also appears that, with one exception (Shafran et al., 2007), attentional bias in BED has not been investigated, and that single exception included only six participants who met diagnostic the criteria for BED.

Another strength of this study was that the word stimuli used in the modified visual probe task received support in another cognitive bias task utilising non-

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clinical participants (see Section 7.5 for summary of those results). The words were also developed so that a differential processing between positively and negatively valenced stimuli could be examined and were well matched to control words.

There has also been a recent suggestion that the traditional visual probe task cannot determine whether attention is being drawn towards threat or whether there is difficulty in disengaging attention from the threatening information (Fox et al., 2001; Mathews & MacLeod, 2002). The present study points to a two-stage process, of attention being initially drawn towards threat when it is below conscious awareness and then being disengaged when the person becomes conscious of the stimuli, and it is the visual probe task which has identified this process.

A number of limitations are also noted; including the fact that the research participants used only two eating disordered groups, BN and BED, to draw implications for the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003). For full testing of the transdiagnostic cognitive behavioural theory, participants with AN, BN, BED and eating disorder NOS would be necessary in further research. However, that would be an ambitious undertaking, and this research aimed only to investigate eating disorders involving binge eating.

Although the word stimuli were well matched and allowed for the detection of differential processing, it should be noted that they were developed based on ratings by individuals without eating disorders. It has recently been argued that discrepancies between the ratings made by individuals with eating disorders and non-patient community controls can influence results (Shafran et al., 2007). This suggests that further research would benefit from using word lists created and

validated with eating disordered patients, as these are likely to be the most

ecologically valid. Further, recent research has shown promising results in the use of

a pictorial visual probe task (Shafran et al., 2007), which could provide a more

sensitive index of attentional bias (Pishyar et al., 2004), although it may remain an

open question as to whether words or pictures are likely to produce more valid

results.

The word lists in this study involve contrasting subcategories for each word

type. Although the valence of the food and body shape and weight word

subcategories appeared adequately balanced, it was less clearly so for the

perfectionism word subcategories. It is possible that these words, although matched

on valence, may have been less adequate antonyms. Indeed, it is arguable that

neutral words such as "average," "usual" or "appropriate" might provide more

suitable contrasts for the words connoting perfection. It is also possible also that

the low perfectionism words used here also reflected self ego-threats or failure to

achieve rather than low perfectionism. If a more suitable set of antonyms for the

perfectionism category, which would facilitate future studies, but there also remains

the need for instruments to assess clinical perfectionism, as this term is defined in

the transdiagnostic theory.

This research is limited by the absence of control over depression levels,

which could be a confound to attentional bias. Similarly, the use of a comparison

group high in anxiety might have assisted in distinguishing whether the attentional

bias effects demonstrated were a feature of high anxiety in general or specifically

due to eating disorder psychopathology and symptomatology. This is important as

such biases are known to exist in individuals with anxiety, thus making an anxiety control group desirable (Bradley, Mogg, & Millar, 2000; MacLeod & Mathews, 1988).

The findings of this research are limited to females and no other research appears to have examined attentional bias to disorder salient information in eating disordered males. While certain similarities between males and females with eating disorder are known, it is also possible that males could attend selectively to other types of information. For example, males may attend to information consistent with muscularity to a higher degree than information consistent with thinness (Cafri et al., 2005), so male participants could usefully be the focus of future studies.

Further research could also investigate whether the attentional biases found here exacerbate other aspects of eating disorder psychopathology or symptomatology, such as dietary restraint or body image disturbance (e.g. body dissatisfaction, body checking or body avoidance). The hypervigilance and avoidance characteristics of those with eating disorders in this study could also be studied with eye tracking equipment, in which case that those with eating disorders would be expected to show an initial approach movement and then avoidance movement (more saccades between target and neutral stimuli) than non-eating disordered individuals to eating disorder related stimuli.

8.5 SUMMARY STUDY 3

Overall, this study aimed to investigate the nature of attentional biases in those with clinical eating disorders, namely BN and BED. The findings

demonstrated that both individuals with BN and BED demonstrated attentional

biases to eating, shape and weight and perfectionism stimuli. In particular,

individuals with BN and BED were found to be faster processing disorder salient

information such as words relating to high fat and calorie food choices, high fat

body descriptors and information about being perfect when this information was

presented below consciousness. When information was presented at awareness, the

results indicated that individuals with BN and BED tended to be slower in

processing the disorder salient information.

Across the word stimuli, the findings for eating, shape, weight and

perfectionism related attentional biases were greater in individuals with eating

disorders and absent in those who were OW and NW. These findings suggest that

there are transdiagnostic processes operating across eating disorder diagnoses and

that the specific feature of overconcern with eating, shape and weight and their

control, as well as the cognitive aspects of perfectionism, are key factors implicated

in the development and maintenance of eating disorders. This supported the notion

from the transdiagnostic cognitive behavioural theory of eating disorders that all

eating disorders share similar core features.

Although attentional bias research in eating disorders appears to be very

much in its infancy, these research findings together with other recent findings,

suggest that understanding this domain in psychopathological research is likely to

have important implications in providing support for cognitive behavioural models

of eating disorders, on which substantial treatments are based.

CHAPTER 9

SUMMARY AND CONCLUSIONS

9.1 SUMMARY AND IMPLICATIONS OF RESULTS

The DSM-IV (APA, 2000) currently classifies eating disorders such as BN and BED as distinct clinical conditions and this implies that they involve separate aetiological and maintenance factors, and that separate eating disorders would require different treatment approaches. While the majority of previous research has focused on the differences between these eating disorders (often using separate but related theoretical models), more recently it has been suggested that eating disorders such as BN and BED can be adequately classified and described by one transdiagnostic cognitive behavioural theory (Fairburn et al., 2003). This suggests that all eating disorders would involve similar processes and maintenance mechanisms, therefore implying that they could be treated by a similar approach.

The present study made comparisons between individuals with BN, BED, non-binge eating OW individuals and NW non-eating disordered controls. The BN and BED group were based on DSM-IV diagnostic criteria (APA, 2000) and the presence of specific eating disorder psychopathology, symptomatology and other maintaining mechanisms, as proposed by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), was examined for all participants. This study also examined the nature of cognitive bias in those with clinical eating disorders as well as non-eating disordered participants through information related to the overconcern with eating, shape and weight and achieving perfection. Comparisons were made in relation to the level of dietary restraint, binge eating, presence or absence of compensatory behaviours and levels of self-esteem, concern

with perfection, problems with mood intolerance and interpersonal difficulties in individuals with BN and BED.

Overall, the findings supported the inclusion of BED as a form of behaviour closer in its characteristics to BN than to eating disturbance. The research also suggests that although BED warrants recognition as an eating disorder, the symptomatology and psychopathology of this eating disorder (currently classified under eating disorder NOS) does not require status as a separate diagnostic entity, and that all eating disorders (i.e. AN, BN, BED and eating disorder NOS) can be classified under one common diagnosis (i.e. that of "eating disorder") with it is only the behavioural characteristics that vary on a background of common psychopathology. This suggests that although binge eating is described in a distinct way by the criteria proposed in the DSM-IV (i.e. inclusion of additional features), binge eating in BN and BED is in fact quite similar, and these two eating disorders share more features than those that distinguish them.

This is an interesting conceptual shift and is consistent with the theoretical framework of the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). This theory in fact suggests that all eating disorders share similar psychopathology, or maintenance factors, but some individuals experience greater difficulties due to the presence of additional maintenance factors. This study found support for the core features of eating disorder proposed by the transdiagnostic theory (i.e. overconcern with eating, shape and weight; dietary restraint; binge eating; and the presence or absence of compensatory behaviours) in

both BN and BED, again suggesting that diagnosing eating disorders separately is unnecessary, as at least BN and BED share similar core features.

The transdiagnostic theory of eating disorders (Fairburn et al., 2003) suggests that where these eating disorders may become distinct, is in the presence or absence of (one of more) additional maintenance mechanism. This study also found support for a link between low self-esteem and perfectionism in BN and BED, and for the influence of mood intolerance and interpersonal difficulties in BN and BED. These findings provide further support that these conditions share more similarities than differences. Overall these findings imply that, at least the eating disorders characterised by binge eating, share core common maintenance factors as well as similarities in additional barriers/difficulties in low self-esteem, perfectionism, mood intolerance and clinical perfectionism. This would suggest that studying these conditions separately is unnecessary. It also implies a shift in paradigm from examining whether BED is a separate eating disorder, or variation of BN, to eating disorders being the same, with varying behaviours exhibited across common dimensions.

As concern with food, shape and weight and with achieving perfection is also commonly found in the general population, this thesis included a preliminary study examining overconcern with eating, shape and weight and achieving perfectionism. This was examined using an explicit memory task as a measure of cognitive bias in a non-eating disordered population. This study suggested memory biases in non-eating disordered individuals vary for those high in dietary restraint and those who identified themselves as currently dieting. Specifically, restrained eaters were found

to be more likely to recall information from the environment that related to fatness in food, weight and shape, as well as imperfection; while dieters demonstrated a higher recall of information relating to healthy, low fat foods, thin body shape and weight and information about being perfect. These results highlight conceptual difficulties in the terms dietary restraint and dieting and indicate that while non-eating disordered individuals have concerns about eating, shape and weight; other factors are likely to interact with these concerns, such as whether someone is behaving in a way to achieve a certain result (as in dieters) or ruminating about their eating (as in restrained eaters). Overall, these results suggest that disturbed eaters exhibit specific memory biases to information within their environment and that cognitive bias to specific kinds of information is not a unique feature of eating disorders.

This research went on to examine one of the core features of eating psychopathology proposed by the transdiagnostic cognitive behavioural theory (Fairburn et al., 2003), that of the dysfunctional scheme for self-evaluation. This was examined in both of its characteristics, that of overconcern with eating, shape and weight; and overconcern with achieving perfection. The paradigm of investigation was from experimental cognitive psychology, using the modified visual probe task. It was found that both those with BN and BED share similar cognitive features including attentional bias towards information in the environment relating to fatness in food, weight and shape and imperfection when the information was presented below awareness and avoidance of this information when it was presented at awareness. This suggests that individuals with BN and BED share similar cognitive

features, with both having high concern for eating, shape and weight as well as

achieving perfection. It also suggests the role of a hypervigilance and avoidance

response in attentional processes in these disorders which may be outside the

person's awareness. These findings further provide empirical support for the

transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al.,

2003), as they imply that at least the binge eating related eating disorders have

common cognitive profiles maintaining the disorder.

9.2 LIMITATIONS OF THE STUDY AND DIRECTIONS FOR FUTURE RESEARCH

This study was unable to find measurement tools to assess the nature of two

of the maintaining mechanisms proposed by the transdiagnostic cognitive

behavioural theory of eating disorders (Fairburn et al., 2003) meaning that the theory

has not been fully assessed. However, the results found are very promising as both

the additional maintenance mechanisms assessed (i.e. mood intolerance and

interpersonal difficulties) were supported and all the core maintenance mechanisms

proposed by the theory were found to be evident to a similar degree across BN and

BED. The nature of core low self-esteem and clinical perfectionism requires further

investigation as measurement tools are developed to assess these constructs (as they

are described in the theory). With regard to clinical perfectionism, the specific and

unique features that may warrant further investigation include the nature of nothing

being good enough, the focus on always seeking to do it better, the features of the

dysfunctional standards and the key processes by which performance deteriorates (as

a consequence of the clinical perfectionism). In regard to core low self-esteem, it may be worthwhile for research to focus on clarifying how core low self-esteem is different from low self-esteem and the concept that with core low self-esteem, the person views the global self as utterly loathsome, whereas in low self-esteem the person may view themselves as generally dislikeable (but not the worst of the worst). This is likely to be a challenging concept to translate into a quantitative measurement tool.

It is also worth noting that this study is also limited by the availability of tools to measure all of the maintenance factors described by the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), not just core low self-esteem and clinical perfectionism. This study found related questionnaires for mood intolerance and interpersonal difficulties however further research would benefit from examining all four of the additional maintenance characteristics, and to determine the usefulness of examining them in all individuals with eating disorders (i.e. the restriction and binge eating based eating disorder, including the full range of the eating disorder NOS category, as the current research is limited to BN and BED). It is also worth noting that the theory holds that none, one or more of these characteristics may be present in eating disorders and it would be helpful for future research to determine the proportion of eating disorder cases which exhibit only the core psychopathology versus those who also exhibit one or more of the additional maintenance mechanisms.

The results of this study may also be limited as the age of the participants as those with BED were found to be significantly younger than is typically reported for

BED. This may suggest that the BED group in this study was somewhat atypical and may not be representative of the general BED population or comparable to the results of other studies, where the participants with BED are usually older. The research focus on young women between the ages of 18 and 30 years is also not representative of the general BED population. Despite this, it is worth noting that when using the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003), the younger age of these participants is not likely to be significant, as the theory suggests that all eating disorders share similar characteristics. There is also known to be a high degree of fluidity with eating disorders and one patient can be seen to have had the full range of eating disorder diagnoses across the lifetime of their eating disorder. This suggests that the clinical picture may be more simply understood by naming it as an "eating disorder" which varies by degrees of weight, restriction, bingeing or purging at any one time.

As this research suggests that eating disorders should be classified as one disorder, further research would likely benefit from examining alternative ways to classify eating disorders. Combining recent research examining the use of dimensional versus categorical models of eating disorders (Widiger & Cocker, 2003; Williamson, Gleaves, & Stewart, 2005) with that examining the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003; Wade et al., 2006) is likely to provide a way to advance the classification of eating disorders. Future research may also benefit from examining the concept of the eating continuum and whether a three-dimensional eating continuum is able to explain the progression of eating behaviour in normal, disturbed and disordered eating.

This series of studies was also unique as it examined the cognitive underpinnings of the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). This allowed for the examination of the processes involved in overconcern with eating, shape and weight (as well as overconcern with achieving perfectionism) to be examined as they automatically occur, using an empirically valid methodology. It is worth noting that a possible limitation from this study is that the word lists used for these cognitive bias tasks were created for and used only by this research. For the results of cognitive tasks to be comparable, it may be useful for future research to use a common database of word lists with words based on appropriate frequency and use data, as well as common categories.

The nature of cognitive bias in both clinical eating disorders and non-eating disordered populations could also be an interesting area of further study. Specifically, the contrast found for cognitive bias for positively and negatively valanced information in both participant groups and the influence of processing this information at and below conscious awareness would be an interesting area for further investigation. It would also be beneficial to investigate whether cognitive bias differs depending on the domain investigated (e.g. memory, attention or judgement) and to assess whether the use of pictures does enhance the ecological validity of these tasks as it has been suggested.

Further advances in the treatment approaches for BN and BED (as well as other eating disorders) is also certainly a useful direction for further research. Examining the enhanced cognitive behavioural therapy for eating disorders (based on the transdiagnostic cognitive behavioural theory) as well as interpersonal

psychotherapy, dialectical behaviour therapy and other approaches such as acceptance and commitment therapy may provide further direction for an evidence based approach to the treatment of eating disorders. The new enhanced cognitive behavioural therapy, of which is based on transdiagnostic cognitive behavioural theory, is in particular, likely to represent a significant advance in the treatment of eating disorders as it crosses diagnoses and works to address the main maintenance factors identified by this thesis.

Overall, the recommended long-term direction of further research is to further examine the application of a transdiagnostic approach beyond eating disorders. This would be beneficial as it would assist with explaining the high level of co-morbidity observed in clinical practice and the number of persons who could be diagnosed with several separate conditions based on the DSM-IV. It would also assist in the development of treatments as a transdiagnostic approach would encourage greater transfer of theory and treatment advances between disorders. The transdiagnostic perspective may also allow for explaining difference found between researches looking at similar areas, as the presence of one or more additional maintenance factors may confound the results.

9.3 CONCLUSIONS

Together, the results from this series of studies provide support for the notion that the eating disorders BN and BED can be adequately described by one theory, the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003). This suggests that the diagnosis and classification of eating disorders

warrants further examination. These studies suggests evidence for the need to review the current classification system for eating disorders. This would assist the recognition and understanding of behaviour for those individuals who receive different eating disorder diagnoses across different stages of their eating disorder. It would seem more useful to provide one diagnosis to these individuals, rather than changing the diagnosis across time when different eating disorder characteristics become more acute. For example, a person who engages in high dietary restriction and is physically underweight may also occasionally binge eat and use compensatory purging, although if the level of severity of dietary restriction decreased then the diagnosis would currently shift from AN to eating disorder NOS when it is in fact the same eating disorder with varying behavioural characteristics.

As the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) suggests that eating disorders are essentially one disorder with varying characteristics, this, and the evidence from this study, suggests that the main difference between BN and BED is that those with BN binge and purge, while those with BED binge eat only. This research found that core features of eating disorders, including overconcern with eating, shape and weight, dietary restraint, binge eating (and purging) are exhibited across both BN and BED. Support has been found for the presence of varying additional maintenance mechanisms such as mood intolerance and interpersonal difficulties as well as a possible role of low self-esteem and perfectionism.

This thesis provides significant support for the transdiagnostic cognitive behavioural theory of eating disorders (Fairburn et al., 2003) and thereby advances

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our understanding of eating disorders. In providing this support, this thesis adds to

our understanding of both BN and BED and thus aids the development of new

treatment approaches for treating these clinical conditions.

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Appendix A: Information Sheet Eating Disorder Study

INFORMATION SHEET

Thinking Processes and Eating Patterns

Mr. Peter Ball	Dr. Elaine Hart	Miss. Sarah Kinch
Senior Lecturer	Clinic Director	PhD Student
School of Psychology	School of Psychology	School of Psychology

The aim of this study is to investigate the relationship between thinking processes and eating patterns in order to investigate the characteristics of individuals with eating disorders which may maintain the condition and obstruct treatment. The project is being undertaken by Sarah Kinch as part of the requirements for a PhD in Clinical Psychology.

While the researchers cannot guarantee any personal benefit for participation, participating in this research is unlikely to be a distressing experience. The investigation may provide a better understanding of the factors which maintain eating disorders and shape more effective treatment. This research involves investigating thinking processes and eating patterns in normal weight individuals, overweight individuals and in individuals who engage in binge eating.

This study involves:
1. Answering questions about your eating habits and having your height and weight measured;
2. Completing some computer administered reaction time tasks where you will be required to respond to one of two words presented on a screen; and
3. Completing a series of self-report measures indicating your mood and thoughts about yourself.

The experiment should take approximately 2 hours and you will be given a break and drink. You will be fully debriefed upon completion of the experiment and will be given the opportunity to ask questions about the experiment.

First-year psychology students at the University of Tasmania will receive two hours course credit for participating in this study. While course credit will not be forfeited for withdrawal from the study, you will only receive course credit for the time you participated in the study.

For some people, discussion of eating habits and thoughts about oneself may lead to some feeling of anxiety. Should you or the investigator believe this to be necessary, information about and assistance in contacting appropriate psychological services will be provided. The services indicated will be free of charge. If you are already receiving therapeutic assistance you may wish to discuss participation with this study with your therapist prior to participation.

Personally identifying information will be removed from the cover page of your screening questionnaire and replaced by an identification number. The information you provide will not be re-identifiable in any database or in other publication or other research. All data for this experiment will be stored on a password-protected computer and will be kept for a period of at least five years. Accordingly, your data and that of other participants will be stored securely in the School of Psychology at the University of Tasmania until it is no longer required.

Participation in this study is voluntary, and is evidenced by signing of a consent form prior to participating. However, you may withdraw from participation at any time without disadvantage and without being required to explain your reasons. Should you wish you may also withdraw any data you have supplied up to that point.

For more information on this study you can contact Mr. Peter Ball (ph. 6226 7462), Dr. Elaine Hart (ph. 6226 2963) or Miss. Sarah Kinch (ph. 6226 1896).

This project has received ethical approval from the Human Research Ethics Committee (Tasmania) Network. If you have either concerns of an ethical nature or complaints about the manner in which the project is conducted, you may contact the Executive Officer of the Human Research Ethics Committee (Tasmania) Network, Amanda McAully (ph. 6226 2763). The Executive Officer can direct participants to the Chair of the subcommittee that reviewed the research. Students who have any personal concerns related to the study, you may also choose to discuss these concerns confidentially with a University Student Counsellor free-of-charge (ph. 6226 2697).

If you wish, you may view the results of your own personal data. You will also be kept informed during the course of the study of any significant findings that might affect you, and you will be able to access the final overall results on the School of Psychology homepage at http://www.utas.edu.au/psychol/participants_info.htm (go to RHD, then Sarah Kinch). As an alternative, contact Sarah Kinch on sjkinch@utas.edu.au or phone 6226 1896.

You will be given copies of the information sheet and statement of informed consent to keep.

Mr. Peter Ball

Dr. Elaine Hart

Miss. Sarah Kinch

Appendix B: Consent Form Eating Disorder Study

CONSENT FORM

Thinking Processes and Eating Patterns

1. I have read and understood the 'Information Sheet' for this study

2. The nature and possible effects of the study have been explained to me

3. I understand that the study involves completing some self-report questionnaires and computer administered reaction time tasks, and having my height and weight measured. I understand that participation may take up to 2 hours.

4. I understand that some people may possibly feel some anxiety during these tasks

5. I understand that my research data will be securely stored on the University of Tasmania premises for a period of at least 5 years.

6. Any questions that I have asked have been answered to my satisfaction

7. I agree that research data gathered for the study may be published provided that I cannot be identified as a participant

8. I understand that my identity will be kept confidential and that any information I supply to the researcher(s) will be used only for the purposes of the research

9. I agree to participate in this investigation and understand that I may withdraw at any time without incurring any disadvantage, and if I so wish may request that any data I have supplied to date be withdrawn from the research.

Name of participant

Signature of participant   Date

---

10. I have explained this project and the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation.

Name of investigator

Signature of investigator   Date

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Appendix C: Phone Interview to Screen for Group Membership

Participant Number _____

Phone Questions for Participants to Check Eligibility for Participation

Before I ask you to come into the University for the study, I have a few questions for you about your eating habits. Do you mind if I ask you these now?

We are asking you these questions so that we are able to allocate you to one of our groups because as you saw, we have a few different groups participating in the experiment.

Could you give me an example of what overeating or bingeing is for you?

_____

_____

_____

If Identified as an Objective Binger

Could you estimate for me, how many times a week you binge?

_____

How long have you been doing this for?

_____

Do you ever do something after eating to compensate for having eaten, like throwing up, using laxatives, using diuretics, using diet pills or doing excessive exercise?

___ Yes

___ No

Could you estimate, how many times a week you overeat or binge and then compensate for having done so?

_____

How long have you been doing this for?

_____

For All Participants

Could I ask you to estimate your height for me?

_____

Could I also ask you to estimate your weight for me?

_____

Thank you. Do you have any (more) questions about my study of what I will be asking you to do?

Before you come into the University, I would like to send you some things in the mail for you to fill in. I will include some instructions, but if you have any questions you can phone me and I can help you. These forms will take you about half an hour

to an hour to complete and I'd like you to bring them in to the University when you come in to do the study.

Please fill in these forms by your self. This is because we're interested in your individual thoughts about the questions. I will be available to assist you if you need and you can call me for help on any of the forms. You should also know that some of the forms are a bit complicated and long. Please don't feel as though you can't participate in the study if you have any trouble. We can have a look at them together when you come into the university if you need any help and we're very interested in your help with the study.

Also, if you could fill these forms in, in the order that we give them to you that would be helpful. We just ask you to do that so that we are able to say that everyone completed them in the same order in my report.

Would you like to arrange a time to come in and complete the study?

Appendix D: Visual Analogue Scales for Mood Intolerance

Participant Number _____

When considering these statements, use the following definitions:
- **Emotions** are short-term subjective experiences or the response you make to your feelings
- **Mood** is a longer-term sustained emotional state or an internal feeling or emotion that influences your behaviour the way you think

Please rate the following statements by placing a mark through the line for how you have felt *over the last 6 months*

Example:

I ...

Not at all   Very true
true of me   of me

1. I don't like to focus on my feelings

Not at all   Very true
true of me   of me

2. I find it easy to tolerate changes in my mood

Not at all   Very true
true of me   of me

3. I have difficulty tolerating strong negative emotions

Not at all   Very true
true of me   of me

4. I have difficulty tolerating strong positive emotions

Not at all   Very true
true of me   of me

5. I find it easy to express strong emotions

Not at all   Very true
true of me   of me

6. When I have strong emotions I must do something to change how I feel

---

Not at all   Very true
true of me   of me

7. I am too aware of changes in my mood

Not at all   Very true
true of me   of me

8. I don't think I have especially strong mood states

Not at all   Very true
true of me   of me

9. When I have strong emotions I feel that I can't cope with them

---

Not at all   Very true
true of me   of me

10. Strong emotions make it difficult for me to cope with everyday things

---

Not at all   Very true
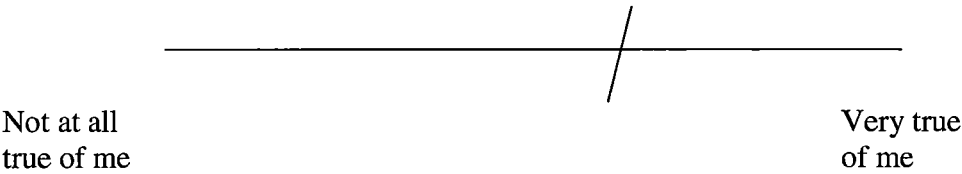true of me   of me

Appendix E: Visual Analogue Scales for Interpersonal Difficulties

Participant Number _____

Please rate the following statements by placing a mark through the line for how you have felt *over the last 6 months.*
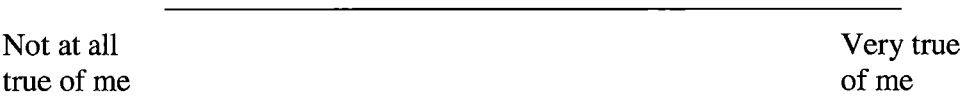
Example:

I ...

Not at all	Very true
true of me	of me

1. I feel as though there is conflict in my relationships with other people (e.g. other family members, co-workers, and friends)

Not at all	Very true
true of me	of me

2. In general, I feel that I don't have many close relationships

Not at all	Very true
true of me	of me

3. I feel as though I have little support from other people in my life

Not at all	Very true
true of me	of me

4. I feel as though I don't have much control over my interpersonal relationships

Not at all	Very true
true of me	of me
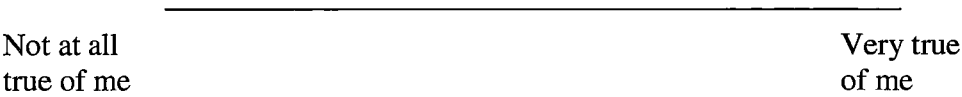
5. I feel as though I have had trouble in my relationships with others for a long time (more than a few weeks/months)

Not at all
true of me

Very true
of me

6. I feel pressured to be thin by what the people in my life say and do

Not at all
true of me

Very true
of me

7. I am more likely to manage my weight and shape (e.g. by restricting my diet, vomiting, using laxatives, diuretics, diet pills, or exercising) when I am having trouble in my relationships

Not at all
true of me

Very true
of me

8. I am more likely to binge-eat when I am having trouble in my relationships

Not at all
true of me

Very true
of me

9. When things go wrong between me and other people I am more likely to focus on managing my weight and shape

Not at all
true of me

Very true
of me

10. I've missed out on some of the normal opportunities/challenges of growing up because of the concern with my weight and shape (e.g. dating, finishing school, getting a job, or moving out of home)

Not at all
true of me

Very true
of me

11. I need to keep as slim as possible because of the kinds of work or activities that I do

Not at all true of me		Very true of me

Participant Number _____

Thinking Processes and Eating Patterns

This package contains several questionnaires that I would like you to complete prior to your participation in this study at the University. Try to complete the questionnaires as honestly as you can. **Do not put your name on any of the questionnaires.**

While you are completing the questionnaires please consider the following definitions:

Binge

A binge is when you eat an amount of food within a distinct period of time (e.g. a 2 hour period) that is definitely larger than most other people would eat under similar circumstances. During a binge, you may feel as thought you have lost control over your eating.

Overeating

Overeating is when you eat an amount of food that is larger than other people might eat under similar circumstances. e.g. overeating may be having a second helping of dinner or continually snacking throughout the day.

Don't worry if you can't fill in all of these questionnaires; I can help you complete them when you come into the University.

Please bring these questionnaires to the University with you when you come in to complete the study.

Thankyou again for your participation in this study.

Sarah Kinch
PhD Student

Appendix G: Statistical Outputs for Analyses Study 1

See attached CD

INFORMATION SHEET

Diet, Memory and Thinking Processes

Mr. Peter Ball	Dr. Elaine Hart	Miss. Sarah Kinch
Senior Lecturer	Clinic Director	PhD Student
School of Psychology	School of Psychology	School of Psychology

The aim of this study is to investigate the relationship between memory and thinking processes in females aged 18 to 35 who are in the normal weight and overweight range. The project is being undertaken by Sarah Kinch as part of the requirements for a PhD in Clinical Psychology. While the researchers cannot guarantee any personal benefit for participation, participating in this research is unlikely to be a distressing experience. The investigation may provide a better understanding of the factors which are involved in diet, as well as how we remember and think about information.

The study involves answering some questions about your eating habits. You will be then invited to attend an experimental setting in a group of other participants and will be asked to listen to 16 different lists of words and to recall as many of the words as you can within a short-time period.

The experiment should take approximately an hour and you will be fully debriefed upon completion of the experiment and will be given the opportunity to ask questions. First-year psychology students at the University of Tasmania will receive an hour course credit for participating in this study. While course credit will not be forfeited for withdrawal from the study, you will only receive course credit for the time you participated in the study.

Any identifying information collected during this experiment will be destroyed and replaced by an identification number when you attend the experimental setting. This means that the information you provide will not be re-identifiable in any database, publication or other research. All data for this experiment will be stored on a password-protected computer and will be kept for a period of at least five years. Accordingly, your data and that of other participants will be stored securely in the School of Psychology at the University of Tasmania until it is no longer required.

Participation in this study is voluntary, and is evidenced by signing of a consent form prior to participating. However, you may withdraw from participation at any time without disadvantage and without being required to explain your reasons. Should you wish you may also withdraw any data you have supplied up to that point.

For more information on this study you can contact Mr. Peter Ball (ph. 6226 7462), Dr. Elaine Hart (ph. 6226 2963) or Miss. Sarah Kinch (ph. 6226 1896).

This project has received ethical approval from the Human Research Ethics Committee (Tasmania) Network. If you have either concerns of an ethical nature or complaints about the manner in which the project is conducted, you may contact the Executive Officer of the Human Research Ethics Committee (Tasmania) Network, Amanda McAully (ph. 6226 2763). The Executive Officer can direct participants to the Chair of the subcommittee that reviewed the research. Students who have any personal concerns related to the study, may also choose to discuss these concerns confidentially with a University Student Counsellor free-of-charge (ph. 6226 2697).

If you wish, you may view the results of your own personal data. You will also be kept informed during the course of the study of any significant findings that might affect you, and you will be able to access the final overall results on the School of Psychology homepage at http://www.utas.edu.au/psychol/participants_info.htm (go to RHD, then Sarah Kinch). As an alternative, contact Sarah Kinch on sjkinch@utas.edu.au or phone 6226 1896.

You will be given copies of the information sheet and statement of informed consent to keep.

Mr. Peter Ball

Dr. Elaine Hart

Miss. Sarah Kinch

Appendix I: Consent Form Memory Study

CONSENT FORM

Diet, Memory and Thinking Processes

1. I have read and understood the 'Information Sheet' for this study.

2. The nature and possible effects of the study have been explained to me.

3. I understand that the study involves completing a self-report questionnaire, and writing down some word lists from memory. I understand that participation in this study may take up to an hour.

4. I understand that my research data will be securely stored on the University of Tasmania premises for a period of at least 5 years.

6. Any questions that I have asked have been answered to my satisfaction.

7. I agree that research data gathered for the study may be published provided that I cannot be identified as a participant.

8. I understand that my identity will be kept confidential and that any information I supply to the researcher(s) will be used only for the purposes of the research.

9. I agree to participate in this investigation and understand that I may withdraw at any time without incurring any disadvantage, and if I so wish may request that any data I have supplied to date be withdrawn from the research.

Name of participant

Signature of participant   Date

_____

10. I have explained this project and the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation.

Name of investigator

Signature of investigator   Date

Appendix J: Diet Questions for Memory Study

Participant Number _____

11. What is your current weight*?

12. What is your height*?

13. Are you currently (or have you in the past) experiencing an eating disorder?

14. Are you currently and actively dieting in order to lose weight? (if no, finished).

15. How long have you been dieting for?

16. How much weight have you lost during this time?

Thank you

* Measuring tape and scales are provided for anyone who is unsure

Appendix K: Memory Word Lists

Food Nouns

1. Cake	1. Celery
2. Cupboard	2. Lolly
3. Tomato	3. Desk
4. Couch	4. Lasagne
5. Chocolate	5. Lettuce
6. Beans	6. Cream
7. Bed	7. Chair
8. Grapes	8. Bench
9. Sausages	9. Spinach
10. Pear	10. Pizza
11. Cabinet	11. Orange
12. Biscuits	12. Bookcase
13. Chips	13. Burger
14. Table	14. Strawberry
15. Apple	15. Shelf

Body Adjectives

1. Thin	1. Overweight
2. Large	2. Fertile
3. Pruned	3. Skinny
4. Fragrant	4. Toned
5. Slender	5. Massive
6. Flabby	6. Mature
7. Chubby	7. Ripe
8. Scented	8. Slight
9. Floral	9. Grown
10. Petite	10. Plump
11. Slim	11. Huge
12. Fat	12. Trim
13. Green	13. Lush
14. Lean	14. Dainty
15. Bulky	15. Big

Body Nouns

1. Hips	1. Seed
2. Finger	2. Buttocks
3. Grass	3. Nose
4. Leaf	4. Chest
5. Ear	5. Hose
6. Calves	6. Plant
7. Tree	7. Thumb
8. Thighs	8. Breast
9. Legs	9. Heel
10. Toe	10. Flower
11. Weed	11. Hand
12. Hedge	12. Waist
13. Stomach	13. Cheeks
14. Eyes	14. Knee
15. Palm	15. Lawn

Perfectionism Adjectives

1. Perfect	1. Inland
2. Best	2. Faultless
3. Mistaken	3. Ideal
4. Boundary	4. Ineffective
5. Last	5. Elevated
6. Urban	6. Excellent
7. Winning	7. Flooded
8. Rural	8. Faulty
9. Rugged	9. Greatest
10. Critical	10. Volcanic
11. Imperfect	11. Wrong
12. Coastal	12. Inadequate
13. Competent	13. Highest
14. Successful	14. Flawed
15. Worst	15. Sandy

Appendix L: Statistical Outputs for Analyses Study 2

See attached CD

Appendix M: Visual Analogue Scales for Anxiety

Please rate the following statements by placing a mark through the line.

Right now, I am feeling...

_____

Not at all   Extremely
anxious   anxious

Appendix N: Pre-Experimental Questionnaire

<div align="right">

Participant Number _____
</div>

Age _____

Height _____cm

Weight _____kg

1. Please rate by placing a mark through the line, how hungry you are feeling right now

_____

extremely   not at all
hungry   hungry

2. What was the last meal you ate? (e.g. breakfast)

_____

3. What did you eat? (e.g. cereal with milk, piece of toast with butter and jam, yoghurt)

_____

4. What time did you eat it?

_____

5. Could you please record the current time?

_____ (am/pm)

6. Are you presently taking any medication?

____ Yes (continue)

____ No (finished)

a. What are you taking?	b. When was the last time you took it?

Appendix O: Word Pairs Modified Visual Probe Task

High Calorie/High Fat Foods
1. Cake – Table
2. Chips – Chair
3. Cream – Bed
4. Chocolate – Cabinet
5. Lolly – Couch
6. Biscuits – Bookcase
7. Pizza – Desk
8. Burger – Bench
9. Sausages – Cupboard
10. Lasagne – Shelf

Low Calorie/Low Fat Foods
1. Tomato – Ornament
2. Beans – Lamp
3. Lettuce – Drawers
4. Celery – Mantelpiece
5. Spinach – Cradle
6. Orange – Closet
7. Apple – Locker
8. Pear – Stool
9. Grapes – Bunk
10. Strawberry – Futon

Positive Body Adjectives
1. Thin – Lush
2. Skinny – Pruned
3. Slim – Ripe
4. Petite – Mature
5. Slender – Grown
6. Toned – Floral
7. Lean – Fertile
8. Slight – Green
9. Trim – Scented
10. Dainty – Fragrant

Negative Body Adjectives
1. Large – Barren
2. Fat – Bright
3. Bulky – Flowery
4. Massive – Colourful
5. Plump – Vibrant
6. Chubby – Sunny
7. Flabby – Blooming

8. Big – Vivid
9. Huge – Aromatic
10. Overweight – Perfumed

Negative Body Nouns
1. Hips – Hose
2. Thighs – Plant
3. Legs – Weed
4. Stomach – Lawn
5. Buttocks – Flower
6. Chest – Tree
7. Breast – Leaf
8. Waist – Grass
9. Calves – Hedge
10. Cheeks – Seed

Neutral Body Nouns
1. Finger – Pollen
2. Ear – Soil
3. Toe – Fence
4. Nose – Pond
5. Eyes – Rose
6. Thumb – Shrub
7. Heel – Seed
8. Hand – Dirt
9. Palm – Spade
10. Knee – Shovel

Positive Perfectionism Adjectives
1. Perfect – Boundary
2. Best – Urban
3. Winning – Rural
4. Competent – Rugged
5. Successful – Coastal
6. Faultless – Elevated
7. Ideal – Sandy
8. Excellent – Flooded
9. Greatest – Volcanic
10. Highest – Inland

Negative Perfectionism Adjectives
1. Mistake – Frontier
2. Worst – Rough
3. Last – Hilly
4. Critical – Terrestrial
5. Imperfect – Plentiful

6. Ineffective – Forested
7. Faulty – Global
8. Wrong – Rocky
9. Inadequate –Abundant
10. Flawed – Earthly

Appendix P: Neutral Words for Trial Modified Probe Task

Resort

Flour

Engineer

Until

Ticket

Produce

Orchard

Academy

Numeral

Profit

Field

Recreation

Appendix Q: Statistical Outputs for Analyses Study 3

See attached CD