The Role of Schema Compensation in Restrictive

Pathology in the Eating Disorders

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ABSTRACT

Despite relative success in establishing effective treatment for bulimia nervosa, empirically validated treatment for anorexia nervosa is lacking. It has been suggested that current models are mistakenly targeting superficial cognitions, instead of deeper level cognitions. A new schema-based cognitive-behavioural model of eating disorder pathology suggests that the process of schema compensation is key to restrictive pathology. The current experimental study aimed to provide support for the presence of such a process. Sixty-eight eating-disordered and female control participants completed a computer-driven task measuring the compensation process. The results of the study provide limited support for the hypotheses. There was some evidence of increased schema compensation in individuals with restrictive anorexia, and this was correlated with increasing levels of restrictive pathology. Clinical and research implications are discussed.

CHAPTER ONE

INTRODUCTION

The core of existing cognitive-behavioural models of anorexia nervosa (e.g., Garner & Bemis, 1982) is that anorexic behaviours are precipitated and maintained by a series of maladaptive thoughts and dysfunctional assumptions regarding body shape and weight. Whilst research suggests that cognitive-behavioural therapy (CBT) is the treatment of choice for bulimia nervosa, there is still a lack of research regarding efficacy of CBT for anorexia nervosa (Roth & Fonagy, 1996). Fairburn, Shafran and Cooper (1999) suggest that these findings may be due to a limited understanding of anorexia nervosa, and Cooper (1997) suggests that it may be advisable to address underlying maladaptive core beliefs, instead of focusing exclusively on dysfunctional assumptions. A suggested area for future cognitive research is the schema-focused model (described by Young, 1994). Within this model, researchers have investigated the role of schema content in the eating disorders. However, the importance of schema processes is gaining increasing recognition, and may illuminate new treatment angles. Using an experimental paradigm, this study aims to investigate the role of one such process - schema compensation - in women with restrictive anorexia nervosa.

The Introduction chapter is divided into three parts. First, current knowledge regarding anorexia and bulimia nervosa will be outlined, including aetiology, current treatment and empirical findings. A particular focus will be the current lack of evidence for the efficacy of treatment of anorexia nervosa

(regardless of theoretical orientation), in contrast to the effectiveness of treatments for bulimia nervosa. Second, the current literature on cognitive theory and, in particular, the schema-focused model will be discussed. The development of cognitive theory and practice for more complex and enduring cases will be discussed. Third, the current studies using experimental paradigms with individuals with eating disorders will be presented, including a summary of the contribution of such studies to the literature so far and a discussion of the advantages and disadvantages of the approach.

1.1 EATING DISORDERS

1.1.1 Introduction to the Eating Disorders

The core feature of an eating disorder is an overwhelming obsession with control of weight and shape, in conjunction with restricted, chaotic or irregular eating styles. The identification of a mental disorder associated with severe and inexplicable emaciation and amenorrhoea occurred in the late 1800s (Gull, 1874, Lasegue, 1873; cited in Russell, 1995). In 1979, Russell delineated the new syndrome of bulimia nervosa (Russell, 1979). Subsequently, further types of eating disorders (e.g., binge eating disorder) have been identified, though these are less well established.

1.1.2 Anorexia Nervosa

The primary feature of anorexia nervosa is significant and often life-threatening weight loss, often accompanied by severe restriction of food intake and strenuous exercise in order to maintain the desired weight. The individual

will place excessive importance on body weight or shape as a means of self-evaluation, and may deny the seriousness of current low body weight. Anorexia nervosa is listed on Axis I of DSM-IV (American Psychiatric Association, 1994), and may be diagnosed if the following criteria are fulfilled:

1. Refusal to maintain body weight at or above a minimally normal weight for age and height. This is defined as a body weight of less than 85% expected or the failure to gain weight during a period of weight gain, again leading to a body weight of less than 85% of that expected.

2. An intense fear of becoming fat or gaining weight, even though underweight.

3. A disturbed perception of body image and weight.

4. In post-menarchal women, amenorrhoea will be present.

There are two sub-types of anorexia nervosa. The binge eating/purging sub-type involves regular self-induced bingeing or vomiting, use of laxatives, or other purging behaviour. These behaviours are absent in the restrictive sub-type.

Anorexia nervosa is associated with many medical complications, including hormonal disturbance, osteoporosis, stunted growth, and gastrointestinal and cardiovascular complications. In patients who vomit or use laxatives, renal and metabolic complications may arise due to dehydration (Goldbloom & Kennedy, 1995). Furthermore, recent studies suggest that the brains of individuals with anorexia nervosa are different to normal controls. For example, SPECT analysis (single photon emission computed tomography) has

shown that these individuals are more likely to have asymmetric blood flow in the temporal lobes (Chowdury, Gordon & Lask, 2001). These findings are currently of uncertain significance.

Anorexia nervosa has been shown to be comorbid with anxiety and depression (Braun, Sunday & Halmi, 1994). Concurrent anxiety disorders include obsessive-compulsive disorder, phobias, social phobia, panic disorder and generalised anxiety disorder. There is debate as to the presence of personality disorder in these individuals, with different studies yielding prevalence rates from 23-80% (Halmi, 1995). However, anorectic restrictors are less likely to have a personality disorder diagnosis than the other eating disorder sub-types (Braun, Sunday & Halmi, 1994). The premorbid personality of these patients is often described as perfectionistic, shy and compliant (Vitousek & Manke, 1994). They may be harshly self-critical and profoundly insecure. In an attempt to hide or compensate for their perceived inadequacies, anorexics feel driven to excel at every activity undertaken, and may sometimes experience a brief but heady feeling when they are successful (Vitousek & Hollon, 1990). Vitousek and Hollon (1990) suggest that anorexics can be characterised by their "New Year's Resolution" cognitive style: "I must just do X, so that Y will come to pass – and I shall be a better person for my efforts". This emphasises their preference for simplicity and certainty.

1.1.3 Bulimia Nervosa

In common with anorexia nervosa, people with bulimia nervosa have a fear of obesity and attempt to lose weight. However, due to the binge eating,

they maintain a normal body weight or higher. Bulimia nervosa may be diagnosed (DSM-IV, American Psychiatric Association, 1994) if the following features are present:

1. Recurrent episodes of binge eating (more than two episodes per week) associated with a lack of control over eating behaviour during the binges.

2. Recurrent inappropriate behaviours (including self-induced vomiting, fasting, use of laxatives or diuretics, and excessive exercise) are used to compensate for loss of control and bingeing.

3. Persistent preoccupation with shape and weight, and self-evaluation is linked to shape and weight.

4. Diagnosis is excluded if the behaviours occur exclusively during episodes of anorexia nervosa.

There are two sub-types of bulimia nervosa. In the purging sub-type, individuals regularly purge after binge eating via self-induced vomiting, the abuse of laxatives or other purging behaviours. In the non-purging sub-type, individuals do not engage in purging behaviours but use compensatory methods of dieting or exercising. Individuals with bulimia nervosa may complain of fatigue, nausea, abdominal pain and feeling bloated. Associated physical complications include enlarged parotid glands (resulting in a puffy cheeked appearance), dental enamel erosion, and abrasions on the knuckles from using the hand to induce vomiting (Mitchell, 1995). Behaviours such as vomiting and laxative use lead to disturbed electrolyte levels. In particular, lowered potassium levels may result in heart attack, stroke or epileptic fit (Mitchell, 1995).

Raised levels of depression are also evident in individuals with bulimia nervosa (Braun, Sunday & Halmi, 1994). Significantly higher levels of substance and alcohol abuse are found in all bulimic subgroups of eating disorder compared with anorectic restrictors (Braun, Sunday & Halmi, 1994). A study of in-patients revealed a DSM-IV (American Psychiatric Association, 1994) diagnosis of a cluster B (dramatic) personality disorder in one third of the bulimic group, while approximately one third had a cluster C (anxious) personality disorder diagnosis (Braun, Halmi & Sunday, 1994). In contrast to the rigidity often displayed by anorectics, bulimics appear to manifest an erratic pattern, in which restraint and disinhibition alternate, suggesting premorbid characteristics of impulsivity and compulsivity (Vitousek & Manke, 1994).

1.1.4 Prevalence

Establishing the prevalence rates for eating disorders is difficult. Evidence suggests that the rates are rising or that more cases are coming to professionals' attention (Lucas, Crowson, O'Fallon, & Melton, 1999; Steinhausen, Rauss-Mason & Seidal, 1991). DSM-IV (American Psychiatric Association, 1994) estimates the prevalence of anorexia nervosa among women in late adolescence and early adulthood at between 0.5% and 1.0%. Hsu (1991) estimates rates of 1-2%. In their review of studies of prevalence rates for bulimia nervosa, Fairburn and Beglin (1990) find rates between 1% and 3%. Overwhelmingly, eating disorders are seen within a female population (female: male ratio of 10:1; Lucas et al., 1999). These are most commonly adolescent girls and young women (Beumont, 2002).

1.1.5 Outcome

Anorexia nervosa is associated with poor outcome. Zipfel, Lowe, Reas, Deter and Herzog (2000) reviewed 84 female patients a mean of 21 years (SD=2.9) after their first hospitalisation for anorexia nervosa. Although 50.6% had made a full recovery, 10.4% still met full diagnostic criteria for the disorder, and 15.6% had died from causes related to anorexia nervosa. Herzog et al. (2000) concluded that anorexia nervosa is associated with significant risk of death or suicide.

Although initially thought to be unresponsive to treatment, more recent studies suggest that bulimia nervosa is responsive to a number of different interventions, including cognitive-behavioural therapy and anti-depressants (Craighead & Agras, 1991). Thus, the outcome may be less severe than for anorexia nervosa. A follow-up study of women with bulimia nervosa a decade after initial presentation found that 11% met full criteria for bulimia nervosa, 0.6% met full criteria for anorexia nervosa, 18.5% met criteria for an eating disorder not otherwise specified (EDNOS), and 69.9% were in remission (Keel, Mitchell, Miller, Davis & Crow, 1999).

1.1.6 Aetiology and Maintenance of Anorexia Nervosa

There is a large quantity of research dedicated to understanding the aetiology of eating disorders (e.g., Szmukler, Dare & Treasure, 1995). This is derived from a variety of perspectives, including genetic, sociocultural,

psychodynamic, cognitive and family models. A number of potential causal or risk factors have been implicated, such as personality (e.g., Wonderlich, 1995) and sexual abuse (e.g., Palmer, 1995). The development of cognitive-behavioural models of anorexia nervosa will be presented below, followed by an overview of psychodynamic and systemic models to inform the reader of current theoretical positions regarding anorexia nervosa.

1.1.6.1 *Cognitive and Behavioural Models*

1.1.6.2 *Behavioural Models*

In the most simplistic behavioural form, anorexia nervosa can be conceptualised as a learned behaviour, maintained by positive reinforcement. The individual diets to lose weight, and this behaviour is reinforced by the positive reactions of others. Thus, the individual continues dieting, to the point where their health is in jeopardy. Initial dieting may be triggered by a disparaging remark regarding size, or by a pressure to be slim. Clearly, this basic model has many limitations and leaves many questions unanswered. For example, what provides the immediate reinforcement to continue dieting, and what provides the reinforcement once the individual has passed the desired shape and weight and become emaciated?

Slade's (1982) functional analysis of anorexia nervosa may be the most useful of the behavioural models in understanding the aetiology. Slade highlights the importance of antecedent factors in the context of the necessary setting conditions. Given those setting conditions (described as general dissatisfaction with life and the self, and perfectionist tendencies), initial dieting and weight loss

may be triggered by specific psychosocial stimuli (e.g., peer group comments or preoccupation with weight). Dieting is then reinforced positively by feelings of success and "being in control", and negatively through the fear of weight gain and avoidance of other problems. Thus, central to the model is the hypothesis that an individual with perfectionist tendencies, in a situation where they are experiencing dissatisfaction with their lives, will seek to gain complete control or success in one area of their life (namely, weight control). This reinforcement is sufficient to maintain and intensify dieting behaviour, eventually developing into anorexia nervosa.

Slade's conceptualisation of the role of antecedent events is supported by the evidence that many anorexics show perfectionist or obsessive tendencies (e.g., Dally & Gomez, 1979), and by evidence of a relationship between onset of dieting and stressful events, such as family difficulties and examinations (e.g., Beumont, George & Smart, 1976). It has been suggested that a major limitation of this model is the emphasis on the need for control at the expense of concerns about shape and weight (Fairburn, Shafran & Cooper, 1999). Furthermore, in common with behavioural models for other psychological difficulties, it ignores the role of cognitions (de Silva, 1995).

The role of cognitions and maladaptive thinking in eating disorders has been implicitly recognised for many years (de Silva, 1995), and was noted in the clinical observations of Bruch (1973). Garner and Bemis (1982, 1985) were significant in applying the principles of Beck's cognitive theory and treatment of depression (Beck, Rush, Shaw & Emery, 1979) to anorexia nervosa. Until

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recently, their account has been perceived as the leading cognitive-behavioural model, and is outlined below.

1.1.6.3 *Garner & Bemis's (1982, 1985) cognitive-behavioural model*

Garner and Bemis (1985) suggest that at some point, causal factors converge in the patient's belief: "it is absolutely essential that I be thin". The avoidance paradigm, which assumes that behaviour is more likely to occur following negative reinforcement, is crucial to this model. The anorexic's stereotypical behaviour, (such as exercising, dieting, vomiting and the use of purgatives) is aimed at avoiding the feared stimulus (i.e., being fat). Avoidance behaviour is generally resistant to extinction because it prevents the individual from recognising when the aversive contingencies are no longer in place. Cognitive distortion contributes to this process. Although these patterns of behavioural and cognitive avoidance suggest parallels with a phobic disorder, Garner and Bemis (1982) have commented on an aspect they believe to be unique to eating disorders. The individual is unable to place significant distance between herself and the feared stimulus, since this is herself at higher weight levels. Therefore she seeks to control her weight through constant vigilance. In contrast to other disorders in which avoidance plays a fundamental role, the anorexic may not wish to be relieved of her anxiety around food and weight gain, because her anxiety is functional in enabling her to engage in dietary restraint despite overwhelming hunger.

Garner and Bemis (1985) hypothesise that anorexia nervosa is maintained by positive as well as negative reinforcement. Weight loss provides a

sense of gratification in its own right, and a thinner weight is actively pursued through dieting. Within Western culture, a thin body is equated with sexuality, beauty, success and social competence. However, social reinforcement does not adequately account for the development of anorexia nervosa, since the emaciated shape of most anorexics far exceeds societal views of a desirable shape. Instead, it is suggested that the sense of mastery, competence and self-control derived from relentless dieting provides strong cognitive self-reinforcement. This recognition of the role of cognitive reinforcement makes the cognitive models far more apt than the simplistic behavioural models, which rely solely on societal reinforcement. This hypothesis is supported by observations on the pride and sense of accomplishment that anorexics express with regard to weight loss, and the exhilaration or elation that may follow weight loss (see Garner & Bemis, 1985).

Treatment follows the lines suggested by Beck for the treatment of depression, and includes tackling the belief "I must become thin". Assumptions include the belief that a perfect weight can and should be sought, and that weight or shape can serve as the sole indices of self-worth. Treatment focuses on the discovery of distortions in the processing and interpretation of events, and the evaluation of automatic thoughts and the underlying assumptions.

This model incorporates a number of key factors, providing a framework to understand the cognitive processes of positive and negative self-reinforcement and the cognitive distortions involved in developing and maintaining anorexia nervosa. It accounts for the role of shape and weight concerns. However, the model is more effective in explaining proximal causes

and maintenance variables than long-term aetiology (de Silva, 1995). It does not fully explain why some dieters develop an eating disorder and others do not, or which eating disorder they may develop, and it neglects issues relating to control (Fairburn, Shafran & Cooper 1999).

1.1.6.4 *Fairburn, Shafran and Cooper's (1999) cognitive-behavioural model*

In 1999, Fairburn, Shafran and Cooper proposed a new cognitive-behavioural model of the maintenance of anorexia nervosa, in which they elaborate the ideas of Slade (1982) and Garner and Bemis (1982, 1985). Fairburn, Shafran & Cooper (1999) propose that once attempts to restrict eating begin, these are reinforced through three main feedback mechanisms that vary in influence over time. The first mechanism is that introduced by Slade (1982), who states that dietary restriction enhances the sense of being in control. The second reinforcing mechanism is that aspects of starvation encourage further dietary restriction, through the physiological and psychological changes bought about by starvation (including impaired concentration, intense hunger and heightened sense of fullness), which all threaten the anorexic's sense of self-control. The third mechanism focuses on concerns about shape and weight, and may be culturally specific to Western societies. Shape and weight become inextricably bound up in the individual's perception of their self-worth. The individual engages in hypervigilant body checking and secondary avoidance, which are reinforced by distorted beliefs about weight and perceived body imperfections, and which are perceived as failures of control over eating, shape and weight. This final mechanism, which was seen as central by Garner and

Bemis (1982, 1985), is viewed as optional by Fairburn and his colleagues, accounting for anorexia nervosa in the absence of shape or weight concerns.

This new model has many strengths. Fairburn, Shafran and Cooper (1999) acknowledge that the over-evaluation of shape and weight is an important maintaining factor and that it is associated with information processing. However, in contrast to Garner and Bemis' (1982) account, they hypothesise that it operates largely through issues of self-control. The optional nature of the third mechanism provides an adequate explanation for the suggestion that concerns regarding shape and weight are a relatively recent addition to anorexia nervosa (Russell, 1995) and the absence of these concerns in many cases from non-Western cultures (Palmer, 1993).

Fairburn, Shafran & Cooper (1999) suggest the onset of the disorder may be related to a need for self-control in general, which is a result of the individual's well-recognised and typical sense of perfectionism (Vitousek & Manke, 1994) interacting with long-standing low self-esteem. Such individuals may attempt to control various aspects of their lives (such as work, sport or other interests), but soon learn that controlling their eating is the one domain impervious to external factors. Another "advantage" of dieting is that successful restriction will provide direct and immediate evidence of self-control. Thus, as Slade (1982) states, control over eating becomes essential because it is experienced as "successful behaviour in the context of perceived failure in all other areas of functioning" (p. 173). Fairburn, Shafran and Cooper (1999) also note that the ability to control eating has other implications, including impact upon the family, gaining admiration in a Western society that places value on

dieting and limiting puberty (which itself may be perceived as a threat to self-control, Crisp, 1980).

The theory has two major implications for treatment. First, Fairburn, Shafran & Cooper (1999) suggest that treatment should be considerably more focused than it is at present, and should be directed at the core maintaining mechanisms, only broadening if other issues are proving an obstacle. Features that need to be addressed are: the use of eating, shape and weight as indices of self-control and self-worth; the disturbed eating itself and associated extreme weight control behaviour; body checking; and low body weight. In contrast, low self-esteem, difficulty recognising and expressing emotions; interpersonal problems and family difficulties do not need to be addressed. The second major implication is a focus on the patient's need for self-control. Thus, the focus on what is the core of anorexia nervosa moves from shape and weight concerns to the extreme need to control eating.

1.1.6.5 *Psychodynamic models*

There are many variations on the psychodynamic model of anorexia; some of which are outlined in the following section. As with all the theoretical orientations, there is currently little evidence supporting these models (Dare, Eisler, Russell, Treasure & Dodge, 2001). Selvini-Palazzoli's (1978) object-relations view holds that the future anorexic experiences unresolved problems in the oral incorporative stage, which impede later separation-individuation. The anorexic fantasises an oral incorporation of a maternal, bad and overcontrolling object, which is then equated with the anorexic's body. She perceives her own

body as the maternal object, from which the ego must separate itself at all costs. Starvation is an attempt to end the feminisation of her body, thereby minimising the ambivalent identification with her mother. The anorexic behaviour arises from these distorted mental representations of self, body and object.

Selvini-Palazzoli's theory shares ideas with that of the work of Bruch (1962, 1973, 1978), who proposed that the self-starvation in anorexia represents a struggle for autonomy, control, competence and self-respect. The failure of the mother to recognise and confirm the child's expression of independent needs leads to an inner confusion. This confusion is expressed in the three areas of perceptual/conceptual disturbance that are central to anorexia nervosa: body image disturbance; interoceptive disturbance (characterised by an inability to identify and attend to internal sensations such as hunger, satiety, affective states and sexual feelings); and a pervasive sense of ineffectiveness (reflected by feelings of loss of control).

Self-psychologists emphasise the absence of mirroring, idealising and validation during the development of the future anorexic, which leads to deficits in self-esteem, cohesion and various self-regulating capacities, resulting in impaired self-object capacities (Goodsitt, 1997). In contrast to boys, young girls are often discouraged from seeking gratification from academic or sporting achievements. Instead, the focus is on physical appearance. The failure to provide an appropriate and affirming self-object may occur when parents themselves are self-absorbed, overwhelmed, depressed, anxious or psychotic. The girl may decide that over-reliance on others is too risky, and develops a façade of pseudo self-sufficiency. In addition, perceiving that she is the cause of

the parents' condition, she may decide never to become a burden on others, and her goal becomes to ensure others' well-being. Thus emerges the compliant model child, who in caring for others, negates her own self-object needs. On some level, she is aware of her limitations and dreads puberty and maturity because it means loss, loneliness, isolation, emptiness and coming apart. When the onset of anorexia occurs, the ignored wishes and needs break through. Now, with her emaciated frame, the anorexic can no longer be ignored. As the anorexia develops, it provides a sense of self and control for the anorexic. Attempts at recovery are defended against, as the illness is all that stands between the individual and nothingness or insignificance.

Crisp (1980, 1997) stresses the importance of a developmental model, in which the psychopathology of anorexia is rooted in the biological and psychological experiences of entering puberty and reaching adult weight. Crisp postulates that anorexia nervosa is an attempt to cope with fears and conflicts associated with psychobiological maturity. These dynamic issues have resulted in a "phobic fear" of adult body weight.

1.1.6.6 *Systemic and family models*

Proponents of family and systems models have argued convincingly that an eating disorder may reflect certain dysfunctional roles, alliances, conflicts or interactional patterns within a family (e.g., Minuchin, Rosman & Baker, 1978; Selvini-Palazzoli, 1974). Minuchin and his co-workers (Minuchin, Rosman & Baker, 1978) based their structural family therapy on the "psychosomatic family model". They hypothesise that anorexia may develop in a family in which: firstly,

the child is physiologically vulnerable; secondly, the family has certain transactional characteristics (enmeshment, rigidity, overprotectiveness and lack of conflict resolution) and finally, the sick child plays an important role in the family's pattern of conflict avoidance. The importance of this role maintains the symptoms. In contrast, the central idea of the Milan approach (Selvini-Palazzoli, 1974; Selvini-Palazzoli, Boscolo, Checchin & Prata, 1978) is that the family has become a rigidly organised interactional system in which the symptoms of the anorexia play an important role as a powerful homeostatic mechanism.

The most contemporary familial model, the Maudsley model (Dare & Eisler, 1997), suggests that an interactional systems model is necessary to be able to account for the multifactorial aetiological influences that result in anorexia. Social, genetic and physiological influences affect the individual in a unidirectional manner. However, there is also the circular influence of the life cycle, which itself is influenced by the psychological state of the individual and her family. The symptom, which arises as a result of the complex interaction of the aetiological factors, now has an impact upon the family and on the individual's psychology, and therefore the life cycle. This model also emphasises the impact upon the family of the anorectic symptoms (e.g., mood, behaviour and social functioning), and acknowledges that the dysfunction observed in these families may be a result of the intense stress caused by the life-threatening illness in a previously healthy child, rather than being the trigger of the illness.

1.1.7 Aetiology and maintenance of bulimia nervosa

In this section, the aetiology and maintenance of bulimia nervosa is outlined briefly, so that the reader can appreciate the difference in the models for bulimia and anorexia nervosa. This will assist the reader in understanding why treatment approaches are currently more successful for bulimia nervosa than anorexia nervosa (discussed in greater detail in Sections 1.1.8 & 1.1.9), and will provide a context for the current study.

The most widely used model within the eating disorders field for the aetiology and maintenance of bulimia nervosa is the cognitive model of Fairburn and his colleagues (e.g., Fairburn, 1997; Fairburn, Marcus & Wilson, 1993). As in Garner and Bemis's (1982, 1985) account of anorexia nervosa, Fairburn, Marcus and Wilson (1993) take their lead from Beck's model of depression, hypothesising that the patients' attitudes to their shape and weight are central to the maintenance of the disorder. Attitudes to food and eating are thought to be secondary consequences of attitudes to shape and weight. Patients with bulimia nervosa also hold the same rigid beliefs and emphasis on evaluation of self in terms of shape and weight as patients with anorexia nervosa. It is hypothesised that they also share certain dysfunctional styles of reasoning and disturbances in information processing. Intense concern about shape and weight causes patients to adopt extreme dieting rules, which are impossible to comply with. Inevitable minor deviations from these self-imposed rules are seen as catastrophic and a sign of weakness, reflecting a dichotomous thinking style. In contrast to restrictive anorexics, who would then intensify dieting or exercising in order to compensate for their aberrations, individuals with bulimic behaviours

are likely to temporarily abandon all controls over eating, with subsequent episodes of binge-eating. Thus, one mechanism maintaining the disorder is that of rule violation. Another mechanism, although less well elaborated, is affect-triggered binges.

Purging and other forms of extreme weight control follow binge eating as the individual attempts to compensate for the effects of binge-eating. Purging helps to maintain binge-eating by reducing the individual's anxiety about potential weight gain, and by disrupting the learned satiety that regulates food intake. In turn, binge-eating and purging cause distress and lower self-esteem, thereby reinforcing the conditions that lead to further episodes of dietary restraint and binge-eating. The model is summarised in Figure 1.1.

Figure 1.1 The cognitive view of the maintenance of bulimia nervosa (Fairburn, 1997)
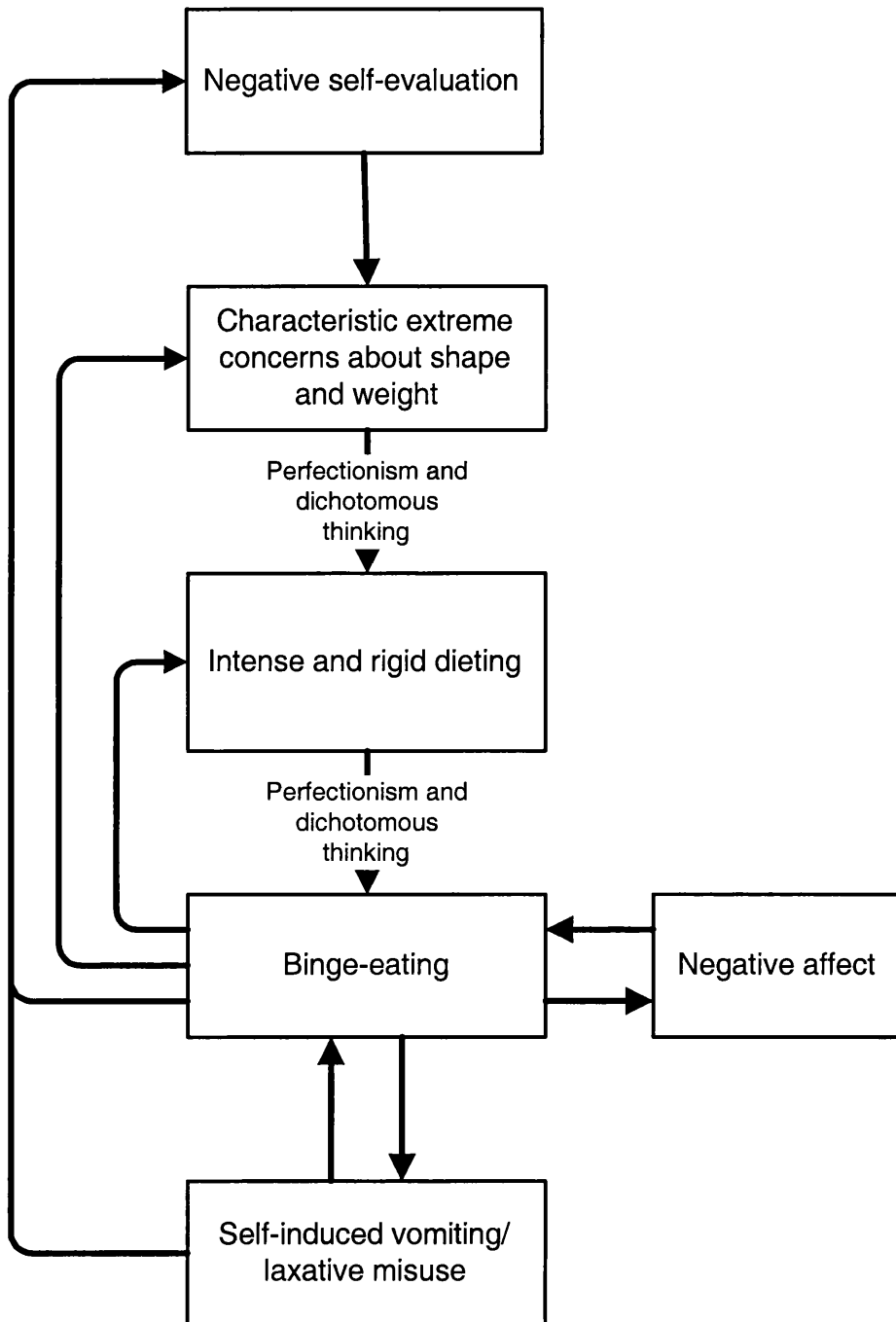
Fairburn, Marcus and Wilson's (1993) model for the treatment of bulimia nervosa also focuses on challenging and modifying negative automatic thoughts and dysfunctional assumptions. Both this and the treatment for anorexia nervosa (Garner & Bemis, 1982, 1985) were, in general, developed primarily on the basis of clinical observation and anecdotal reports, rather than empirical evidence (Cooper, 1997).

Thus, it appears that the aetiology of anorexia and bulimia nervosa share the setting conditions of low self-esteem, preoccupation with shape and weight, and an overemphasis on these factors as a measure of self-worth. The point at which the models divide appears to be in the response of the individual to deviations from their self-imposed dietary regimes - anorectics tend to increase their levels of restriction, whilst bulimics abandon all limits. As yet, the models cannot predict which eating disorder sub-type an individual will develop. Research presented in 1.1.2 and 1.1.3 suggests that premorbid personality may play a role. Other work (Waller, under consideration) and the findings from the current study may illuminate the role of differing cognitive processes in the eating disorders. These cognitive processes will be outlined at a further point in the Introduction (Section 1.2.2.2).

1.1.8 Status of treatment models for anorexia nervosa and bulimia nervosa

Cognitive–behaviour therapy and psychodynamic therapy have been suggested to be the treatments of choice for both anorexia nervosa and bulimia nervosa (Herzog, Keller, Strober, Yeh & Pai, 1992). However, published outcome trials for anorexia nervosa are still few. The first randomised controlled

trial compared cognitive-behavioural treatment with behavioural treatment and routine outpatient management (Channon, de Silva, Hemsley & Perkins, 1989). Following Garner and Bemis' (1982, 1985) model, the main focus of cognitive-behavioural treatment was identifying and challenging dysfunctional assumptions associated with eating, weight and shape. All subjects demonstrated improvement regardless of group membership, and cognitive-behavioural treatment was found to be superior only in terms of number of sessions attended (suggesting this approach may be more acceptable to patients).

A further randomised controlled trial compared dietary advice with twenty sessions of manualised cognitive therapy in the outpatient treatment of anorexia nervosa (Serfaty, Turkington, Heap, Ledsham & Jolley, 1999). In contrast to Channon et al. (1989), schema level interventions were included in the cognitive treatment. At three months, all dietary advice participants had dropped out, whilst only two of those receiving cognitive therapy dropped out. Cognitive therapy participants showed significant improvement at six months, as measured by body mass index (BMI), and by scores on the Beck Depression Inventory and the Eating Disorder Inventory. Sixteen out of 23 (70%) patients treated with cognitive therapy no longer met diagnostic criteria for anorexia nervosa. The high dropout of the control group limits the comparisons that can be made, and Serfaty et al. (1999) admit that comparisons with an alternative therapeutic intervention such as family or interpersonal therapy are desirable. Nevertheless, these preliminary findings provide some support for the hypothesis that effective intervention needs to be targeted at schema-level

beliefs about the self, rather than simply at negative assumptions regarding weight and shape.

More recently, the results of a randomised controlled trial, with a sample of 84 anorexic patients have been published, comparing four out-patient treatments – focal psychoanalytic psychotherapy, cognitive-analytic therapy (CAT), family therapy and low contact "routine" treatment (control group) (Dare, Eisler, Russell, Treasure & Dodge, 2001). All treatments were for one year, except CAT which lasted seven months. At the end of the one-year treatment phase, approximately one third of the patients in the three specialist psychotherapies no longer met diagnostic DSM criteria for anorexia nervosa, in comparison to only 5% in the routine contact group. The focal psychoanalytic psychotherapy and family therapy were superior to CAT. It is unfortunate that this trial did not incorporate a cognitive treatment to enable comparisons. It is difficult to make direct comparisons between these trials, particularly since the patients in the Dare et al. (2001) trial had been ill for longer and had lower BMIs at the start of treatment. Both these trials (Dare et al., 2001; Serfaty et al., 1999) require longer-term follow-up and are limited by the relatively small sample sizes.

In contrast, the effectiveness of cognitive-behaviour therapy for bulimia nervosa is well-established (Agras, Walsh, Fairburn, Wilson & Kraemer, 2000). A review of the best-controlled studies show a mean percentage reduction in binge-eating ranging from 93% to 73% and a reduction in purging ranging from 94% to 77% (Fairburn, Agras & Wilson, 1992). Furthermore, follow-up studies have demonstrated that the effects of CBT are maintained at five years

(Fairburn, Norman, Welch, O'Connor, Doll & Peveler, 1995). CBT has proved to be at least, if not more effective than antidepressant drug treatment and alternative psychological therapies (Wilson, Fairburn & Agras, 1997). Cognitive-behaviour therapy, within a stepped care approach, is now widely regarded as the treatment of choice for bulimia nervosa (Royal College of Psychiatrists, 1992). Hollon and Beck (1994) comment that, despite the apparent success of CBT for bulimia nervosa, it is still unclear as to whether it has been operationalised in the most powerful manner possible.

1.1.9 Implications of treatment efficacy differences

Paradoxically, it appears that the theory and treatment of bulimia nervosa (a disorder first described only 23 years ago) is more advanced than that of anorexia nervosa (which has been recognised for centuries). As discussed above, current models of anorexia nervosa have strengths (e.g., highlighting the role of shape- and weight-related cognitions in anorexia), but are based mainly upon clinical observation. From the review of the outcome literature, it is clear that (in contrast to bulimia nervosa) anorexia nervosa is not being treated effectively. It is valid, therefore, to re-examine existing knowledge with regard to cognitive theory and anorexia nervosa.

Traditional cognitive-behavioural models (e.g., Garner & Bemis, 1982, 1985) have focused on identifying and challenging negative automatic thoughts and dysfunctional assumptions regarding shape, size and weight. Core beliefs regarding underlying feelings (such as a need to be in control and a sense of failure) have been largely ignored. Recently, researchers and clinicians have

begun to suggest that traditional cognitive therapy may be mistaken in targeting less important cognitive levels (e.g., Cooper, 1997). Support for this hypothesis arises from Cooper and Fairburn's (1992) exploration of the negative self-statements of women with anorexia and bulimia nervosa. They found that women with bulimia nervosa are particularly concerned with weight and appearance, whilst women with anorexia are more concerned with eating. Since current cognitive-behavioural models have a tendency to focus on dysfunctional assumptions regarding shape and weight, this might explain why cognitive-behaviour therapy is an effective treatment for bulimia but not anorexia nervosa.

In order to increase our understanding of anorexia nervosa, clinicians and researchers (Cooper, 1997) have suggested a need to address underlying maladaptive core beliefs, rather than focusing exclusively on dysfunctional assumptions regarding shape, weight and size. In the following section, the reader will be introduced to schema theory. The evidence regarding schemas and the eating disorders will then be reviewed.

1.2 COGNITIVE THEORY AND SCHEMAS

The work of Fairburn, Shafran and Cooper (1999), Cooper (1997) and Waller and Kennerley (in press) indicates that core underlying beliefs about the self may be important in developing our understanding of anorexia nervosa. Cognitive theorists have started to address such concerns using schema theory, outlined below.

1.2.1 Cognitive Theory

Cognitive therapy was initially developed in the 1960s as a structured, short-term, present-oriented psychotherapy for depression, aimed at solving current problems and modifying dysfunctional thoughts and behaviour (Beck, 1964). The core premise of cognitive theory is that it is the individual's interpretation of beliefs surrounding an event that are responsible for psychological disturbance. Cognitive therapy has been adapted to treat a number of psychological disorders, and is empirically supported as a treatment for depression, anxiety, social phobia, obsessive-compulsive disorder and more (e.g., Beck, 1995). As exploration of cognitive therapy has continued and therapists have begun to focus on more complex presentations (including psychosis and personality disorder), the limitations of Beck's original model have become apparent (e.g., Holmes, 2002; James, 2001).

Young (1999) highlights the characteristics of people with personality disorder that might limit success in short-term cognitive therapy. First, cognitive therapy assumes that an individual has sufficient flexibility in their thinking to be able to modify their maladaptive beliefs after engaging in collaborative empiricism with the therapist. According to DSM-IV (American Psychiatric Association, 1994) and Young's clinical experience, people with personality disorder have a pervasive, inflexible and enduring cognitive pattern, which is a serious obstacle to collaborative empiricism. The rigidity of thinking found in people with personality disorders can be compared to the rigid thinking style found in those with eating disorders. Second, Young suggests that (unlike short-term patients) individuals with personality disorder are more likely to "block" or

avoid thoughts and feelings because they are painful. This, too, can be viewed as representative of the eating disorder patient who denies there is anything wrong. The third characteristic (shared by patients with personality disorder and eating disorders) is interpersonal difficulties, which have implications for the therapeutic relationship.

Therefore, as researchers in the eating disorders field became more aware of the importance of deeper, core beliefs (e.g., Cooper, 1997), Young and his colleagues (e.g., Layden, Newman, Freeman & Morse, 1993; Padesky, 1994) were developing a cognitive therapy that focused upon these schema-level representations. The parallels between individuals with personality disorder and eating disorder (and, indeed, those with comorbid eating and personality disorder presentations) discussed above and further features of anorexics (including possible resistance to treatment, low motivation, and an active "valuing" of their disorder) support the suggestion that schema-focused cognitive therapy may prove highly relevant to this population.

1.2.2 Schema Theory

While Beck defined and included a schema level of cognition in his model (Beck et al., 1979), Young (1999) conceptualises schema therapy as an expansion of the short-term cognitive model proposed by Beck and his colleagues (1979). The term "schemas" has been used for many years with varying degrees of precision (Williams, Watts, MacLeod & Mathews, 1997). A brief description of the more general theoretical cognitive understanding of the term schemas will be given, followed by Young's more precise clinically-led

definition. From a theoretical and non-clinical perspective, schemas are conceptualised as stored bodies of knowledge, which interact with the encoding, comprehension and retrieval of new information by guiding attention, expectancies and interpretation. The schemas then act as templates by which new information is organised (Williams et al., 1997). Thus, schemas function to assist us when we encounter new experiences that resemble previous situations (e.g., if we go to a new supermarket, we will expect to see goods for sale, trolleys or baskets to carry goods in, and so on).

To date, the development of schema theory has been clinically-led, and the model is intended primarily to guide intervention rather than being seen as a comprehensive model of psychopathology. The model is organised around early maladaptive schemas (EMS), and schema processes, which are described below.

1.2.2.1 *Early Maladaptive Schemas*

The term "Early Maladaptive Schemas" is used to describe extremely stable, negative, rigid and global core beliefs, which develop during childhood and which are expanded upon throughout the individual's lifetime. The early childhood experiences of people who develop these negative schemas are described as invalidating and lacking in support and nurturance. In childhood, these schemas were adaptive because they enabled the child to understand and cope with aversive and/or abusive experiences. They are then used as a template to interpret new experiences. Because schemas are rigid and global structures, they persist into adulthood, where they are maintained by a number

of cognitive processes and distortions. When a schema or core belief is triggered, the individual will experience intense affect, such as a high level of anger, anxiety, sadness or shame. It is this intolerable level of affect that drives the schema processes, as the individual attempts to avoid or eradicate these feelings.

With regard to this clinical definition of early maladaptive schema, the terms schema and core belief are used interchangeably to represent the deepest level of cognitions. To date, Young has identified a number of early maladaptive schemas (Appendix 1).

1.2.2.2 *Schema processes*

Three major schema processes have been identified - avoidance, maintenance and compensation. It is these processes that explain how schemas function within an individual.

1.2.2.2.1 *Schema maintenance*

Schema maintenance refers to the process by which the schemas are directly reinforced or perpetuated, including cognitive distortions and maladaptive thinking. This accounts for the rigidity observed in such individuals. At the cognitive level, schema maintenance is accomplished by the processes already described by Beck (1967) as cognitive distortions (e.g., exaggerating information that confirms the schema, minimizing contradictory evidence). New information is distorted to keep the schema intact.

At the behavioural level, schema maintenance is achieved through self-defeating behaviour patterns. These behaviours may have been adaptive and functional in the context of the individual's dysfunctional childhood environment. In adulthood, however, away from the family of origin, these behaviours serve to reinforce the negative schema (Young, 1999).

1.2.2.2.2 *Schema avoidance*

The importance of avoidance has already been noted. Schema avoidance is the process by which an individual uses cognitive, emotional or behavioural strategies to avoid triggering a schema and the intensely painful affect associated with it. This process can be automatic or volitional. At a cognitive level, this involves attempts to block thoughts or images that might trigger the schema. Patients may say they do not wish to think about an event that triggers the schema, or will be unable to visualise it. Other strategies include depersonalisation (in which the individual removes herself psychologically from the situation that triggers the schema) and compulsive behaviours (which function by distracting the individual from focusing on their thoughts). Behavioural avoidance occurs when the individual seeks to avoid real-life events or circumstances that might trigger their schemata.

1.2.2.2.3 *Schema compensation*

The final process by which schemas are reinforced is known as schema compensation. Young (1994) observed that many patients adopt cognitive or behavioural styles that appear to be the opposite of what would be predicted

from their schemas and that the patients were overcompensating for their schema. However, it appears that in an attempt to challenge their schemas, these individuals are often too extreme, and this may lead to undesirable consequences (e.g., an individual who has a schema relating to dependence may become very independent, even in situations in which seeking help is appropriate). It has been suggested that in restrictive disorders, schema compensation may manifest behaviourally, for example, restricting dietary intake or compulsively exercising, in order to perfect the body.

1.2.4 Current research status regarding eating disorders and schemas

The majority of research to date has focused on identifying the content of schemas in the eating disorders (e.g., Leung, Waller & Thomas, 1999; Waller, Ohanian, Meyer & Osman, 2000). Both anorexic and bulimic women have significantly higher levels of maladaptive core beliefs (schema content) than comparison women (Cooper & Turner, 2000; Leung et al., 1999). However, there is no significant difference between anorexic and bulimic individuals in terms of schema content (Leung et al., 2000). It may be that similar patterns of maladaptive schema content are present in other psychopathologies, for example, depression (Waller, Shah, Ohanian & Elliot, 2001). Furthermore, differing patterns of association between core beliefs and eating psychopathology have been found between anorexic and bulimic women (Leung et al., 1999). In women with bulimia nervosa, unhealthy eating attitudes are associated with eight of the 16 core beliefs, but there was no such association in the women with restrictive anorexia (Leung et al., 1999). For example, in bulimic

women, emotional inhibition beliefs predict severity of bingeing, while defectiveness/shame beliefs predict severity of vomiting (Waller et al., 2000). Leung et al. (1999) concluded that it is not the intensity of the core beliefs that is important in distinguishing between anorexic and bulimic individuals but how the beliefs relate to the maladaptive eating patterns. Furthermore, they suggest that core beliefs may play very different roles in anorexia nervosa and bulimia nervosa. It has been suggested, therefore, that schema processes may be superior to schema content in understanding and distinguishing eating pathologies (Waller, 2000). Research interest has therefore extended to include schema processes as well as schema content (Vitousek & Hollon, 1990).

Some research has focused on identifying the cognitive processes involved in bulimic pathology, using tests of information processing (e.g., Waller & Meyer, 1997; Waller & Mijatovich, 1998; Waller, Quinton & Watson, 1995). Studies have demonstrated that the subliminal presentation of threat cues triggers eating in women with unhealthy eating attitudes (Meyer & Waller, 2000; Waller & Mijatovich, 1998). Non-clinical women with more bulimic attitudes have been shown to take longer to respond to threatening than neutral words on a computer-driven task of information processing, whilst there was no such effect for those women with less bulimic attitudes (Waller, Quinton & Watson, 1995). Furthermore, women with bulimic attitudes are differentially sensitive to threat cues, with ego threat cues (e.g., words such as "failure" or "stupid") having greater impact than physical threat cues (e.g., "hurt", "kill") (Waller & Meyer, 1997; Waller & Mijatovich, 1998). These findings have led to the hypothesis that bulimic attitudes are associated with a characteristic pattern of cognitive

processing. It has been proposed that, under abandonment threats, a schema avoidance process is activated, in which the bulimic individual uses recognised behaviours (e.g., binging, vomiting) to escape from awareness of that threat. This concurs with previous suggestions that bulimia is linked with efforts to avoid unbearable cognitive or emotional states (Heatherton & Baumeister, 1991; Lacey, 1986). Attempts have been made to differentiate between domains of schema avoidance, and to find a means of assessing avoidance that is clinically meaningful when working with individuals with bulimia (Spranger, Waller & Bryant-Waugh, 2001).

Less investigation has occurred with regard to the schema processes that underpin restrictive attitudes and behaviours (i.e., those that predominate in anorexia).

1.2.3 Literature review of schema-focused cognitive therapy

Controlled clinical trials comparing the efficacy of schema-focused cognitive therapy with traditional cognitive therapy have yet to be conducted (James, 2001). However, the literature reports successful clinic-based schema-focused interventions, including: relapse prevention in anxiety and depressive disorders (Morrison, 2000; Young, Beck & Weinberger, 1993); treatment of avoidant, dependent, compulsive, passive-aggressive, histrionic, borderline, and narcissistic personality disorders; treatment of substance abuse during the recovery phase; and treatment of those with a history of eating disorders, chronic pain, or childhood abuse (Layden et al., 1993; McGinn, Young & Sanderson, 1995).

1.2.5 Implications for future research

A new model is under development, aimed at understanding and treating these deeper level cognitions (Waller, under consideration). It is hypothesised that bulimic behaviours are characteristic of schema avoidance, whilst restrictive behaviours are characteristic of schema compensation. It is emphasised that these models represent restrictive and bulimic pathology, not diagnoses. The schema compensation process involves making consistent efforts to reduce awareness of negative cognitions in order to avoid the triggering of aversive and intolerable emotion. This often involves the use of compensatory schemas – alternative schemas that do not trigger aversive levels of affect. The restrictive pathology model is presented below (Figure 1.2).

Figure 1.2 The schema-focused model of restrictive pathology (Waller, under consideration)

```
                    ┌─────────────────────────────────────┐
                    │         Early experiences           │
                    │ - e.g., critical/controlling         │
                    │ parenting; losses; emotional         │
                    │ absence; sexual/physical trauma      │
                    └─────────────────────────────────────┘
                                    │
                                    ▼
                    ┌─────────────────────────────────────┐        ┌──────────────────────────┐
                    │          Core beliefs               │        │   Ego threat trigger     │
                    │ - e.g., abandonment; defectiveness;  │◄───────│ - e.g., examination; loss │
                    │ failure to achieve; vulnerability to │        │ of relationship; social   │
                    │ harm; mistrust/abuse; emotional      │        │ conflict                  │
                    │ deprivation; emotional inhibition    │        └──────────────────────────┘
                    └─────────────────────────────────────┘
                                    │
                                    ▼
                    ┌─────────────────────────────────────┐
                    │          Hot cognitions             │
                    │ e.g., "I am going to be betrayed and │
                    │ rejected."; "People will see how     │
                    │ dreadful I am."                      │
                    └─────────────────────────────────────┘
                                    │
                                    ▼
                    ┌─────────────────────────────────────┐
                    │      Threat of activation of        │
                    │     intolerable negative affect     │
                    └─────────────────────────────────────┘
                                    │
                                    ▼
                    ┌─────────────────────────────────────┐        ┌──────────────────────────────────┐
                    │   Activation of compensatory        │        │ Use of specific schemata/        │
                    │      schemata/cognitions            │◄┈┈┈┈┈┈┈│ behaviour(s) determined by:      │
                    │ - e.g., emotional inhibition; social │        │ • functional utility in the       │
                    │ isolation; subjugation; self-        │        │   environment where learned       │
                    │ sacrifice; unrelenting standards     │        │   (e.g., parents demand or model  │
                    │ (perfectionism)                     │        │   high standards)                 │
                    └─────────────────────────────────────┘        │ • functional relevance in the     │
                                    │                               │   current environment (e.g.,      │
                                    ▼                               │   criticism over weight/shape)    │
                    ┌─────────────────────────────────────┐        └──────────────────────────────────┘
                    │      Compensatory behaviours        │
                    │ - establish perceived control and   │
                    │       reduce/avoid affect           │┈┈┈┈┈┈┈┈
                    │ (e.g., restricting intake;          │
                    │ obsessional-compulsive behaviours;  │
                    │ compulsive exercise; compulsive     │
                    │ self-harm)                          │
                    └─────────────────────────────────────┘
                                    │
                                    ▼
                    ┌─────────────────────────────────────┐
                    │  Cognitions relevant to specific    │
                    │            behaviours               │
                    │ e.g., negative automatic thoughts   │
                    │ and conditional assumptions         │
                    │ regarding food, weight and shape    │
                    └─────────────────────────────────────┘
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Short-term reduction

Longer-term enhancement

Short-term reduction

Short-term positive affect

It could be suggested that the type of behaviour and schema reflecting a compensation process include an unrelenting standards schema. This corresponds with the well-documented image of a restrictive anorexic as perfectionistic and high in achievement (Vitousek & Manke, 1994). Bruch (1982) observed that individuals with anorexia feel compelled to conceal or compensate for perceived imperfections by striving to excel at everything they do. High levels of obsessive and compulsive behaviours are often observed in individuals with anorexia (Serpell, Livingstone, Neiderman & Lask, under consideration). Waller (under consideration), therefore, suggests that whilst bulimic behaviours are best understood as characteristic of impulsive elements, restrictive pathology is best characterised as the more compulsive element of the eating disorders. These hypotheses suggest a new treatment angle for the eating disorders, using a schema-focused cognitive approach that addresses the process as well as the content of core beliefs (Kennerley, 1997; Waller, under consideration).

A further implication of the current research is increased understanding of the differences between the eating disorders, and the ability to predict which individual will develop which disorder. Although the behaviour of individuals with anorexia and bulimia is superficially quite different, in key respects they are almost identical. Both validate their self-worth in terms of shape and weight, both fear weight gain and fatness, and both devote a large proportion of time and energy in the pursuit of thinness. More often than not, the difference is explained in terms of premorbid personality, but it remains to be established whether these distinctions will be represented at a cognitive level. The hypothesis presented

here suggests that it is the underlying cognitive or schematic processes that are responsible for the different behaviours.

3. EXPERIMENTAL PARADIGMS

Work on the cognitive theory of anorexia nervosa (e.g., Cooper, 1997), findings regarding the triggering of a schema avoidance process in bulimics when faced with a "threat" (e.g., Waller & Mijatovich, 1998) and current research on schema content and process in the eating disorders have culminated in a new hypothesis. This hypothesis suggests that for individuals with restrictive pathology, "threat" situations result in the activation of a schema compensation process. The aim of the current study, therefore, was to operationalise and test this hypothesis. Since a large quantity of non-experimental data already exists, an experimental paradigm offers the strongest opportunity to confirm or disconfirm these ideas. A subliminal procedure was selected because it is suggested that conscious presentation of material allows participants to modify their responses (Bornstein, 1990).

The next section, therefore, will outline the concept of parallel processing followed by a description of the subliminal psychodynamic activation procedure, (SPA; Silverman, 1983) and an outline of recent relevant research in the eating disorder field. This will enable the reader to understand the rationale for the study.

1.3.1 Preconscious and conscious processing

It has long been known that in some situations (e.g., hypnosis), people are receptive to information that they are not consciously aware of. Psychologists have proposed that there are two cognitive systems that process information in parallel (e.g., Brewin, 1988; Dixon, 1981), one under control and one not under the control of the individual. Conscious processes are highly flexible and adaptive, but the processing capacity is hampered by the limited attention span of the individual. Conscious processing is deliberate, effortful and adaptable to new situations, but is vulnerable to disruption when the individual's attention is distracted. In contrast, non-conscious processes are rapid, relatively inflexible, require minimal attention to occur, and may be activated without attention or awareness. Therefore, an individual's behaviour can be regulated by conscious or unconscious thought.

An important characteristic of pre-conscious processing is that the recipient of a subliminal message remains unaware, both of the stimulus and the fact that they are being stimulated. This lack of awareness means that the individual is unable consciously to modify his or her possible responses. Consequently, researchers using subliminal processing techniques propose that they are seeing the participant's "true" response. A wide variety of exploratory paradigms utilising subliminal stimuli have shown that a particularly relevant input will activate an emotionally charged response (Dixon, 1981). In contrast, when the same stimuli are presented supraliminally (and therefore processed in a conscious manner), there is no impact.

1.3.3 The subliminal psychodynamic activation (SPA) method

The basic premise of the SPA method is that the unconscious fears, motives and wishes that underlie behaviour can be triggered through the presentation of stimuli below the level of conscious awareness. To affect behaviour, the message must be presented subliminally so that the individual cannot rationalise it. Bornstein's (1990) meta-analysis of SPA research supports this hypothesis, demonstrating that subliminal presentation of the stimuli had a significantly stronger effect upon behaviour than the same stimuli presented supraliminally.

The SPA method clearly stems from a psychoanalytic perspective, and this is apparent in the terminology used. There is support, however, for interpreting preconscious processing of subliminal visual cues within a cognitive framework (Brewin, 1988; Williams et al., 1997). Since the current hypothesis requires a procedure in which individuals are unable consciously to modify emotions that they find intolerable, a subliminal procedure was called for.

The validity of the SPA method has been controversial. A typical SPA experiment involves presenting experimental and control stimuli subliminally to two or more groups who show different symptoms or behaviour. Attempts at replication have not always been successful (e.g. Borgeld, 1990; Holmes, 1991). However, Silverman (1985) argues that such failures are due to procedural inadequacies, and more recent reviews have provided support for the SPA approach (Fudin & Benjamin, 1992; Hardaway, 1990).

1.3.4 The use of cognitive processing paradigms in the study of eating disorders

Cognitive processing paradigms offer clear advantages in the study of eating disorders (Vitousek, 1996). They use strategies that participants are unable to decode, use dependent variables that are difficult to falsify, and can reduce or eliminate the dependency on self-report. They avoid the problem of subjects trying to give socially desirable responses, and are easy to administer. A further advantage is that they enable researchers to move beyond cognitive content to explore process. Ten general strategies for the investigation of information processing in individuals with eating disorders have been identified (Vitousek & Hollon, 1990). It is suggested that individuals with eating disorders differ from others in the following ways: the ease and speed with which food- and weight-related stimuli are processed; the elaboration of meaning around the construct of weight; the intrusion of weight-related content into unrelated or ambiguous situations; the possession of differentiated knowledge structures in connected domains; an enhanced memory for schema-consistent information; the ability to retrieve schema-relevant behavioural evidence; the degree of confidence in judgements and predictions about food and weight; the specific relevance of weight concerns for the self; the level of cognitive and affective involvement in weight-related events; and, lastly, the resistance to counter-schematic information (Vitousek & Hollon, 1990).

A number of studies, using a variety of techniques, have used the concept of preconscious and conscious information processing in the field of eating disorders. A modified version of the Stroop test, demonstrated that both

anorexic and bulimic individuals (but not control participants) selectively process eating- and weight-related information (Cooper & Todd, 1997). Lovell, Williams and Hill (1997) carried out a similar study, in which the inclusion of recovered anorexia and bulimia sufferers allowed them to test the hypothesis that selective attention to concerns regarding weight and shape might be part of an enduring cognitive schema. As in previous studies, women with eating disorders were slower to colour-name shape-related words. Although women who had recovered from bulimia did not differ from control participants, women who had recovered from anorexia continued to selectively process information related to shape concerns. A further elaboration involved measuring the time it took participants to solve neutral, food-related and threat-related anagrams (Waller & Meyer, 1997).

Evidence from modified Stroop studies has shown that bulimics and non-clinical women with bulimic attitudes are slower to colour-name ego threat cues (words such as "failure", "inferior", "stupid") than physical threat cues ("hurt", "maim", "kill") (McManus, Waller & Chadwick, 1996; Waller, Watkins, Shuck & McManus, 1996). Investigating the same hypothesis that bulimic attitudes are associated with the processing of threat cues, Patton (1992) used subliminal visual presentation of a threatening stimulus ("Mama is leaving me") or a neutral message ("Mama is loaning it"). In a subsequent taste discrimination task, women with unhealthy eating attitudes ate more following the threat message. No such effect was found following supraliminal presentation or among the control group. Waller and Mijatovich (1998) presented subliminal neutral, ego threat and physical threat messages to women with unhealthy eating attitudes,

also using the amount of food subsequently eaten as the dependent variable. Their findings suggested that both ego and physical threats are relevant, although ego threats are more salient. In a further study using a non-clinical population, Meyer and Waller (2000) preceded a modified Stroop test with one of three subliminal cues. The cues were an abandonment cue ("lonely"), an appetitive cue ("hungry") and a neutral cue ("gallery"). They concluded that there were specific links between cue type and schematic content. Exposure to the subliminal abandonment cues led to the activation of food-related schemas, whilst exposure to the subliminal appetitive cue led to greater activation of abandonment schemas.

Particularly relevant to the current study is the literature regarding computer-driven tests of the processing of threat-related information. One such study (Waller, Quinton & Watson, 1995) involved participants having to identify whether a stimulus word (neutral or threat) that was shown initially was present or absent from an array of 16 words displayed subsequently. They found that women with bulimic eating attitudes were relatively slow at identification if the threat word had been present in the display, suggesting cognitive avoidance.

1.4 SUMMARY OF THE LITERATURE

In the search for an effective treatment for anorexia nervosa, cognitive theorists and clinicians have shifted from an initial focus on shape and weight concerns (e.g., Garner & Bemis, 1985), via an increased emphasis on the need for control (Fairburn, Shafran & Cooper, 1999), to investigating schema-level cognitions (e.g., Cooper, 1997; Waller, under consideration). Both questionnaire

(e.g., Leung et al., 1999) and experimental (e.g., Meyer & Waller, 2000) methodologies have demonstrated the higher incidence of maladaptive schemas in both bulimic and anorexic populations than controls. Since schema content cannot distinguish between anorexia nervosa and bulimia nervosa (Cooper & Hunt, 1998; Leung et al., 1999), attention has turned to schema processes. Whilst preliminary work has investigated the role of schema avoidance in bulimic pathology (Spranger et al., 2001), little is known about restrictive pathology. A new model (Waller, under consideration) hypothesises that in restrictive disorders, a schema compensation process is activated by the threat of aversive emotion. Behaviourally, this process is manifested by attempting to be perfect at something (e.g., restricting diet, increasing exercise, gaining top grades) or other compensatory behaviours (e.g., emotional inhibition). In a questionnaire study, Luck, Waller, Meyer & Lacey (under consideration) found evidence for schema compensation in restrictive but not bulimic individuals.

Models of schema processing are still in their infancy and thus require further investigation. In particular, the models would be strengthened by the use of a variety of methodologies, such as experimental methodologies or treatment outcome studies for schema-focused interventions.

1.5 AIMS OF THE STUDY

This experimental study aims to investigate the preliminary finding that a schema compensation process is present in restrictive anorexics. The computer-driven search task enables us to discover if restrictive anorexic women utilise a different cognitive process (i.e., schema compensation) in threatening situations,

relative to individuals with other eating disorders and control participants, as predicted by the new schema model (Waller, under consideration). As discussed above (section 1.4), the use of a methodology different to that of previous studies (Luck et al., under consideration), will further strengthen our understanding of schema processes.

1.5.1 Research Questions/Hypotheses

The study will test the following hypotheses:

1. Restrictive eating attitudes are associated with a characteristic form of cognitive processing (i.e., schema compensation).

2. Level of schema compensation will be related to the level and type of unhealthy eating patterns (i.e., type of restrictive attitude and behaviour).

3. The different behaviours demonstrated by individuals with restrictive and bulimic pathology relate to the different underlying schema processes.

4. It is schema process, rather than schema content, that is predictive of pathology.

CHAPTER TWO

METHOD

2.1 Design

The study followed an experimental paradigm, using a subliminal psychodynamic activation (SPA) procedure (Silverman, 1983), with a cohort of female eating disorder patients. There were four participant groups: restrictive anorexic women; bulimic anorexic women; bulimia nervosa women and non-eating-disordered women. Participants were asked to complete a computer-driven test of cognitive processing, and to complete a questionnaire packet to assess schema content and processing and level of restrictive behaviour.

2.2 Participants

A total of 73 individuals were recruited. Of these, three were excluded because they did not fit DSM-IV criteria for anorexia or bulimia nervosa. Two further individuals (a bulimic anorexic and a bulimic) recorded error rates above the cut-off of 25% on the computer-processing task, and so were also excluded. Therefore, the participants were 48 female patients with eating disorders and 20 female non-clinical control participants. The eating disorder participants comprised 19 restrictive anorexics, 9 bulimic anorexics and 20 bulimia nervosa patients, diagnosed using the criteria outlined in the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994). Experienced professionals, using a semi-structured interview, made the diagnoses. Participants were consecutive referrals to a

specialist eating disorder service (where they had been referred for assessment of their eating disorder), and current in- and outpatients of the same service (who still met DSM-IV criteria). They were given an information sheet regarding the experiment (Appendix 2) and were offered the opportunity to take part. They were informed that whether or not they took part was not related to the treatment they would receive.

The comparison group consisted of 20 non-eating-disordered women aged 18 upwards. They were drawn from a non-student population (recruited via opportunity sampling) to aid demographic comparability with the clinical samples. Exclusion criterion for control participants was the presence (currently or in the past) of an eating disorder. An exclusion criterion for all participants was the presence of dyslexia, since this would have affected the visual search task.

The participant groups were selected in this manner because the underlying model predicts that the experimental effects will occur only in patients with restrictive pathology, because of their cognitive processing style. The inclusion of other types of eating disorder patients eliminates the risk that such an effect may be due to having any type of eating disorder or psychological difficulties. Power analysis (using G-power; Faul & Erdfelder, 1992), based on 80% power with a 5% significance level, demonstrated that there should be a total sample of 52 participants to give an effect size equalling 0.7. Due to the large numbers that needed to be recruited in a relatively short time scale and the low numbers of males presenting to an eating disorders service, it was decided to limit the study to females only.

Table 2.1: Mean age and body mass index of participants

	Female controls	Restrictive anorexics	Bulimic anorexics	Bulimics
N	20	19	9	20
Mean age	30.15	27.95	27.00	28.35
(s.d.)	(8.21)	(10.4)	(5.72)	(8.41)
Mean weight (kg)	64.00	45.03	47.59	55.53
(s.d.)	(9.23)	(6.82)	(6.05)	(5.86)
Mean height (m)	1.67	1.65	1.63	1.64
(s.d.)	(0.06)	(0.06)	(0.06)	(0.06)
Mean Body Mass Index (BMI)*	25.18	16.49	17.75	20.67
(s.d.)	(9.19)	(2.18)	(1.29)	(1.68)

*BMI = kg/m^2

2.3 Ethics

Ethical approval for the study was obtained from the Local Research Ethics Committee at St George's Healthcare NHS Trust (Appendix 3).

2.4 Procedure

In response to their referral to the Eating Disorders Service, clinical participants were initially sent an appointment letter for an assessment. This also informed them that they might be asked to take part in a research trial, but that this was optional and would not affect their treatment. Current patients were accessed via their clinician, who informed them of the study and gave them the

information sheet to read. They were then offered the opportunity to take part at a later date.

Clinical participants were firstly assessed by a qualified clinician experienced in the field of eating disorders, and were given a DSM-IV diagnosis. Weight and height were measured, in order to calculate body mass index (BMI=weight (kg)/height (m)^2). After the assessment, they met the researcher, who gave them an information sheet regarding the experiment (Appendix 2). After reading and discussing this, participants gave informed consent (Appendix 2). Three individuals chose to decline to take part at this point. Participants were asked to complete the computer-driven task, which took approximately ten minutes. Participants then completed a brief subliminal word validation task, to confirm they had not seen the words (described in section 2.5.4). They were then asked to complete a questionnaire packet, which asked questions about how they saw themselves and their eating. This was given last to avoid activating eating- or self-related concerns prior to the computer task. Participants were then debriefed and thanked for their time. The researcher was blind to both diagnosis and the questionnaire results at the time of administering the experimental task.

2.5 Materials and Measures

2.5.1 *Measures*

Each participant completed the following five questionnaires:

- Young Schema Questionnaire – Short Version (Young, 1998), which measures core beliefs or schemas;

- Young Compensation Inventory (Young, 1999), which measures the use of compensation strategies;

- Young-Rygh Avoidance Inventory (Young & Rygh, 1994), which measures the use of avoidance strategies;

- Three Factor Eating Questionnaire (Stunkard & Messick, 1985), which measures the type and level eating beliefs held by the individual;

- Eating Disorders Inventory (Garner, Olmsted & Polivy, 1983), which measures eating attitudes.

These were presented together in a questionnaire packet (Appendix 4), which took approximately 45-50 minutes to complete. The psychometric properties of each questionnaire are presented below.

2.5.1.1. *Young Schema Questionnaire – Short Version (YSQ-S; Young, 1998).*

The YSQ–S is a 75-item questionnaire derived from the original long version, and has been selected here for the purpose of efficiency. Since most of the validation work relates to the YSQ-Long Version (YSQ-L), this will be presented first and extrapolated to the YSQ–S. The YSQ–L (Young, 1994) is a 205-item questionnaire developed to measure 16 core beliefs, also known as schemas. The items on the YSQ–L were derived from clinical experience, reflecting beliefs associated with each of the hypothesised 16 schemas. Using a clinical sample, Schmidt, Joiner, Young and Telch (1995) demonstrated that factor analysis matched 15 of the clinically derived schemas. These findings have been replicated using a larger clinical sample (Lee, Taylor & Dunn, 1999).

There is also evidence that the YSQ–L discriminates well between Axis I and Axis II patients (Lee et al., 1999; Mihaescu et al., 1997). The YSQ–L is seen as a promising instrument for research and clinical use (Schmidt et al., 1995).

The YSQ–S consists of the 15 constructs validated by Schmidt et al., (1995), each of which is measured by the five items from the original scale that loaded most strongly on each factor. The items are answered on a six-point Likert scale, ranging from "completely untrue of me" to "describes me perfectly". The 15 schemas and corresponding beliefs in the YSQ-S are:

1. abandonment (others cannot provide emotional support or protection);

2. mistrust/abuse (others will be abusive or hurtful);

3. emotional deprivation (emotional needs are not satisfied by others);

4. defectiveness/shame (the belief that one is defective or internally flawed);

5. social isolation (one is different from others and isolated from the rest of the world;

6. dependence/incompetence (one is helpless to cope with everyday tasks);

7. vulnerability to harm/illness (fear that disaster will strike at any time);

8. enmeshment (lack of own identity due to emotional over-involvement with others);

9. failure to achieve (one is fundamentally inadequate in areas of achievement);

10. entitlement (one is entitled to whatever one wants);

11. insufficient self-control (one cannot control own impulses or feelings);

12. subjugation (surrendering of control to others for fear of negative consequences);

13. self-sacrifice (sacrificing one's own needs to meet the needs of others);

14. emotional inhibition (inhibition of feelings to avoid disapproval from others); and

15. unrelenting standards (striving to meet impossible standards).

A sample item is: "In general, people have not been there to give me warmth, holding and affection", which measures the level of emotional deprivation beliefs.

Whilst the YSQ–L has been subject to factor analysis, which provides some evidence for its validity, the newer short version has not been extensively investigated. Therefore the data that has been published on the YSQ-S will be described in some detail. An investigation of the psychometric properties of the YSQ-S using a group of bulimic women and comparison women (Waller, Meyer & Ohanian, 2001) found both versions had good internal reliability, with alpha levels for the overall scales above 0.9. When considering the sub-scales, the alpha level was above 0.8 for each group on each version of the 15 scales. Overall scores on the two scales correlated highly for both clinical and comparison groups (Pearson's r = .98 and .93, respectively), and correlations between the forms for each sub-scale were greater than .84 in all cases. The YSQ–S demonstrated discriminative validity, and use of the Defectiveness and Insufficient Self-Control sub-scales alone led to an overall correct allocation rate of 87% (i.e., much higher than the 50% rate predicted by chance). Although Waller et al. (2001) highlight a number of limitations (including a homogenous client group and a need to explore test-retest reliability), they conclude that the YSQ–S is a reasonable alternative to the YSQ–L.

Further investigation into the validity of the YSQ has been carried out by Stopa and her colleagues (Stopa, Thorne, Waters & Preston, 2001). Using a heterogeneous outpatient psychiatric population, they examined whether the short and long versions produced comparable scores and to what extent each version predicted psychopathology scores. To determine the internal consistency, Cronbach's alpha was calculated for each sub-scale of both versions. For the YSQ–L, 14 out of 15 scales had alpha levels above the cut-off criterion of 0.7 (Nunnally, 1978), and this was the case for 13 out of 15 YSQ – S sub-scales. The <u>dependency</u> sub-scale fell just short of an acceptable level in the YSQ–Short Version (alpha = 0.675). In both versions, the <u>vulnerability to harm</u> sub-scale did not reach an acceptable level of internal consistency. Stopa et al. (2001) suggest this may be because the sub-scale includes a number of different types of harm (e.g. being attacked, losing money, serious illness). Although Waller et al. (2001) found acceptable levels of internal consistency in this scale, this may reflect the use of a more homogeneous population.

A comparison of the scores obtained on both the versions showed no difference on 12 of the sub-scales. Small differences were obtained on three of the sub-scales - <u>dependency,</u> <u>self-sacrifice</u> and <u>emotional inhibition</u> – but the pattern of these differences was inconsistent. Stopa et al. (2001) argue that although this may have some impact in a research setting, this may be counterbalanced by the fact that the selection of items that loaded most strongly onto the different factors should minimise that amount of "noise" or variance compared to the long version. Furthermore, some items on the YSQ–L may trigger high levels of affect, which patients may find distressing. Therefore, the

YSQ–S may be less distressing, as well as being less time consuming (Stopa et al., 2001).

Stopa and her colleagues (2001) also investigated how well the YSQ– S predicted psychopathology as measured by the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1977). The SCL-90-R is a self-report symptom inventory, designed to measure psychological symptom patterns. It has nine symptom sub-scales and three global indices (Global Severity Index – a measure of the level or depth of the disorder; Positive Symptom Distress Index – an intensity measure, corrected for the number of symptoms; and the Positive Symptom Total – a total count of symptoms, independent of severity). Since depression and anxiety were the most common Axis I diagnoses found in the sample, the depression, anxiety and phobic anxiety symptom sub-scales were subjected to multiple regression analysis to investigate which of the schema sub-scales were most predictive of these symptoms. With regard to the depression symptom sub-scale, two schemas – abandonment and self-sacrifice - accounted for 39% of the variance. Although there was a significant overall association of the YSQ–S and the SCL-90-R anxiety scale, none of the individual schemas was significantly predictive of anxiety. The defectiveness schema was significantly predictive of phobic anxiety, accounting for 25% of variance. Regression analysis was then carried out using the three global indices. The unrelenting standards schema accounted for 37% variance in the Global Severity Index and 46% of the variance in the Positive Symptom Distress Index. There was a significant overall effect of the YSQ–S on the Positive Symptom Index, with the defectiveness schema approaching significance. These findings suggest that

schemas are relatively modest predictors of specific symptom patterns, and are slightly better at predicting more general patterns of psychopathology.

Stopa et al. (2001) query how these findings fit with the schema model, which suggests that these underlying cognitive structures lead directly or indirectly to symptomatic problems and have a role in maintaining long-term personality difficulties. Clearly, these issues require further investigation. Further support for the validity of the YSQ–S comes from a preliminary investigation (Petrocelli, Glaser, Calhoun & Campbell, 2001), which demonstrated that early maladaptive schemas (as measured by the YSQ–S) could correctly identify empirically derived patterns of personality disorders (as measured by the Millon Clinical Multiaxial Inventory-II; Millon, 1987). Discriminant analyses revealed that there were two significant functions composed of cognitive schemas, which correctly identified 61.2% of an outpatient psychotherapy sample in terms of cluster group membership (Petrocelli et al., 2001).

The YSQ is a relatively new measure and, as such, evidence regarding reliability and validity is somewhat limited. The YSQ–L has adequate test-retest reliability (Schmidt et al., 1995), although this has yet to be explored in the short version. However, there is increasing support for the YSQ–L (Schmidt et al., 1995; Lee et al., 1999), and further studies conclude that the YSQ–S can be used with reasonable confidence (Stopa et al., 2001; Waller et al., 2001).

2.5.1.2 *Young Compensation Inventory (YCI; Young, 1999)*

The YCI is a 48-item questionnaire developed to identify the presence and level of compensation strategies utilised by the individual. It corresponds to

the schema compensation process described in the Introduction. The items are answered on a six-point Likert scale, ranging from "completely untrue of me" to "describes me perfectly". High scores indicate greater levels of cognitive and behavioural compensation. A sample item is: "I agonise over decisions so I won't make a mistake".

As yet, there are limited data on the validity and reliability of the YCI. One study has investigated its psychometric properties on a sample of 134 eating disordered women and 345 non-eating disordered women (Luck, Waller, Meyer & Lacey, under consideration). Using the non-clinical sample, scree analysis indicated three strong factors, which were: <u>social control</u> (a strategy of primary avoidance of emotional activation through control of others); <u>individuality</u> (a strategy of primary avoidance of emotional activation through independence and rebellion against society); and <u>personal control</u> (a strategy of primary avoidance of emotional activation through controlling the self. Internal consistency (Cronbach's alpha) was above 0.7 for all factors, across both the clinical and non-clinical groups. Test-retest reliability, assessed over a seven-day period, was acceptable. With regard to discriminant validity, the different scales of the YCI were able to differentiate between eating-disordered and non-eating disordered women, and also between eating disorder subtypes (restrictive anorexic, bulimic anorexic and bulimic women). This study suggests that the YCI has good psychometric properties. However, these findings need replication in both non-clinical and clinical (in addition to eating disorder) populations.

2.5.1.3 *Young-Rygh Avoidance Inventory (YRAI; Young & Rygh, 1994)*

The YRAI is a 40-item questionnaire, developed to assess the presence and degree of avoidance strategies, and corresponds to the "schema avoidance" process detailed in the Introduction. The YRAI assesses cognitive, behavioural, emotional and somatic avoidance. The items are answered on a six-point Likert scale, ranging from "completely untrue of me" to "describes me perfectly". Higher scores indicate greater levels of avoidance. A sample item is: "I believe I should not get angry, even at people I don't like".

The YRAI has not been well developed to date. Preliminary attempts to evaluate the clinical utility of the YRAI using bulimic and female control populations (Spranger et al., 2001) demonstrated acceptable internal consistency and the ability to discriminate between the two groups. In the study described above (Section 2.5.1.2), the psychometric properties of the YRAI were also investigated (Luck et al., under consideration). Scree analysis suggested two factors - behavioural/somatic avoidance (a strategy of secondary avoidance of emotions through behavioural avoidance and a focus on somatic symptoms), and cognitive/emotional avoidance (a strategy of secondary avoidance of emotions through the blocking of aversive thoughts and emotions). Three items (8, 21, 27) were removed from the first factor, due to poor face validity. Whilst the level of internal consistency was acceptable for the behavioural/somatic scale for the non-clinical and clinical group (Cronbach's alpha = .73 and .72 respectively), the internal consistency for the cognitive/emotional scale reached only moderate levels (Cronbach's alpha = .66 (non-clinical) and .56 (clinical)). Assessed over a seven-day period, the YRAI demonstrated acceptable test-

retest reliability. Evidence for the discriminant validity of the YRAI was also demonstrated.

2.5.1.4 *Three Factor Eating Questionnaire (TFEQ; Stunkard & Messick, 1985)*

The TFEQ is a 51-item questionnaire, designed to measure three dimensions of human eating behaviour. It includes 36 statements that require a "True/False" response, and 15 questions requiring a response from a four-point scale. Higher scores represent greater eating pathology. The TFEQ is derived from three sources - the Revised Restraint Scale (Herman & Polivy, 1980), the Latent Obesity Questionnaire (Pudel, Mettsdorf & Oetting, 1975; cited in Stunkard & Messick, 1985), and new items based on clinical experience. The three factors of eating are <u>cognitive restraint of eating</u>, <u>disinhibition</u> and <u>hunger</u>.

The <u>restraint</u> scale was conceptualised as measuring pure cognitive restraint of eating, and tends to identify dieters (i.e., those who monitor what they eat). In contrast, unrestrained eaters (or "free eaters") indicate that eating is a matter of indifference for them (e.g., often skip meals, leave something on their plate, and only eat when hungry). The restraint factor is further divided into two sub-scales - <u>flexible control</u> (which relates negatively to disinhibition and binge eating) and <u>rigid control</u> (which demonstrates the opposite relationships). In terms of these sub-scales, flexible control is associated with a diagnosis of anorexia nervosa, whilst rigid control is associated with bulimia nervosa and binge-eating (Shearin, Russ, Hull, Clarkin & Smith, 1994). It is of note that the TFEQ originates from attempts to measure human eating behaviour rather than to assess the psychopathology of eating disorders. This has led, therefore, to

the naming of some of the scales (in particular, flexible and rigid control) appearing somewhat inappropriate and confusing when applied to the eating disorders. The <u>disinhibition</u> scale was designed to be a measure of disinhibited eating. In restrained eaters, but not unrestrained eaters, the following have all acted as disinhibiting stimuli – alcohol, food pre-loads and dysphoric emotion (Stunkard & Messick, 1985). Three kinds of possible disinhibition have been identified - items relating to social disinhibition, items relating to taste as a disinhibitor, and items relating to dysphoric states as disinhibitors. The third factor is that of <u>hunger</u>. This scale consists of items relating to the experience of being hungry.

A number of studies have investigated and provided support for the reliability and validity of the TFEQ (e.g., Shearin et al., 1994; Stunkard & Messick, 1985). Coefficient alpha reliabilities were above 0.7 for all three factors (Stunkard & Messick, 1985). Criterion validity is supported by Marcus and Wing's (1983; cited in Stunkard & Messick, 1985) finding that binge severity (quantified by a scale designed for that purpose) correlated with disinhibition, but not with cognitive restraint. High test-retest reliabilities have been found in a college student population, including some overweight individuals (Ganley, 1982; cited in Stunkard & Messick, 1985). Shearin et al. (1994) investigated the construct validity of the two dietary restraint sub-scales of the TFEQ (flexible control and rigid control), using a sample of female patients on long-stay personality disorder units. The results supported the validity of the two constructs. Flexible control was inversely related to BMI and predicted an anorexia nervosa diagnosis, while the rigid control sub-scale directly predicted

BMI and was associated with a history of bulimia and weight fluctuations. All factors and sub-scales except hunger demonstrated good to excellent internal consistency. These studies demonstrate that the TFEQ is a reliable and valid measure of restrictive eating attitudes, and can distinguish between the dysfunctional eating patterns associated with bulimia nervosa and those associated with restrictive anorexia nervosa. It is, therefore, an appropriate measure to use in the current study to assess the level of restrictive eating beliefs held by participating individuals.

2.5.1.5 *Eating Disorders Inventory (EDI; Garner, Olmsted & Polivy, 1983)*

The EDI is a 64-item self-report measure of eating attitudes and symptoms associated with anorexia and bulimia nervosa. A shorter 23-item version (consisting of the three sub-scales related to eating, weight and shape – Drive for Thinness, Body Dissatisfaction and Bulimia) was given to participants in this study. The EDI was used to confirm that control participants did not have attitudes and symptoms associated with the eating disorders. Scores higher than fourteen on the Drive for Thinness sub-scale are perceived as indicative of eating disturbance (Garner, 1991). The scales regarding psychological traits more generally related to individuals with eating disorders were omitted because these aspects are already covered by the YSQ. Each item is presented in a six-point format, requiring respondents to indicate whether each item applies "always", "usually", "often", "sometimes", "rarely" or "never". Higher scores indicate greater eating pathology.

The <u>Drive for Thinness</u> sub-scale was derived from Bruch (1973), who described a "drive for thinness" or a "relentless pursuit of thinness" as the defining feature of an eating disorder. Items on this sub-scale measure excessive concern with dieting, fear of weight gain, and a preoccupation with weight. The <u>Body Dissatisfaction</u> sub-scale measures dissatisfaction with overall shape and with the size of parts of the body that are of greatest concern to those with eating disorders (e.g., thighs, stomach). Although body dissatisfaction is widespread among women in Western cultures, in its extreme form it is considered as an important feature of eating disorders. It is often viewed as a factor responsible for initiating and maintaining the restricting behaviours. The <u>Bulimia</u> scale assesses the tendency to think about and engage in episodes of uncontrollable eating (binge eating). The presence of binge-eating is one of the defining features of bulimia nervosa, and separates the restrictive and bulimic subtypes of anorexia nervosa. In most cases, the behaviour is associated with severe distress.

The reliability and validity of the EDI have been extensively investigated in a number of different populations. Garner (1991) reported alpha coefficients for internal consistency of above 0.8 for all the EDI sub-scales. Test-retest reliability for the three scales used here ranged from 0.77 to 0.96 (Wear & Pratz, 1987). Validity of the EDI is demonstrated by a number of analyses, including correlations between anorexic patients' sub-scale scores and clinician's ratings of these patients on the dimensions measured by the EDI (Garner, Olmsted & Polivy, 1983) and significant differences between restrictive and bulimic anorexics on the Bulimia sub-scale (Garner, Olmsted & Polivy, 1983). To ensure

construct validity, the EDI was compared with the Eating Attitudes Test (EAT-26; Garner, Olmsted, Bohr & Polivy, 1982), which demonstrated significant correlations ($p < .001$) between the EAT and all three sub-scales (Garner, 1991). Comparisons with measures of actual and ideal weight and body dissatisfaction also provide evidence in support of the construct validity of the EDI (Garner, 1991).

2.5.2 *Experimental Materials*

This section describes the materials used in the computer-driven task, while Section 2.5.3 details the actual procedure. The visual search task was developed from a procedure used by Slade, Newton, Butler and Murphy (1991) to measure perfectionism. The computer task used here required a Pascal Turbo programme on a desktop PC (IBM compatible; SVGA screen). The computer presented words to the participants at a subliminal level of consciousness. The presentation time of 14 milliseconds for the word stimuli task was chosen because it has been demonstrated that participants are unaware of the semantic content of words under these conditions (e.g., Kihlstrom, 1993; Van den Hout, Tenney, Huygens, Merckelbach & Kindt, 1995). Six cue words were presented on the screen during the task. The words were matched for length and frequency of use, using Johansson and Hofland's (1989) criteria. The six cue words used were;

1. Disorder relevant cue ("hungry")

2. Positive affect cue ("happy")

3. Negative affect cue ("angry")

4. Neutral cue ("gallery")

5. Abandonment cue ("lonely")

6. Shame cue ("ashamed")

In keeping with the aim of the study, the six cue types were included to enable distinctions between the level of compensation triggered by emotive, threat or neutral stimuli. Subliminal abandonment cues (e.g., "Mama is leaving me", "lonely") trigger observable effects in a non-clinical group with bulimic attitudes (Meyer & Waller, 2000; Patton, 1992). Shame is an area of increasing interest to clinicians and researchers alike (e.g., Gilbert & Andrews, 1998), hence a shame cue was included. Two further cues "happy" and "angry" tapped into affect. The inclusion of a word relevant to eating disorders ("hungry") enables the testing of the hypothesis that it is the core beliefs (rather than more superficial level cognitions relating to shape and weight) that drive the schema compensation process.

The words were presented in the centre of the screen in lower case Arial script (font size 16). The mask length was held constant to the same as the longest stimulus word. A normal office desk and chair were used. The participant's head was approximately 60 cm from the screen. The participant's instructions are described below (section 2.5.3).

2.5.3 *Experimental Procedure*

Once participants had given informed consent, the procedure began. First they were asked to rate how hungry they were currently, using an 11-point scale. (This was to exclude the possibility that an experimental effect might be

found when the word "hungry" is presented simply because the participant is in fact very hungry, due to dietary restriction.) They were read the task instructions from a standardised protocol (Appendix 5). Participants were seated in front of the computer screen. A pictorial representation of the task is given in Figure 2.1 below.

Figure 2.1 Pictorial representation of computer task

xxxxxxxxxxxxxx
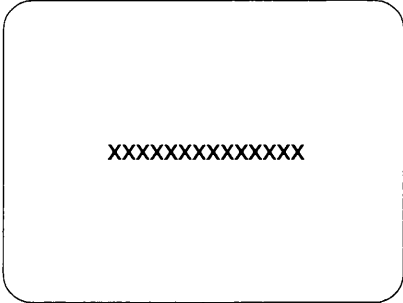
First, a row of X's will be displayed across the centre of the screen. Participants are asked to focus on the X's. This is the mask.

lonely
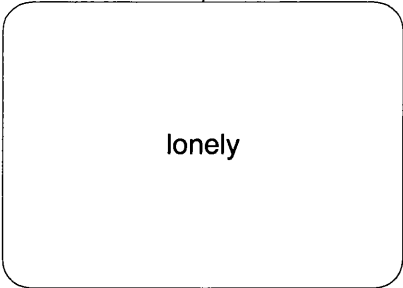
The X's are displayed for five seconds, during which the subliminal word is flashed on the screen (for 14ms).

xxxxxxxxxxxxxx

```
p  p    p        p
   p     p p     p
   p p   p  b     p
p       p    p
   p    p  p p   p
   p   pp        p  p
```
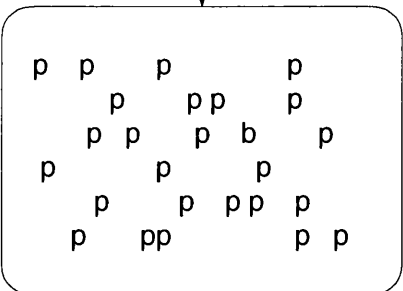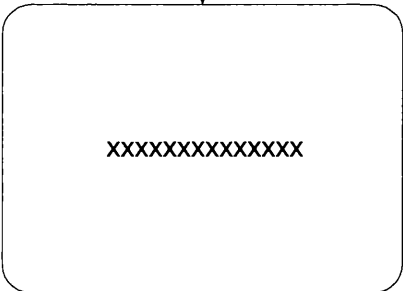
Next, 40 lower case characters will appear, randomly positioned across the screen. These characters are "p"s. On half the trials, one "b" will appear amongst the "p"s.

Participants were asked if the "b" is present, and were instructed to press the Yes or No button on the keyboard in response (as quickly as they could, but without making a mistake). The computer recorded the time taken to respond. The programme then proceeded with the next trial.

While the X's were on the screen, one of the six cue words was presented. Presentation of the word was subliminal (14 milliseconds), so that participants would be unaware of the words.

There were six trials per condition. In summary, this means there were 72 trials (6 trials x 6 words x 2 conditions [present/absent]). Words were presented in a randomised order, to prevent bias resulting from fatigue, anxiety or boredom. Trials took approximately 5 seconds, with a further 5 seconds fixating on the X's beforehand. Thus, the task took approximately 10 minutes to complete.

2.5.4 Subliminal word validation task

This task was to ensure that participants had not seen any words. The seven words (six cue words plus one wash-out word (see Section 2.6)) used in the visual search task were each matched to orthographically and semantically similar words. This gave a list of 21 words (Appendix 6). Three versions of the list with the words randomly positioned were produced, to ensure that word selection was not due to positioning. Participants were asked to circle seven words from the list of 21, even if they were not sure. Chance level is 33%. Therefore, it is predicted that if participants have not seen the words, this is the level they will attain.

2.6 Analysis

The dependent variables were the error rate (participants with an error rate above 25% will be excluded) and an over-searching index. The over-searching index is the difference in time to respond between when the target is absent and when it is present. Higher scores equal greater difference in time.

1. The main analysis will be a three way MANOVA of the over-searching index with one between subject level (group [AN-R, AB, BN or FC]) and three within-subject levels (cue type [disorder relevant, positive, negative, neutral, abandonment, shame] x cue present/absent). The cue present condition will provide a baseline measure.

2. Correlation and correlation co-efficients will be calculated to discover if there is an association between score on the Flexible Control sub-scale (a measure of restriction) and the Rigid Control sub-scale (a measure of rigidity) of the TFEQ and the over-searching index.

3. A multiple regression will be carried out to discover whether the YCI or YRAI is better at predicting the over-searching index and which of the three YCI scales (social control, individuality, personal control) is most predictive of the over-searching index. A multiple regression will also investigate which scales are best at predicting accuracy levels.

4. Correlations were used to determine whether specific scales of the YSQ had predictive power for the over-searching and accuracy indexes.

2.6 Ethical Issues

This study will use subliminal cues. Research shows that the impact of these cues is relatively short-lived, so it is not anticipated that they will cause long-term difficulties. A "wash-out" will be carried out at the end of the trial, using a positive cue ("friendship") to reduce any risk of distress post-study (using the method established by Barter, 1999).

CHAPTER THREE

RESULTS

3.1 Overview

This study addressed four main hypotheses. In this chapter, the data will first be inspected for normality. Second, data regarding the experiment's validity will be given, including the number of participants who stated they saw the subliminal words, the results of the hunger rating scale, and the results of the word validation check. Thirdly, descriptive data will be presented. Finally, the results for each research hypothesis will be presented in turn.

Recruitment of bulimic anorexics was limited. Therefore, interpretation of analyses relating to this group is questionable and provided for interest alone. Of the participants included in the analysis, sixty returned their questionnaires (although some had not completed every questionnaire).

All control participants scored below 4 on the Eating Disorder Inventory Drive for Thinness sub-scale. This is well below the cut-off rate of 14 suggested as indicative of eating disturbance (e.g., Garner, 1991), and suggests that this group did not suffer from any eating disorders.

3.2 Tests for normality

The data were inspected for normality before analysis was undertaken. Homogeneity of variance tests suggested that the data were sufficiently normally distributed to allow the use of parametric tests (Kirk, 1968).

3.3 Validation of the subliminal procedure

Four participants (one restrictive anorexic and three bulimics) stated they saw some words. One participant, who stated she saw "angry", did this unprompted. The others stated that they had seen a word when the researcher informed them that some words had been shown. One individual reported the word "angry"; another "angry" and "hungry". A fourth individual, after looking at the list, stated she saw "ashamed" and "embarrassed" (not a cue word). None of the individuals saw the words on a frequent basis.

At the end of the experiment, participants were asked to circle seven words from a list of 21 semantically and orthographically matched words. To eliminate the possibility that individuals were selecting words depending on where they were positioned, three versions of the list were used (Appendix 6). The cue words were selected on 35% of possible occasions. This is very close to the predicted chance level of 33% and suggests that participants were not consciously aware of the cue words.

3.4 The hunger rating scale

Since, by the nature of their diagnosis, some participants may be actively restricting their diet, the hunger rating scale was included to eliminate the possibility that findings may be related to the fact the individual is very hungry. The scale was from 0 (not at all hungry) to 10 (very hungry). The mean hunger scores by diagnostic group were: controls=3.55 (s.d.=2.48); restrictive anorexia nervosa=2.47 (s.d.=2.67); bulimic anorexia nervosa=3.33 (s.d.=3.35); and bulimia nervosa=4.78 (s.d.=2.92). There was not a significant difference

between scores (F=2.24, NS). Bivariate correlations demonstrated no significant associations between the hunger rating scale and search times or error rates (p>.10 in all cases). Therefore, hunger levels were not used as a covariate in subsequent analyses.

3.5 Descriptive data

The descriptive data for the questionnaires are presented in this section. Since these data are not directly relevant to the hypotheses, they have not been analysed, but are presented in descriptive format.

3.5.1 Three Factor Eating Questionnaire

Table 3.1 presents the means and standard deviations for the three scales and two sub-scales of the TFEQ.

Table 3.1 Means and standard deviations for the TFEQ

	Total sample (n=55)	Female control (n=18)	Restrictive anorexia nervosa (n=13)	Bulimic anorexia nervosa (n=6)	Bulimia nervosa (n=18)
Disinhibition (Maximum score=16)	6.35 (4.87)	3.72 (2.37)	3.69 (3.28)	4.50 (3.99)	11.5 (3.91)
Hunger (Maximum score=14)	6.13 (3.47)	4.50 (1.98)	4.92 (3.35)	5.17 (3.06)	8.94 (3.32)
Restraint (Maximum score=21)	12.1 (7.03)	2.89 (2.17)	18.0 (2.22)	17.8 (2.32)	15.2 (3.13)
Flexible control sub-scale (Maximum score=7)	3.95 (2.35)	1.17 (0.92)	6.08 (0.76)	5.67 (1.21)	4.61 (1.65)
Rigid control sub-scale (Maximum score=7)	4.11 (2.57)	0.94 (1.21)	6.08 (1.19)	6.00 (1.10)	5.22 (1.44)

The control participants fall within a low range for the TFEQ (Stunkard & Messick, 1985). Unsurprisingly, individuals with anorexia nervosa fall within a low range for the Disinhibition scale, whilst in contrast individuals with bulimia nervosa score higher. Within the Flexible Control sub-scale (which is associated with restraint), the restrictive anorexia nervosa group almost hits ceiling level. Surprisingly, this group also score highest on the Rigid Control sub-scale (which is more often associated with bulimia nervosa).

The female control group score within a similar range for the Disinhibition and Hunger Scales when compared to a community sample of mothers (Rizvi,

Stice & Agras, 1999) and a community sample of adult women (Bulik, Sullivan, Fear & Pickering, 2000). However, the control participants in this sample appear to score lower on the Restraint scale than the other samples (6.5 in the Bulik et al., 2000 sample; 7.2 in the Rizvi et al., 1999 sample). This may suggest that this control group demonstrated less cognitive restraint than other groups. The Bulik et al. (2000) study also included a sample of fifteen long-term eating-disordered women (including diagnoses of anorexia nervosa, bulimia nervosa and EDNOS). In general, the two samples scored similarly on the Hunger sub-scale. The sample in this study scored slightly higher on the Restraint sub-scale. The Disinhibition scale cannot be compared, since the Bulik et al. study combined individuals with anorexia and bulimia nervosa. A population study of 954 women (mean age 41.8; mean BMI 24.4) (Westenhoefer, Stunkard & Pudel, 1999) found higher scores on both the Flexible Control (3.1) and Rigid Control (2.4) sub-scales of the Restraint scale than the current study's control sample. This is concordant with the Rizvi et al. (1999) and Bulik et al. (2000) studies.

3.5.2. Eating Disorders Inventory

Table 3.2 presents the means and standard deviations for the three EDI sub-scales used in the study.

Table 3.2 Means and standard deviations for EDI sub-scales

	Total sample (n=57)	Female Control (n=18)	Restrictive anorexia nervosa (n=16)	Bulimic anorexia nervosa (n=6)	Bulimia nervosa (n=17)
Drive for Thinness (Max. score=21)	10.4 (7.94)	0.50 (1.04)	13.4 (5.49)	19.7 (2.80)	14.8 (4.14)
Body Dissatisfaction (Max. score=27)	14.3 (9.00)	5.06 (6.76)	17.1 (6.35)	20.5 (5.43)	18.9 (7.02)
Bulimia (Max. score=21)	4.38 (5.56)	0.00 (0.00)	2.67 (2.72)	5.00 (4.56)	10.3 (5.63)

The control participants fall within a low range for the three sub-scales of the EDI. As expected, the clinical groups fall within a higher range for both the Drive for Thinness and Body Dissatisfaction sub-scales. Both anorexia nervosa groups fall into a lower range on the Bulimia sub-scale, in comparison with the bulimia nervosa participants. These scores are comparable to Garner's (1991) sample, although individuals with anorexia nervosa in this study score slightly higher on all three sub-scales. Individuals with bulimia nervosa in this study score slightly lower on all three sub-scales. Finally, female controls in this study score somewhat lower, again, on all three sub-scales.

3.5.3 Young Schema Questionnaire – Short Version

Table 3.3 presents the means and standard deviations for the 15 YSQ-S scales. The maximum possible score for each schema is 6. A score of 5-6 suggests this schema is of significant importance to the individual, 3-4 suggests it is of moderate importance and 1-2 suggests it is unlikely to be relevant to the individual (Young, 1999). Unsurprisingly, scores for the non-clinical group are lower and fall within an insignificant range. The pattern of scores among the clinical groups is broadly similar, with abandonment, defectiveness/shame and unrelenting standards appearing to be the most relevant schemas. Of particular note is the very high scores achieved by all clinical groups on the unrelenting standards schema.

These results are broadly comparable to the investigation using bulimic women and female control women and the YSQ-S (Waller, Meyer & Ohanian, 2001). Another study (Leung, Waller & Thomas, 1999), which compared all three eating disorder groups using the long version of the YSQ, also found similar results. However, they observed lower levels of the unrelenting standards schema than the current study.

Table 3.3 Means and standard deviations for YSQ-S

	Total Sample (n=60)	Female Controls (n=18)	Restrictive Anorexia nervosa (n=16)	Bulimic Anorexia nervosa (n=7)	Bulimia nervosa (n=19)
Abandonment	3.30 (1.71)	1.68 (1.68)	3.89 (1.56)	5.00 (1.10)	3.73 (1.59)
Mistrust/ abuse	3.16 (1.58)	1.61 (0.44)	3.83 (1.59)	4.23 (0.93)	3.66 (1.43)
Emotional Deprivation	2.96 (1.55)	1.59 (0.51)	3.04 (1.86)	4.20 (0.79)	3.75 (1.20)
Defectiveness/ shame	3.54 (1.89)	1.30 (0.44)	4.41 (1.48)	5.29 (0.84)	4.28 (1.40)
Social Isolation	3.21 (1.69)	1.69 (0.65)	4.26 (1.50)	4.17 (1.21)	3.40 (1.69)
Dependence/ Incompetence	2.75 (1.41)	1.46 (0.41)	3.08 (1.47)	4.26 (1.10)	3.16 (1.15)
Vulnerability to harm	2.51 (1.40)	1.46 (0.48)	2.83 (1.20)	3.31 (1.45)	2.94 (1.65)
Enmeshment	2.44 (1.49)	1.33 (0.38)	3.38 (1.63)	3.36 (0.52)	2.36 (1.56)
Failure to achieve	3.21 (1.67)	1.61 (0.54)	3.89 (1.21)	3.77 (1.82)	3.94 (1.71)
Entitlement	2.36 (1.02)	1.79 (0.73)	2.40 (1.04)	3.23 (1.23)	2.55 (0.91)
Insufficient self-control	2.88 (1.48)	1.81 (1.10)	2.76 (1.21)	3.06 (1.85)	3.92 (1.15)
Subjugation	3.22 (1.63)	1.43 (0.45)	4.23 (1.37)	4.03 (1.22)	3.75 (1.36)
Self-sacrifice	3.29 (1.44)	2.41 (0.91)	3.60 (1.75)	3.83 (1.44)	3.67 (1.28)
Emotional Inhibition	2.71 (1.60)	1.41 (0.56)	3.79 (1.54)	3.31 (1.65)	2.79 (1.60)
Unrelenting standards	4.13 (1.48)	2.84 (1.18)	5.15 (0.84)	5.14 (1.08)	4.10 (1.40)

3.5.4 Young Compensation Inventory

Table 3.4 presents the means and standard deviations for the three sub-scales of the YCI.

Table 3.4 Means and standard deviations for YCI sub-scales

	Total sample (n = 59)	Female control (n=18)	Restrictive anorexic (n=16)	Bulimic anorexic (n=7)	Bulimic women (n=18)
Social control	2.88	2.06	3.38	3.46	3.04
	(0.98)	(0.61)	(0.84)	(0.80)	(0.98)
Individuality	2.85	2.24	3.30	3.05	2.99
	(1.00)	(0.80)	(1.02)	(1.10)	(0.88)
Personal control	3.78	2.89	4.90	4.76	3.30
	(1.54)	(1.05)	(1.17)	(1.75)	(1.45)

The YCI is scored in the same manner as the YSQ-S. Scores of 1-2 indicate little relevance to the individual, 3-4 indicates moderate importance and 5-6 indicates significant importance (Young, 1995). Results suggest that the restrictive anorexia nervosa group are more likely to attempt to avoid triggering emotion through the strategy known as personal control (i.e., controlling the self). A similar pattern is evident in the bulimic anorexia nervosa participants. In contrast, the bulimia nervosa group appeared to use a combination of personal control and social control (a strategy of controlling others). The third factor, individuality (avoiding emotional activation through independence and rebellion against society), appeared less important for all clinical groups. In contrast, the control group fell in the low range for all sub-scales.

The patterns found in this sample are comparable to those found by Luck, Waller, Meyer and Lacey (under consideration) in their sample of eating-disordered women. They also found both anorexic groups scoring highly on personal control. The bulimic anorexic group also scored most highly on the social control scale although, in contrast to Luck et al., there was no significant difference between the restrictive and bulimic anorexics on this sub-scale.

3.5.5 Young-Rygh Avoidance Inventory

Table 3.5 presents the means and standard deviations for the two YRAI sub-scales.

Table 3.5 Means and standard deviations for YRAI sub-scales

	Total sample (n=58)	Female control (n=17)	Restrictive anorexic (n=16)	Bulimic anorexic (n=7)	Bulimic women (n=18)
Behavioural/ Somatic	3.64 (1.24)	2.18 (0.67)	4.42 (0.72)	4.43 (1.04)	4.02 (0.87)
Cognitive/ Emotional	2.95 (0.88)	2.98 (0.74)	3.07 (0.95)	2.80 (1.27)	2.87 (0.82)

The YRAI is scored in the same manner as the YSQ-S and YCI. Scores of 1-2 indicate little relevance to the individual, 3-4 indicate moderate importance and 5-6 indicate significant importance (Young & Rygh, 1994). All clinical groups scored highly on the behavioural/somatic sub-scale, suggesting a

strategy of avoiding emotion through behavioural avoidance of situations and a focus on somatic symptoms. This pattern of scores is broadly similar to that of Luck et al.'s eating disorder sample. All groups scored the same on the cognitive/emotional sub-scale (a strategy of avoiding emotion through the blocking of aversive thoughts and emotions. This is in contrast to the Luck et al. study, in which the non-clinical group scored significantly higher than the clinical groups on the cognitive/emotional sub-scale.

3.6 Hypotheses

The hypotheses have been reframed in terms of the measures used, in order to operationalise them.

Hypothesis 1: Restrictive pathology is associated with over searching in a computer-driven search task.

Hypothesis one predicted that there would be differences within diagnostic groups with regard to performance on the computer-processing task. This is because the underlying model predicts that when there is a risk of an aversive emotion being triggered, individuals with restrictive pathology will utilise a schema compensation process in an attempt to cope. It was hypothesised that the schema compensation process would be demonstrable through a computer search task. Performance on the task is measured in terms of speed and error rate. This difference would be observable only when the negative affect cue words were used (i.e., there is the threat of the activation of aversive emotion) and when the target was absent (because this will lead to the over-searching). It was hypothesised that the schema compensation process would be observable,

reflecting increased need to be totally sure that they are giving the right answer on the task. Thus, it is predicted that individuals with restrictive pathology will show over-searching only when the negative affect cue is used and the target is absent. It is predicted that there will not be an effect for the non-clinical or bulimia nervosa groups.

First, an explanation of the computer results will be given. The data will be presented in tabular and graph form to aid clarity. This will then be related to the hypothesis.

Computer processing task

Each word was presented on six random trials, for both the target present and target absent conditions. The total time taken on correct responses was divided by the total number of correct responses to yield a mean reaction time (mRT). (Each participant, therefore, had a total of twelve mRTs). The dependent variable is the:

mRT target absent − mRT target present.

This is known as the "over-searching index". Higher scores equal greater differences in time or "over-searching" (i.e., greater impact on the task).

Table 3.6 presents the over-searching index (means and standard deviations) for each cue word.

Table3.6 Means and standard deviations for over-searching index

Cue type	Over-searching Index			
	Female controls (n=20)	Restrictive anorexia nervosa (n=19)	Bulimic anorexia nervosa (n=9)	Bulimia nervosa (n=20)
Neutral-gallery	2981.53	4401.25	3231.58	4169.18
	(2048.29)	(3804.21)	(2148.46)	(2427.14)
Eating - hungry	3142.22	3659.53	3995.08	4609.42
	(1902.25)	(2924.33)	(2599.83)	(2956.80)
Affect – happy	3315.88	3460.44	3798.21	4196.14
	(2012.41)	(2885.81)	(2480.85)	(3032.15)
Affect – angry	3377.26	3782.65	3524.91	4077.81
	(2184.44)	(2803.66)	(3465.84)	(2132.80)
Affect – lonely	3450.12	3828.02	3499.69	4322.32
	(3022.55)	(3270.81)	(1763.20)	(2434.33)
Affect - ashamed	3195.33	3889.27	3557.40	3923.26
	(2220.26)	(2442.46)	(2198.54)	(2080.61)

The same procedure was used to calculate the difference in the number of correct responses (Tcrt = total correct) each participant made for each cue word:

Tcrt target absent – Tcrt target present.

This is known as the "accuracy index". Again, higher scores equal greater interference with the task.

<u>Table 3.7 Means and standard deviations for the accuracy index</u>

Cue type	Accuracy Index			
	Female controls (n=20)	Restrictive anorexia nervosa (n=19)	Bulimic anorexia nervosa (n=9)	Bulimia nervosa (n=20)
Neutral-gallery	0.30	0.47	1.00	0.80
	(0.73)	(0.77)	(1.41)	(1.15)
Eating - hungry	0.65	0.74	0.67	0.35
	(0.81)	(1.05)	(0.71)	(0.67)
Affect – happy	0.30	0.53	0.89	0.65
	(0.66)	(1.12)	(0.78)	(1.04)
Affect – angry	0.85	0.63	0.89	0.50
	(1.14)	(1.07)	(1.05)	(0.61)
Affect – lonely	0.60	0.89	1.00	0.60
	(0.94)	(1.33)	(1.22)	(0.82)
Affect - ashamed	0.75	0.37	1.44	0.65
	(1.07)	(1.26)	(1.33)	(1.04)

Graph One and Table 3.6 shows the over-searching index by cue word and diagnostic group. The graph shows some effect in the predicted direction, for the restrictive anorexia group, the words "gallery" and "lonely" led to an increase in over-searching (i.e., a compensation effect is apparent). The MANOVA showed no significant main effect of diagnosis [$F (3, 62) = 0.96$, $p = 0.42$] or type of cue [$F (5, 58) = 1.42$, $p = 0.23$], and no reliable interaction effect of cue by diagnosis [$F (15, 180) = 1.15$, $p = 0.31$]. Therefore, as there were no significant main or interaction effects, no further analysis was undertaken to determine any differences.

Graph 1 – Over-searching Index (age & BMI controlled)
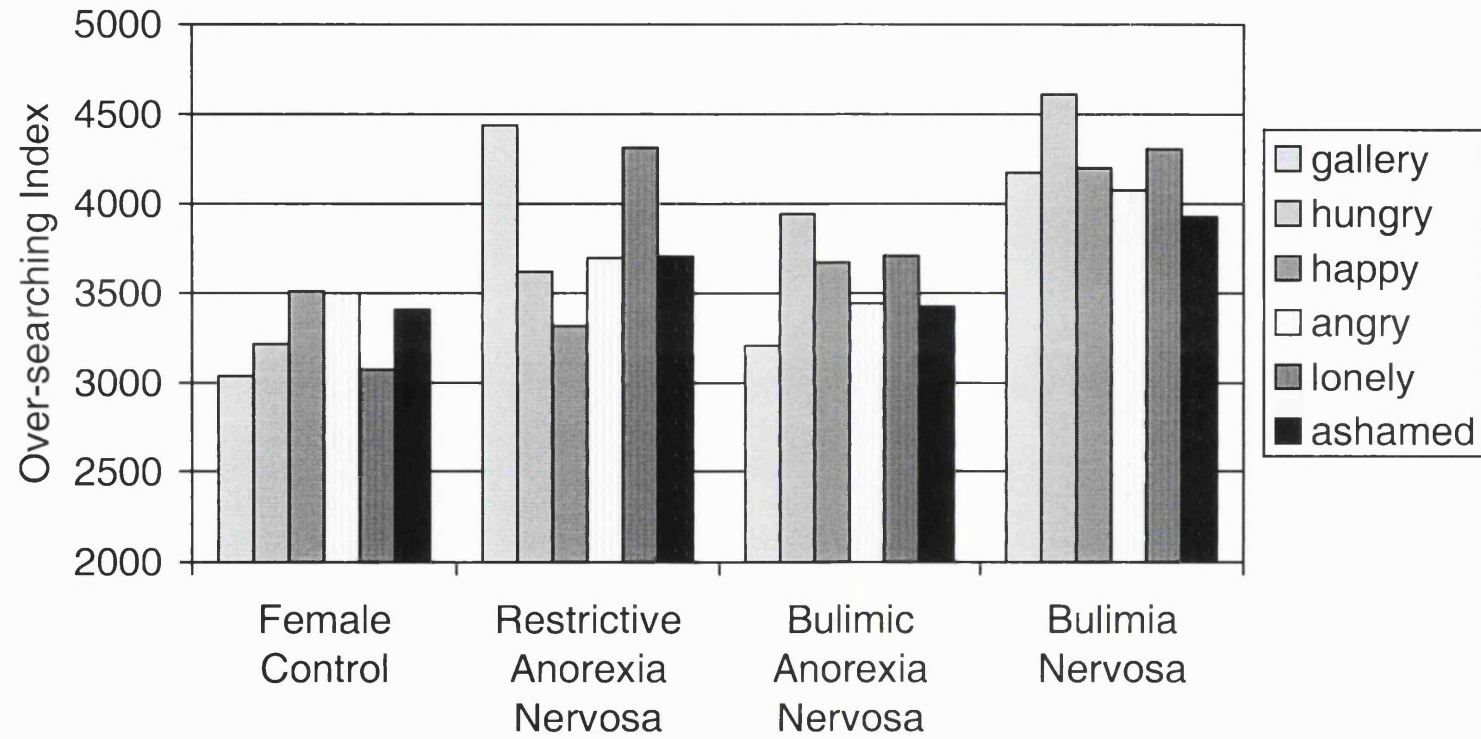
Graph Two and Table 3.7 shows the accuracy index. The MANOVA showed no significant main effect of diagnosis [$F_{(3, 62)} = 0.65$, $p = 0.59$] or type of cue [$F_{(5, 58)} = 0.74$, $p = 0.60$], and no reliable interaction effect of cue by diagnosis [$F_{(15, 180)} = 1.66$, $p = 0.06$]. Therefore, as there were no significant main or interaction effects, no further analysis was undertaken to determine any differences.
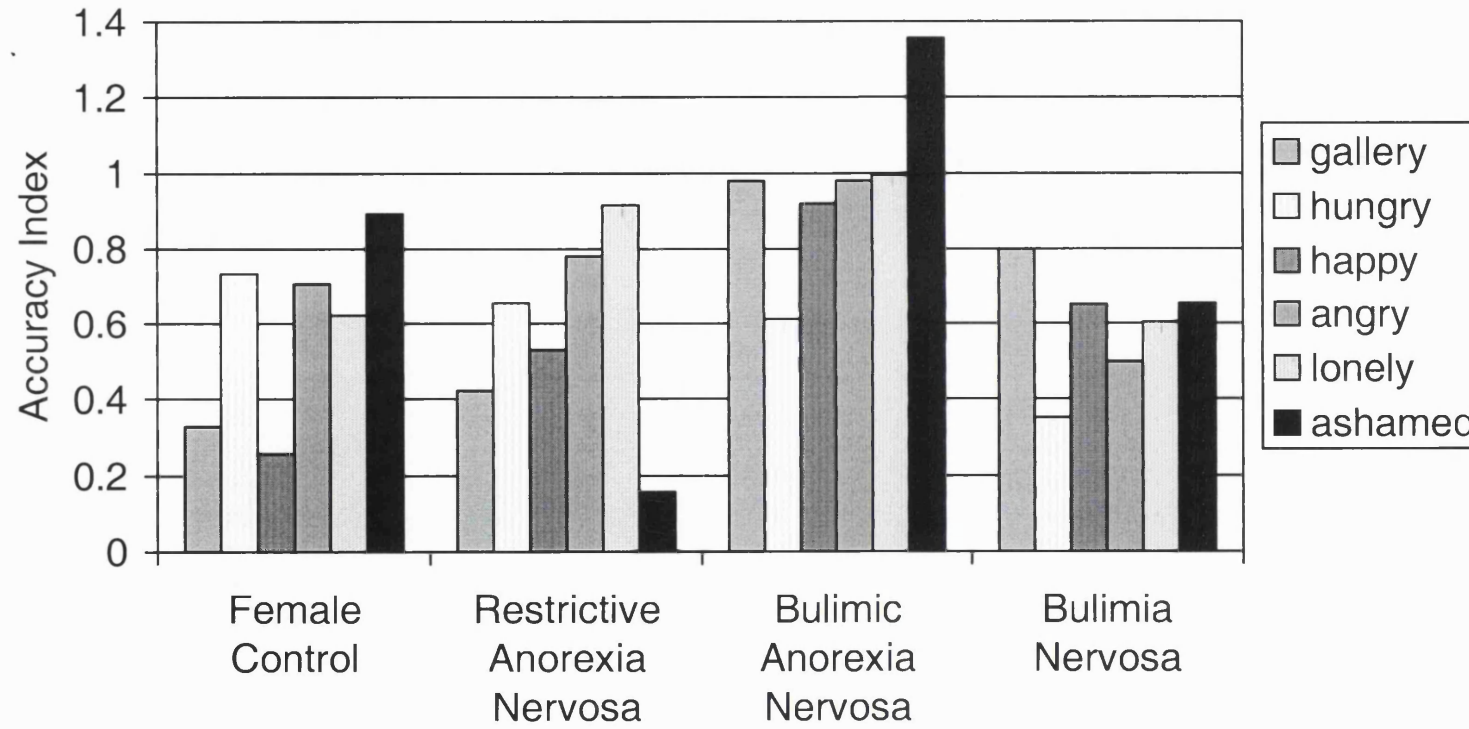
Therefore, Hypothesis One is not supported.

Graph 2 – Accuracy Index (BMI & age controlled)

Hypothesis 2: There will be a dimensional association between level of restriction (as measured by the Flexible Control sub-scale of TFEQ) and level of compensatory behaviour.

Hypothesis Two follows from Hypothesis One, and predicts that effects found categorically would also be observable at a dimensional level. It was predicted that the higher the level of restriction, the greater the level of compensation, as demonstrated by increased over-searching. Equally, it was predicted that there would be no relationship between over-searching and level of rigidity (as measured by the Rigid Control sub-scale of the TFEQ).

Table 3.8 presents the correlation and correlation co-efficients for the Flexible Control sub-scale. There were no reliable associations between the Flexible Control sub-scale and the over-searching index for any individual groups. However, the pattern is interesting - associations for the restrictive anorexic group are always positive, meaning the greater the level of restriction, the greater the level of over-searching. In contrast, the associations for the bulimia nervosa and bulimic anorexic groups were all negative, meaning that the greater the level of restriction, the less over-searching. The bulimia nervosa group demonstrated small associations. The female control group demonstrated negligible associations. Therefore, although there were no significant effects, there were two different patterns of association, in the predicted direction.

Given this difference, the correlation co-efficients were compared to test the pattern (Kanji, 1999). The difference in correlations was significant between the restrictive anorexic group and bulimic anorexic group for the affect-happy cue and the affect-ashamed cue. Therefore, for the Flexible Control sub-scale,

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whilst correlations amongst the restrictive anorexic group are not strong enough to be significant, they are reliably different from the bulimic anorexic group. The greater the interference, the more restrictive the individual is.

Table 3.9 shows the correlations and correlation co-efficients for the Rigid Control Scale of the TFEQ. In contrast to the Flexible Control sub-scale, the Rigid Control sub-scale did not have any significant correlations or differences and the pattern was not consistent. This is as predicted.

Therefore, there is a greater link between the over-searching index and restriction (as measured by Flexible Control) than rigidity (as measured by Rigid Control). Hypothesis Two is partially supported, with an association at a dimensional but not categorical level.

Table 3.8 Correlation Co-efficients for TFEQ Flexible Control Sub-scale x over-searching index

	Pearson's correlations				Differences between correlations (Kanji, 1999)					
	FC	RAN	BAN	BN	FC vs. RAN	FC vs. BAN	FC vs. BN	RAN vs. BAN	RAN vs. BN	BAN vs. BN
					Z	Z	Z	Z	Z	Z
N	18	13	6	18						
Neutral – gallery	.088	.074	-.401	-.184	0.04	0.81	0.75	0.76	0.64	0.38
Eating – hungry	.101	.221	-.466	-.148	0.30	0.96	0.69	1.11	0.92	0.56
Affect – happy	.089	.526	-.647	-.131	1.21	1.36	0.61	1.97*	1.61	1.01
Affect – angry	-.007	.409	-.351	-.057	1.24	0.47	0.04	1.18	1.14	0.49
Affect – lonely	-.093	.174	-.615	-.169	0.46	1.28	0.21	0.94	0.65	1.40
Affect – ashamed	.150	.307	-.749	-.079	0.41	1.77	0.63	1.96*	0.97	1.41

FC = Female Controls; RAN = Restrictive Anorexic; BAN = Bulimic Anorexic; BN = Bulimia nervosa   *p<0.05

Table 3.9 Correlation Co-efficients for TFEQ Rigid Control Sub-scale x over-searching index

	Pearson's Correlations				Differences between correlations (Kanji, 1999)					
	FC	RAN	BAN	BN	FC vs. RAN	FC vs. BAN	FC vs. BN	RAN vs. BAN	RAN vs. BN	BAN vs. BN
					Z	Z	Z	Z	Z	Z
N	18	13	6	18						
Neutral – gallery	.242	-.174	-.629	.215	1.04	1.56	0.08	0.86	0.97	0.82
Eating – hungry	.213	.154	-.214	.236	0.15	0.69	0.66	0.56	0.21	0.72
Affect – happy	.299	.199	-.266	.250	0.27	0.92	0.15	0.72	0.13	0.84
Affect – angry	.214	.102	.344	.319	0.28	0.22	0.31	0.39	0.56	0.04
Affect – lonely	.079	.085	.038	.162	0.02	0.07	0.23	0.07	0.19	0.20
Affect – ashamed	.318	.100	-.311	.243	0.56	0.74	0.22	0.36	0.36	0.61

FC = Female Controls; RAN = Restrictive Anorexic; BAN = Bulimic Anorexic; BN = Bulimia Nervosa   *p<0.05

Hypothesis 3: There will be a relationship between level and type of schema process (as measured by the YCI and YRAI) and the level of compensation demonstrated by the over-searching index.

It was hypothesised that scores on the YCI would predict the over-searching index and search pattern. It was of interest to investigate if one sub-scale was more efficient than the other two. It was also predicted that the YRAI, a measure of the avoidance process, would not be predictive of over-searching. The bulimic anorexic sub-sample was eliminated from the analysis at this point for two reasons. First, the sample size was too small to be reliable. Second, preliminary investigation suggested this group demonstrated yet another response pattern, which might further confuse the findings.

Over-searching index

Table 3.10 shows the results of a multiple regression of the over-searching index and the YCI and YRAI. None of the regressions were significant. However, despite the lack of significant overall effects, one individual variable (YCI social control) did reliably predict the level of interference for three cues (neutral-gallery, affect-angry, affect-lonely). This effect applied only to the clinical group. Since the effect was found for the neutral term as well as two affect terms, this does limit the impact. It suggests that over-searching may be a general tendency related to restrictive anorexia pathology, rather than a result of a particular experimental variable.

Accuracy index

Table 3.11 shows the results of a multiple regression with the accuracy index and the YCI and YRAI. Again, there are no overall significant effects. However, the independent variables suggest an interesting trend. They suggest that when the cue word is "angry", if one is low in personal control, high in social control and low in behavioural/somatic avoidance, there is a smaller accuracy index. This corresponds to the profile found in individuals with restrictive anorexia. To turn this the other way round, if an individual is high in personal control, low in social control and high in behavioural/somatic avoidance (i.e., the bulimic profile), the accuracy index is increased (i.e., they will make more errors if the target is not there).

A similar effect is evident for the affect-"lonely" cue. If an individual is low in social control and low in behavioural/somatic avoidance (restrictive profile), the accuracy index will be smaller. If the individual is high in social control and behavioural/somatic avoidance (bulimic profile), the accuracy index is increased.

In the non-clinical group, a different pattern was evident, with different sub-scales being relevant. With regard to the affect-"angry" cue, results suggest that the higher an individual is in individuality and cognitive/emotional avoidance, the lower the impact on error rate.

Summary

To summarise, the results suggest that, for some of the cues, the higher an individual scores on social control (a restrictive profile) the greater the impact upon over-searching, but the lower the impact upon accuracy. In contrast, the

higher an individual scores on social control and behavioural/somatic avoidance (a bulimic profile), the greater the impact upon accuracy, but the lower the impact upon over-searching. Therefore, a restrictive profile impacts upon over-searching, as the schema compensation process results in increased perfectionism and compulsive behaviour, whilst a bulimic profile impacts upon accuracy as the schema avoidance process results in greater levels of impulsivity. This provides partial support for Hypothesis Three.

Table 3.10 Multiple Regression – over-searching index and YCI and YRAI

	Multiple regression			Significant independent variables		
	F	p	Explained variance (%)	YCI/YRAI scale	t	Beta
Clinical Group N = 34						
Neutral - gallery	1.82	.14	11.1	YCI social control	2.90**	.548
Eating - hungry	1.00	.44	0.0			
Affect - happy	1.23	.32	3.4	YCI social control	2.24*	.441
Affect- angry	1.32	.29	4.6			
Affect - lonely	1.67	.17	9.2	YCI social control	2.69*	.514
Affect - ashamed	0.72	.62	-4.4			
Non-clinical group N= 18						
Neutral – gallery	0.41	.83	-22.7			
Eating - hungry	0.46	.80	-20.5			
Affect – happy	1.23	.36	6.6			
Affect – angry	0.35	.87	-25.3			
Affect - lonely	0.48	.79	-19.6			
Affect - ashamed	0.40	.84	-23.1			

*p<.05. **p<.01.

Table 3.11 Multiple Regression –accuracy index and YCI and YRAI

	Multiple regression			Significant independent variables		
	F	p	Explained variance(%)	YCI/YRAI scale	t	Beta
Clinical Group N = 34						
Neutral - gallery	1.17	.35	2.5			
Eating - hungry	1.07	.40	1.0			
Affect - happy	1.17	.35	2.4			
Affect- angry	3.73	.01	29.2	YCI social control	3.18**	-.536
				YCI personal control	2.47*	.508
				YRAI behav/somatic	2.49*	-.454
Affect - lonely	2.93	.03	22.6	YCI social control	2.29*	-.405
				YRAI behav/somatic	2.73*	-.522
Affect - ashamed	.674	.65	-5.2			
Non-clinical group N= 18						
Neutral – gallery	2.16	.13	26.5			
Eating - hungry	0.45	.81	-20.8			
Affect – happy	0.24	.94	-31.0			
Affect – angry	5.35	.01	57.6	YCI individuality	4.15**	1.06
				YRAI cognitive/emotional	3.04*	.594
Affect - lonely	0.55	.74	-16.5			
Affect - ashamed	1.54	.26	14.5			

*p<.05. **p<.01.

Hypothesis 4: Schema process will be a better predictor of the over-searching index than schema content.

The underlying model suggests that it is schema processing rather than schema content which is of most importance in understanding eating pathology. Thus, it is expected that there will be no relationship between schema content (as measured by YSQ-S) and over-searching (as measured by computer-driven task). The number of parts was not large enough to carry out a multiple regression. Therefore, correlations were used, for investigatory purposes only. Tables 3.12 and 3.13 show the correlations for the clinical and non-clinical groups, respectively. The pattern suggests that there is little within this analysis. Although a few correlations are significant, the large number of exploratory tests means that these may be Type 1 errors. At this stage, the safest assumption is to assume that there is no association. A larger sample size is required to reduce the risk of a Type 1 error.

Thus, Hypothesis Four is partially supported, because whilst an association between schema processing and over-searching has already been demonstrated (Hypothesis Three), it has not been possible to demonstrate such a link between schema content and over-searching.

Table 3.12 Correlation between schema content and over-searching index for clinical group (restrictive anorexia nervosa and bulimia nervosa)

	Over-searching index					
N = 35	Neutral - gallery	Eating - hungry	Affect – happy	Affect – angry	Affect – lonely	Affect – ashamed
Emotional deprivation	-.149	-.034	-.180	-.250	-.169	-.194
Abandonment	-.024	-.061	-.273	-.196	-.010	-.050
Mistrust/abuse	-.101	-.071	-.221	-.235	-.145	-.206
Social isolation	-.222	-.245	-.312	-.304	**-.340***	-.159
Defectiveness/ shame	-.068	.050	-.114	-.207	-.115	-.075
Failure to achieve	-.043	.019	-.071	.000	.090	.183
Dependence/ incompetence	-.212	-.122	-.173	-.117	-.161	-.044
Vulnerability to harm	.133	.088	.032	.042	-.026	.062
Enmeshment	.185	.073	.016	.115	.127	.100
Subjugation	.144	.029	-.183	-.113	.012	.020
Self-sacrificing	.093	.037	-.141	-.001	.026	-.011
Emotional inhibition	.036	-.086	-.209	-.219	-.061	-.058
Unrelenting standards	.011	-.066	-.138	-.053	-.027	-.091
Entitlement	.187	**.337***	.289	.275	.231	.253
Insufficient self-control	.051	.166	.193	.087	.067	.060

Table 3.13 Correlation between schema content and over-searching index for non-clinical group

N = 18	Over-searching index					
	Neutral - gallery	Eating - hungry	Affect – happy	Affect – angry	Affect – lonely	Affect – ashamed
Emotional deprivation	.149	.217	.102	.287	.310	.199
Abandonment	.264	.349	.125	.267	.379	.228
Mistrust/ abuse	.175	.253	.177	.227	.158	.274
Social isolation	.073	.086	.304	.111	.033	.191
Defectiveness/ shame	.087	.017	.060	.121	-.040	.090
Failure to achieve	-.203	-.351	-.229	-.258	-.174	-.252
Dependence/ incompetence	-.075	.015	-.239	-0.11	-.025	-.043
Vulnerability to harm	.150	.123	.037	.155	-.050	.142
Enmeshment	.221	.356	.328	.320	**.498***	.233
Subjugation	.304	.365	.389	.444	.441	.347
Self-sacrificing	-.198	-.197	-.169	-.085	-.044	-.177
Emotional inhibition	-.209	-.212	-.138	-.229	-.315	-.054
Unrelenting standards	-.124	-.174	-.031	-.171	.021	-.052
Entitlement	.175	.295	.150	.218	.351	.242
Insufficient self-control	.242	.226	.080	.110	.126	.139

3.8 Summary

It was predicted that individuals with restrictive pathology would demonstrate increased levels of over-searching on a search task when at risk of aversive or intolerable emotion. The results of the study offer only limited support for this hypothesis. The predicted result did not occur at a diagnostic level (Hypothesis 1). However, differing patterns do seem to be observable at a dimensional level between individuals with restrictive pathology, individuals with bulimic pathology and control participants (although not at a significant level) (Hypothesis 2). The most interesting finding of the study was the differing patterns of schema process identified by the YCI and YRAI, and the relationship with task performance (Hypothesis 3). It appears that individuals who try to avoid triggering aversive emotion by controlling the world around them tend to engage in increased over-searching. In contrast, those who try to cope by controlling themselves and blocking out aversive thoughts and feelings tend not to over-search, but to have an increased error rate. Finally, as predicted, it appears that schema content is not an effective predictor of compensatory behaviour (Hypothesis 4).

CHAPTER FOUR

DISCUSSION

4.1 Overview

The discussion section will first remind the reader of the rationale, method and aims of the study. Second, a summary of the findings will be presented. Third, the findings will be discussed in relation to the existing clinical and research literature and current theory, as outlined in the Introduction. Finally, the research and clinical implications of the study will be discussed.

4.2 Aims of the study

Whilst research and clinical trials show that effective treatments for bulimia nervosa are becoming increasingly well established, the search for effective treatment for anorexia nervosa continues. Within the cognitive paradigm, researchers and clinicians in the eating disorders field have moved from an initial focus on shape and weight concerns (e.g., Garner & Bemis, 1985), via an increased emphasis on the need for control (Fairburn, Shafran & Cooper, 1999), to investigating schema-level cognitions (e.g., Cooper, 1997; Waller, under consideration). This shift in focus coincides with the increasing general interest in schemas and schema processes in cognitive psychology (e.g., Layden et al., 1993; Padesky, 1994; Young, 1999).

A new model (Waller, under consideration) hypothesises that in restrictive disorders, a schema compensation process is activated by the threat of aversive emotion. In behavioural terms, this process manifests as attempting to be

perfect at something (e.g., restricting diet, increasing exercise, gaining top grades, being the "model child"), or inhibiting undesirable emotions, such as anger.

The rationale for the study, therefore, was to test for the presence of a schema compensation process in a behavioural way (namely, measuring over-searching on a computer-driven search task under different potentially affect-triggering conditions). In brief, the methodology was that of an experimental paradigm, using a subliminal psychodynamic activation (SPA) procedure (Silverman, 1983) with a cohort of female eating disorder patients. Participants completed a computer-driven test of cognitive processing, in which they were presented with different words at a subliminal level (words were neutral, positive or negative affect related) and then asked to search for a target. This generated an over-searching index. Participants also completed a questionnaire packet measuring level of schemas, schema compensation and schema avoidance.

The study aimed, therefore, to address the following hypotheses;

1. Restrictive eating attitudes are associated with a characteristic form of cognitive processing (i.e., schema compensation – as measured by the over-searching index).

2. Level of schema compensation will be related to the level and type of restrictive attitude and behaviour.

3. The different behaviours demonstrated by individuals with restrictive and bulimic pathology relate to the different underlying schema processes.

4. It is schema process, rather than schema content, that is predictive of pathology.

4.3 Summary of findings

The findings as related to the hypotheses were as follows;

Hypothesis 1: Restrictive eating attitudes are associated with a characteristic form of cognitive processing (i.e., schema compensation).

Hypothesis one predicted that there would be differences within diagnostic groups with regard to degree of over-searching on the computer-processing task. Although the results showed some movement in the predicted direction (for the "gallery" and "lonely" cue type condition), there were no significant interaction terms. Thus, hypothesis one was not supported.

Hypothesis 2: Level of schema compensation will be related to the level and type of unhealthy eating patterns (i.e., type of restrictive attitude and behaviour).

The results demonstrated a greater link between over-searching and restrictive pathology (as measured by Flexible Control) than rigidity (as measured by Rigid Control). Hypothesis Two is partially supported. There is an association at a dimensional level but not at a categorical level.

Hypothesis 3: The different behaviours demonstrated by individuals with restrictive and bulimic pathology relate to the different underlying schema processes.

The results suggest that, for some of the cues, the higher an individual scores on social control (a restrictive profile) the greater the impact upon over-searching, but the lower the impact upon accuracy. In contrast, the higher an individual scores on social control and behavioural/somatic avoidance (a bulimic profile), the greater the impact upon accuracy, but the lower the impact upon over-searching. Therefore a restrictive profile impacts upon over-searching, as the schema compensation process results in increased need to be correct, whilst a bulimic profile impacts upon accuracy as the schema avoidance process results in greater levels of impulsivity and avoidance. This provides partial support for Hypothesis Three.

Hypothesis 4: It is schema process, rather than schema content, that is predictive of pathology.

Although the results suggest that hypothesis four might be partially supported, the small sample size relative to the number of associations tested indicates that the safest assumption is that it is inadvisable to comment on whether there is an association of over-searching and schema content or not.

4.4 Relationship to existing literature

4.4.1 *Clinical literature*

Within the clinical literature, it has been suggested that the binge/purge behaviour observed in individuals with bulimia nervosa serves the function of "blocking" awareness of intolerable emotions (e.g., Heatherton & Baumeister, 1991; Lacey, 1986). This has led to the hypothesis that schema avoidance is the primary process in bulimic pathology. This is supported by clinical observations of the impulsivity and compulsivity observed in this group (Vitousek & Manke, 1994). Further discussion of this is in the research literature section (4.4.2).

The findings of this study provide some support for the idea that the degree of restrictive pathology is related to a schema process known as schema compensation (hypothesis two). Schema compensation is a process whereby, in order to avoid the risk of triggering negative or aversive affect, the individual goes to extreme lengths to be successful or in control of the situation. This may result in the activation of a compensatory schema (e.g., emotional inhibition, unrelenting standards), so that the individual sometimes appears to act in almost the opposite way to that predicted. This is concordant with clinical literature commenting on the perfectionist nature of restrictive anorexics (Vitousek & Manke, 1994). Furthermore, this finding supports observations that restrictive individuals feel driven to excel in order to compensate for their perceived inadequacies (e.g., Slade, 1982; Vitousek & Hollon, 1990). The observation that anorexic patients often display minimal levels of emotion (Casper, Hedeker & McClough, 1992) suggests the long-term use of emotional inhibition as a compensatory schema.

Slade's (1982) functional analysis, which focuses on issues of control, is also relevant. Many clinicians and researchers (e.g., Bruch, 1973; Fairburn, Shafran & Cooper, 1999; Slade, 1982) have hypothesised that the drive for control is key to restrictive pathology. The support for hypothesis three suggests that not only is control an important factor, but that it can be separated out into differing types of control. Individuals with restrictive pathology score highly on the personal control factor. This measures the extent to which the individual seeks to avoid the threat of aversive emotion by attempting to control herself. This is in contrast to social control, in which an individual seeks to avoid emotion by controlling others around her. Garner and Bemis (1985) suggest that losing weight provides the anorexic with much needed feelings of self-control. Thus, this finding provides support for the well-documented idea of the importance of personal or self-control described in the clinical literature.

It is of note that whilst personal control appears to differentiate the eating disorder subtypes, it is social control that is most strongly associated with over-searching (the behavioural measure of compensation). Slade (1982) hypothesised that weight loss provided a sense of achievement and control in an otherwise uncontrollable environment. It is suggested that it is difficult, if not impossible, to achieve a sense of control, if the main means of doing so is by attempting to control others. This study suggests that social control is particularly associated with schema compensation. The increasing interest in the use of therapies such as interpersonal therapy (Agras, Walsh, Fairburn, Wilson & Kraemer, 2000; McIntosh, Bulik, McKenzie & Jordan, 2000) supports this finding, and suggests this is an important treatment focus. This is in contrast to

the current model of anorexia nervosa (Fairburn, Shafran & Cooper, 1999), which does advocate addressing issues of self–control, but states that addressing interpersonal problems need not be an integral part of treatment. Schema-focused cognitive approaches have incorporated an increased focus on relationships (in comparison to traditional CBT), again highlighting the potential utility of this approach.

4.4.2 Research literature

In a review of cognitive theory and eating disorders, Cooper (1997) suggested that one hypothesis that could be drawn from the literature was that schema-driven cognitive processes would be evident in areas of core belief concerns. At that time, this had not been investigated empirically within the eating disorders, and such research is only beginning now. Cooper (1997) suggests that techniques from experimental psychology might be useful in investigating schema-driven processes (such as schema compensation), as this study has done.

As in other studies (Leung et al., 1999; Waller et al., 2000), the clinical women in this sample had higher levels of maladaptive core beliefs than the control women, providing further support for the hypothesis that deeper level core beliefs are relevant to the eating disorders. This is concordant with the move within the research literature from a focus on shape- and weight-related cognitions to schema-level cognitions. Although it is unwise to make assumptions, the findings appear to agree with the suggestion that schema processes might be more relevant to predicting the behaviour than schema

content (Waller, 2000). The results differ from the hypotheses of Luck et al. (under consideration), who suggest that the personal control factor of the YCI is the primary means of affect control for individuals with restrictive pathology. Although in this study, it is personal control that differentiated individuals with restrictive pathology from those with bulimic pathology, it appears to be social control that is most strongly associated with the compensation process.

The current model of anorexia nervosa (Fairburn, Shafran & Cooper, 1999) suggests that difficulty in recognising and expressing emotions should only be attended to in treatment if they are preventing change. The proposed schema-focused model suggests that in some cases, where emotional inhibition schema is particularly predominant, these difficulties may be key to the restrictive anorexic. This is concordant with the observation of the psychodynamic literature of the typically quiet and compliant child (Goodsitt, 1997), similar findings within the personality literature (Vitousek & Manke, 1994), and the suggested link with alexithymia (Rastam, Gillberg, Gillberg & Johansson, 1997).

4.5 Relationship to theory

The findings of the current study provide some (but not complete) support for the underlying model (Waller, under consideration). As predicted by the model, differences in schema content occurred only between clinical and non-clinical groups. In contrast, differences between restrictive and bulimic individuals were found at a schema process level. A more restrictive profile was associated with over-searching, whilst a more bulimic profile was associated

with decreased accuracy. This supports the theory of two different methods of coping with aversive emotion.

Further support for the model arises from the finding that the over-searching index identified differences at a dimensional but not categorical level. This can be interpreted with regard to the new model. In the model, the limitations of diagnostic categories are highlighted. Instead the importance of observable behaviour and pathology are noted. As observed clinically (Striegel-Moore, 1993), individuals with bulimia often have restrictive tendencies. It is possible that this accounts for the lack of a significant association at diagnostic level within the current study (hypothesis one). This finding highlights the value of a model based on observable behaviour rather than diagnosis.

The findings support a key concept of the new model: first, the need to account for why some individuals develop anorexia, whilst others develop bulimia; and second, to account for why some individuals experience both pathologies simultaneously (i.e., bulimic anorexia nervosa) or sequentially (i.e., in the case of diagnostic transition). Although previous models (e.g., Garner & Bemis, 1985; Fairburn, Shafran & Cooper, 1999) have been unable to distinguish between the two pathologies, the current model suggests that it is differences at the level of schema processing that are crucial. Furthermore, since these processes are not "fixed" and occur in response to "hot" cognitions, the model enables us to understand the phenomenon of bulimic anorexia nervosa and shifts in diagnosis. This is discussed in further detail in Section 4.7.

4.6 Research implications

This study is one of the first to use experimental techniques to investigate schema processes within the eating disorders and, as such, there are several potential improvements. The first possibility is that the theory might be wrong, however, there are a number of methodological issues to resolve before coming to that conclusion. The use of different and convergent methodologies is vital in testing any theoretical model or idea. It is suggested that, in the future, the use of a supraliminal condition as well would strengthen any findings from the subliminal condition. The potential limitations of the SPA approach have been raised in the Introduction (e.g., Fudin & Benjamin, 1992, Silverman, 1985). Furthermore, it may be advisable to have fewer cue words but to increase the number of trials per word. It is also suggested that the words chosen should be reviewed. Although shame is highly relevant to individuals with eating disorders (e.g., Andrews, 1997), it is hypothesised that the cue word "ashamed" did not cause an effect in the study because it is a "second order" emotion. The neutral word "gallery" did at times appear to cause an effect. This weakens the study findings and is difficult to explain. It is apparent that the bulimic anorexia nervosa group were of significant interest to the study (this group often appeared as most pathological on measures) and also in addressing the hypothesised model. Future studies would benefit from increased size of this sub-sample.

As discussed in the Method, the key measures used in this study (YSQ-S, YCI and YRAI) are fairly recently developed. They have not, therefore, had extensive investigation into their psychometric properties, although the

preliminary results are promising (Luck et al., under consideration; Stopa et al., 2001).

In terms of future research, it is recommended that the current study is replicated with improvements to clarify the findings. It may be that there are more effective methods that can measure compensation behaviourally. The study would also benefit from a range of participants, including dieters, restrained eaters and individuals with some eating disorder symptomatology (but not a diagnosis) and individuals with other disorders (Cooper, 1997). Given the debate regarding diagnosis, it may be important to focus on both diagnosis and observable behaviour and pathology. The nature of the compensation process requires further investigation, and it would be of interest to examine the hypothesis of functional linkage between schemas (i.e., that the threat of one schema (e.g., abandonment) is associated with the activation of a particular compensatory schema (e.g., subjugation)).

4.7 Clinical implications

The findings of the study have implications for the assessment, formulation, treatment and evaluation of individuals with restrictive pathology.
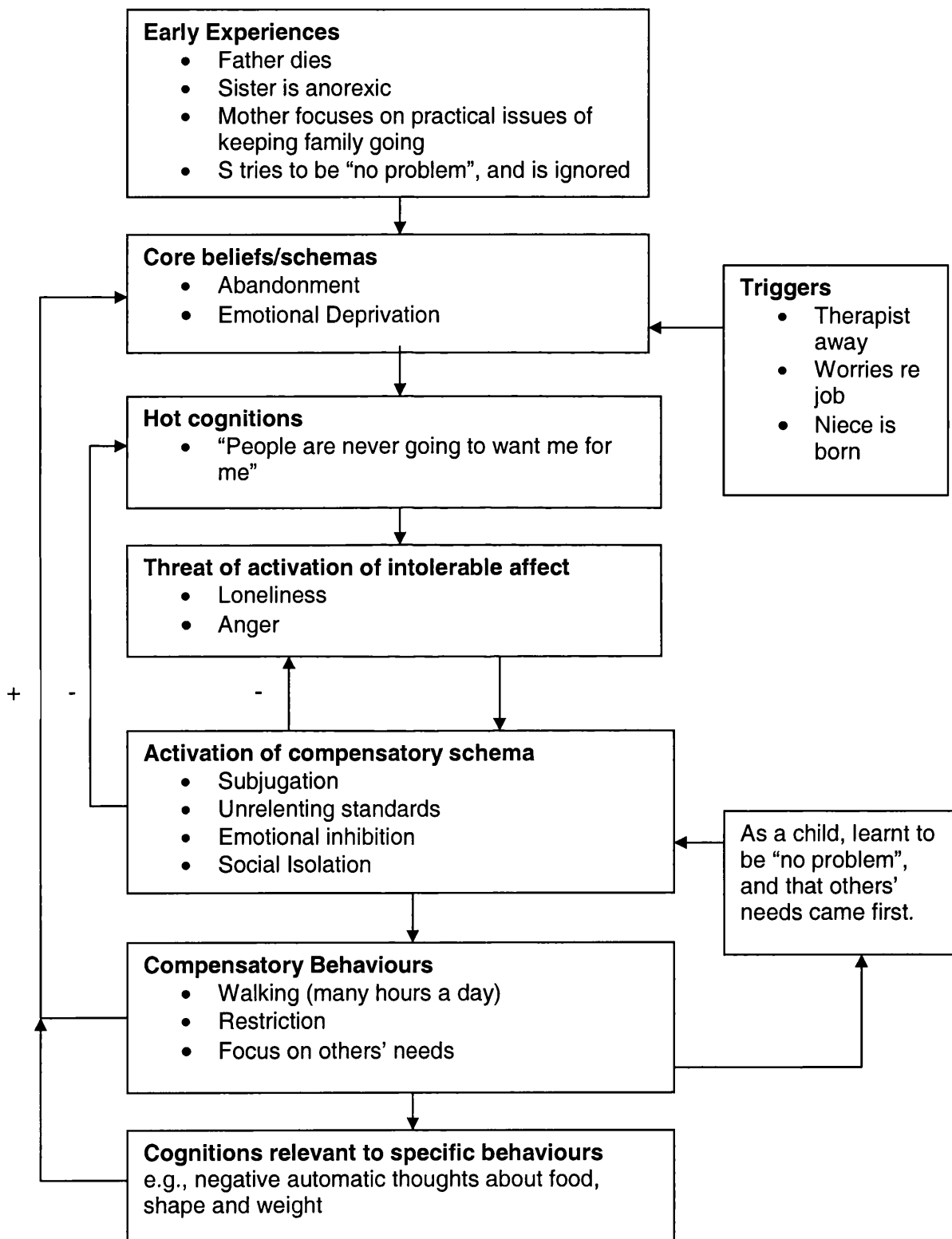
With regard to the assessment process, the model alerts the clinician to the value of enquiring about comorbid difficulties and personality traits. The model predicts that for an individual with restrictive pathology, there may also be compulsive or obsessive behaviours and a tendency towards perfectionism. Conversely, for individuals with a bulimic pathology, behaviours may be more impulsive (e.g., shop-lifting, substance abuse). Because the key cognitive

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process for individuals with bulimic pathology is schema avoidance, it is also important to enquire about dissociation. This may improve accurate diagnosis – for example, there are identified cases of normal weight individuals who meet the criteria for bulimia nervosa, but who more accurately "fit" the restrictive profile (Turner & Bryant-Waugh, 2001). A large percentage of individuals within community services meet diagnostic criteria for EDNOS (Eating disorder, not otherwise specified) (Turner & Bryant-Waugh, 2001), which has little clinical utility. It may be more useful to focus on the pathology of the individual. Indeed Waller (under consideration) suggests that the model is not unique to eating disorders, but is applicable to compulsive (e.g., obsessive-compulsive disorders) and impulsive (e.g., alcohol abuse) behaviours. This is relevant to the comorbidity of psychological problems often found within the eating disorders (Braun, Sunday & Halmi, 1994), as different behaviours can be seen as serving the same function (e.g., controlling anger, anxiety management).

The model is useful clinically with regard to formulation. The findings of the current study provide some support for the schema compensation process in restrictive pathology. For individuals with restrictive pathology, it is hypothesised that early experiences result in the development of core beliefs or schemas (often, for example, abandonment, mistrust/abuse, emotional deprivation). When a situation triggers the core beliefs, the result is the threat of aversive and intolerable emotion. This leads to a schema compensation process, in which an alternative (relatively acceptable) schema is activated. It is hypothesised that these compensatory schemas are often those such as emotional inhibition,

subjugation or unrelenting standards. An example formulation is given in Figure

4.1.

Figure 4.1 Example of a schema-focused formulation of an individual with restrictive anorexia – "S"

Early Experiences
- Father dies
- Sister is anorexic
- Mother focuses on practical issues of keeping family going
- S tries to be "no problem", and is ignored

Core beliefs/schemas
- Abandonment
- Emotional Deprivation

Triggers
- Therapist away
- Worries re job
- Niece is born

Hot cognitions
- "People are never going to want me for me"

Threat of activation of intolerable affect
- Loneliness
- Anger

+   -   -

Activation of compensatory schema
- Subjugation
- Unrelenting standards
- Emotional inhibition
- Social Isolation

As a child, learnt to be "no problem", and that others' needs came first.

Compensatory Behaviours
- Walking (many hours a day)
- Restriction
- Focus on others' needs

Cognitions relevant to specific behaviours
e.g., negative automatic thoughts about food, shape and weight

It can be seen that the formulation is an individualised version of the model described in the Introduction (Figure 1.2). Clinical experience suggests that many patients find having their own formulation immensely helpful. The model also enables individuals to understand why their childhood (which for some patients is many years ago) is relevant. As discussed above, individuals with eating disorders often have multiple problems and the formulation provides a clear framework for the individual to understand how these difficulties interlink. It is also an important reminder for the therapist to be alert to changes in a number of areas (e.g., level of dietary restraint, level of compulsive exercise, compulsive self-harm, levels of perfectionism, etc.)

In terms of a cognitive-behavioural model, the binge/purge behaviour of bulimics is often easier to explain than the restrictive behaviour of anorexics. For example, it is often easier to identify the trigger to a binge. In contrast, dietary restriction or high levels of exercise are more long-term strategies and less context specific. It is hypothesised that this may be linked into the compensatory process, in which these behaviours act as a "slow-release" method for controlling aversive emotions.

The model may also provide some insight into the diagnostic transitions often found in the eating disorders (most commonly, individuals with restrictive anorexia developing bulimia or bulimic anorexia) (Fairburn, Cooper, Doll, Norman & O'Connor, 2000). It is hypothesised that the schema compensation process demands significant and sustained investment (e.g., the individual is always striving to be the best and/or inhibit inappropriate emotions), which may become increasingly hard to maintain. There may be occasions when emotions

are too intense for the compensation process to be effective, at which point the individual will use an avoidance process as a "back-up". Thus, over time, the avoidance process and associated behaviours (e.g., bingeing and purging) will become increasingly relevant to the anorexic.

The suggestion that one of the key differences between individuals with restrictive and bulimic pathology is their central schema processing style has important implications for treatment, both at the level of planning and delivery. Perhaps most significantly, it is hypothesised that the increasing evidence for the role of schema processes within restrictive anorexia may account for the relatively poor treatment outcomes in this disorder (Fairburn, Shafran & Cooper, 1999). If this is so, the use of schema-focused cognitive-behaviour therapy (Young, 1999) appears increasingly appropriate (Waller & Kennerley, in press).

Because the model focuses on behaviours rather than diagnosis, this enables clear treatment targets to be identified. Following the formulation, a clear structure to treatment can be agreed with the patient, focusing firstly observing and identifying schemas and schema processes, and secondly on challenging or testing these. The outcome (in behavioural and cognitive terms) can then be observed. It is highlighted that the very nature of the schema compensation process means that the individual never has the opportunity to reality-test their beliefs. For example, an individual who believes she should never get angry with anyone for fear that they might leave her (abandonment schema), will continue to inhibit angry emotions (compensatory schema – emotional inhibition). Therefore, she never gets the opportunity to check if people really do abandon her if she gets angry. Thus, the schemas are both

reinforced. Within therapy, the patient might be encouraged to test this by gradually expressing more feelings and observing the reactions of others.

The role of compensation processes is also relevant within a therapy session. The concept of compensatory schemas is valuable within a clinical setting as it may explain why clients behave in a way different from predicted (Young, 1999). It highlights the need to be alert to and investigate situations in which clients appear particularly flat (emotional inhibition schemas may be compensating for overwhelming emotion) or have particular anxieties about their homework (an unrelenting standards schema has been activated). Furthermore, the finding that personal control is highly salient to individuals with restrictive pathology supports the idea of this as an important treatment focus (Slade, 1982). As stated above (section 4.4.1), the finding that social control is particularly associated with schema compensation highlights the need to address interpersonal difficulties within treatment.

As stated above, the model lends itself to clear treatment targets. It is equally helpful with regard to evaluation. In the case of individuals with restrictive pathology, positive change on the YCI would be a good indicator of successful outcome. The model predicts that cognitive change would occur first, followed by behavioural change. The model also suggests that if cognitive change has not occurred, but restriction decreases anyway, it is possible that another behaviour, sharing the same function, has increased (e.g., alcohol use).

The findings suggest important differences in the way that individuals with restrictive or bulimic pathology cope with the threat of aversive or intolerable emotion. To end perhaps on a more colourful note, I hope the following analogy

is helpful in understanding how these difficulties play out in "real life". Imagine two women, each extremely proud of their gardens, the focus of which is the immaculate lawn. Unfortunately, the gardens both become plagued by moles and the lawns are ruined by molehills. The first woman decides to concrete over the lawn, thus preventing any molehills. In contrast, the second woman decides to standby with a shovel ready to attend to every molehill as it happens. The first option represents the individual with restrictive pathology, focused on over-compensating to avoid the possible threat of aversive emotion. The second option represents bulimic pathology, in which the individual attempts to block or avoid the aversive emotion as it happens (e.g., by bingeing or self-harm). With either option, both women are left unhappy, as they cannot have the lawn as they would like it. In the same way, individuals with restrictive or bulimic pathology are left with coping mechanisms that are not wholly effective, require significant effort and have multiple disadvantages.

4.8 Conclusion

The hypotheses are partially supported. Although differences were not found at a diagnostic level, there were differences in the predicted direction at a dimensional level. Furthermore, the role of social control (as measured by the YCI) in restrictive pathology has been highlighted. Unfortunately the results were somewhat inconsistent, in that the cue words did not create the predicted effect. However, there is some support for the notion of schema compensation as the central process within restrictive pathology. This lends increasing value to the

consideration of employing schema-level interventions with this population. Further investigation is required.

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APPENDICES

1. Definition of Young's (1998) schemas

2. Information sheets and consent forms

3. Letter of ethical approval for the study

4. Questionnaire packet

5. Protocol and debriefing for the computer task

6. Example of word validation task

Appendix One

Definition of Young's (1998) schemas

Definition of Young's (1998) schemas

1. <u>abandonment</u> (others cannot provide emotional support or protection);

2. <u>mistrust/abuse</u> (others will be abusive or hurtful);

3. <u>emotional deprivation</u> (emotional needs are not satisfied by others);

4. <u>defectiveness/shame</u> (the belief that one is defective or internally flawed);

5. <u>social isolation</u> (one is different from others and isolated from the rest of the world;

6. <u>dependence/incompetence</u> (one is helpless to cope with everyday tasks);

7. <u>vulnerability to harm/illness</u> (fear that disaster will strike at any time);

8. <u>enmeshment</u> (lack of own identity due to emotional over-involvement with others);

9. <u>failure to achieve</u> (one is fundamentally inadequate in areas of achievement);

10. <u>entitlement</u> (one is entitled to whatever one wants);

11. <u>insufficient self-control</u> (one cannot control own impulses or feelings);

12. <u>subjugation</u> (surrendering of control to others for fear of negative consequences);

13. <u>self-sacrifice</u> (sacrificing one's own needs to meet the needs of others);

14. <u>emotional inhibition</u> (inhibition of feelings to avoid disapproval from others); and

15. <u>unrelenting standards</u> (striving to meet impossible standards).

Appendix Two

Information Sheets and Consent Forms

Sub-Department of Clinical Health Psychology

UNIVERSITY COLLEGE LONDON

GOWER STREET LONDON WC1E 6BT

Centre Number:
Study Number:

PATIENT INFORMATION SHEET

(9[th] March 2001; Version 1)

Title of Project:

The role of schema compensation in restrictive anorexic women

Name of Researcher: Victoria Mountford

You are invited to take part in this research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, and discuss it with friends, family and your GP if you wish. Ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part when you attend for your appointment.

Consumers for Ethics in Research (CERES) publish a leaflet called *Medical Research and You*. This leaflet gives more information about medical research, and looks at some questions that you may want to ask. A copy can be obtained from CERES, PO Box 1365, London N16 0BW.

Background to the study

There are different types of eating disorder, for example, anorexia or bulimia. Some people tend to limit or restrict the amount of food they eat. They may also seek to control their weight and shape by exercising a lot. This is in contrast to people with bulimic problems, who may use other ways (e.g., vomiting) to control their weight. Little is known about why these differences exist, although it has been suggested that they may relate to different thinking processes. The present study will investigate whether there is an association between people with restrictive attitudes and behaviours and a type of thinking style known as schema compensation.

The research will take approximately six months, although you will only need to take part for approximately 45 minutes.

Why have I been chosen?

You have recently been referred to the Outpatient Eating Disorders Service, Springfield University Hospital. All patients who are referred to this service between April 2001 and December 2001 are being asked to take part.

Do I have to take part?

You do not have to take part. If you do not take part, it will have no impact on the treatment that you will be offered.

What will happen to me if I take part?

You will be asked to complete five simple questionnaires, relating to your eating patterns, your level of restrictive beliefs, and your beliefs about yourself. You will then be asked to complete a simple task on a computer that will take approximately 20 minutes.

What are the possible disadvantages and risks of taking part?

There are no known risks in taking part in this form of study. The only disadvantage is that you will be asked to give up 45 minutes of your time.

What are the possible benefits of taking part?

Your treatment may be influenced by the information that you give us, since we will be more readily able to understand your problem and suggest treatment strategies.

What if new information becomes available?
Sometimes during the course of a research project, new information becomes available about the topic that is being studied. If this happens, the researcher will tell you about it and discuss with you whether you wish to continue in the study. If you decide to withdraw, the researcher will make arrangements for your care to continue. If you decide to continue in the study, then you will be asked to sign an updated consent form.

On receiving new information, the researcher might consider it to be in your best interests to withdraw you from the study. She will explain the reasons and arrange for your care to continue.

What if something goes wrong?

During research trials, there can be problems due to the methods that are used (see note about side effects, above) or due to the way in which you are treated by members of staff. It is highly unlikely that the method being used in this study will have any harmful effects. However, if you were to be harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, then you may have grounds for legal action (but you may have to pay the costs). Regardless of this, if you wish to complain about any aspect of the way that you have been approached or treated during the course of this study, the normal NHS complaints mechanisms may be available to you.

Will my taking part in the study be kept confidential?

All information collected about you during the course of the research will be kept entirely confidential. Any information about you that leaves the hospital will have your name and address removed, so that you cannot be recognized from it. However, you will be asked if it is acceptable for the researcher to notify your GP and your subsequent therapist that you are taking part in the research.

What will happen to the results of the research study?

It is anticipated that the results will be submitted for publication in a peer-reviewed journal. You will not be identified in any report or publication. If you should wish, then you will be sent a brief summary of the findings at the end of the study (July 2002) and/or a copy of the final paper when it is published (probably in 2003).

Who is organizing and funding the research?

The research is not funded by any external source, and the researcher is not being paid for including you in the study.

Who has reviewed the study?

This study has been reviewed and approved by the Wandsworth Local Research Ethics Committee (contact number: 0208-725 3398).

Contact for further information

For further information about the study, please contact: Victoria Mountford, Sub-Dept of Clinical Health Psychology, University College London, Gower Street, London, WC1E 6BT.   Tel: 020 7380 7897.

This copy of the Information Sheet is yours to keep. If you agree to take part, then you will be asked to sign a Consent Form. and you will be given a copy of that form.

Centre Number:
Study Number:

INFORMATION SHEET - CONTROL GROUP

(9th March 2001; Version 1)

<u>Title of Project:</u>

The role of schema compensation in restrictive anorexic women

<u>Name of Researcher:</u> Victoria Mountford

You are invited to take part in this research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, and discuss it with friends, family and your GP if you wish. Ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Consumers for Ethics in Research (CERES) publish a leaflet called *Medical Research and You*. This leaflet gives more information about medical research, and looks at some questions that you may want to ask. A copy can be obtained from CERES, PO Box 1365, London N16 0BW.

<u>Background to the study</u>

There are different types of eating disorder, for example, anorexia or bulimia. Some people with anorexia are known as restrictors. This means that they tend to limit or restrict the amount of food they eat. They may also seek to control their weight and shape by exercising a lot. This is in contrast to people with bulimic problems, who may use other ways, for example, vomiting, to control their weight. Little is known about why these differences exist, although it has been suggested that they may relate to different thinking processes. The present study will investigate whether there is an association between people with restrictive attitudes and behaviours and a type of thinking style known as schema compensation.

The research will take approximately six months, although you will only need to take part for approximately 45 minutes.

<u>Why have I been chosen?</u>

You are being asked to take part as a non-eating disordered woman, to provide a control group for the group of eating-disordered women that is being collected elsewhere.

<u>Do I have to take part?</u>

You do not have to take part. If you do not take part, it will have no impact on you.

<u>What will happen to me if I take part?</u>

You will be asked to complete five simple questionnaires, relating to your eating patterns, your level of restrictive beliefs, and your beliefs about yourself. You will then be asked to complete a simple task on a computer that will take approximately 20 minutes.

What are the possible disadvantages and risks of taking part?

There are no known risks in taking part in this form of study. The only disadvantage is that you will be asked to give up 45 minutes of your time.

What are the possible benefits of taking part?

The treatment of anorexic disorders may be influenced by the information that you give us, since we will be more readily able to understand how women with those problems differ from women without an eating disorder.

What if new information becomes available?

Sometimes during the course of a research project, new information becomes available about the topic that is being studied. If this happens, the researcher will tell you about it and discuss with you whether you wish to continue in the study. If you decide to withdraw, the researcher will make arrangements for your care to continue. If you decide to continue in the study, then you will be asked to sign an updated consent form.

On receiving new information, the researcher might consider it to be in your best interests to withdraw you from the study. The reasons will be explained to you.

What if something goes wrong?

During research trials, there can be problems due to the methods that are used (see note about side effects, above) or due to the way in which you are treated. It is highly unlikely that the method being used in this study will have any harmful effects. However, if you were to be harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, then you may have grounds for legal action (but you may have to pay the costs). Regardless of this, if you wish to complain about any aspect of the way that you have been approached or treated during the course of this study, the normal NHS complaints mechanisms may be available to you.

Will my taking part in the study be kept confidential?

All information collected about you during the course of the research will be kept entirely confidential. Any information about you that leaves the hospital will have your name and address removed, so that you cannot be recognized from it.

What will happen to the results of the research study?

It is anticipated that the results will be submitted for publication in a peer-reviewed journal. You will not be identified in any report or publication. If you should wish, then you will be sent a brief summary of the findings at the end of the study (July 2002) and/or a copy of the final paper when it is published (probably in 2003).

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The research is not funded by any external source, and the researcher is not being paid for including you in the study.

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Contact for further information

For further information about the study, please contact: Victoria Mountford, Sub-Dept of Clinical Health Psychology, University College London, Gower Street, London, WC1E 6BT.   Tel: 020 7380 7897.

This copy of the Information Sheet is yours to keep. If you agree to take part, then you will be asked to sign a Consent Form, and you will be given a copy of that form.

Centre Number:
Study Number:
Patient Identification Number for this trial:

CONSENT FORM - PATIENT VERSION

Title of Project:
The role of schema compensation in restrictive anorexic women

Name of Researcher:
Victoria Mountford

**Please initial
below**

1. I confirm that I have read and understand the Information Sheet
   dated 9th March 2001 (Version 1) for the above study, and have   _____
   had the opportunity to ask questions.

2. I understand that my participation is voluntary, and that I am
   free to withdraw at any time, without giving any reason and   _____
   without my medical care or legal rights being affected.

3. I understand that sections of any of my medical notes may be
   looked at by responsible individuals from South West London and
   St. George's Mental Health NHS Trust or from regulatory   _____
   authorities where it is relevant to my taking part in research.
   I give permission for these individuals to have access to my records.

4. I agree to take part in the above study.   _____

_____   _____   _____
Name of patient   Date   Signature

_____   _____   _____
Name of person taking consent   Date   Signature
(if different from researcher)

_____   _____   _____
Name of Researcher   Date   Signature

UNIVERSITY COLLEGE LONDON

GOWER STREET LONDON WC1E 6BT

Centre Number:
Study Number:
Patient Identification Number for this trial:

CONSENT FORM - CONTROL VERSION

<u>Title of Project:</u>
The role of schema compensation in restrictive anorexic women

<u>Name of Researcher:</u>
Victoria Mountford

**Please Initial
below**

1. I confirm that I have read and understand the Information Sheet
   dated 9[th] March 2001(Version 1) for the above study, and have
   had the opportunity to ask questions.   _____

2. I understand that my participation is voluntary, and that I am
   free to withdraw at any time, without giving any reason and
   without my medical care or legal rights being affected.   _____

3. I agree to take part in the above study.   _____

_____   _____   _____
Name of participant   Date   Signature

_____   _____   _____
Name of person taking consent   Date   Signature
(if different from researcher)

_____   _____   _____
Name of Researcher   Date   Signature

Appendix Three

Letter of Ethical Approval

St George's Healthcare **NHS**

NHS Trust

Our Ref:CH/avm/01.24.9

16th May 2001

Miss Victoria Mountford
Trainee Clinical Psychologist
Sub-Department of Clinical Health Psychology
University College London
Gower Street
London WC1E 6BT

Dear Miss Mountford,

Re: **The role of schema compensation in restrictive anorexic women – 01.24.9**

Thank you for your letter dated 2nd May 2001 concerning the above-named study. Your letter satisfactorily addresses the points raised by the Committee and I am now happy to give final approval for the study to proceed.

The Committee is looking forward to Professor Waller's attendance at the forthcoming meeting and to learning more about the subliminal processing and other aspects of this work on that occasion.

Yours sincerely,

Dr Christine Heron
Vice-Chair/Clinical Secretary
Local Research Ethics Committee

<u>Please Note:</u> All research should be conducted in accordance with the guidelines of the Ethical Committee; the reference number allocated to the project should be used in all correspondence with the Committee and the Committee should be informed:

(a)   when the project is complete.

(b)   what stage the project is at one year from today's date.

(c)   if any alterations are made to the treatment or protocol which might have affected ethical approval being granted.

(d)   all investigators whose projects have been approved by this Committee are required to report at once any adverse experience affecting subjects in the study and at the same time state the current total number of Serious Adverse Events that have occurred.

St George's Healthcare NHS Trust Incorporating: St George's Hospital, Atkinson Morley's Hospital, Bolingbroke Hospital
Chairman: Catherine McLoughlin CBE   Chief Executive: Ian Hamilton

(04/00)

Appendix Four

Questionnaire Packet

YSQ-S

INSTRUCTIONS:
Listed below are statements that a person might use to describe himself or herself. Please read each statement and decide how well it describes you using the rating scale below. When you are not sure about how a statement applies to you, base your answer on what you emotionally **feel**, not on what you **think** to be true. Using the rating scale below, **choose the highest rating from 1 to 6** that applies to you and write the number in the space before the statement.

RATING SCALE:

1 = Completely untrue of me

2 = Mostly untrue of me

3 = Slightly more true than untrue

4 = Moderately true of me

5 = Mostly true of me

6 = Describes me perfectly

1. _____ Most of the time, I haven't had someone to nurture me, share him/herself with me, or care deeply about everything that happens to me.

2. _____ In general, people have not been there to give me warmth, holding, and affection.

3. _____ For much of my life, I haven't felt that I am special to someone.

4. _____ For the most part, I have not had someone who really listens to me, understands me, or is tuned into my true needs and feelings.

5. _____ I have rarely had a strong person to give me sound advice or direction when I'm not sure what to do.

6. _____ I find myself clinging to people I'm close to because I am afraid they'll leave me.

7. _____ I need other people so much that I worry about losing them.

8. _____ I worry that people I feel close to will leave me or abandon me.

9. _____ When I feel someone I care for pulling away from me, I get desperate.

10. _____ Sometimes I am so worried about people leaving me that I drive them away.

11. _____ I feel that people will take advantage of me.

12. _____ I feel that I cannot let my guard down in the presence of other people, or else they will intentionally hurt me.

13. _____ It is only a matter of time before someone betrays me.

14. _____ I am quite suspicious of other people's motives

15. _____ I'm usually on the lookout for people's ulterior motives

16. _____ I don't fit in.

17. _____ I'm fundamentally different from other people.

18. _____ I don't belong; I'm a loner.

19. _____ I feel alienated from other people.

20. _____ I always feel on the outside of groups.

21. _____ No man/woman I desire could love me once he/she saw my defects.

22. _____ No one I desire would want to stay close to me if he/she knew the real me.

23. _____ I'm unworthy of the love, attention, and respect of others.

24. _____ I feel that I'm not lovable.

25. _____ I am too unacceptable in very basic ways to reveal myself to people.

26. _____ Almost nothing I do at work (or school) is as good as other people can do.

27. _____ I'm incompetent when it comes to achievement.

28. _____ Most other people are more capable than I am in areas or work and achievement.

29. _____ I'm not as talented as most people are in their work.

30. _____ I'm not as intelligent as most people when it comes to work (or school).

31. _____ I do not feel capable of getting on in everyday life.

32. _____ I think myself a dependent person, when it comes to everyday functioning.

33. _____ I lack common sense.

34. _____ My judgment cannot be relied upon in everyday situations.

35. _____ I don't feel confident about my ability to solve everyday problems that come up.

36. _____ I can't seem to escape the feeling that something bad is about to happen.

37. _____ I feel that disaster (natural, criminal, financial, or medical) could strike at any moment.

38. _____ I worry about being attacked

39. _____ I worry that I'll lose all my money and become destitute.

40. _____ I worry that I am developing a serious illness, even though nothing serious has been diagnosed by a physician.

41. _____ I have not been able to separate myself from my parent(s), the way other people my age seem to.

42. _____ My parent(s) and I tend to be overinvolved in each other's lives and problems.

43. _____ It is very difficult for my parent(s) and me to keep intimate details from each other, without feeling betrayed or guilty.

44. _____ I often feel as if my parent(s) are living through me - I don't have a life of my own.

45. _____ I often feel that I do not have a separate identity from my parents or partner.

46. _____ I think if I do what I want, I'm only asking for trouble.

47. _____ I feel that I have no choice but to give in to other people's wishes, or else they will retaliate or reject me in some way

Please turn over and continue

48. _____ In relationships, I let the other person have the upper hand.

49. _____ I've always let others make choices for me, so I really don't know what I want for myself.

50. _____ I have a lot of trouble demanding that my rights be respected and that my feelings be taken into account.

51. _____ I'm the one who usually ends up taking care of people I'm close to.

52. _____ I am a good person because I think of others more than of myself

53. _____ I'm so busy doing things for the people that I care about that I have little time for myself.

54. _____ I've always been the one who listens to everyone else's problems.

55. _____ Other people see me as doing too much for others and not enough for myself.

56. _____ I am too self-conscious to show positive feelings to others (e.g. affection, showing I care).

57. _____ I find it embarrassing to express my feelings to others.

58. _____ I find it hard to be warm and spontaneous.

59. _____ I control myself so much that people think I am unemotional.

60. _____ People see me as uptight emotionally.

61. _____ I must be the best at most of what I do; I can't accept second best.

62. _____ I try to do my best; I can't settle for "good enough".

63. _____ I must meet all my responsibilities.

64. _____ I feel there is constant pressure for me to achieve and get things done.

65. _____ I can't let myself off the hook easily or make excuses for my mistakes.

66. _____ I have a lot of trouble accepting "no" for an answer when I want something from other people.

67. _____ I'm special and shouldn't have to accept many of the restrictions placed on other people.

68. _____ I hate to be constrained or kept from doing what I want.

69. _____ I feel that I shouldn't have to follow the normal rules and conventions other people do.

70. _____ I feel that what I have to offer is of greater value than the contributions of others.

71. _____ I can't seem to discipline myself to routine or boring tasks.

72. _____ If I can't reach a goal, I become easily frustrated and give up.

73. _____ I have a very difficult time sacrificing immediate gratification to achieve a long-term goal.

74. _____ I can't force myself to do things I don't enjoy, even when I know it's for my own good.

75. _____ I have rarely been able to stick to my resolutions.

Thank you very much for answering these questions.
Please turn over and continue with the next questionnaire.

YCI

INSTRUCTIONS:
Listed below are statements that a person might use to describe himself or herself. Please read each statement and decide how well it describes you. Then choose the highest rating from 1 to 6 that describes you, and write the number in the space before the statement.

RATING SCALE:

1 = Completely untrue of me

2 = Mostly untrue of me

3 = Slightly more true than untrue

4 = Moderately true of me

5 = Mostly true of me

6 = Describes me perfectly

1. _____   I take out my frustrations on the people around me.

2. _____   I often blame others when things go wrong.

3. _____   I show a lot of anger when people let me down or betray me.

4. _____   I can't let go of anger without getting revenge.

5. _____   I get defensive when I'm criticized.

6. _____   It's important that others admire my accomplishments or achievements.

7. _____   The visible trappings of success (e.g., expensive car, clothing, home) are important to me.

8. _____   I work hard to be among the best or most successful.

9. _____   It's important to me to be popular (e.g., part of the in-crowd)

10. _____   I often have fantasies of success, fame, wealth, power, or popularity.

11. _____   I like to be the centre of attention.

12. _____   I am more flirtatious or seductive than the average person.

13. _____   I put a lot of emphasis on having order in my life (e.g., organization, structure, planning, routine).

14. _____   I expend a lot of effort trying to avoid having things go wrong.

15. _____   I agonize over decisions so I won't make a mistake.

16. _____   I am quite controlling of the people around me.

17. _____   I like being in positions where I have control or authority over the people around me.

18. _____   I dislike other people having any say over my life.

19. _____   I have a hard time compromising or giving in.

20. _____   I don't like being dependent on anyone.

21. _____   It's crucial to me that I make my own decisions and support myself.

22. _____   I have trouble committing to one person or settling down.

23. _____   I like to be a "free agent", to have the freedom to do what I want.

24. _____ I have trouble limiting myself to one job or career; I like to keep my options open.

25. _____ I usually put my own needs before others.

26. _____ I am often demanding with other people - I like everything to be "just right".

27. _____ I have to take care of myself first, the way other people do.

28. _____ It is very important to me that my environment be comfortable (e.g., temperature, light, furniture).

29. _____ I think of myself as a rebel; I often go against the established authority.

30. _____ I dislike rules and can get satisfaction from breaking them.

31. _____ I enjoy being unconventional, even if it's unpopular or I don't fit in.

32. _____ I don't try to be successful by society's standards (e.g., wealth, achievement, popularity).

33. _____ I've always "marched to a different drummer".

34. _____ I'm a very private person; I don't like people knowing a lot about my private life or feelings.

35. _____ I try to appear strong to other people, even if I feel vulnerable or unsure of myself.

36. _____ I can be very possessive or clinging with the people I value.

37. _____ I am often manipulative to achieve my goals.

38. _____ I often prefer indirect means of getting my way instead of directly asking for what I want.

39. _____ I keep people at a distance so they only see the parts of myself I want them to see.

40. _____ I am a highly critical person.

41. _____ I feel I'm under a great deal of pressure to meet my own standards or responsibilities.

42. _____ I am often tactless or insensitive in expressing myself.

43. _____ I try to be optimistic at all times; I don't let myself focus on the negative.

44. _____ I believe it's important to "put on a happy face" regardless of what I feel inside.

45. _____ I often feel envious or frustrated when others are more successful or get more attention than I do.

46. _____ I will go to considerable lengths to be sure I get my fair share and am not cheated.

47. _____ I look for ways to outsmart people, so they won't take advantage of me or hurt me.

48. _____ I know just what to say or do to get other people to like me (e.g., flattery, saying what they want to hear).

Thank you very much for answering these questions.

Please turn over and continue with the next questionnaire.

YRAI

INSTRUCTIONS:

Listed below are statements that a person might use to describe herself or himself. Please read each statement and decide how well it describes you. Then, using the rating scale below, choose the highest rating from 1 to 6 that best describes you and write the number in the space before the statement.

RATING SCALE:

1 = Completely untrue of me
2 = Mostly untrue of me
3 = Slightly more true than untrue
4 = Moderately true of me
5 = Mostly true of me
6 = Describes me perfectly

1. _____ I try not to think about things that upset me.

2. _____ I drink alcohol to calm myself.

3. _____ I am happy most of the time.

4. _____ I rarely feel sad and blue.

5. _____ I value reason over emotions.

6. _____ I believe that I should not get angry, even at people I don't like.

7. _____ I use drugs to feel better.

8. _____ I don't feel much when I remember my childhood.

9. _____ I smoke when I'm upset.

10. _____ I suffer from gastrointestinal problems (e.g. indigestion, ulcers, colitis).

11. _____ I feel numb.

12. _____ I often get headaches.

13. _____ I withdraw when I am angry.

14. _____ I don't have as much energy as most people my age.

15. _____ I suffer from muscular aches and pains.

16. _____ I watch a lot of TV when I'm alone.

17. _____ I believe that one should use reason to keep emotions under control.

18. _____ I cannot intensely dislike anyone.

19. _____ My philosophy when something goes wrong is to put it behind me as soon as possible and move on.

20. _____ I withdraw from people when I feel hurt.

21. _____ I don't remember much about my childhood years.

22. _____ I take naps or sleep a lot during the day.

23. _____ I'm happiest when I'm roaming or travelling around.

24. _____ Sticking to the task at hand keeps me from feeling upset.

25. _____ I spend a lot of time daydreaming.

26. _____ When I'm upset, I eat to feel better.

27. _____ I try not to think about painful memories from the past.

28. _____ I feel better if I keep myself constantly busy, not leaving much time to think.

29. _____ I had a very happy childhood.

30. _____ I withdraw when I'm sad.

31. _____ People say I'm like an ostrich with my head in the sand. (In other words, I tend to ignore unpleasant thoughts)

32. _____ I tend not to think about losses and disappointments.

33. _____ Often I don't feel anything, even when the situation seems to warrant strong emotions.

34. _____ I was fortunate to have such good parents.

35. _____ I try to stay emotionally neutral most of the time.

36. _____ I find myself buying things that I don't need, to improve my mood.

37. _____ I try not to put myself in situations that are difficult or make me uncomfortable.

38. _____ I get physically ill when things aren't going well for me.

39. _____ When people have left me or died, I didn't feel too upset.

40. _____ What others think of me does not bother me.

TFEQ

I	When I smell a sizzling steak or see a juicy piece of meat, I find it very difficult to keep from eating, even if I have just finished a meal.	T	F
2	I usually eat too much at social occasions, like parties and picnics.	T	F
3	I am usually so hungry that I eat more than three times a day.	T	F
4	When I have eaten my quota of calories, I am usually good about not eating any more.	T	F
5	Dieting is so hard for me because I just get too hungry.	T	F
6	I deliberately take small helpings as a means of controlling my weight.	T	F
7	Sometimes things just taste so good that I keep on eating when I am no longer hungry.	T	F
8	Since I am often hungry, I sometimes wish that while I am eating, an expert would tell me that I have had enough or that I can have something more to eat.	T	F
9	When I feel anxious, I find myself eating.	T	F
10	Life is too short to worry about dieting.	T	F
11	Since my weight goes up and down, I have gone on reducing diets more than once.	T	F
12	I often feel so hungry that I just have to eat something.	T	F
13	When I am with someone who is overeating, I usually overeat too.	T	F
14	I have a pretty good idea of the number of calories in common food.	T	F
15	Sometimes when I start eating, I just can't seem to stop.	T	F
16	It is not difficult for me to leave something on my plate.	T	F
17	At certain times of the day, I get hungry because I have gotten used to eating then.	T	F
18	While on a diet, if I eat food that is not allowed, I consciously eat less for a period of time to make up for it.	T	F
19	Being with someone who is eating often makes me hungry enough to eat also.	T	F
20	When I feel blue, I often overeat.	T	F
21	I enjoy eating too much to spoil it by counting calories or watching my weight.	T	F
22	When I see a real delicacy, I often get so hungry that I have to eat right away.	T	F
23	I often stop eating when I am not really full as a conscious means of limiting the amount that I eat.	T	F
24	I get so hungry that my stomach often seems like a bottomless pit.	T	F
25	My weight has hardly changed at all in the last ten years.	T	F
26	I am always hungry so it is hard for me to stop eating before I finish the food on my plate.	T	F
27	When I feel lonely, I console myself by eating.	T	F
28	I consciously hold back at meals in order not to gain weight.	T	F
29	I sometimes get very hungry late in the evening or at night.	T	F
30	I eat anything I want, any time I want.	T	F

31	Without even thinking about it, I take a long time to eat.	T	F
32	I count calories as a conscious means of controlling my weight.	T	F
33	I do not eat some foods because they make me fat.	T	F
34	I am always hungry enough to eat at any time.	T	F
35	I pay a great deal of attention to changes in my figure.	T	F
36	While on a diet, if I eat a food that is not allowed, I often then splurge and eat other high calories foods.	T	F

Please answer the following questions by circling the appropriate response.

37	How often are you dieting in a conscious effort to control your weight?			
	Rarely	Sometimes	Usually	Always
38	Would a weight fluctuation of 5lbs affect the way you live your life?			
	Not at all	Slightly	Moderately	Very much
39	How often do you feel hungry?			
	Only at mealtimes	Sometimes between meals	Often between meals	Almost always
40	Do your feelings of guilt about overeating help you to control your food intake?			
	Never	Rarely	Often	Always
41	How difficult would it be for you to stop eating halfway through dinner and not eat for the next four hours?			
	Easy	Slightly difficult	Moderately difficult	Very difficult
42	How conscious are you of what you are eating?			
	Not at all	Slightly	Moderately	Extremely
43	How frequently do you avoid 'stocking up' on tempting foods?			
	Almost never	Seldom	Usually	Almost always
44	How likely are you to shop for low calorie foods?			
	Unlikely	Slightly unlikely	Moderately likely	Very likely

45	Do you eat sensibly in front of others and splurge alone?			
	Never	Rarely	Often	Always

46	How likely are you to consciously eat slowly in order to cut down on how much you eat?			
	Unlikely	Slightly likely	Moderately likely	Very likely

47	How frequently do you skip dessert because you are no longer hungry?			
	Almost never	Seldom	At least once a week	Almost everyday

48	How likely are you to consciously eat less than you want?			
	Unlikely	Slightly likely	Moderately likely	Very likely

49	Do you go on eating binges though you are not hungry?			
	Never	Rarely	Sometimes	At least once a week

50	On a scale of 0 to 5, where 0 means no restraint in eating (eating whatever you want, whenever you want it) and 5 means total restraint (constantly limiting food intake and never 'giving in'), what number would you give yourself? Circle the number that best applies to you.
	0 - eat whatever you want, whenever you want it
	1 - usually eat whatever you want, whenever you want it
	2 - often eat whatever you want, whenever you want it
	3 - often limit food intake, but often 'give in'
	4 - usually limit food intake, rarely 'give in'
	5 - constantly limiting food intake, never 'giving in'

51	To what extent does this statement describe your eating behaviour? "I start dieting in the morning, but because of any number of things that happen during the day, by evening I have given up and eat what I want, promising myself to start dieting again tomorrow."			
	Not like me	Little like me	Pretty good description of me	Describes me perfectly

Thank you very much for answering these questions.
Please turn over and continue with the next questionnaire.

EDI

INSTRUCTIONS

The items ask about your attitudes, feelings and behaviour. Some of the items relate to food or eating. Other items
ask about your feelings about yourself.

For each item, decide if the item is true about you ALWAYS (A), USUALLY (U), OFTEN (O), SOMETIMES (S),
RARELY (R), or NEVER (N). Circle the letter that corresponds to your rating. For example, if your rating for an item
is OFTEN, you would circle the (O) for that item. Respond to all of the items, making sure that you circle the letter
for the rating that is true about you. If you need to change an answer, make an 'X' through the incorrect letter and
then circle the correct one.

1) I eat sweets and carbohydrates without feeling nervous	A	U	O	S	R	N
2) I think that my stomach is too big	A	U	O	S	R	N
4) I eat when I am upset	A	U	O	S	R	N
5) I stuff myself with food	A	U	O	S	R	N
7) I think about dieting	A	U	O	S	R	N
9) I think that my thighs are too large	A	U	O	S	R	N
11) I feel extremely guilty after overeating	A	U	O	S	R	N
12) I think that my stomach is just the right size	A	U	O	S	R	N
16) I am terrified of gaining weight	A	U	O	S	R	N
19) I feel satisfied with the shape of my body	A	U	O	S	R	N
25) I exaggerate or magnify the importance of weight	A	U	O	S	R	N
28) I have gone on eating binges where I have felt that I could not stop	A	U	O	S	R	N
31) I like the shape of my buttocks	A	U	O	S	R	N
32) I am preoccupied with the desire to be thinner	A	U	O	S	R	N
38) I think about bingeing (overeating)	A	U	O	S	R	N
45) I think my hips are too big	A	U	O	S	R	N
46) I eat moderately in front of others and stuff myself when they're gone	A	U	O	S	R	N
49) If I gain a pound, I worry that I will keep gaining	A	U	O	S	R	N
53) I have the thought of trying to vomit in order to lose weight	A	U	O	S	R	N
55) I think that my thighs are just the right size	A	U	O	S	R	N
59) I think my buttocks are too large	A	U	O	S	R	N
61) I eat or drink in secrecy	A	U	O	S	R	N
62) I think that my hips are just the right size	A	U	O	S	R	N

What is your height? _____   What is your weight? _____

What is your age? _____ years   Date of birth: _____/_____/_____

This is the end of the questionnaires. Thank you very much for completing them.

Now go back over the booklet, making sure that you have not missed out any items.

Once you are sure that you have completed all items, please return the booklet as arranged.

Appendix Five

Protocol and debriefing for computer task

Protocol and debriefing for computer task

I am going to ask you to do a task on the computer. It takes about 5- 10 minutes.

When the programme starts you will first see a blank screen.

You will then see a line of X's across the screen. Please look at the middle of the X's.

This is followed by a screen full of p's.

Sometimes, there is one b amongst the p's. Sometimes there is not.

I would like you to look for the b. If the b is present I want you to hit yes. If it is absent, hit no.

The task is timed so please try to be as quick as possible, but also to be careful and make as few mistakes as possible.

If you do make a mistake, don't worry, just keep going.

Are there any questions you want to ask?

After task

Participants were asked if they noticed anything about the task. Then they were asked the following:

There were actually some words on the screen. Did you see any words?

Can you tell me what word(s) you saw?

They were then asked to complete the subliminal validation task.

Debrief

When the X's were presented, there was a word presented subliminally (so you would not have been able to see it). The words were; gallery, hungry, happy, angry, lonely and ashamed.

Lastly, the word friendship was shown.

The study looks at how long it takes for you to find the b after you have seen these words.

We think that if the word is negative, it will take longer for restrictive anorexics to say that the b is absent than other people.

If this is the case, this study will help us to understand more about how anorexics cope when they are faced with something they find threatening.

Appendix Six

Example of subliminal validation task

ID No. _____

Please circle the seven words you think you may have seen.

Do not worry if you are not sure.

starving	lovely	frightened
joyous	fellowship	hanger
allowed	hiccup	happy
enraged	lonely	museum
gallery	angry	isolated
acorn	friendship	hungry
giggling	embarrassed	ashamed