Dieters' Experience of Craving Thoughts: The Role of Appraisal and Thought Control in Dysfunctional Eating Behaviour and Emotional Distress.

Submitted for the Doctorate of Clinical Psychology, 2000

Joanne Newbolt

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

Acknowledgments

First and foremost I would like to thank Dr Konstantine Loumidis for his supervision and support throughout the period of work involved in this study. I would also like to thank Dr Claudia Morris and Weight Watchers UK for the permission to contact local Weight Watchers meetings in order to recruit participants for the study. In addition I would like to thank Val Walker, Area Services Manager for Leicester, Sally Morpeth, Area Services Manager for Nottingham and Christine Parr, Area Services Manager for Sheffield for allowing me to attended local Weight Watchers meetings and providing space to conduct interviews. I would also like to greatly thank all the women who took part in the study and in particular those giving their time to be interviewed. Finally thank you to my Mum for reading through the whole thing for me and correcting my grammar.

The current study was completed by the author between February 2000 and July 2000, in partial fulfillment of a Doctorate in Clinical Psychology at Leicester University. The proceeding work was conducted solely by the author and is original unless qualified by a reference. The current study has not been submitted to any other university or course of study.

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ABSTRACT

Dieters' Experience of Craving Thoughts: The Role of Appraisal and Thought Control in Dysfunctional Eating Behaviour and Emotional Distress.

Joanne Newbolt, Department of Psychology, University of Leicester

Food cravings are a commonplace experience in the general population and ordinarily, are not associated with emotional distress or a lack of behavioural control (e.g. bingeing). However in some groups with disordered eating, food cravings can be associated with significant distress and are implicated as a contributory factor in binge eating.

Recent advances in cognitive theory have highlighted the role of appraisal and thought control strategies in emotional distress and various strategies for controlling unwanted thoughts have been described. In particular the thought control strategies of worry and punishment have been associated with higher levels of distress. It is therefore proposed that the way in which craving thoughts are appraised and dealt with is theoretically and clinically a more meaningful focus of analysis than the craving thoughts themselves.

The current study is a cross sectional correlation design exploring the association between thought control strategies, ratings of dimensions of cravings, eating behaviour and emotional distress in dieters. 127 dieters currently attending Weight Watchers to achieve weight loss were recruited to complete a battery of questionnaires. In addition beliefs about craving and coping strategies were explored in more detail in a subsample of ten dieters.

The current study found that both the appraisal of the negative experience of food craving and the thought control strategies of worry and punishment were associated with dysfunctional eating behaviour and emotional distress.

The theoretical and clinical implications of the role of appraisal and thought control in the behavioural and emotional response to food cravings, are discussed. Areas for further research are highlighted.

Total Word Count 28 567

1 INTRODUCTION

Food cravings are a commonplace experience in the general population and ordinarily are not associated with emotional distress or a lack of behavioural control (e.g. bingeing). Hence craving thoughts per se appear to be an innocuous cognitive phenomenon. However in some groups with disordered eating, food cravings can be associated with significant distress and are implicated as a contributory factor in binge eating. It is therefore likely that the way in which craving thoughts are appraised and dealt with is theoretically and clinically a more meaningful focus of analysis than the craving thoughts themselves.

Recent advances in cognitive theory have highlighted the role of appraisal and thought control strategies in emotional distress and various strategies for controlling unwanted thoughts have been described. In the current study it is suggested that dieters experiencing dysfunctional eating behaviour or emotional distress will be more likely to make negative appraisals of craving thoughts and subject craving thoughts to greater attempts at thought control.

The current research is a cross sectional study exploring the association between thought control strategies, ratings of dimensions of cravings, eating behaviour and emotional distress in dieters. Understanding of the strategies used and their association with eating behaviour and emotional distress may have direct clinical implications for helping people with clinical or subclinical problems of craving and disturbed eating behaviour.

The following review describes the literature on the experience of cravings both in the general population and in groups with more disordered eating behaviour. Explanatory models of craving are described and areas for further development are highlighted. In light of this a more generic model of emotional disorder is described and related to craving. Finally the process of thought control is described as a mechanism which may be used to control craving thoughts in dieters.

1.1 FOOD CRAVING

1.1.1 Overview of Food Craving

Cravings can be described as subjective cognitive experiences that represent a primary motivational process in behaviour (Tiffany, 1992). The term craving is generally used to describe an urge, a desire or a longing for a particular substance and is used frequently both in everyday language and in the scientific literature, particularly in the context of addictive behaviours and eating (Weingarten and Elston, 1990). The areas share a number of common features, however the literature reviewed below will focus predominately on food craving.

Understanding and usage of the term craving has been found to vary greatly depending upon the context in which it is used (Hill and Heaton-Brown, 1994). Definitions used in the scientific literature have also been found to differ (Toneatto, 1999). In the case of food cravings people regularly use the term to describe everyday expressions of appetite. However the scientific literature often equates craving with more anomalous expressions of appetite and consequently a relationship is often assumed between food craving and dysfunction (Hill and Heaton-Brown, 1994). Hence craving thoughts about food have been associated with emotional distress and a lack of behavioural control, for example binge eating. In recent years, however, the concept of craving has received considerable attention in an effort to define it more clearly (Toneatto, 1999). The concept of craving thoughts about food is not specifically defined in the literature. However for purposes of the current research craving thoughts about food are taken to refer to any cognitions relating to an urge or desire for a specific food and the anticipated outcome of consumption of the food. Hence craving thoughts may take the form of imaging the taste, texture or smell of the desired food or the sensation or emotional experience which accompanies or follows the consumption of the food.

1.1.2 The Experience of Food Craving

Food cravings are reported by men and women both with and without clinical eating disorders (Hill and Heaton-Brown, 1994). However for the most part, research has tended to examine the experience of food craving in specific populations of disordered eaters. It has been argued that "identifying food cravings as abnormal events in atypical populations has invited a narrow biological view of their cause and meaning" (Hill and Heaton-Brown 1994, pg. 802).

1.1.2.1 Craving in the General Population

Weingarten and Elston (1991) conducted one of the few studies looking at the prevalence of food cravings in the general population. They surveyed over one thousand college students to collect self-reports about food cravings and found them to be a relatively commonplace and normative experience. 97% of women and 68% of men reported experiencing food cravings, with chocolate found to be the most frequently reported craving, particularly amongst women. Differences in triggers to craving thoughts were reported between men and women, with the men describing hunger as the most frequent prerequisite to craving. Whereas women detailed more specific events such as television commercials, boredom or stress as triggering their cravings. Both men and women reported indulging their cravings on the majority of occasions. However women were more likely to experience negative affect in relation to this indulgence than men.

In a second study 101 women from a random community sample were interviewed about food craving experiences and 52% reported having experience of food cravings (Gendall et al 1997b).

The different prevalence rates found between the studies is likely to be due to the differing definitions used in the research, which is a weakness of research in this area. Craving is a

subjective state and accordingly cannot be directly observed, only inferred from self-report or behavioural observation (Toneatto, 1999). Hence as with all psychological constructs, measurement is difficult. Weingarten and Elston's (1991) research has been criticised for using inadequate measurement (Gendall, Sullivan, Joyce, Fear and Bulik, 1997b). Gendall, Sullivan, Joyce and Bulik (1997a) subsequently devised a food craving questionnaire, which was designed to address some of the difficulties in measuring craving.

Hill and Heaton-Brown (1994) explored the experience of craving in a group of women without obvious pathology and found that cravings were relatively commonplace and "characterised as hunger modifying and directed at wanting to consume highly pleasant tasting food" (pg. 811). "They were not associated with obvious abnormalities of either physiological or psychological state" (pg. 809). This study found that the cravings were largely innocuous and viewed by the majority of subjects "merely as curious or irritating episodes rather than having a distressing nature" (pg. 810). In this study it was found that four out of five food cravings reported, resulted in the food being eaten (Hill and Heaton-Brown 1994). Furthermore Gendall et al (1997b) found that a group of women experiencing food cravings were no more likely than non cravers to have experienced a mood or anxiety disorder. This data suggested that craving thoughts in a normal population were more likely to be indicative of positive reinforcement, i.e. driven by appetite, than negative reinforcement.

1.1.2.2 Craving in Eating Disorders

As described above cravings are reported to be a commonplace experience and in normal populations are not associated with distress or dysfunction. However cravings have frequently been implicated in dysfunctional eating behaviour and in these cases can be associated with significant emotional distress.

1.1.2.2.1 Binge Eating

Food cravings have been implicated in the onset of a binge in many studies. For example cravings for food have been described as preceding binges in people with obesity, premenstrual symptoms (Wurtman, 1990) and compulsive overeaters (Heatherington and Macdiarmid, 1993). However there is not any detailed information available in the literature about the precise role that food craving plays in binge eating disorder.

Binge eating is found in non clinical and eating disordered groups (Bruce and Agras 1992; Fairburn, Hay and Welch 1993) and tends to co-exist with dieting (Heatherton and Polivy, 1990; Polivy and Herman, 1985). It is defined as the consumption of a large amount of food within a discrete period of time, accompanied by feelings of lack of control over eating during the episode (American Psychiatric Association, 1994). One in five women report an experience of binge eating at some time and 3% binge regularly (Fairburn, 1995). However the significance attributed to the binge varies considerably from being a relatively benign and unimportant event, to being perceived as a real problem and having a negative impact on many areas of their life (Fairburn, 1995). Binge eating can be an extremely distressing symptom and frequently co-occurs with other symptoms of eating disorders (McManus and Waller, 1995). It is characteristic of bulimia nervosa, anorexia nervosa (bulimic subtype) and binge eating disorder (American Psychiatric Association, 1994).

As described food craving is a commonplace experience. However the majority of food cravers do not binge eat. Food cravers who binge have been found to be more likely to be heavier, more likely to meet the criteria for bulimia nervosa and have a higher level of dietary restraint than food cravers who do not binge (Gendall et al, 1998b). In addition food cravers who binge were found to have a low level of self directedness. Gendall et al (1998b) describe this as being in accord with previous research which describes characteristics associated with binge eating as being body dissatisfaction, unstable self concept, inadequate coping skills and impulsivity.

The affective component in craving followed by bingeing is clearly different from that in a normal craving experience. Affect associated with bingeing includes depression, anger, hopelessness, worry, dissatisfaction (Strickney, Miltenberger and Wolff, 1999) guilt, disgust and helplessness (Cooper et al, 1988).

1.1.2.2.2 Bulimia Nervosa

Recurrent episodes of binge eating form part of the diagnostic criteria of Bulimia Nervosa, which is typified by the binge purge cycle and a feeling of lack of control over eating behaviour during binges. It is also associated with high levels of depression and anxiety (American Psychiatric Association, 1994). Up to 82% of women with Bulimia Nervosa have attributed the onset of a binge to a craving for sweet food (Abraham and Beaumont, 1982, Mitchell, Hatsukami, Eckert and Pyle, 1985).

Waters Hill and Waller (in press, b) examined the factors that predict whether a food craving develops into a binge in bulimia nervosa. "Time of day and social context were identified as crucial determinants of whether food cravings develop into binge-eating". A binge was more likely to follow a food craving if the women were alone or if the craving occurred in the morning. The act of eating the craved for food was also a highly specific predictor of whether the craving led to a binge. The affective context of food cravings has been shown to be markedly different in women with Bulimia Nervosa than non eating disordered groups (Hill and Heaton-Brown, 1994, Waters, Hill and Waller, in press a). Waters, Hill and Waller (in press, a) found that cravings leading to a binge in a group of women with bulimia nervosa were associated with higher tension, lower mood and lower hunger than cravings not leading to a binge. This is in line with previous research which has found that negative affect precedes food cravings (Cooper and Bowskill, 1986) and binge eating (Lingswiler, Crowther and Stephens, 1989) in bulimics.

A preoccupation with craving thoughts of food and eating is frequently described as a consequence of food restriction and eating disturbance (e.g. Kerr et al, 1991). Cognitive factors have been implicated in the binge purge cycle of bulimics (Zotter and Crowther, 1991) and the cognitive regulation of dietary restraint is thought to be associated with this preoccupation with food and eating (Herman and Polivy, 1984). The Stroop test is widely used in studies of selective attention in clinical groups (Wells and Matthews, 1994). Information processing is thought to be slowed when words associated with the individual's condition are shown. In bulimics Stroop tests have shown a retardation of reaction time in colour naming of food words, suggesting a preoccupation with food (e.g. Cooper and Todd, 1997).

1.1.2.2.3 Anorexia Nervosa

Anorexia Nervosa is characterised by an intense fear of becoming fat, a disturbance in the perception of body weight and shape and results in an unwillingness or inability to maintain a minimal normal weight (American Psychiatric Association, 1994). Gendall, Sullivan, Joyce and Bulik (1997a) found that the high level of dietary restraint seen in anorexia nervosa does not increase the likelihood of food cravings in this group. They found that a similar proportion of women with anorexia nervosa experience food cravings as those in a control group. However the cravings in women with anorexia nervosa were found to occur more frequently and more intensely than in the control group and were associated with lifetime bulimia nervosa. In addition craving in the group with anorexia nervosa was associated with increased difficulty in resisting the craved food and greater anxiety if the food was unavailable (Gendall et al, 1997a).

Anorexia nervosa is associated with extreme and constricted thinking in relation to eating situations (Butow, Beumont and Touyz, 1993). In this group, eating or thoughts about food and eating, for example cravings, are linked to dichotomous thoughts of either control or lack of control, virtue or indulgence, normality and abnormality (Butow et al,

1993). Negative emotion, such as fear and anxiety is frequently associated with thoughts about food and eating in anorexics (Kerr, Skok and McLaughlin, 1991).

In the same way as individuals with bulimia nervosa have been found to have a preoccupation with thoughts about food and eating, anorexics show what has been described as an "obsessive ruminative preoccupation with food" (Bruch, 1981). Anorexics have also been shown to consistently show retarded colour naming of food words on the Stroop test (e.g. Cooper and Todd, 1997).

1.1.2.3 Summary

In summary, studies looking at the role of craving in groups with disordered eating patterns, have generally found that the incidence of craving is similar to that in a normal population. However, craving thoughts in groups with disordered eating are more frequent, often associated with high levels of distress and negative affect and are implicated in the onset of dysfunctional eating patterns such as binge eating.

Overall it would appear that food cravings are an innocuous cognitive phenomenon and that craving thoughts per se are not associated with emotional distress. Therefore it is possible that the emotional distress or a lack of behavioural control evidenced in specific groups of disordered eaters is the result of some secondary factor such as the associated meaning and interpretation of the craving for the individual.

1.1.2.4 Craving in Dieting

Dieting refers to a "reduction in calorie intake for the purpose of weight loss" (Brownell and Rodin 1994). It is a very common phenomenon in today's society, and has been described as "almost normative" (Huon and Strong 1998). Data suggests that 24% of men and 40% of women in the U.S, are currently dieting (Horm and Anderson, 1993) and as many as 50% (Worsley, Worsley, McConnon and Silva 1990) and up to 80% (Huon

1994) of young females have reported having dieted at some time. However, definitions of dieting vary and can relate to "many different patterns of behaviour, ranging from healthy changes in food selection to severe caloric restriction" (Brownell and Rodin, 1994). In particular, Fairburn (1995) has described three different patterns of dieting which relate to the avoidance of specific foods, the avoidance of eating over a long time period and the restriction of the overall volume of food consumed. Dieting by definition is said to refer to effort to loose weight (Lowe, 1993). However it has been noted that many people will also class themselves as dieters while aiming to maintain previous weight loss. These difficulties in the definition of dieting are likely to help explain the different prevalence rates found in the literature. The terms dieting and dietary restraint are frequently used interchangeably in the literature and are often thought to be functionally equivalent (Herman and Polivy, 1984). However Lowe, Whitlow and Bellwoar (1991) have disputed this, suggesting that the concepts can be functionally different, in that restrained eaters may not be currently dieting and dieters may not be restrained eaters. The term dietary restraint is most frequently used in relation to a high score on the restraint scale (Herman and Polivy, 1978, 1982). The restraint scale has been shown to be closely related to the consequences of unsuccessful dieting (Laessle, Tuschl, Kothaus and Pirke, 1989), in particular a propensity towards disinhibition and binge eating (Heatherton, Herman, Polivy, King and McGree, 1988), whereas the term dieting can be related to both successful and unsuccessful caloric reduction. However it is sometimes difficult to distinguish this from the literature reviewed below and consequently in the following review the terms used will reflect that used in the paper in discussion.

1.1.2.4.1 Dietary Restraint and Eating Disorder

Many restrained eaters display attitudes and behaviours characteristic of individuals with eating disorders (Polivy and Herman 1987). Furthermore dieting frequently predates the onset of an eating disorder and may be causally implicated in its development (e.g. Polivy and Herman, 1985; Howard and Porzelious, 1999). However, as only a small proportion of dieters go on to develop an eating disorder (Wilson 1993) and in a minority binge

eating precedes dieting (Bulik, Sullivan, Carter and Joyce, 1997), dieting is not a sufficient condition for the development of an eating disorder (Brownell and Rodin 1994).

Dieters share a number of characteristics with individuals with eating disorders, including a heightened focus and preoccupation with food, eating and weight (Hart and Chiovari, 1998, Harnden, McNally and Jimerson, 1997). Stroop tasks have shown a retardation of reaction time in colour naming of food words, in food deprived normal subjects (Channon and Hayward 1990) and in restrained eaters (Perpina, Hemsly, Treasure and de Silva, 1993). Additionally, self reports by dieters suggest increased thoughts of food (Nylander, 1971). However other studies have found that it is the nature of cognitions which differ between restrained and unrestrained eaters and not the frequency of thoughts (Hickford, Ward and Bulik, 1997).

Patterns of restrained eating followed by episodes of overeating or bingeing are observed in dieters, binge eaters and bulimics (Herman and Polivy, 1984). Dietary restraint in dieters, as in anorexics and bulimics is largely believed to be cognitively regulated (Polivy and Herman 1985) and this together with the observed preoccupation with food, eating and weight appears implicated in the binge eating pattern observed in many dieters (Polivy and Herman 1985). Dysfunctional beliefs are commonly implicated in eating disorders (e.g. Fairburn and Cooper, 1989). Dieting groups have been found to occupy an intermediary position between non dieters and eating disordered groups in terms of cognitions (Cooper and Fairburn, 1992). Hickford et al (1997) found that restrained eaters reported more negative feelings about their personality and behaviour and gained higher scores on the Beck depression inventory than unrestrained eaters.

There is little literature about the precise role that craving plays in dieting. However, due to the number of shared characteristics dieters have with eating disordered groups, it is reasonable to assume that cravings in some dieters will be associated with higher levels of distress than in a normal population. As in the Cooper and Fairburn (1992) study mentioned above it may be that dieters occupy an intermediary position between non

dieters and eating disordered groups in terms of their interpretation of cravings. Hence increased understanding of the cognitions associated with craving thoughts in dieters is of interest and may help increase understanding of the process between dieting and eating disturbance.

1.2 MODELS OF CRAVING AND DISORDERED EATING

1.2.1 Physiological Models of Craving

The majority of the literature places food cravings in a biological framework (Weingarten and Elston, 1990). These models perceive cravings as being the result of a biological or nutritional deficit. The function of the craving is therefore to correct this deficit by encouraging ingestion of the craved substance.

1.2.1.1 Hormone Related

Hormonal states in women, for example during pregnancy or the menstrual cycle are frequently linked to the experience of food cravings in the literature.

Cleckner-Smith, Doughty and Grossman (1998) found food cravings were one of the most commonly reported premenstrual symptoms. In addition Bancroft (1995) has linked cycle related changes in serotonergic activity to pre menstrual food cravings. However Weingarten and Elston (1991) found only 32 percent of women with food cravings rated their food cravings as linked to the menstrual cycle. Hill and Heaton-Brown (1994) conducted a prospective recording of food cravings and found cravings to occur throughout the monthly cycle. However they also found a marked increase in food cravings in the premenstrual phase (i.e. the 7 days prior to the onset of a period). The level of premenstrual craving was 66% higher than the average number of food cravings reported at other times. They found an increase in all the food types craved at this time.

Food cravings in relation to pregnancy have been described in the literature since 1893 (Giles 1893) and as many as 50 per cent of women report experiencing food cravings during pregnancy (Dickens and Trethowan 1971). The intensity of food cravings during pregnancy has been described as more severe than at other times (Harries and Hughes 1958).

1.2.1.2 Addictive Behaviour

Food cravings have been described as co-occurring with other addictive behaviour and there is evidence of similarities in the mechanisms underlying food, alcohol and drug cravings (Cooper, 1989). For example Mitchell et al (1985) found that over a third of a sample of 275 individuals with bulimia nervosa reported a history of problems with alcohol or drugs. Weiss (1982) found that heroin addicts experience coincident sweet and heroin cravings, which suggested an overlap in the neural systems involved in the craving experience.

Women who report food cravings have been found to be significantly more likely to have experienced alcohol abuse or dependence than women without food cravings (Gendall et al 1998a). This may suggest a biological or neurological root to the craving. However Gendall et al (1998a) speculated that this relationship was related to a novelty seeking personality trait making certain individuals more likely to experience appetitive behaviour. Other studies have found that individuals with eating disorders share characteristics with other addictive disorders. For example De Silva and Eysenck (1987) found that bulimics profile on the Addiction Scale of the Eysenck personality Questionnaire resembled that of drug dependent individuals.

1.2.1.3 Dietary Related

The literature on salt cravings provide the most direct evidence that cravings serve to correct bodily needs (Weingarten and Elston, 1990). For example Stein, Cowart, Epstein

and Pilot (1996) found that the use of chloride deficient feeding formula in infancy was associated with salt cravings and a later preference for salty foods.

Dieting is one way in which food intake is restricted and this restriction can lead to biological, psychological and sensory deficits (Herman and Polivy 1988). Physiological models suggest that the food craving is then a mechanism for motivating the body to correct these deficits by eating. Indeed periods of dieting have been found to predispose to cravings (Striegel-Moore, Silberstein and Rodin, 1986) and Gendall et al (1998b) found that in a group of women without clinical eating disorders, weight control behaviours were reported more frequently in those who experienced food cravings than in those who did not experience food cravings. Evidence has also been found that the macronutrient composition of meals influences subsequent craving experience (Gendall et al, 1999). This suggests that craving may assist carbohydrate intake regulation in some individuals. However, the literature in this area is varied and other studies have found no link between the level of dietary restraint and the experience of food cravings (Hill and Heaton-Brown 1994; Hill, Weaver and Blundell, 1991, Rodin, Mancuso, Granger, Nelbach, 1991).

Differences in findings may be seen to arise from the difference between the concepts of hunger and craving and the complex relationship between them (Waters et al, in press, a). "Hunger can be seen as a motivational state arising from a general awareness of calorific deprivation. In contrast, food craving is a motivational state associated with a strong desire for an expected positive outcome" (Waters et al, in press a, pg. 12). In this way craving relates more to a cognitive event and hence cognitions need to be implicated in any explanatory model.

Biological models describe food cravings as occurring in response to a physiological deficit. However "logic and data, often challenge the homeostatic view since other foods as rich or richer in the same constituents that are putatively provided by the craved food are often not similarly desired" (Rodin et al, 1991). As a result it has been suggested that cravings relating to pure biological needs operate only under extreme circumstances of

deficit or major shifts in energy and carbohydrate metabolism such as may occur during pregnancy" (Rodin et al, 1991). The treatment implications of these models is limited to supplementation of the craved for food, which does not necessarily eradicate the craving. In addition, psychological variables, such as thoughts, feelings and beliefs about cravings, are largely ignored by biological models. A food craving can be seen as both a physiological experience and a cognitive event and as a result it has been argued that although biological need my cause craving in some cases, in others there is a clear need to look for other causes (Weingarten and Elston, 1990).

1.2.2 Cognitive Models of Disordered Eating

1.2.2.1 The Restraint Model

The restraint model (Herman and Polivy, 1984) was developed to describe eating patterns in dieters and obese individuals and was later developed to describe the aetiology of bulimia nervosa (e.g. Fairburn and Cooper, 1989). Eating patterns are described as being influenced "by the balance between physiological factors promoting a desire for food and efforts to cognitively resist that desire" (Ruderman, 1986). This cognitively mediated effort to resist the desire to eat is termed restraint.

Restraint theory proposes that "restrained eaters develop anomalous eating patterns characterised by dieting and periodic overindulgence" (Ruderman 1986), as a result of the stress inherent in chronic self control. As in the biological models food craving is thought to be a reflection of biological need resulting from dietary restriction imposed between bingeing episodes (Polivy and Herman, 1985). Craving is then proposed as a trigger for overeating or bingeing at times when resources are lower or if self control is perceived as being disrupted by either forced preloads (Herman and Mack 1975), worry (Scattolon and Nicki 1995), alcohol (Polivy and Herman 1976) or negative affect (Schotte, Cools and McNally, 1990; Grilo, Shiffman and Wing, 1989). For example the preload studies found that restrained eaters ate more after a forced high calorie preload than without one,

whereas the opposite effect is observed in unrestrained eaters (e.g. Herman and Mack, 1975).

1.2.2.2 The Boundary Model

The boundary model for the regulation of eating (Herman and Polivy, 1984) is an expansion of the restraint model. It aims to draw together the physiological and non physiological factors which influence eating and resolve the many inconsistencies in research findings in this area.

The boundary model states that food consumption is regulated between two boundaries. The lower end of the boundary is marked by hunger and the upper end by satiety, between the two, eating is principally regulated by non physiological factors such as social, cognitive or other psychological factors. Dieters are thought to have a lower hunger boundary and a higher satiety boundary. Hence their eating is controlled to a greater extent by social, cognitive and other psychological factors. Whereas the food intake of non dieters is regulated more frequently by physiological cues of hunger and satiety. In addition a third boundary is described in dieters, which is placed close to the hunger boundary and is made up of beliefs and rules about eating. As described above craving thoughts about food are thought to be the result of dietary restraint and can render the diet boundary temporarily ineffective when resources are lowered. If craving thoughts are acceded to, the diet boundary is perceived as being transgressed and restrained eaters will then continue to eat and frequently binge. Herman and Polivy (1984) term this the "what the hell effect", as once the diet boundary is transgressed the dieter perceives no further point in restricting food intake and consumes food until the satiety boundary begins to inhibit consumption. Binge eaters are thought to have higher satiety boundaries and so once having transgressed the diet boundary will tend to eat to capacity rather than until reaching usual levels of satiety. This model is contestable (Lowe, 1993), however a considerable amount of research has been gathered in its support. For example the

thoughts of restrained but not unrestrained eaters have been observed to play an important part in eliciting and controlling eating behaviour (Boon, Stroebe, Schut and Jansen, 1998).

1.2.2.3 Cognitive Factors in Dieting

Underlying restraint theory and the boundary model is the "general assumption that restrained eaters regulate their eating behaviour cognitively, regardless of whether they transgress their diet boundary" (Boon et al 1998, pg. 28). Dieters are thought to have explicit behavioural rules, which become operational when the dieter is confronted by food or thoughts about food, for example craving thoughts. Cognitive regulation of food intake then involves cognitive pressures such as thoughts about weight gain or how many calories the food is, which reduce or override the craving thoughts. Boon et al (1998) found that "exposure to food words as well as actual food intake elicited more eating control, weight and shape related thoughts in restrained eaters than in unrestrained eaters, with restrained dieters reporting the highest number of thoughts" (pg. 38). These strategies are demonstrably effective in facilitating eating control in dieters (Boon et al, 1998, Herman and Polivy, 1984), however as described above inhibiting factors can impede these strategies.

Underlying the dietary rules and thoughts about food, weight and eating, restrained eaters (Herman and Polivy, 1984) and disordered eaters (Cooper, 1997) tend to have all or nothing, rigid, irrational beliefs. One small transgression over their diet boundary is then perceived as abandoning their ideals. Ruderman (1985) looked at the relationship between restraint and rationality and found they were significantly negatively correlated. Ruderman concluded that "the rigid, all or nothing thinking that restrained eaters display in regard to dieting may be part of a more general and pervasive set of perfectionistic absolutistic beliefs that they hold" (Ruderman 1986).

Fairburn and Cooper (1989) proposed a cognitive behavioural formulation of bulimia nervosa, which stressed the primary importance of self esteem to bingeing. They described

poor self esteem as contributing to over concern about weight and shape, which in turn leads to extreme dieting. They described many features of anorexia nervosa and bulimia nervosa such as depression, anxiety, social withdrawal and impaired concentration as being "a secondary psychological response to loss of control over eating". Therefore in comparison to the normal population who viewed craving thoughts as merely curious or irritating, for people with more dysfunctional eating schema, craving can be interpreted as threatening or a sign of weakness and hence behavioural responses to cravings will differ. Hence self concept and low self esteem must be addressed in the treatment of any eating disorder. However everyday responses to thoughts about food may also be important to address in helping the individual to manage their eating behaviour and consequently reduce the secondary psychological response to craving thoughts about food.

However although the restraint model is well supported by empirical evidence, it is increasingly found to be insufficient as a complete explanation (Waters et al, in press, a). As previously described some studies have found no link between dietary restraint and food craving (Hill, Weaver and Blundell, 1991, Hill and Heaton-Brown 1994). Other research has also found that hunger does not have a significant role in bingeing (Lingswiler, Crowther and Stephens 1989) and that dietary restraint is not linked with increased bingeing (Cooper, Clark and Fairburn 1993). As a result it has been advocated that the restraint model needs to be complemented by an understanding of affect driven eating (Waters et al in press, a).

1.2.3 Affective Models of Disordered Eating

Affective models of craving propose that food cravings can be seen as an indicator of negative reinforcement. In other words, food is used to regulate mood because of its pleasurable or distracting properties (Waters et al, in press, a). Indulging in the craved substance is a method of control over negative cognitive events. Affective models of craving described in the literature generally relate to disordered patterns of eating, such as bingeing. As, is previously described, in a normal population food cravings are not

associated with negative affect (Hill and Heaton-Brown, 1994). Whereas in binge eaters (Strickney et al, 1999) and in women with bulimia nervosa (Waters et al, in press, a) the affective context of food cravings has been shown to be markedly different.

Low mood has been found to precede bingeing (Cooper and Bowskill 1986), and has been described as having a disinhibitory effect on dietary restraint (Cooper and Bowskill 1986). Waters et al (in press, b) findings also implicated low mood and higher tension in food cravings, which lead to a binge. These findings suggest a clear link between negative emotional states and binge eating.

Affective models describe bingeing and purging as serving the function of regulating emotional states (McManus and Waller,1995). In the short term this appears to be adaptive, as temporary relief from negative affect is gained. However in the longer term this can exacerbate the initial negative affect and so is maladaptive (McManus and Waller, 1995). Waters et al (in press, a) found that when a food craving was followed by a binge, mood was found to deteriorate further. Conversely when a binge did not follow a craving, mood was found to improve. Similarly purging can be seen to compensate for eating during a binge and so decrease the negative emotions, which follow a binge (McManus and Waller, 1995).

Heatherton and Baumeister (1991) propose a different slant on other affective models of binge eating. They describe binge eaters as having exceptionally high standards, which when not fulfilled can lead to the cognitive narrowing of the focus of attention in order to avoid thoughts of failure. When this occurs bingeing in response to cravings is more likely because higher level cognitive functions such as restraining eating are inhibited.

Affective models therefore describe an association between craving, bingeing and negative affect. McManus and Waller (1995) suggest that when affective models are combined with the dietary restraint models, they serve to provide an integrated view of the predisposing factors and specific triggers leading to binge eating. Hence dietary restraint leads to food

cravings because nutritional needs are not met and binge eating may be initiated in response to this. However individuals may then continue to binge due to the reinforcing effects of emotional assuagement. Nonetheless even when combined, craving thoughts as cognitive events and the role of appraisal, interpretation and control of these thoughts is largely ignored.

1.2.4 Cognitive Model of Craving

A cognitive model specific to craving was described by Tiffany (1992), which goes some way towards describing craving as a cognitive event which is then open to appraisal. This model was developed in relation to drug craving and drug use.

In the dependencies literature "it is not uncommon for researchers to treat drug urges and drug use as nearly synonymous variables" (Tiffany 1992, pg. 124). However Tiffany (1990) reviewed a number of studies looking at the association between the experience of cravings or urges and drug use and found at best only a modest correlation between the two. This called into question the frequently made assumption that cravings are regularly associated with drug use and led Tiffany (1992) to described a cognitive model of craving in drug use, in which craving is not a necessary prerequisite for drug use to occur.

The cognitive model of craving proposes that when drug use becomes habitual in addicts, it becomes controlled to a large extent by automatic processes, in the same way that driving or typing can become automatic if practiced sufficiently. This theory then postulates that exposure to stimuli associated with the desired substance will trigger action schemata, which control the behaviour of drug use. Hence this will lead to the behaviour without a craving being experienced. Tiffany (1992) describes cravings as arising when the usual stimuli for a certain behaviour are resisted and so action schemata are impeded. Therefore, if addicts are either prevented from taking drugs or are attempting to abstain from taking drugs, cravings will be invoked.

If applied to food cravings Tiffany's model would postulate that eating is controlled to a large degree by automatic processes and that craving thoughts occur when food is resisted and so schema activating eating are thwarted. Hence this is in line with models described above where food craving is thought to increase with dietary restraint, although, as reported, this finding is not consistent in the literature. In this model, craving thoughts about food occur when the usual automatic processes are impeded and so voluntary controlled processing is operated which creates thoughts about food. In this way craving thoughts are seen to represent conscious cognitive events, which are then open to appraisal and interpretation. However Tiffany's model provides a narrow definition of schema which does not address individual beliefs or assumptions about events and therefore does not consider the influence of these beliefs on the craving. Hence behavioural and emotional responses to cravings are not addressed.

Cognitive schema or beliefs are generally described as "stable and organised representations of past experiences", which direct behaviour (Rucovius and Reinhard, 1990). Hence previous experiences help form the beliefs and assumptions of an individual and these beliefs then influence the interpretation of events and guide subsequent behaviour. This is the major axiom of Beck's cognitive theory of emotional disorders (Beck, 1976). In this model, the meaning attributed to an event or how it is interpreted, is therefore dependent upon the individual's particular schema. For example an event such as experiencing a food craving will be appraised by the individual and depending upon their beliefs and experience could be interpreted either as a benign experience which requires little further thought or processing or as an ominous unwanted event which may threaten their diet. Tiffany's model does not address schema in this light. The appraisal of thoughts such as cravings pertains to metacognition.

1.2.5 Metacognitive Model of Craving

Toneatto (1999) has described a metacognitive model of craving, which was also developed in relation to drug and alcohol craving. He proposed that craving thoughts are

an indication that the individual is experiencing an unpleasant thought, feeling or memory and that ingestion of the craved for substance would provide relief from the negative state. Hence he proposed that a craving can be "viewed as a metacognitive statement indicative of a strong desire to modify ongoing cognitive experience" (Toneatto, 1999). The model suggests that past experience can build an association between a certain substance and relief from discomfort. Consequently if an individual is experiencing an aversive state such as marked anxiety, then a craving for this substance may be experienced as an indication to consume the craved for substance and modify their cognitive state. However Toneatto (1999) states that the precise nature of the cognitive experience is not necessarily experienced by the individual as they may be automatically self regulating and their awareness may only be of the craving thoughts.

In this model, a craving is described as an indication of another cognitive experience. In this way cravings are not defined as cognitive events open to appraisal in their own right. Toneatto defines metacognition as "statements about other cognitions". However this is a very loose definition of metacognition, which does not take into account the personal appraisal of the craving thoughts that should be described by a metacognitive model. In many ways Toneatto's model appears to better reflect the affective models of craving described above, as in the same way as in those models, it is the drug, alcohol or food which is associated with relief from a negative state and the craving becomes representative of this through experience. Hence the craving is a sign of negative reinforcement. Beliefs about the craving thoughts and their subsequent appraisal and interpretation are not addressed. Consequently the emotional response to a craving and the subsequent coping strategies and behavioural responses to craving cannot be fully explained. As a result a more generic model of metacognition and emotional disorder needed to be explored to elucidate this.

1.2.5.1 Metacognition and Emotional Distress

The most developed application of metacognitive processing to clinical disorder has been Wells' (1995) cognitive model of generalised anxiety disorder (GAD). In this model metacognition is defined as "the appraisal of the content of thought or appraisal of cognitive processes" (Wells, 1995). The worries of individuals with GAD have been found to be largely similar in content to the worries of individuals without anxiety disorders. However in GAD worrying thoughts are rated as less controllable and less responsive to corrective strategies (Craske, Rapee, Jackel and Barlow, 1989). If the content of the thoughts does not differ between groups this suggests that it is the appraisal of the thoughts which is likely to account for the difference in experience (Wells, 1995). Indeed metacognitive beliefs have been shown to be the most important predictors of thought frequency and controllability (Purdon and Clark, 1994a; 1994b) and meta-worry (or worry about worry) has been shown to contribute to problematic and pathological worry (Wells and Carter, 1999). Hence differences in appraisals of worrying thoughts lead to different emotional, behavioural and cognitive responses to worrying thoughts and can perpetuate an anxiety disorder.

Metacognition is viewed as an important mediating factor in self regulation (Wells and Matthews, 1994). Wells (1995, based on Flavell, 1979) describes metacognition as referring to four factors: "stable knowledge or beliefs about one's cognitive system; knowledge about factors that affect the functioning of the system; the regulation and awareness of the current state of cognition, and appraisal of the significance of thoughts and memories" (pg. 302). Subsequent cognitive, behavioural and emotional responses will differ depending upon the individual's metacognitive beliefs and appraisals. For example thought control strategies result from particular metacognitive beliefs (Wells, 1995). Meta cognition can become maladaptive if threat is attributed to certain cognitions. In this case dysfunctional self regulatory attempts may ensue. For example using thought control strategies designed to switch the attentional focus away from thoughts perceived as threatening may in fact contribute to the disorder (Wells and Matthews 1994).

If this model is applied to food cravings, then the focus of attention becomes the appraisal and interpretation of the craving thoughts, rather than the role of the craving thought itself. As described above craving is a commonplace experience, which in the general population is not usually associated with distress or behavioural dysfunction (Weingarten and Elston, 1991; Hill and Heaton-Brown, 1994). However in some individuals craving thoughts are associated with high levels of distress and maladaptive behaviours such as binge eating (Gendall et al, 1997a, 1998b). In the same way that "the development of negative beliefs and meta worry mark the transition from non problematic to problematic worry" in GAD (Wells, 1995, pg. 307), it is feasible that it is an individuals beliefs and the subsequent way in which craving thoughts are appraised and dealt with, which leads to emotional distress or a lack of behavioural control. In particular strategies for controlling thoughts perceived as unpleasant or unwanted have been shown to be associated with emotional and behavioural difficulties and this is described in detail below.

1.3 INFORMATION PROCESSING AND EMOTIONAL DISORDER

1.3.1 The Self Regulatory Executive Functioning Model (S-REF)

For the most part existing models of emotional disorders (e.g. Beck, 1976) have tended to consider only a limited area of cognition and have mainly focused on the examination of schema, appraisals and beliefs about external events and non-cognitive internal stimuli such as bodily sensations. Other areas of cognition such as attention, regulation of cognition, levels of control of processing and interactions between varieties of processing have received less clinical attention (Wells and Matthews 1996). Wells and Matthews (1994) postulated that an understanding of the interaction between upper level controlled processing (i.e. schema) and lower level automatic processing furthers the understanding of emotional distress. The self regulatory executive functioning (S-REF) model (Wells and Matthews, 1994) was proposed in response to this with the aim of integrating Beck's schema theory (1967) and information processing research. It offers "an integrative account of cognitive-attentional processes involved in the development and maintenance

of emotional disorders" (Wells and Matthews 1994). The focus is therefore on the factors that control and modulate thinking, which pertains to meta-cognitive processing.

1.3.1.1 An Overview of the Model

The S-REF model describes three interacting levels of cognition and is shown in figure 1.

1) The lower level represents the automatic and reflexive processing of three types of information; external stimulus information, cognitive state information, (e.g. discrete thoughts, errors in cognition) and body state information (e.g. pain or temperature).

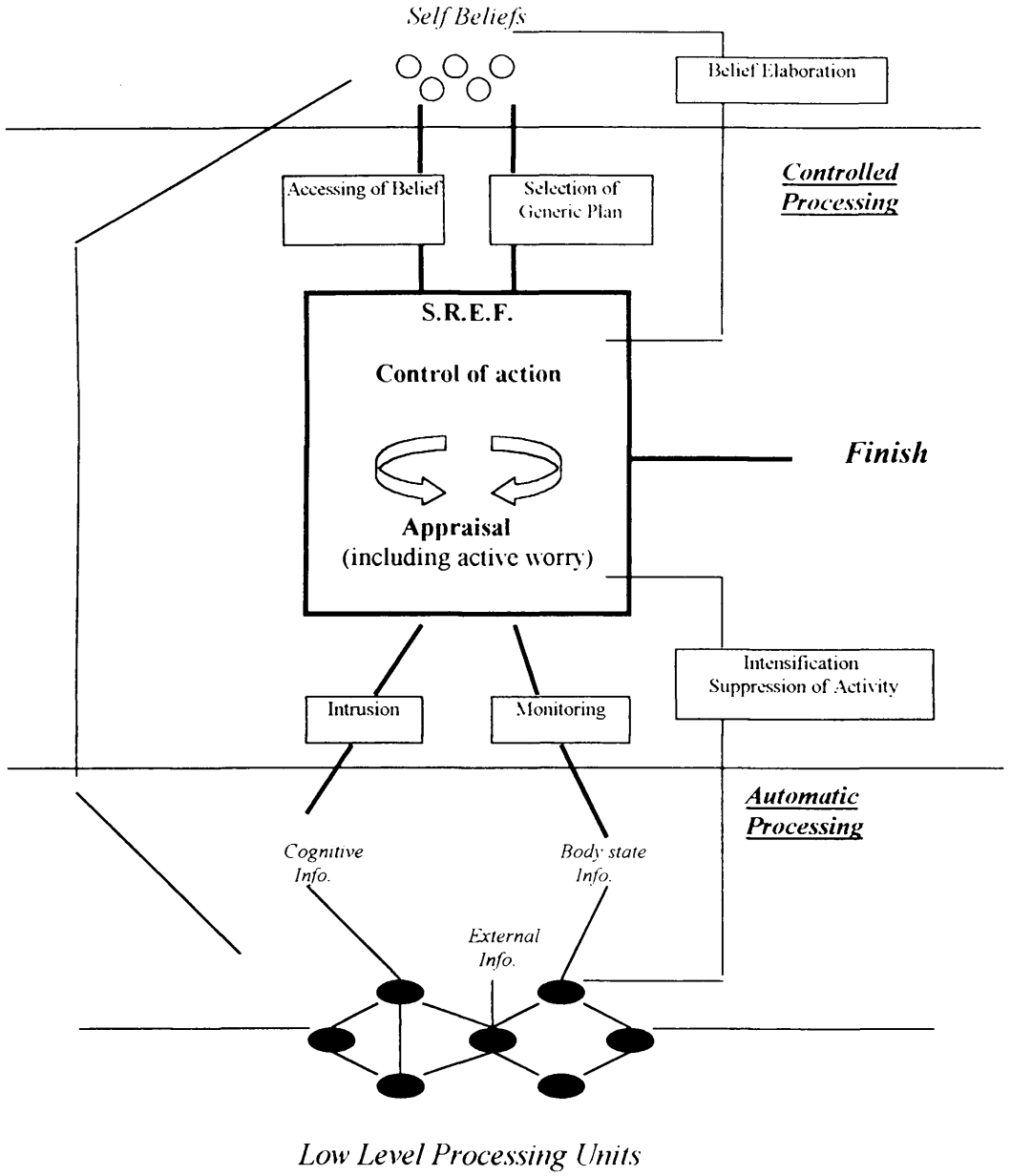
2) The S-REF forms the second level and acts as a meta cognitive process involved in cognitive, affective and behavioural self regulation. It involves the regulation of attention and the conscious appraisal and regulation of lower level stimuli. It then initiates action in response to any perceived deficits or threats to the self.

3) The third level relates to self knowledge, self beliefs and strategies for self regulation stored in long term memory.

Stimuli from both external and internal events trigger processing by the lower level of the model. Processing of this information takes place continually and automatically. Lower level processing is generally unconscious and highly learned stimulus response patterns can undergo quite complex processing without upper level input. However the focus of the events being processed may also be influenced by higher level functioning, in that certain knowledge stores or beliefs may direct attention towards certain stimuli more than others.

When processed units become highly activated they intrude into consciousness and activate the S-REF. The significance of this information to the self will then be consciously appraised. If the information is perceived as threatening or a discrepancy between current state and a goal state is perceived, the S-REF will initiate and regulate action designed to

Figure 1: Schematic Representation of the S-REF Model of Emotional Disorder [1]



[1] Reproduced from Wells & Matthews (1994)

reduce this discrepancy. The S-REF can also be activated consciously by higher level commands.

Self knowledge and self beliefs stored in the third level of the model highly influence the appraisal of information by the S-REF and influence the strategies designed to reduce perceived threat or discrepancy. Certain beliefs may also increase the monitoring of specific lower level outputs. For example, if a dieter has the belief that if she eats a forbidden food she is bad or out of control, stimuli and information about forbidden foods are likely to be perceived as threatening. Thoughts about eating these foods will be incongruous with goals for the self and consequently a plan for monitoring certain "bad thoughts" about food may be active. "These plans direct selective attention, memory retrieval, appraisal and meta-cognitive processing in response to stimuli" (Wells and Matthews 1996, pg. 882). Several factors mediate the choice and control of action in response to appraisals: the content of self knowledge; capacity limitations, the degree of intrusiveness of lower level activity, social cues, individual differences in attentional style and preferences in certain coping strategies (Wells and Matthews, 1994).

1.3.1.2 Maladaptive S-REF Functioning

"The S-REF influences both the immediate focus of attention and longer term changes in knowledge structures" (Wells and Matthews, 1994). Plans directed by the S-REF can either help assimilate new information into existing knowledge structures or conversely they can help maintain existing dysfunctional structures. Ruminating on specific thoughts or the monitoring of lower level input for specific types of information can be seen as maladaptive strategies, which help maintain dysfunctional self beliefs and emotional distress.

Controlled processing in the S-REF is of limited capacity and thus subject to attentional demands. Rumination in the form of active worry is seen as a problematic strategy in emotional disorders, in that appraisal is perseverative and attentionally demanding. This

therefore reduces the capacity of the S-REF to complete other functions and may lead to information, which is incongruent with the active worry not being processed. Hence the perceived threat or the focus of the active worry will not be disconfirmed. Rumination also means that intrusions of confirmatory information from lower level structures are also increased.

Similarly a plan for monitoring specific types of information, such as thoughts or sensations may be active, as in the example of the dieter above. In this case the system will be primed to be more sensitive to information about forbidden food. "One of the disadvantages of monitoring is that it is likely to prime representations of stimuli which make intrusions more likely" (Wells and Matthews, 1996). Furthermore, as plans for monitoring are led by existing self beliefs, the information monitored can lead to increased appraisal of threat and again confirm existing knowledge at the expense of information, which could be used to disconfirm existing dysfunctional beliefs.

Wells and Matthews (1994) describe "a particular cognitive attentional syndrome" which is related to emotional distress and disorder. This consists of "heightened self focused attention, reduced efficacy of cognitive functioning, activation of self beliefs and self appraisal, attentional bias and capacity limitations" (Wells and Matthews 1996, pg. 883). The S-REF model offers an explanation for attentional bias as a result of voluntary threat monitoring. As described above specific beliefs activate plans designed to monitor information for perceived threat, which in turn may serve to focus attention on threatening information and increase the likelihood of further intrusions.

"Attentional control strategies may be seen as one element of the person's strategies for coping with stress" (Matthews and Wells, 1996, pg. 885). However these strategies may not always have the desired effect and can sometimes serve to increase the very emotions they are designed to reduce.

1.4 THOUGHT CONTROL

1.4.1 An Overview of Thought Control

Thought control represents one dimension of metacognitive self regulation (Wells and Davis, 1994). "Mental control occurs when people exert influence on their own mental state" (Wegner and Pennebaker, 1993). This effectively requires the focus of attention to be manipulated in order to control what appears in consciousness. Hence mental control is a function of the S-REF.

As described above the S-REF directs the focus of attention and mediates the control and regulation of thinking. When information about thoughts or events intrude into consciousness, via the lower level processing system, the S-REF initiates plans in response to any perceived threat or discrepancy between actual state and desired state. In this way plans to control certain thoughts are actioned.

The second dimension of meta cognitive self regulation is the beliefs that an individual holds about their thoughts and thought processes (Wells and Davis, 1994). An individual's self beliefs and knowledge will direct the appraisal of thoughts and the personal importance of the thought will be assessed. Dysfunction may arise in response to this appraisal. It is likely that the beliefs an individual holds initiate the use of thought control strategies. For example, if it is believed that it is dangerous to hold a certain thought, this may lead to distress and excessive attempts at control.

1.4.2 The Use of Thought Control

Research has suggested that unpleasant and unwanted thoughts are a frequent occurrence in both normal and clinical populations (Wells and Davies, 1994). However, the degree of distress evoked by the thoughts and the methods of their regulation can be very different. Unpleasant and unwanted intrusive thoughts are associated with many clinical disorders

including obsessive compulsive disorder, post traumatic stress disorder, anxiety and depression and can cause high levels of emotional distress. Intrusive thoughts are defined as "repetitive thoughts, images or impulses that are unacceptable and/or unwanted. They are generally accompanied by subjective discomfort" (Rachman 1981) and will be particularly subject to thought control strategies due to their unpleasantness. Wells and Matthews (1994) proposed that thought control strategies represent one dimension of meta cognitive self regulation and emphasised the role of thought control strategies in the maintenance of unwanted thoughts in distress and emotional disorder (Wells and Matthews, 1994).

Mental control is a biological and psychological event and can be considered to be a significant stressor (Wegner and Pennebaker, 1993). Autonomic activity has been found to increase with mental control (Wegner, Shortt, Blake and Page, 1990) and Pennebaker and Susman (1988) found that individuals who claim to have actively attempted to regulate their emotions about traumatic events earlier in their lives, report higher rates of doctors visits, hospitalisation and minor and major health problems. Furthermore, individuals who continuously attempt to control their unwanted thoughts, report greater rates of depression (Nolen-Hoeksema, 1990).

Many clinical intervention programs incorporate components of thought control into their treatment for clinical disorders, techniques include: distraction, thought stopping, controlled worry periods and cognitive re-appraisal (Wells and Davies, 1994). However successful mental control is often ongoing, as once thoughts are controlled the individual must remain continually vigilant in order to maintain this state (Wegner and Pennebaker, 1993). Failed attempts at mental control can lead to further distress and feelings of failure, because they can confirm existing negative beliefs. For example a dieter who succumbs to a craving may then believe his/her eating is out of control, which can confirm existing beliefs about him/herself as being out of control and a failure. Subsequently, a minor set back in his/her diet may lead to a full blown eating binge. Furthermore, there is evidence

to suggest that it may be the attempts at mental control themselves which set processes in motion which lead to the failure of mental control (Wegner and Pennebaker, 1993).

1.4.3 Thought Suppression

1.4.3.1 Unwanted Thoughts and Thought Suppression

Not thinking about an issue or an event is a frequently employed method of attempting to controls one's thoughts and subsequent behaviour (Bodenhausen and Macrae, 1998, Erdelyi and Goldberg 1978). Indeed 99 percent of non clinical subjects have reported having tried on occasion to suppress disturbing thoughts (Erdelyi and Goldberg, 1978). Thought suppression is defined as "an effort not to think about a particular thought" (Wegner, Carter, Schneider and White, 1987) and in recent years it has been well described in the literature (cf. Purdon 1999, for a review).

Thoughts will be targets for suppression when they occur often and are viewed as undesirable (Wegner and Pennebaker, 1993). Hence the motivation to suppress a thought may be influenced by the nature of the emotional response to the thought (Salkovskis and Campbell, 1994), with thoughts that are associated with greater levels of emotional distress or anxiety likely to be subject to greater levels of suppression. Additionally, thoughts, which are disapproved of either socially or by the individual themselves, will commonly be subject to greater suppression (Wegner and Pennebaker, 1993).

1.4.3.2 The Ironic Effects of Suppression

Research on thought suppression suggests that any attempt to control thoughts by suppressing them may actually promote the preoccupation with the thought that is unwanted. (Wegner, Schneider, Knutson and McMahon, 1991; Davis and Clark, 1998; Macrae, Bodenhausen, Milne and Jetten, 1994; Lavy and van den Hout, 1990). This effect was first described by Wegner, Schneider, Carter and White (1987) in their white bear

experiments. They instructed participants to try not to think about a white bear and found that "the instruction to suppress a thought typically induced a remarkable preoccupation with that thought" (Wegner and Zanakos, 1994).

Wegner et al (Wegner and Zanakos, 1994, Wegner and Pennebaker 1993, Wegner et al 1991) described a "two process system" to explain mental control, in which thought suppression automatically induces two opposing cognitive processes: a conscious effortful operating process and an unconscious ironic monitoring process. When a thought is suppressed an "automatic target search" takes place in order to monitor for the occurrence of the unwanted thought. If the unwanted thought is identified the operating process is then triggered. This consciously searches for cognitive material unrelated to the suppressed thought, in order to maintain a replacement thought or distracter in consciousness. These distracters can be either external or internal stimuli (Purdon 1999).

The more chronically accessible the unwanted thoughts are, the more cognitive resources they will demand for suppression (Ward et al 1996), as each time the unwanted thought occurs, a search for a new distracter will be prompted. However, ironically it is the monitoring process that can increase the cognitive accessibility of the unwanted thought, as unintentional associations are made between the distracter thoughts and the unwanted target thought. As more and more distracters are provided in consciousness by the operating process, they will unintentionally become associated with the unwanted thought and serve as cues for it. Hence when external or internal stimuli chosen as distracters are detected by the automatic target search they will then serve to evoke the unwanted thought and a "rebound effect" increasing the unwanted thought will occur (Wegner et al, 1994, 1993, 1991). This description accords with Wells and Matthews (1994) description of monitoring by the S-REF.

Rebound effects are especially likely in situations where suppression fails and will be greater the more chronically accessible the thoughts are. Factors identified in the mental control literature as being high risk for lapses in suppression include high stress, highly

affective states, fatigue, alcohol or drug use (Wegner et al, 1993). These conditions increase cognitive load under which the process of providing distracting thoughts becomes more difficult. When distracters fail the ironic monitoring system is left unimpeded and subsequently floods the mind with exactly the thoughts that the individual was trying to suppress.

Wegner (1993) described preoccupations as arising out of failed attempts at thought control, and hypothesised that this was due to the subsequent resurgence of unwanted thoughts following failed attempts at thought suppression. This process may account for dieters and eating disordered individuals preoccupation with food.

Behavioural control is thought to follow from thought control (Wegner, 1993). Hence the ironic effects of rebound may compromise the effectiveness of thought control as a method employed to control behaviour (Johnston et al, 1999, Wegner, 1994).

1.4.3.3 Research on Thought Suppression

There is a wide literature, which examines the effects of thought suppression in a variety of contexts and taken together the findings from these studies are vastly inconsistent (Purdon, 1999). Purdon (1999) reviewed the literature on thought suppression and psychopathology and found that differing effects have been found in non clinical and clinical groups and between clinical groups. For example, the research looking at the effects of thought suppression in groups with depression, posttraumatic stress disorder and obsessive compulsive disorder (OCD) indicates that thought suppression "appears to have a negative impact on the frequency and or emotional experience of unwanted thought" (Purdon 1999, pg. 11049). For example Morgan, Matthews and Winton (1995) showed that thought suppression was related to trauma symptoms in flood victims. However the effects on phobias and worry related thoughts are unclear.

Differences are also found when the suppression of neutral thoughts (for example a white bear, Wegner et al, 1987) is compared with the suppression of emotional thoughts (for example thoughts of spiders in a group of spider phobic). The motivation to suppress neutral thoughts is often imposed by a researcher and has very little internal incentive for the participant. Consequently, failure in thought control will have little emotional relevance to them, whereas thoughts in emotional disorders are characteristically unwanted and unpleasant and cause significant distress. Therefore the motivation to suppress them is likely to be internally imposed. Hence an individuals expectations about thought control will determine the thought control strategy selected as well as the cognitive and affective experiences in thought control. (Purdon, 1999).

1.4.4 Strategies of Thought Control

Attempts at thought control have been observed to differ both in terms of the strategy used and the subsequent outcome. For example distraction techniques used in treatment can have either a facilitory or inhibitory effect on outcome (Wells and Matthews, 1994). Fennell and Teasdale (1984) found that distraction only appeared to have a positive effect on reducing negative cognitions and mood in mildly depressed individuals. Additionally depressed individuals have been found to be more likely to use distracters with a negative content to control unwanted thoughts than non depressed individuals. Non depressed individuals are more likely to use positive distracters and have been observed to be more successful in suppressing thoughts than a depressed group (Wenzlaff, Wegner and Roper, 1988). Wegner (1989) has also suggested that suppression using unfocused distraction can produce a delayed increase in unwanted thoughts, whereas focused distraction can reduce this effect. Consequently there was a need to clarify different techniques used in thought control and to ascertain the difference these strategies have on outcome.

1.4.4.1 The Thought Control Questionnaire

The thought control questionnaire was developed to examine the different thought control strategies used by individuals to control unpleasant and unwanted thoughts (Wells and Davies, 1994). They used a semi-structured interview to explore the range of different thought control strategies in two groups: people with anxiety disorders and a control group, without a history of emotional problems. The responses generated were then developed into a questionnaire, administered to much larger groups and the results factor analysed to develop five major thought control strategies: distraction (e.g. I do something that I enjoy), social control (e.g. I ask my friends if they have similar thoughts), worry (e.g. I focus on different negative thoughts), punishment (e.g. I punish myself for thinking the thought) and reappraisal (e.g. I try to re-interpret the thought).

These different dimensions of thought control were found to be associated with differing degrees of emotional distress. "Worry and punishment subscales but not other thought control questionnaire subscales (were found to) predict a variety of scores on measures related to emotional vulnerability/psychopathology. This suggests that the use of worry and punishment to control unwanted thoughts is associated with proneness to emotional problems" (Wells and Davies, 1994, pg. 877). Distraction as a strategy did not correlate with measures of emotional distress, which may be taken to suggest that it is neither an adaptive or a maladaptive method of controlling unwanted thoughts. However as described above it may be that different types of distraction produce different effects and therefore the results are not clear (Wells and Davis, 1994). Social control and reappraisal strategies also did not correlate with measures of trait anxiety or neuroticism and Wells and Davis (1995) suggest that these strategies may be more healthy methods of thought control. However measures of emotional stability were not used in this study and so this could not be fully assessed.

Others studies which have used the thought control questionnaire have found similar results. Warda and Bryant (1998) investigated the thought control strategies of survivors

of motor vehicle accidents with either acute stress disorder or no acute stress disorder. They found that worry and punishment strategies, were used significantly more frequently by the group with acute stress disorder and that these strategies were also "strongly associated with severity of intrusive, avoidance, arousal and depressive symptoms". Similarly in a second study punishment was found to be the biggest discriminator between individuals with obsessive compulsive disorder and a non patient group (Amir, Cashman and Foa, 1997). This study also found that patients with obsessive compulsive disorder used worry, social control and reappraisal strategies more often than controls. Finally Reynolds and Wells (1999) found depressed individuals reported using more punishment and re-appraisal strategies than a group of individuals with post traumatic stress disorder. Both these strategies involve continued preoccupation with the depressive rumination itself.

Hence there is a suggestion that certain methods of thought control, in particular punishment and worry are related to higher levels of emotional distress and disturbance and are less successful as a means of thought control.

1.4.5 Thought Control in Dietary Restraint

As described above, dietary restraint is largely believed to be cognitively regulated (Polivy and Herman, 1985). Cognitions about weight gain and the calorific value of foods serve to inhibit the usual responses to hunger and the desire to eat (Boon et al, 1998). However in dieters with a high degree of dietary restraint and people with disordered eating, thoughts about food and eating may also represent threats to dietary control, as they present the individual with the very thoughts they are trying to dismiss (Herman and Polivy, 1993). Hence thoughts about food may be viewed as unpleasant or unwanted and be targets of thought control (Herman and Polivy, 1993).

Control of thoughts is described as leading to paradoxical rebound and decreased controllability over the thought. Furthermore the more chronically accessible the unwanted

thoughts are the greater the ironic consequences of suppression (Ward et al, 1996). Dieters with a high degree of dietary restraint may therefore find that food thoughts are hyper accessible and thus be harder to control. Indeed it has been shown that both dieters and eating disordered individuals show a heightened preoccupation with thoughts of food, weight and shape (e.g. Harnden et al, 1997, Kerr et al, 1991) and that inhibition of appetitive behaviour results in a preoccupation with thoughts of eating and food (Hart and Chiovari, 1998).

Ward, Bulik and Johnston (1996) have proposed that unwanted thoughts and the subsequent attempts to suppress them are part of the phenomenology of bulimia nervosa. In the same way that thought suppression leads to rebound effects, so bulimics attempts at mental control in order to restrict food intake, are followed by lapses in control and subsequent binge eating. In bulimia, the most frequently cited precursors to binge eating are high levels of stress and negative affect (Strickney et al, 1999; Water, Hill and Waller, in press a). Similarly, the disinhibiting agents of restrained eating include alcohol, negative affect and worry (Scattolon and Nicki 1995). All these factors increase cognitive load and can therefore reduce attempts at mental control.

It has been shown that behavioural control may follow the same ironic pathways that thought control does. Johnston, Bulik and Anstiss (1999) instructed a group of chocolate cravers and a group of non cravers to suppress thoughts about chocolate. Participants then completed a computer based task, through which they earned chocolate rewards. It was shown that in both groups, suppression led to greater task performance to earn more chocolate. Hence, mental control may lead to a loss of behavioural control and restriction of food intake may be impaired.

Further evidence for the deleterious effect of mental control in dietary restraint is provided by research showing that self monitoring has been shown to be associated with successful weight loss (Baker and Kirschenbaum, 1993). Similarly overeating following a preload has been observed to be impeded by self monitoring (Polivy, Herman, Hackett and Kuleshynk, 1987) and it has been suggested that overeating by restrained eaters represents a

disruption in self monitoring (Ruderman 1986). Hence thinking about food or eating actually appears to inhibit food intake (Herman and Polivy 1993). Self monitoring requires an increased focus of attention on thoughts about food and foods eaten and in this way is the reverse of thought suppression. In the S-REF model Wells and Matthew's (1994) describe monitoring as being disadvantageous as it is likely to prime representations of stimuli, which make intrusions more likely. However Baker and Kirschenbaum (1993) refer to self monitoring as "the systematic observation and recording of target behaviours" (pg. 377) which reflects a healthy form of monitoring, increasing self awareness and fully processing the thoughts. Whereas Wells and Matthews (1994) model is describing monitoring of perceived threatening thoughts which may then be subjected to thought control. Hence thoughts are not fully processed and dealt with, which leaves the individual open to subsequent intrusions.

At present little is known about the thought control strategies used by dieters to regulate thoughts about food, in particular how dieters cope with and regulate craving thoughts. Understanding of thought control processes may elucidate the cognitive events, which underlie some aspects of dieting and eating disorders.

1.5 SUMMARY OF THE LITERATURE

The literature has shown the experience of food craving in the general population to be a commonplace experience not associated with emotional distress or a lack of behavioural control. However in certain groups, food cravings are frequently associated with significant distress and are implicated in the onset of binge eating. This literature suggests that craving thoughts per se are relatively innocuous and rather it is the way in which the cravings are appraised and dealt with that should be the focus of analysis.

Existing models of craving go some way towards explaining this difference. However evidence that craving is a cognitive phenomenon, which is then open to appraisal and thought control is currently lacking. The Self Regulatory Executive Functioning Model of

emotional disorder (Wells and Matthews, 1994) emphasises the role of metacognitive appraisal and self regulation in the development and maintenance of emotional disorder. In this model beliefs about thoughts and thought processes represent one dimension of metacognitive self regulation and the resulting thought control strategies form the second dimension. Thoughts are likely to be subjected to mental control if they are perceived as unpleasant and unwanted. Dieters in an attempt to lose weight will be restricting their usual food intake and thus will be resisting the usual stimuli for food. Consequently, it is feasible that in some dieters craving thoughts will be viewed as unwanted and unpleasant thoughts and be subject to thought control.

The literature suggests that certain methods of thought control, in particular punishment and worry are related to higher levels of emotional distress and disturbance and are less successful as a means of thought control. Unsuccessful thought control can lead to increased intrusion of unwanted thought, a lack of behavioural control and increased emotional distress.

1.6 RESEARCH QUESTIONS

1.6.1 Study One

The current study aims to examine the thought control processes and craving experience of a population of dieters currently attending a weight watchers programme to achieve weight loss. The relationship between dimensions of thought control, eating behaviours and distress will be explored.

The following hypotheses were developed in light of the literature described above:-

Hypothesis One: A significant proportion of dieters will experience food cravings.

Hypothesis Two: There will be a significant association between restrained eating and the experience of food craving.

Prediction 1 Restrained eaters will be more likely to experience cravings than unrestrained eaters.

Prediction 2 Restrained eaters will experience stronger and more frequent cravings than unrestrained eaters.

Prediction 3 Restrained eaters will be more likely to experience accompanying anxiety and discomfort if the food they are craving is unavailable than unrestrained eaters.

Hypothesis Three: Restrained eaters will be more likely to experience eating dysfunction and emotional distress than unrestrained eaters.

Prediction 1 Restrained eaters will be more likely to experience clinical levels of depression than unrestrained eaters.

Prediction 2 Restrained eaters will be more likely to experience clinical levels of anxiety than unrestrained eaters.

Prediction 3 Restrained eaters will be more likely to experience symptoms and concerns characteristic of eating disorders (eating attitudes test (EAT) score >20) than unrestrained eaters.

Prediction 4 Restrained eaters will be more likely to report binge eating and purging behaviour (i.e. vomiting and use of diuretics, diet pills, and laxatives) than unrestrained eaters.

Hypothesis Four: There will be no significant difference between cravers and non cravers on measures of eating dysfunction and emotional distress.

Prediction 1 Clinical levels of depression will not differentiate between cravers and non cravers.

Prediction 2 Clinical levels of anxiety will not differentiate between cravers and non cravers.

Prediction 3 Cravers will not have significantly different scores on the EAT to non cravers.

Prediction 4 Cravers and non cravers will not report significantly different levels of binge eating or purging behaviour.

Hypothesis Five: Food craving dieters' ratings on dimensions of cravings will be associated with measures of distress and eating dysfunction.

Prediction 1 Ratings on dimensions of craving will be associated with measures of distress (Beck depression inventory and Beck anxiety inventory scores)

Prediction 2 Ratings on dimensions of craving will be associated with scores on the EAT, the restraint scale and reports of binge eating and purging behaviour.

Hypothesis Six: Dieters with a vulnerability to eating disorders, binge eating, purging behaviour and emotional distress will show differences in thought control strategies compared to dieters without difficulties.

Prediction 1 Dieters with a vulnerability to eating disorders will show differences in thought control processes compared to dieters without a vulnerability to eating disorders.

Prediction 2 Dieters with binge eating and purging behaviours will show differences in thought control processes compared to dieters without maladaptive eating behaviour.

Prediction 3 Thought control processes associated with "worry" and "punishment" will be related to emotional distress (anxiety, depression)

Hypothesis Seven: Body mass index, social desirability and ideal actual weight discrepancies will not moderate the above relationships

1.6.2 Study Two

Study two will be a semistructured interview study, using a clinical methodology, with the aim of providing a more detailed understanding of the craving experience of a subsample of dieters. In particular beliefs about craving, beliefs about self and control strategies will be explored.

2 METHODOLOGY

The study employed a quantitative methodology and was in two parts.

2.1 STUDY 1

2.1.1 Design

The study was a cross sectional, correlational design and was questionnaire based. It investigated the relationship between food cravings, thought control strategies, eating behaviour and emotional distress.

2.1.2 Participants

Participants were currently on a diet and attending a Weight Watchers program to achieve weight loss or maintain current weight.

Weight Watchers is an international profit making company, which was established in 1963 and operates in 24 countries around the world. In the UK there are currently over 6000 meetings held each week. Members must be over the age of 16, have a body mass index of at least 20, with at least 10lbs over this weight to lose at the point of joining and not be currently pregnant. Children aged between 10 and 16 will be accepted with parental consent and written permission from a GP.

Body Mass Index (BMI) is a standard method of measuring healthy body weight. It is calculated by using the following equation:- weight in kg/(height in m)^2. Table 1 shows the groupings of BMI scores.

The goal weight for a member is discussed with the programme leader and is set at a body mass index of between 20 and 25. The Weight Watchers programme is based on a points

system, which limits saturated fat and calorie intake. A weekly group meeting takes place where members are weighed and their diet from the previous week is tracked and discussed. Then a group discussion takes place to provide group support, information and suggestions about weight loss (Weight Watchers UK Promotional Information, 2000).

Table 1 Weight classification using body mass index

BMI	**Weight classification**
Below 15	Emaciated
15-19	Underweight
20-25	Normal weight range
26-30	Overweight
31-40	Obese
40+	Gross obesity

Abraham and Llewellyn-Jones (1997)

The current sample was recruited from fourteen Weight Watchers meetings within the Trent region. There were no exclusion criteria above those implemented by Weight Watchers UK. This group included 5 individuals who had reached their target weight and 1 who was below their target weight but continued to attend weight watchers in order to maintain their weight. They were considered as dieters because they continued to monitor and restrict their food intake. Approximately 30% (n=38) of individuals approached, self excluded due to time restrictions, difficulty in reading or comprehending the material or for other reasons. In addition 26 participants were later excluded from the study due to incomplete completion of questionnaires.

2.1.2.1 Characteristics of the Sample

The sample comprised of 127 women. Men were not intentionally excluded from the sample. However the vast majority of Weight Watchers members are women and the few men approached for the study either declined to participate or were later excluded as

questionnaires were not fully completed. The women's ages ranged from 14 to 70 years (mean 38.17, SD=13.96). The majority of the women were married or living with a partner (65.8%; n=81) and most were working (69.9%; n=86), 16.3% (n=20) were housewives or unemployed, 4.9% (n=6) were full time students and 8.9% (n=11) were retired. 93.9% (n=107) of the women were white, 4.4% (n=5) were Asian and 1.8% (n=2) were black.

The length of time that participants had been members of Weight Watchers ranged from having just joined on the day of completing the questionnaires to being a member for 16 years (M=57.43 weeks, SD=118.46 weeks). 27.4% (n=34) had been members of Weight Watchers for over a year. However the median and mode number of weeks of membership was 12. The mean number of months spent on a diet in the last 5 years (60 months) was 31.03 (SD=21.87) or approximately just over half of it. 29.1% (n=32) of participants had been on a diet for all of the last five years.

2.1.3 Procedure

Consent and guidance was obtained from the clinical psychology course ethics meeting and the research officer for the healthcare trust prior to conducting the study. Weight Watchers UK head office was approached for permission to contact local group organisers and attend local meetings in order to recruit participants. Additional ethical approval was not required as a non clinical sample was being approached.

Participants were approached while attending their local Weight Watchers meeting. The first thirty minutes of each meeting is allocated to checking in and weighing time. Participants were approached after they had been weighed. A brief description of the study together with an information sheet (See Appendix I) was given and written consent was gained from members who expressed an interest (See Appendix II). Assessment measures were completed during the meeting. Completion of the questionnaires took approximately 20 minutes. For the majority of participants, time allowed for them to complete the

questionnaires before the start of the formal meeting. Questionnaires were presented together with instructions for completion in a rotating order in order to control for any carry over effects from any of the questionnaires. For example, it was felt that the thought control questionnaire, although measuring generic thought control strategies, may be related more to control of cravings if administered after the craving and diet questionnaires.

Participation was completely voluntary and confidential. Participants were not asked to give their name or any other identifying information. All materials were individually coded and securely stored.

2.1.4 Measures

A battery of eight questionnaires was used to explore the hypotheses described above. These included:

2.1.4.1 The Food Craving Questionnaire (Gendall, Sullivan, Joyce and Bulik, 1997a)

The Food Craving Questionnaire (FCQ) (see appendix III) is a twelve item, self report questionnaire. It was used in the current research to assess the experience of food craving in the sample group.

Other food craving research described in the literature has tended to use a single definition of craving when asking respondents whether they experience cravings (e.g. Hill and Heaton-Brown, 1994 and Weingarten and Elston, 1991). However the FCQ asks respondents whether they have ever experienced "an uncontrollable desire to eat a specific food or type of food" or "a strong urge to eat a specific food" before asking them if they had ever experienced "a craving for a specific food". An individual is then identified as experiencing food cravings if they agree with any of the former statements. "The questionnaire was designed to allow for a varied understanding of the concept and to

avoid an initial emotive response to the term craving" (Gendall et al, 1997a). Additional questions go on to assess the subjective experience of the craving, for example difficulty resisting eating, anxiety or discomfort if the craved food is unavailable and a change in the speed of consumption. Gendall et al (1997a) describes these as the core features of craving. However information on the reliability and validity of this measure is not available and time did not allow for this to be gained in the current study.

2.1.4.2 The Thought Control Questionnaire (Wells and Davies, 1994)

The Thought Control Questionnaire (TCQ) (see appendix IV) represents the only known method of examining strategies of thought control found in the literature. It was developed to look at the techniques used to control unpleasant and unwanted thoughts and is based on Wells and Matthews (1994) model of emotional disorder. It is a thirty item, self report measure. Scores from the items group into five dimensions of thought control strategy: distraction, social control, worry, punishment and reappraisal.

The measure was validated by Wells and Davis (1994) and the five subscales have been shown to have moderately high internal consistency reliabilities (Cronbach coefficient alphas range from 0.64 to 0.79) and good test retest reliability ($r=0.67$ to 0.83). Predictive validity was found by exploring the relationships of the thought control questionnaire subscales with existing measures. This allowed associations to be made between the subscales and levels of stress vulnerability and perceived lack of control over thinking. The results suggested that the use of worry and punishment to control unwanted thoughts, but not other TCQ subscales is associated with emotional vulnerability and impaired control over cognition (Wells and Davis, 1994).

2.1.4.3 The Eating Attitudes Test, 26 (Garner and Garfinkel 1979, 1982)

The eating attitudes test (EAT-26) (see appendix V) is a 26 item, objective, self report measure of the symptoms and concerns characteristic of eating disorders. This test is the

most widely used in the literature (e.g. Cooper et al, 1998) and was used in this case to screen for the occurrence of symptoms and concerns characteristic of eating disorders.

The eating attitudes test was originally developed as a screening measure for anorexia nervosa (Garner and Garfinkel, 1979). The Eat-26 is a modified version of the original EAT-40, and has been shown to be highly predictive of the total score on the EAT-40 (r=0.98) (Garner, Olmsted, Bohr and Garfinkel, 1982). The EAT has been validated with anorexia nervosa patients and the internal reliability of the EAT-26 is demonstrably high (alpha=0.90) for this group (Garner and Garfinkel, 1979). However its use in identifying eating disturbance in non clinical sample groups has been shown (Button and Whitehouse, 1981; Thompson and Schwartz, 1982). In this case high scores on the EAT are not diagnostic for anorexia nervosa but indicate the presence of symptoms common to this (Button and Whitehouse, 1981). Correlational analysis of the EAT with other measures suggests that the EAT measures specific symptoms and scores on this test are not merely related to measures of dieting (restraint scale), weight fluctuation, extroversion or neuroticism (Garner and Garfinkel, 1979).

A score of 20 or above on the EAT-26 has been shown to indicate symptoms and concerns characteristic of eating disorders. Interviews of those scoring lower than 20 on the EAT show that the test produces very few false negative results (Garner, 2000).

2.1.4.4 The Restraint Scale (Polivy, Herman and Warsh, 1978)

The Restraint Scale (RS) (see appendix VI) is a ten item self report questionnaire, which includes questions on dieting, concerns about weight and eating or over eating and weight variation over time. It measures the extent to which people (a) display overconcern with their weight and (b) chronically diet to control it (Heatherton, Herman, Polivy, King and McGree, 1988). A score higher than 17 is considered to be consistent with restrained eating (Polivy, Herman and Warsh, 1978).

The RS was initially developed as a simple and relatively straightforward, self report device for identifying chronic dieters (Herman and Mack, 1975). The majority of research on the theory of dietary restraint has relied heavily on the restraint scale (Ruderman, 1983) and it is thought to be the "most useful tool for examining behavioural and other dieter/non dieter differences" (Heatherton et al, 1988). Test-retest reliability has been found to be high (r=0.95) (Allison, Kalinsky and Gorman, 1992) and internal consistency was found to be moderate (alpha=0.82) (Allison et al, 1992).

There have been several criticisms leveled at the RS. In reviewing the psychometric properties of the scale Ruderman (1983) suggested that it is less reliable when used with obese individuals than with normal weight individuals. In particular numerically equivalent scores may represent lower restraint in obese individuals as greater weight fluctuation is expected in individuals with higher weight which would increase the score on the RS (Ruderman, 1983). However, Heatherton et al (1988) have contended that the evidence in this area is not clear and that it is likely that increased dieting in obese samples account for the differences found. Incomplete responding to all the questions in the measure especially for unrestrained eaters has also been highlighted as a problem in a UK sample (Wardle, 1986). However, the majority of studies in North America have not found this response (Heatherton et al, 1988). Heatherton et al (1988) suggested that the difference may account for differences in concern about weight between samples as, if this is not a concern, it will be less likely that respondents would be aware of fluctuations in weight and so would be unable to answer the questions. As the current sample is comprised of dieters it was thought likely that they would be very aware of weight gain and fluctuation.

The RS has been shown to be closely related to the consequences of unsuccessful dieting (Laessle, Tuschl, Kothaus and Pirke, 1989). It identifies restrained eaters, a large proportion of whom are likely to be unsuccessfully dieting because restraint leads to a propensity towards disinhibition (Heatherton et al, 1988). The Three Factor Eating Questionnaire (Stunckard and Messick, 1985) and the Dutch Eating Behaviour Questionnaire (Van Strien, Fritjters, Bergers and Defares, 1986) are the two measures

most frequently proposed as alternatives to the RS. However these measures relate more to successful dieting behaviour (Laessle et al, 1989). In the current study the RS was used as a measure of chronic dieting, a large proportion of which is presumed to be unsuccessful.

Five additional questions were added to the bottom of the restraint scale (see appendix VI, questions 11-15) in order to gain information about eating binges, vomiting and laxative, diet pills and diuretic use. Wording of these questions was based on DSM-IV criteria (American Psychiatric Association, 1994).

2.1.4.5 The Beck Anxiety Scale (Beck and Steer, 1993)

The Beck Anxiety Inventory (BAI) is a 21 item measure, which was designed to assess the severity of self reported anxiety (Beck and Steer, 1993). It is widely used in the literature (e.g. Papageorgiou and Wells, 1999) and was used in the current study to assess anxiety symptoms in the sample group. A score of 8 or more is taken to indicate the presence of anxiety (Beck and Steer, 1993).

The BAI was developed for use with adult psychiatric patients and in this group has been shown to have excellent internal consistency (Cronbach's alpha = 0.92), (Beck et al 1988) and good test retest reliability (0.83) (de Beurs, Wilson, Chambless, Goldstein and Feske, 1997). Its use in identifying anxiety symptoms in a normal population sample has been shown (Dent and Salkovskis, 1986) and a high level of internal consistency has been demonstrated in this group (Cronbachs alpha = 0.91, Creamer, Foran and Bell, 1995). However test retest reliability was found to be lower when the BAI was used in a normal population sample (0.62) (Creamer et al, 1995), which suggests that the BAI is measuring state as opposed to trait anxiety in this group. The Speilberger State-Trait Anxiety Inventory (Speilberger, Gorsuch and Lushene, 1970) is the most widely used alternative to the BAI and measures state and trait anxiety separately. However the BAI has shown

superior ability in differentiating anxiety from depression (r=0.50) (Frydrich, Dowdall and Chambless, 1992).

The BAI has been criticised, by Cox, Cohen, Direnfield and Swinsen (1996a, 1996b) who contend that it appears to be confounded with, or actually measures primarily, symptoms which are associated with panic attacks, rather than anxiety in general. However, factor analysis revealed that the BAI was clearly distinguished from measures of fear of fear, a central construct in panic disorder (de Beurs et al, 1997). Steer and Beck (1996) argue that the higher levels of anxiety found in patients with panic disorder is a reflection of the fact that patients with panic disorder generally have more symptoms of anxiety than those with other anxiety disorders.

2.1.4.6 The Beck Depression Scale II (Beck, Steer and Brown, 1996)

The Beck Depression Scale II (BDI-II) is a 21 item self report measure designed to assess the presence and severity of depressive symptoms. All items are consistent with DSM-IV criteria for depression. The BDI-II is based on the original BDI (Beck, Rush, Shaw and Emery, 1979), which has been described as the most frequently used measure of depression in the literature (Robinson and Kelley, 1996). The BDI was amended once before to produce the BDI-1A and more recently the BDI-II was developed in order to adhere more closely to the DSM-IV criteria for depression (Beck, Steer and Brown, 1996).

It is well documented that the BDI has excellent psychometric properties (Robinson and Kelley, 1996). Similarly the BDI-II has been shown to have excellent internal consistency in both a clinical sample (alpha=0.91) (Beck et al, 1996) and a non clinical sample (alpha=0.89) (Whisman, Perez and Ramel, 2000). Furthermore the factor structure of the BDI-II was shown to be stronger than that of the BDI (Dozois, Dobson and Ahnberg, 1998). In the current study the BDI-II was used to assess the presence and severity of

depressive symptoms in the sample group. A score of fourteen or above is taken to indicate the presence of depression (Beck, Steer and Brown, 1996).

2.1.4.7 The Marlowe-Crowne Social Desirability Scale, Short Form MC-3 (Reynolds 1982)

The Marlowe-Crowne Social Desirability Scale MC-3 (see appendix VII) is a thirteen item, self report measure of social desirability, using a true false format. In this context social desirability is defined as "the need of subjects to obtain approval by responding in a culturally acceptable manner" (Crowne and Marlowe, 1960).

"Social Desirability is one of the most common sources of bias affecting the validity of experimental and survey research findings" (Nederhof, 1985) and has been found to confound reports of eating behaviour (Allison and Heshka, 1993). In the current study the MC-3 was used to measure response style tendency and estimate the potentially confounding effect of social desirability on self reporting on other measures.

The Marlowe-Crowne Social Desirability Scale is the most frequently used social desirability scale used in published research (e.g. Ruderman, 1983) and has been shown to have good test retest reliability (Kuder-Richardson formula 20=0.89) (Crowne and Marlowe, 1960). The MC-3 was recommended by Reynolds (1982) as a viable short form of the original 33 item scale as it was shown to possess comparable reliability with the standard form (rKR-20=0.76) and good concurrent validity (r=0.93).

2.1.4.8 The Dimensions of Craving Thoughts Rating Scale

In order to assess participants appraisals of the craving experience twelve 11 point rating scales were developed (see appendix VIII). These were based on Papageorgiou and Wells (1999) scales for assessing metacognitive dimensions of anxious and depressive thoughts. Their scales were based on the "dimensions of thought, considered to be important in

current cognitive and metacognitive conceptualisations of depression and anxiety" (Papageorgiou and Wells, 1999, pg. 158). These were adapted for craving thoughts using the literature on craving and bingeing (e.g. Strickney et al, 1999).

Ratings scales are a frequently used method of assessing factors in cognitive behavioural clinical assessment (Kirk, 1996). In the current study subjects were asked to rate twelve beliefs about craving thoughts, using an 11 point rating scale. Each scale ranged from 0 = not at all, to 100 = extremely so. It is acknowledged that these scales have not been validated. However the method used is known to have good clinical validity.

2.1.5 Choice of Statistical Tests for Analysis

The current study was a one sample cross sectional design. Consequently analysis was either correlational, looking at the relationship between scores on two variables or conducted by grouping data according to scores on variables. For example comparing scores on variables between cravers and non cravers or restrained eaters and unrestrained eaters.

Prior to statistical analysis being conducted the data was examined to determine whether it was appropriate to use parametric statistics. For parametric statistics to be used, three criteria should be fulfilled by the data: the level of measurement should be of interval or ratio scaling, the population scores should be normally distributed and the variance of both variables should be equal (Bryman and Cramer, 1995).

In the current study several variables including the thought control subscales, the BDI-II, BAI, EAT, RS, and SDS total scores, BMI and ideal current weight discrepancy scores and ratings of dimensions of craving were considered to be interval level data. Consequently the distribution of scores on these scales was assessed, using the Kolmogorov-Smirnov test, to determine whether they differed from the normal distribution. However the majority of these variables were found to differ from the normal

distribution. On variables that were normally distributed Levene's tests were performed in order to compare the homogeneity of variance of scores between variables. If these criteria were met parametric statistics were conducted. However the majority of the analysis used non parametric statistics as parametric requirements were not met.

Two tailed tests were performed on all data. Associations between nominal level data (and data reduced to categories) were examined using the Chi squared statistic. For several analyses cell numbers did not meet statistical requirements and so Fishers exact test is quoted. Where data was ordinal a linear by linear test for trend was used. Group differences were examined using t-tests and the Mann Whitney U test. Correlations were examined using Spearman's rho statistics. Interpretation of correlations were based on guidelines suggested by Cohen and Holiday (1982, cited in Bryman and Cramer, 1995) who suggest ±0.20 to ±0.39 is low; ±0.40 to ±0.69 is modest; ±0.70 to ±0.89 is high; and ±0.90 to ±1 is very high. Significance levels were set at $p<0.05$. However where multiple correlations were conducted a Bonferroni correction was used, which increased the significance level. All analysis was performed using SPSS 10.0 for Windows.

2.2 STUDY 2

2.2.1 Design

The study was a semi-structured interview study using a clinical methodology designed to explore beliefs about craving and coping strategies.

2.2.2 Participants

A subsample of participants from study one who were currently experiencing regular food cravings were interviewed. Participants were approached at the time of study 1 and asked whether they would be interested in taking part in a semi structured interview study at a later date. The sample was then randomly selected from a group of 31 who expressed

interest in being interviewed about their craving experience. Three participants who were approached declined to be interviewed at this stage.

2.2.2.1 Characteristics of the Sample

The sample comprised of a subsample of ten women from study 1. In this group participants' ages ranged from 20 to 66 years (mean 35.38%; S.D. 15.21). The majority were working (70%; 7), 20% (2) were students and 10% (1) were retired. 90% (9) were white and 10% (1) were Asian. 50% (5) were married or living with a partner.

The length of time participants had attended Weight Watchers ranged from 4 weeks to 5 years (median 18.5 weeks) and the mean number of months spent on a diet in the last 5 years was 39.7 months (SD=25.8).

2.2.3 Procedure

At the time of study 1 participants were asked if they would be interested in taking part in a semi structured interview at a later date. If so, they were asked to complete the bottom part of the consent form, adding their name and telephone number. They were made aware that not everybody consenting would be contacted, as only ten participants were required. Following this a random selection of participants who currently experienced regular cravings were approached. The majority of interviews took place at participants local weight watchers meeting rooms, one took place in the clinical psychology department and one at a participants work place.

Interviews were audiotaped with participant's consent. These tapes were used to establish the inter rater reliability of the clinical material elicited from the interview. This was to ensure that groupings of descriptions of craving experiences, beliefs about cravings and self beliefs made from the interview material were fully inclusive of the information gained and jointly agreed upon. The tapes were wiped following this process. No names or other

identifying information was stored with the interview notes or tapes. These were individually coded and securely stored.

2.2.4 Materials

A semi-structured interview was designed for the study to explore beliefs about cravings and coping strategies in relation to food cravings in more detail (see appendix IX). Semi structured interviews are widely used in cognitive research (e.g. Loumidis and Wells 1998; Cooper, Todd and Wells, 1998). The interview in the current study was in the form of a clinical cognitive behavioural assessment interview and was based on semistructured interviews used in previous research to elicit self beliefs in patients with eating disorders (Cooper, Todd and Wells, 1998) and to elicit core beliefs in health anxiety (Wells and Hackmann, 1992).

The aim of the semi-structured interview was to elicit assumptions and beliefs about the craving experience in dieters. Automatic thoughts were not specifically collected. The interview started with setting questions designed to encourage the participants to describe a typical recent craving experience. Prompt questions were used including where they were at the time and how they had felt, to encourage the experience to be fully brought to mind. Following this, the participants' experience of the craving experience was explored in more detail. This included the experience of eating the craved for food (e.g. what happens if you have a craving for..... and then you eat.....?), the experience of resisting the craved for food (e.g. what happens if you have a craving for..... and you can't eat?) and choices of coping strategies (e.g. what helps when you experience a craving). The most salient thoughts and feelings derived from this part of the interview were then explored in more detail using the backward chaining technique. Probe questions such as what does it mean to you to feel/think.....?, What is so bad about feeling/thinking.....? were used to derive personal beliefs and assumptions, which underlie their beliefs about cravings.

The semistructured interview was piloted on two dieters who experienced cravings and minor changes to structure and wording were made.

3 RESULTS

3.1 STUDY ONE

3.1.1 Descriptive Statistics on whole sample (n=127)

Appendix V provides a summary of sample scores on all quantitative measures.

3.1.1.1 Food Craving

Descriptive information on the craving experience is gained from questions in the Food Craving Questionnaire (Gendall, Sullivan, Joyce and Bulik, 1997a) (see appendix III). In the current study 88% (n=110) of dieters reported having experienced food cravings. The most frequently listed craving was for chocolate or other sweet food (46%), 24% craved only for savoury food and 29% craved both sweet and savory foods. Table 2 shows the reported frequency and strength of these cravings together with how often the craved for food is consumed. 68.2% (n=75) of cravers reported that cravings cannot be satisfied by foods other than those which they are currently craving. In 49.5% (n=55) of those experiencing cravings, anxiety or discomfort is experienced when the craved for food is not available.

Of those women experiencing cravings, the majority (n=68, 66%) reported that they experienced food cravings solely premenstrually. However there was some ambiguity about the reporting to this question, as many women who agreed with the statement that they experienced cravings solely premenstrually also reported experiencing weekly or fortnightly cravings. It is therefore assumed that respondents' responses are often relating to having the experience of cravings premenstrually but not solely at this time. However it is unlikely that this ambiguity will effect the results of the current study as appraisal and control of the craving is more important than the time the cravings occur.

Table 2 Characteristics of Cravings

Frequency of Craving	N (%)	Strength of craving	N(%)	How often eat craved for food	N(%)
Daily	11(10.1%)	Strong	40(37%)	Always	7(6.4%)
Weekly	36(33%)	Moderate	56(51.9%)	Sometimes	76(69.7%)
Fortnightly	12(11%)	Weak	12(11.1%)	Rarely	25(22.9%)
Once a month or less	50(45.9%)			Never	1(0.9%)

3.1.1.2 Weight

The body mass indexes of dieters in the sample group ranged from 21 to 48 (M=28.85; SD=4.9). 75.63% (n=90) fell in the overweight category having a BMI of over 25. The majority of participants (95%, n=111) were currently below their target weight. However 4% (n=5) of participants were at their ideal weight and 1% (n=1) were below their ideal weight. These 6 participants continued to attend weight watchers in order to maintain their weight. Current-ideal weight discrepancies ranged from 3kgs below desired weight to 67kgs above the desired weight (M=13.49kg, SD=11.2).

3.1.1.3 Emotional Disorder

Scores on the Beck Depression Inventory II ranged from 0 to 45 (M=10.72, SD=10.04), with the mean score falling below the clinical cut off point of 13. The distribution according to the cut off points of the manual are as follows: minimal depression (scores 0-13) n=87, 75%, mild depression (scores 14-19) n=10, 8.6%, moderate depression (scores 20-28), n=10, 8.6% and severe depression (scores 29-63) n=4, 3.2%. Scores on the Beck anxiety inventory ranged from 0 to 54 (M=8.23, SD=8.82), with the mean score falling

above the clinical cut off point of 8. The distribution according to the clinical cut off point is as follows: minimal anxiety (scores 0-7) n=53, 42.1%, mild anxiety (scores 8-15) n=30, 23.8%, moderate anxiety (scores 16-25), severe anxiety (scores 26-63) n=4, 3.2%. Only 20% (n=23) of the sample were currently experiencing clinical levels of both depression and anxiety.

3.1.1.4 Eating Behaviour

Scores on the restraint scale ranged from 7 to 33 (M=21.13, SD=4.94), with the mean score falling above the cut off score of 17, for restrained eating. Three quarters of the sample (n=86, 75.4%), were categorised as restrained eaters (scores 18-40). In addition scores on the eating attitudes test ranged from 6 to 45 (M=12.77, SD=10.02), with the mean falling below the cut off point for symptoms and concerns characteristic of eating disorders. 22.2% (n=28) of the dieters scored above the cut off point suggesting a vulnerability to eating disorders. In the current sample 21.2% (n=23) showed both restrained eating patterns and a vulnerability to eating disorders.

A significant proportion (52.4%, n=66) of the dieters reported either binge eating or purging behaviour, which included vomiting and use of diuretics, diet pills and laxatives to control weight gain. In the current sample 34.5% (n=40) of dieters reported binge eating in the last six months, of which 6 (5.6%) also displayed purging behaviour in the last six months. The number of reported binges during this time ranged from 0 to 25 (M=1.39, SD=3.31). Table 3 shows numbers experiencing bingeing, vomiting and diuretic, diet pill and laxative use.

11.2% (n=14) reported having previously suffered or been treated for an eating disorder.

Table 3 Frequency of Binge Eating and Purging Behaviour

Eating Behaviour	**n(%)**
Eating binges	
♦ In last 6 months	40 (34.5%)
♦ At some time in the past	58 (45.7%)
♦ out of control in last 6 months	32 (27.4%)
♦ out of control at some time in the past	46 (36.5%)
Purging	
♦ Vomited in last 6 months	5 (4.2%)
♦ Vomited at some time in the past	17 (13.5%)
♦ Used laxatives, diet pills or diuretics to control weight in last 6 months	7 (6.1%)
♦ Used laxatives, diet pills or diuretics at some time in the past	26 (20.5%)

3.1.1.5 Thought Control Strategies

Table 4 shows the mean scores on the thought control questionnaire subscales. Distraction is shown to be the most commonly used strategy for controlling unwanted and unpleasant thoughts in the sample group (M=2.44, SD=0.56). Punishment (M=1.65, SD=0.50) and worry (M=1.84, SD=0.60) strategies were used least frequently.

3.1.1.6 Social Desirability

The mean score on the social desirability scale was 7.31 (SD=2.84), which represents an average score on the scale.

Table 4 Strategies of Thought Control

TCQ Subscales	n	Mean (median)	SD
Distraction	119	2.44 (2.50)	0.56
Social Control	118	2.23 (2.17)	0.46
Worry	117	1.84 (1.67)	0.60
Punishment	120	1.65 (1.50)	0.50
Reappraisal	116	2.12 (2.17)	0.60
Total Score	111	61.78 (62.00)	10.89

3.1.1.7 Dimensions of Cravings

Table 5 shows the mean ratings of dimensions of craving thoughts in dieters who reported experiencing food cravings. Inter correlations between dimensions of cravings are presented in appendix VI.

Table 5 Ratings of Dimensions of Cravings

Dimensions of Craving	N	Mean (Median)	SD
Unpleasant	102	30.15 (20.00)	29.20
Intrusive	102	41.23 (40.00)	32.61
Controllable	102	54.34 (50.00)	31.27
Tolerable	102	54.00 (50.00)	29.92
Distressing	102	29.38 (20.00)	31.01
Interfere with life	102	25.20 (10.00)	27.66
Difficult to resist	103	45.62 (50.00)	28.18
Make feel anxious	103	29.45 (20.00)	28.64
Make feel depressed	103	30.00 (20.00)	29.25
Make feel angry	102	21.85 (10.00)	27.49
Make feel ashamed	102	23.82 (10.00)	29.58
Make feel guilty	102	32.21 (20.00)	33.32

Craving thoughts were most frequently rated as being controllable (M=54.34, SD=31.27), tolerable (M=54, SD=29.92), difficult to resist (M=45.62, SD=28.18) and intrusive (M=41.23, SD=32.61). Furthermore the magnitude of intercorrelation between dimensions of cravings ranged from rho=0.01 (between cravings rated as tolerable and intrusive) to rho=0.75 (between cravings rated as being associated with guilt and shame).

3.1.2 Hypothesis One

A significant proportion of dieters will experience food cravings.

To examine this hypothesis, a chi-square analysis was performed, comparing the proportion of cravers to the proportion of non-cravers in the current sample. The results revealed that a significant proportion (χ^2=72, df=1, p<0.001) of dieters (n=110, 86.6%) reported experiencing food cravings, which confirms the hypothesis.

3.1.3 Hypothesis Two

There will be a significant association between restrained eating and the experience of food craving.

Three specific predictions were examined to test this hypothesis. A linear by linear test for trend is used to examine differences in distribution where data is ordinal and Fisher's exact test is used where data is nominal because cell numbers did not meet statistical requirements for chi squared.

1.1.3.1 A significantly higher proportion of restrained eaters will experience cravings than unrestrained eaters.

Among unrestrained eaters (n=28, 25%), 78.6% experienced craving, while among restrained eaters (n=84, 75%) 94% experienced craving. Fisher's exact test was used to

examine the association between restrained eating and craving experience, this was found to be significant ($p<0.05$).

1.1.3.2 Restrained eaters will experience stronger and more frequent cravings than unrestrained eaters.

Table 6 shows the reported frequency and strength of restrained and unrestrained dieters' cravings. A linear by linear test for trend was used to examine the association between restrained eating and strength and frequency of craving. Restrained eating was found to be associated with stronger (linear association $\chi^2 = 8.417$, df=1, $p<0.005$) and more frequent cravings (linear association $\chi^2 = 4.781$, df=1, $p<0.05$) in dieters.

Table 6 The Reported Frequency of Cravings in Restrained and Unrestrained Eaters.

Craving Frequency	**n(%)**	**n (%)**
	Restrained Eaters	Unrestrained Eaters
Daily	9 (11.4%)	0 (0%)
Weekly	30 (38%)	5 (22.7%)
Fortnightly	8 (10.1%)	4 (18.2%
Once a month or less	32 (40.5%)	13 (59.1%)
Total	79 (78.2%)	22 (21.8%)

1.1.3.3 A greater proportion of restrained dieters will experience accompanying anxiety and discomfort if the food they are craving is unavailable than unrestrained eaters.

Over half of restrained eaters (n=47, 59.5%) reported experiencing anxiety or discomfort if not able to eat the craved for food, while only one in five (n=5, 22.7%) of unrestrained eaters experienced this. Fisher's exact test was calculated and found to be significant ($p<0.005$).

Consequently restrained eating is found to be associated with stronger and more frequent cravings which if unable to be satisfied are associated with anxiety and discomfort.

Table 7 The Reported Strength of Cravings in Restrained and Unrestrained Eaters.

Craving Strength	**n (%)**	**n (%)**
	Restrained Eaters	Unrestrained Eaters
Strong	36 (38%)	2 (9.5%)
Moderate	36 (45.6%)	15 (71.4%)
Weak	7 (8.9%)	4 (19%)
Total	79 (79%)	%)

3.1.4 Hypothesis Three

Restrained eaters will be more likely to experience eating dysfunction and emotional distress than unrestrained eaters.

A series of specific predictions were examined to test this hypothesis. Total scores on the BDI, BAI and EAT were not normally distributed and so differences were examined using the Mann Whitney U test. Chi squared was used to examine the difference in distribution of binge eating and restrained eating.

1.1.4.1 Restrained eaters will be more likely to experience depression than unrestrained eaters.

Restrained eaters (n=76) scored significantly higher on the BDI (M=12.86, median=10.0, SD=10.56) than unrestrained eaters (n=27, M=7.33, median=4.0, SD=8.41), (U=635.00,

$p<0.05$). In fact, the mean score of restrained eating group was very close to the cut off point of 13 for clinical levels of depression.

1.1.4.2 Restrained eaters will be more likely to experience anxiety than unrestrained eaters.

Restrained eaters (n=85) scored higher on the BAI (M=9.36, median=7.0, SD=9.75) than unrestrained eaters (n=28, M=6.36, median=4.0, SD=6.07). The mean score in restrained eaters was above the cut off point for clinical anxiety. However this difference was not significant (U=986.50, ns).

1.1.4.3 Restrained eaters will be more likely to experience symptoms and concerns characteristic of eating disorders than unrestrained eaters.

Restrained eaters (n=85) scored significantly higher on the eating attitudes test (M=15.21, median=13, SD=10.29) than unrestrained eaters (M=7.89, median=5, SD=7.75) (U=622.00, $p<0.001$).

1.1.4.4 Restrained Eaters will be more likely to report maladaptive eating behaviour than unrestrained eaters.

Significantly more restrained eaters reported binge eating in the last six months (n=34, 44.7%) than unrestrained eaters (n=2, 7.4%), (χ^2=12.21, df=1, $p<0.001$). The numbers of dieters reporting purging behaviour in the last six months were too small to use comparative statistics.

In summary restrained eaters showed significantly higher levels of depression, more symptoms and concerns characteristic of eating disorder and reported more binge eating in the last six months than unrestrained eaters.

3.1.5 Hypothesis Four

Scores on measures of eating dysfunction and emotional distress will not differentiate between cravers and non cravers.

A series of specific predictions were examined to test this hypothesis. Total scores on the BDI, BAI and EAT were not normally distributed and so differences were examined using the Mann Whitney U test. In addition Fishers exact test was used to examine differences in distribution of reports of binge eating between cravers and non cravers. This was used in preference to a Chi squared test as cell numbers did not meet statistical requirements for Chi squared.

1.1.5.1 There will not be significantly more cravers with eating disturbance than non cravers with eating disturbance.

Cravers (n=109) scores on the EAT (M=12.92, median=10, SD=10.03) were similar to non cravers scores on the EAT (n=15, M=11.73, median=13, SD=10.61). This difference was not significant (U=731.00, ns).

1.1.5.2 Clinical levels of depression will not differentiate between cravers and non cravers.

Cravers (n=101) and non cravers (n=13) gained similar total scores on the BDI, (cravers: M=10.79, median=9.0 SD=9.88; non cravers: M=9.92, median=6.0, SD=12.16). Differences were not found to be significant (U=541.00, ns).

1.1.5.3 Clinical levels of anxiety will not differentiate between cravers and non cravers.

Total scores on the BAI were found to be similar between cravers (n=109, M=8.43, median=6.0, S.D.=9.03) and non cravers (n=15, M=6.53, median=4.0, SD=7.85). Differences were not found to be significant (U=691.00, ns).

1.1.5.4 Maladaptive eating behaviour will not differentiate between cravers and non cravers.

Binge eating in the last six months was reported by 36.6% (n=37) of cravers compared to 7.7% (1) of non cravers. This difference was not found to be significant (Fisher's exact test, ns). The numbers of dieters reporting purging behaviour in the last six months were too small to compare.

Consequently no significant difference was found between cravers and non cravers on measures of eating dysfunction and emotional distress.

3.1.6 Hypothesis Five

Food craving dieters' ratings on dimensions of craving will be associated with measures of distress and eating dysfunction.

Two specific predictions were used to test this hypothesis. Ratings on dimensions of cravings, were not found to be normally distributed, hence Spearman's rho correlations were used to look for associations between dimension ratings and BDI, BAI, EAT and RS scores. In addition the Mann Whitney U test was used to compare belief ratings in bingers and non bingers. A Bonferroni correction was used as multiple correlations were completed. As a result the significance level was adjusted to 0.004. Tables 8 and 9 summarise these results.

1.1.6.1 Beliefs about cravings will be associated with measures of distress (BDI and BAI scores).

Scores on the BDI showed moderately significant correlations with ratings that the craving experience is related to feeling depressed ($r=0.54$, $p<0.001$), feeling angry ($r=0.54$, $p<0.001$), feeling ashamed ($r=0.49$, $p<0.001$) and ratings that cravings interfere with life

(r=0.40, p<0.001). Significant correlations were also found between BDI scores and ratings of the distressing nature of the craving experience (r=0.38, p<0.001), ratings that cravings are controllable (r=-0.33, p<0.001), ratings that cravings are related to feeling anxious (r=0.39, p<0.001) and to feeling guilty (r=0.38, p<0.001). The latter correlations were found to be of low strength

Table 8 Correlations of Craving Dimensions with Distress and Dysfunctional Eating Behaviour.

Craving Dimensions	BDI	BAI	EAT	RS
	Rho	Rho	Rho	Rho
Unpleasant	0.20	0.31**	0.23	1.00**
Intrusive	0.19	0.17	0.26	0.40**
Controllable	-0.33**	-0.12	-0.33**	-0.31**
Tolerable	-0.27	-0.01	-0.31**	-0.29**
Distressing	0.38**	0.37**	0.36**	0.57**
Interfere with life	0.40**	0.38**	0.33**	0.57**
Difficult to resist	0.29	0.19	0.29	0.50**
Makes feel anxious	0.39**	0.44**	0.30**	0.49**
Makes feel depressed	0.54**	0.44**	0.33**	0.57**
Makes feel angry	0.54**	0.37**	0.26	0.52**
Makes feel ashamed	0.49**	0.30**	0.21	0.48**
Makes feel guilty	0.38**	0.20	0.25	0.43**

Note: The significance level was adjusted to p<0.004, **= significant correlation

BAI= Beck Anxiety Inventory (Beck, Epstein, Brown and Steer, 1988)
BDI= Beck Depression Inventory II (Beck, Steer and Brown, 1996)
EAT= Eating Attitudes Test- 26 (Garner & Garfinkel, 1979, 1982)
RS= The Restraint Scale (Polivy, Herman & Warsh, 1978)

Similarly, BAI scores correlated significantly with ratings about the unpleasant nature of the craving experience (r=0.31, p<0.005), the distressing nature of the craving experience (r=0.37, p<0.001), ratings about the craving experience interfering with life (r=0.38,

p<0.001), ratings that cravings are related to anxiety (r=0.44, p<0.001), depression (r=0.44, p<0.001), anger (r=0.37, p<0.001) and shame (r=0.30, p<0.005).

Table 9 Statistical Tests of Difference in Ratings between Dieters who Reported Binge Eating in the Past Six Months (n=36) and Dieters not Reporting Binge Eating in the Last Six Months (n=71)

Craving Dimensions	Binged with in the past six months		
	Yes (n=36)	No (n=71)	U
	M(median) SD	M(median) SD	
Unpleasant	33.61(20.00) 31.55	24.30(20.00) 26.46	1052.50
Intrusive	48.33(40.00) 34.76	31.83(20.00) 30.10	903.00
Controllable	42.00(45.00) 29.76	58.89(70.00) 30.98	873.50
Tolerable	45.08(40.00) 29.76	54.44(60.00) 31.58	1045.00
Distressing	31.86(30.00) 30.61	24.37(10.00) 29.49	1079.00
Interfere with life	30.86(30.00) 30.61	18.87(10.00) 25.15	951.50
Difficult to resist	53.49(50.00) 26.43	34.93(30.00) 27.51	826.50**
Makes feel anxious	37.24(30.00) 29.74	21.06(10.00)24.48	887.50
Makes feel depressed	39.44(35.00) 31.98	19.44(10.00) 23.05	802.00**
Makes feel angry	30.94(20.00) 29.59	12.75(10.00) 19.67	739.50**
Makes feel ashamed	36.11(35.00) 34.25	13.24(0) 20.60	772.50**
Makes feel guilty	43.61(40.00) 35.79	22.46(10.00) 28.38	839.50**

Note: The significance level was adjusted to p<0.004, **= significant correlation

1.1.6.2 Beliefs about cravings will be associated with a vulnerability to eating disorders or maladaptive eating behaviour.

EAT scores correlated significantly with ratings of the distressing nature of the craving experience (r=0.36, p<0.001), ratings of the controllable nature of cravings (r=-0.33, p<0.001), ratings of the tolerable nature of cravings (r=0.29, p<0.005), ratings that

cravings interfere with life ($r=0.33$, $p<0.001$), ratings that cravings are related to anxiety ($r=0.30$, $p<0.005$) and depression ($r=0.33$, $p<0.001$).

Dieters reporting binge eating in the last six months ($n=36$) were found to rate cravings as significantly more difficult to resist ($U=826.50$, $p<0.001$), related to depression ($U=802.00$, $p<0.001$), related to shame ($U=772.50$, $p<0.001$), related to guilt ($U=839.50$, $p<0.004$) and related to anger ($p<0.001$) than dieters not reporting binge eating in the last six months. The numbers of dieters reporting purging behaviour in the last six months were too small to use comparative statistics and so could not be compared.

3.1.7 Hypothesis Six

Dieters with a vulnerability to eating disorders, maladaptive eating behaviour and emotional distress will show differences in thought control strategies compared to dieters without difficulties.

A series of specific predictions were examined to test this hypothesis. The thought control questionnaire provides a mean score for each category of thought control strategy. T-tests were used to examine differences between mean scores on the thought control strategies of distraction, social control, reappraisal and the thought control total score. Mean scores on the worry and punishment subscales, were not found to be normally distributed and so the Mann-Whitney U test was used. A Bonferroni correction was used and as a result the significance level was adjusted to 0.01. Tables 10 and 11 summarise the results.

3.9.1 Dieters with symptoms and concerns characteristic of eating disorders will show differences in thought control processes compared to dieters without eating disturbance.

Dieters with symptoms and concerns characteristic of eating disorders (n=26, 21.85%) were not found to report using significantly different strategies of thought control than dieters without a vulnerability to eating disorders (n=93, 78.15%).

Table 10 T-tests of Difference Comparing Mean Values on Normally Distributed TCQ Subscales and Measures of Distress and Dysfunctional Eating Behaviour.

TCQ Subscale	EAT	Binge Eating	RS	BAI	BDI
	t	t	T	T	t
Distraction	-0.35	1.39	0.21	0.44	0.58
Social Control	-0.16	-1.66	0.00	0.46	0.37
Reappraisal	-1.28	-1.40	2.78	-1.783	-2.00
Total Score	-1.48	-0.29	1.11	-2.82**	-3.06**

Note: The significance level was adjusted to $p<0.01$, **= significant correlation

TCQ= Thought Control Questionnaire (Wells & Davies, 1994)
BAI= Beck Anxiety Inventory (Beck, Epstein, Brown and Steer, 1988)
BDI= Beck Depression Inventory II (Beck, Steer and Brown, 1996)
EAT= Eating Attitudes Test- 26 (Garner & Garfinkel, 1979, 1982)
RS= The Restraint Scale (Polivy, Herman & Warsh, 1978)

3.9.2 Dieters with maladaptive eating behaviours will show differences in thought control processes compared to dieters without maladaptive eating behaviour.

Dieters reporting binge eating in the last six months (n=40, 34.5%) were not found to use significantly different strategies of thought control than dieters not reporting binge eating in the last six months (n=38, 34.5%). The numbers of dieters reporting purging behaviour in the last six months were too small to compare.

Table 11 Mann Whitney U Tests of Difference Comparing Mean Ranks of Non Normally Distributed TCQ Subscales and Measures of Distress and Dysfunctional Eating Behaviour.

TCQ Subscale	EAT	Binge Eating	RS	BAI	BDI
	U	U	U	U	U
Worry	832.5	1005.5	955.5	1200.0	569.0**
Punishment	853.5	1085.0	776.0	1265.0	626.0**

Note: The significance level was adjusted to $p<0.01$, **= significant correlation

TCQ= Thought Control Questionnaire (Wells & Davies, 1994)
BAI= Beck Anxiety Inventory (Beck, Epstein, Brown and Steer, 1988)
BDI= Beck Depression Inventory II (Beck, Steer and Brown, 1996)
EAT= Eating Attitudes Test- 26 (Garner & Garfinkel, 1979, 1982)
RS= The Restraint Scale (Polivy, Herman & Warsh, 1978)

3.9.4 Thought control processes associated with "worry" and "punishment" will be related to emotional distress (anxiety, depression)

Dieters with depression (n=28, 25.69%) reported more use of the thought control strategies: worry ($U=569.0$, $p<0.001$) and punishment ($U=626.0$, $p<0.001$) than dieters without depression (n=81, 73.34%). The total score on the thought control questionnaire was also significantly higher in depressed dieters ($U=-3.06$, $p<0.005$) than non-depressed dieters.

In dieters with clinical levels of anxiety (n=50, 40.2%) the total score on the thought control questionnaire was significantly higher ($U=-2.82$, $p<0.01$) than in dieters without anxiety (n=69, 57.9%). Individual thought control strategies were not found to be significantly different between anxious and non anxious dieters.

In summary only the depressed and non depressed groups of dieters showed differences in individual thought control strategies, with worry and punishment found to be significantly higher in depressed dieters. The total score on the thought control questionnaire was

significantly higher in depressed and anxious dieters but no different in dieters with symptoms and concerns characteristic of eating disorders or dieters reporting binge eating. However as this analysis focused on elective cut off points rather than total scores a second analysis was conducted using Spearman's rho correlations which compared the total scores on the BDI, BAI, EAT and RS with mean scores on the thought control questionnaire subscales and total score. Table 12 summarises the results.

Table 12 Spearman's rho Correlations between Thought Control Strategies and Measures of Distress and Dysfunctional Eating Behaviour.

TCQ Subscale	**EAT**	**BDI**	**BAI**	**RS**
	rho	Rho	rho	Rho
Distraction	0.12	-0.04	0.12	0.00
Social Control	0.04	-0.05	0.11	0.03
Worry	0.26**	0.42**	0.29**	0.1
Punishment	0.30**	0.31**	0.27**	0.25**
Reappraisal	0.24	0.19	0.24**	0.17
Total Score	0.30**	0.22	0.30**	0.15

Note: The significance level was adjusted to $p<0.01$, **= significant correlation

TCQ= Thought Control Questionnaire (Wells & Davies, 1995)
BAI= Beck Anxiety Inventory (Beck, Epstein, Brown and Steer, 1988)
BDI= Beck Depression Inventory II (Beck, Steer and Brown, 1996)
EAT= Eating Attitudes Test- 26 (Garner & Garfinkel, 1979, 1982)
RS= The Restraint Scale (Polivy, Herman & Warsh, 1978)

This additional analysis shows that use of the strategies of worry and punishment is significantly associated with total scores on the EAT, BDI and BAI. In addition increased use of the strategy of reappraisal is associated with a higher score on the BAI and higher total scores on the thought control questionnaire are associated with higher scores on the EAT and BAI.

3.1.8 Hypothesis 7

Body mass index, social desirability and ideal actual weight discrepancies will not moderate the above relationships

Body mass index scores, social desirability scores and actual ideal weight discrepancies were correlated with total scores on the BDI, BAI, EAT, RS, thought control strategy categories and total score and ratings of beliefs about craving thoughts. BMI and SDS scores were found to be normally distributed, whereas ideal-actual weight discrepancy scores were not normally distributed. Correlations of data were examined using Spearman's Rho as the majority of the data was non-parametric. In addition a t-test was used to compare the difference between SDS and BMI scores of dieters reporting binge eating and dieters not reporting binge eating. A Mann Whitney U test was used to compare actual ideal weight discrepancy scores with dieters' reports of binge eating. The numbers of dieters reporting purging behaviour in the last six months were too small to compare. Appendices VII and VIII summarise this information.

BMI and actual current weight discrepancies were not significantly correlated with scores on any of the measures listed above. Furthermore no significant difference was found between BMI scores or actual ideal weight discrepancies in dieters reporting binge eating and dieters not reporting binge eating. However social desirability was found to be significantly related to scores on the BDI ($r_s=0.21$, $p<0.05$), the BAI ($r=-0.24$, $p<0.01$), the RS ($r=-0.23$, $p<0.05$), the social control subscale of the TCQ ($r=-0.21$, $p<0.05$) and ratings of the unpleasant experience of craving ($r=-0.28$, $p<0.005$), the intrusive nature of cravings ($r=-0.20$, $p<0.05$), that the craving experiences is associated with anxiety ($r=-0.21$, $p<0.05$), anger ($r=-0.273$, $p<0.005$) and shame ($r=-0.19$, $p<0.05$). In addition dieters reporting binge eating had significantly lower scores on the SDS ($t=2.02$, $df=103$, $p<0.05$).

3.2 STUDY TWO

Appendix IX presents an overview of the characteristics of the sample in study 2 (n=10). Generally mean scores on measures of distress and eating dysfunction were higher in this group than mean scores on the same measures in study one.

3.2.1 Elicitation of the Craving Experience

All participants were able to easily recall a recent craving experience. In nine of the ten, the cravings had occurred in the week prior to being interviewed and cravings were described as lasting from 5 minutes to 2 days. All of the cravings described were for specific food, including chocolate or chocolate cake (n=8, 80%), chips (n=1, 10%) and crisps (n=1, 10%). Nine of the women described eating the craved for food as a result of the craving, in most cases this was after a process of initially trying to resist eating. The remaining participant described eating a healthier alternative to the craved for food. It was reported that the craving, was satisfied by consumption in 7 participants.

3.2.2 Description of the Craving Experience

Table 13 provides a summary of the descriptors of craving, beliefs about craving, beliefs about self and control strategies. Beliefs and descriptors are reported in participants own words.

All participants described the craving experience as unpleasant. However further descriptors varied greatly, from more mildly negative comments such as being like "a real desire" and being "unable to settle" to extreme negative comments such as "it is crucifying" and "a form of torture". The ambivalent nature of craving was also described by participants, for example "I feel like a naughty child in a sweet shop" or in relation to eating after craving "it is like depression and elation in the same mouthful". Generally descriptors centered on:-

Table 13 Descriptors of Craving, Beliefs about Craving, beliefs about Self and Control Strategies in Dieters

Code	Description of Craving Experience	Beliefs about Cravings	Beliefs about self	Strategies for control/ allowing self to eat
110	Unpleasant, guilt feel like something missing can become obsessive imagine self eating	Not going to be satisfied unless eat Out of my control Think it's a biological reaction can't do anything about it If eat will feel better	I have failed myself I am less of a person I am weak, pathetic stupid	Think you can't have it Be hard on myself Think if resist this you'll be able to have something else later
089	Unpleasant Like an mania Disappointment with self Feel hard done by	Out of control If I eat it proves I don't care about myself It is self destructive It is not fair	I am weak I am a bad person I am a pig I am stupid	Try and remove self from food Try and fool self Thinking it is not fair that some people can eat what they want
030	Unpleasant A real desire	It will pass it is controllable	I am confident	Think of success on diet, being thin, fitting into size 12jeans Doing something else
064	Unpleasant Like an addiction Stops whatever I'm doing Makes me nervous, guilty	Out of control Needs attending to straight away I can't seem to deny myself	I am greedy I am worthless I am a failure	Use friend to control Eat a small amount of craved food immediately
023	Unpleasant Constantly on mind An argument in my head	Needs to be controlled It is weak to crave	I am worthless I am lazy I am weak	Do something else Be around people Think of self as really fat Think want to look good
119	Unpleasant Physical feeling in stomach Can taste it	Is out of control I know I'll eat it eventually I am empty, lost, lonely	I am unattractive I am undesirable	Think I don't care Think I am I am nice & someone will want me anyway –doesn't work because don't believe it

125	Unpleasant, frantic Like someone else has put the thought in your head Not a conscious thing Imagining food Makes feel anxious, fighting with self	I am not in control letting myself or others down If I crave I have to battle with myself	I am weak I am a failure	Go to bed and sleep Eat something else Being around other people
129	Unpleasant Like an achy back Occurs when anxious Feel desperate	Needs to be controlled I have let myself down I shouldn't even be thinking that I shouldn't want that food I don't deserve to eat it	I am undeserving I am no good	Think of the costs of eating (both weight and money) Think I don't deserve it If eat don't eat as much nextday Buy something new
106	Oral based - Need to have something in mouth Fidgety, can't settle Unpleasant	Craving is a rebellion (against Mum) Craving is a way of being in control I know I shouldn't do this but I'm bloody well going to It is OK to crave	I am stuborn I am greedy I am clever	Plan ahead, have a routine Eat healthy alternative/ or indulge a little bit Being at weight watchers Reminder of health reasons Think of success, look in mirror
159	Unpleasant Absolutely overwhelming Feel like a child in a sweet shop Desperation, real need It is a form of torture but I want to be tortured It is crucifying	It is like something forbidden Not in control, not being able to the effect it has on your body Something I shouldn't do If I eat it will make me feel wonderful Associate it with love and closeness I am helpless/powerless to cravings I should be able to control it It is like a form of rebellion If I had the control other people do Everything would be alright Feel as if I'm being punished	I am weak I am disgusting I am needy I will not be respected I am a victim I am stupid/useless I am fat, ugly and horrible I am greedy	Being on a diet Think about how I'll look Say I have a choice Talk to people about it Get support and encouragement Eat fruit

- **Affect associated with the craving**, e.g. "it makes me nervous", "it happens when I am anxious".
- **Issues related to control**, e.g. "it is like a mania", "it is absolutely overwhelming", "it is like someone else put the thoughts into your head, they don't feel like my thoughts".
- **The taste and consumption of the craved for food**, e.g. "I imagine myself eating the chocolate", "I know how good it is going to taste".
- **Relationship to self**, e.g. "I feel disappointed with myself", "I feel hard done by".

3.2.3 Beliefs about Cravings

In a similar way to the descriptors of craving, beliefs about craving were predominantly negative and focused on the personal appraisal of the craving experience. There was one exception to this, where a participant's beliefs about cravings were generally neutral e.g. "I know it will pass". Overall beliefs about cravings concentrated on:-

- **Negative self-inference**, e.g. "it feels as if I am being punished" "it is self destructive", "it is a weakness".
- **Control**, e.g. "I am not in control of my cravings", "cravings need to be controlled", "a craving is controllable".
- **Rebellion**, e.g. "I know I shouldn't do this but I'm bloody well going to", "it's like a form of rebellion".
- **Others**, e.g. "if I eat I will feel better", "it is a biological reaction".

3.2.4 Beliefs about Self

In 8 of the participants beliefs about self were negative and predominantly unconditional. They generally focused on beliefs about:-

- **Attractiveness**, e.g. "I am fat and ugly", "I am undesirable", "I am unattractive"
- **Weakness**, "I am weak", "I am a victim"
- **Failure**, "I am a failure", "I am greedy", "I am lazy"

- **Worthlessness** e.g. "I am undeserving", "I am no good", "I am useless"

Predominantly positive self beliefs were elicited in two participants including "I am clever" and "I am confident".

3.2.5 Control Strategies

Control strategies described by participants were both cognitive and behavioural.

Behavioural strategies included:-

- **Distraction**, e.g. "go and do something else", "going to bed", "try and remove myself from food"
- **Social**, e.g. "being around other people", "talk to people about the craving"
- **Regulated Eating**, e.g. "indulge a little bit", "eat fruit"

Cognitive Strategies included:-

- **Punishment**, e.g. "think of myself as really fat", "think I don't deserve it"
- **Neutralise the thought** e.g. "think I don't care", "think I am nice and someone will want me anyway"
- **Positive thinking**, e.g. "think about how successful my diet has been", "imagine fitting into size 12 jeans"

3.2.6 The Relationship between Experience, Beliefs and Control Strategies

A relationship can be observed between descriptions of the experience of craving, beliefs about craving, beliefs about self and the control strategies used to regulate the craving experience. For example participant 030 describes a relatively mild experience of craving, beliefs that the craving is controllable and will pass if left. Her beliefs about herself were

positive and positive cognitive strategies were described to regulate the cravings. In contrast participant 089 describes an extremely negative experience of craving. She described negative beliefs about the cravings being out of her control and being self destructive. Similarly negative self beliefs were also described including that she was weak and a bad person. Furthermore control strategies also included negative punishing thoughts and restriction.

3.2.7 Summary

In the majority of the interviewed sample the descriptors of the craving experience and beliefs about cravings and self were negative. A relationship can be seen between the experience of craving, beliefs about craving and self and the control strategies used to regulate the craving experience.

4 DISCUSSION

Cravings are subjective cognitive experiences that represent a primary motivational process in behaviour. However as described in the introduction the emotional and behavioural response to craving can differ widely and food cravings can sometimes play an important role in the distress and binge eating behaviour of eating disordered populations. Recent developments in cognitive theory have emphasised the role of appraisal and thought control in emotional disorder and in light of this a cognitive behavioural conceptualisation of craving was proposed. This suggests that craving thoughts per se are an innocuous cognitive phenomenon not associated with either emotional distress or a lack of behavioural control. Rather the way in which craving thoughts are appraised and dealt with will have an important influence on the emotional and behavioural response to the craving. However existing models of craving have not fully addressed the experience of craving in this light. It is felt that further understanding of these processes and their association with dysfunctional eating behaviour and emotional distress could have direct clinical relevance to existing treatments of eating disorder.

4.1 SUMMARY OF RESULTS

The majority of dieters in the current sample reported experiencing food craving. However the frequency, strength and experience of the craving varied considerably between dieters. In particular the degree of dietary restraint was found to be significantly associated with how the craving was experienced. Restrained eaters were found to experience stronger and more frequent cravings, which if unable to be satisfied are associated with anxiety and discomfort. Furthermore restrained eaters were found to have higher levels of depression, more symptoms and concerns characteristic of eating disorders and were more likely to report binge eating in the last six months.

The experience of food craving itself, was not found to be associated with measures of emotional distress (BDI, BAI) or eating disturbance (EAT, binge eating). However ratings on dimensions of the negative experience of craving and negative affect associated with

craving were found to be associated with both emotional distress and dysfunctional eating behaviour. Furthermore the thought control strategies of worry and punishment were found to be associated with higher scores on the EAT, BDI and BAI, punishment was associated with higher scores on the RS and reappraisal was additionally associated with higher scores on the BAI. Body mass index and ideal current weight discrepancy were not found to be related to scores on any measures including BDI, BAI, EAT, maladaptive eating behaviour, craving, RS, metacognitive dimensions of craving and reports of binge eating, suggesting that they did not moderate any of the relationships found in the study. However higher scores on the social desirability scale were found to be significantly associated with lower scores on the BDI, the BAI, the RS, the social control subscale of the TCQ and lower ratings of cravings as unpleasant, intrusive, related to anxiety, related to depression, related to feeling angry and related to feeling ashamed. Furthermore dieters reporting binge eating were found to have significantly lower scores on the social desirability scale. This suggests that social desirability may confound reporting of depression, anxiety, dietary restraint, social control, binge eating and ratings of specific dimensions of cravings.

In addition, study two provided a more specific understanding of the role individual beliefs play in defining the craving experience and the control strategies used. In particular a link was seen between beliefs about self, beliefs about craving, the experience of the craving and the control strategies used.

4.2 INTERPRETATION OF FINDINGS

4.2.1 The Experience of Craving in Dieters

In the current study the majority of dieters (n=110, 88%) reported experiencing food cravings. This figure is similar to frequencies of craving found in other studies. It falls between Weingarten and Elston's (1991) finding that 97% of women in a normal population reported experiencing food cravings and Gendall et al's (1998a) finding that 52% of a general population sample experienced craving.

As discussed previously, measurement of craving is frequently highlighted as an area of weakness of research in this area (e.g. Toneatto, 1999). Indeed, use of the term craving itself is a contentious issue in the literature (e.g. Kozlowski and Wilkinson, 1987). The current study used a recently designed and fairly rigorous method of measuring craving, which aimed to allow for varied understanding of the concept and avoid an initial emotive response to the term craving (Gendall et al, 1997a). Previous research has frequently relied on a single definition of craving (Weingarten and Elston, 1991; Hill, Weaver and Blundell, 1991). Consequently the lower figure than that found in Weingarten and Elston's (1991) research may reflect this difference in measurement.

The literature, in particular Tiffany's (1992) model of drug craving, suggests that dieters will be more likely than non dieters to experience cravings. In this model cravings are described as occurring when the usual stimuli for certain behaviour are resisted and so action schemata are impeded. Dieters, especially those with a high degree of dietary restraint will have reduced their usual food intake in an effort to lose weight. Thus they will be resisting the usual stimuli for food and so be more likely to experience food cravings. This would explain why the current study found a higher rate of food craving than that found in Gendall et al's (1998a) research, when the same measurement was used.

Indeed, the current study did find that a significantly higher proportion of restrained eaters experienced food cravings than unrestrained eaters. Furthermore restrained eaters were found to have stronger and more frequent cravings than unrestrained eaters, and were significantly more likely to experience accompanying discomfort and anxiety if the craved for food was unavailable.

In addition to Tiffany's model (1992), the biological models of craving (Weingarten and Elston, 1990) together with restraint theory (Herman and Polivy, 1984) describe food craving as resulting from the biological, psychological and sensory deficits associated with food restriction. As described the function of the food craving is then viewed as a

mechanism to correct this deficit by encouraging ingestion of the craved substance. This has been supported by previous research (Gendall et al, 1998b, Gendall et al 1999, Striegel-Moore, Silberstein and Rodin, 1986). Hence, in these models food craving is thought to increase with dietary restraint and the results of the current study are consistent with this view. However, as described the research in this area is inconsistent and several studies have found no link between food craving and dietary restraint (Weingarten and Elston, 1991, Rodin et al, 1991), while still others have found no increased likelihood of craving occurring with increased dietary restraint but found increased intensity (Hill, Weaver and Blundell, 1991; Gendall et al, 1997a) and frequency (Gendall et al, 1997a) of craving in relation to dietary restraint.

To a certain degree, inconsistencies between research findings may be influenced by differences in the measurement of both dietary restraint and food craving. In particular measurement of dietary restraint can vary considerably. The restraint scale used in the current research is largely a measure of unsuccessful dieting, which is characterised by severe dietary restraint, a subsequent tendency towards disinhibition and weight fluctuations (Laessle et al, 1989). However in Weingarten and Elston's (1991) research, dietary restraint referred only to current dieting status. Furthermore Hill, Weaver and Blundell (1991) used the Dutch eating behaviour questionnaire (Van Strien et al, 1986) and the three factor eating questionnaire (Stunkard and Messick, 1985) to measure dietary restraint. These measures have been described as representing more successful aspects of dieting behaviour (Laessle et al, 1989). It may be that unsuccessful dieting characterised by restraint, disinhibition and weight fluctuation is associated with increased biological, psychological and sensory deficit which increases food craving, whereas successful calorific restriction may not have the same effect. However Rodin et al's (1991) research did use the restraint scale (Polivy et al, 1978) and also found no association between craving and dietary restraint.

Taken together the results of the current study and previous research suggest that the experience of food craving is commonplace in both the general population and in dieters and the experience may be somewhat increased by dieting or dietary restraint.

4.2.2 Craving and Vulnerability to Emotional Distress and Eating Disorders

In the current study no measures of emotional distress or eating dysfunction were found to differentiate between cravers and non cravers, which suggests that the experience of craving per se is not associated with clinical symptomatology.

This finding is in accordance with previous literature, which has found food craving in a non clinical population to be a commonplace experience (Weingarten and Elston, 1991), viewed by the majority of subjects as "merely curious or irritating episodes", rather than being associated with "obvious abnormalities of either physiological or psychological state" (Hill and Heaton-Brown, 1994). As described, it has been demonstrated that the affective response to food cravings in eating disordered populations is clearly different from non clinical populations. In eating disordered populations, craving has been linked to emotional distress and eating disturbance (Gendall et al, 1997a; Waters, Hill and Waller, in press a). Little research has been conducted looking at the experience of craving in dieting populations. However the majority of dieters do not go on to develop eating disorders (Wilson 1993) and so it would not be expected that eating disturbance and emotional distress would be significantly different in dieters who experience cravings than in dieters who do not experience cravings. The current research suggests that this is the case. Hence even when the usual intake of food is restricted, the experience of craving per se does not cause distress or eating disturbance.

Restrained eaters, however were found to experience higher levels of depression, more symptoms and concerns characteristic of eating disorders and were more likely to report binge eating than unrestrained eaters. Anxiety levels although higher in the restrained eating group were not significantly different. These results are also consistent with

previous research in this area. High scores on the restraint scale have consistently been linked with increased levels of binge eating in the literature (e.g. Gendall et al, 1998b; Greenberg, 1986; Herman and Polivy, 1984). Furthermore restrained eating has been associated with higher levels of depression (Hickford et al, 1997) emotional instability and symptoms and concerns characteristic of eating disorders (Stice et al, 1997).

4.2.3 Metacognitive Dimensions of Craving

As described, the current study, consistent with past research, has found that the experience of food craving is relatively commonplace and not in itself associated with eating disturbance or emotional distress. Recent advances in cognitive theory have emphasised the role of appraisal and thought control strategies in emotional distress, with the self regulatory executive functioning model (Wells and Matthews, 1994, 1996) providing a framework for understanding this. In this model, the appraisal of cognitions, such as craving thoughts, influences the emotional, behavioural and cognitive response to the thought. In particular the negative appraisal of thought is associated with subsequent attempts at thought control (Wells, 1995). However thought control is frequently found to be unsuccessful and is itself associated with a lack of control over thoughts and a subsequent lack of behavioural control. This therefore suggests that the negative appraisal and subsequent control of craving thoughts will be associated with emotional distress and a lack of behavioural control e.g. binge eating.

4.2.3.1 Appraisal of Craving Thoughts

In the current study the mean ratings of all dimensions describing a negative experience of craving or associated negative affect were higher for dieters with symptoms and concerns characteristic of eating disorders, depression, anxiety, restrained eating and binge eating than the mean scores of dieters without difficulties. Similarly, mean ratings of the craving experience as tolerable and controllable were lower for dieters with symptoms and concerns characteristic of eating disorders, depression, anxiety, restrained eating and binge eating than the mean scores of dieters without difficulties. This suggests that dieters with

emotional distress and dysfunctional eating behaviour generally appraised craving thoughts as more negative, than those dieters without difficulties.

A proportion of these differences were found to be statistically significant. In particular dimensions of craving were in general most strongly correlated with scores on the restraint scale. The unpleasant nature of the craving experience was very highly correlated with scores on the restraint scale. In addition the distressing nature of the craving experience, that cravings interfere with their life and that cravings are associated with depression, were modestly correlated with scores on the RS. The dimensions describing the association of negative affect with the craving experience were most strongly correlated with scores on the BDI and BAI and were found to differentiate most significantly between bingers and non bingers. Scores on the BAI were most significantly but modestly associated with ratings that craving thoughts made them feel anxious and depressed. Scores on the BDI were most significantly but modestly correlated with ratings that the craving experience was related to depression, anger and shame. Similarly these same dimensions most significantly differentiated between bingers and non bingers. Surprisingly, correlations with the EAT were of the lowest strength and were most significantly associated with the distressing nature of the craving, the uncontrollable nature of the craving and that the craving experience was related to depression.

Consequently, negative dimensions of the craving experience and associated negative affect are related to all measures of eating dysfunction and emotional distress. However, due to the lack of clear differentiation between correlations and the high degree of intercorrelation between dimensions, conclusions about the specific meaning of individual appraisals could not be drawn. As discussed below the use of multivariate statistical analysis or greater differentiation between groups may have lead to stronger conclusions but this was not possible in the current study. The significant correlation between scores on the social desirability scale and ratings of the unpleasant and intrusive nature of the craving experience, together with ratings that cravings are related to anxiety, anger and shame, suggests that social desirability is potentially confounding scores on ratings of

these dimensions. This may mean that significance levels in analysis involving these variables will be under represented. Previous research has similarly found social desirability to confound reports of emotional eating (Allison and Heska, 1993).

Previous research has found a variety of negative appraisal dimensions to be important predictors of the uncontrollability of obsessional intrusive thoughts (Purdon and Clarke 1994a, 1994b), anxious and depressive thoughts (Papageorgiou and Wells, 1999) and thoughts in generalised anxiety disorder (Wells and Carter, 1999). However there is considerable disagreement about which appraisals are most salient to the persistence of unwanted intrusions (Purdon and Clarke 1994b). Similar research has not been conducted on craving thoughts or thoughts of food in eating disorders. However Rachman (1993) contends, that when thoughts are ascribed intense personal meaning, the thought will no longer be readily dismissable. The results of the current study suggest that increased negative meaning is attributed to craving thoughts in groups with disordered eating behaviour and emotional distress. Hence craving thoughts in these groups are likely to be ascribed greater threat, cause increased distress and be subject to greater attempts at thought control.

4.2.3.2 Thought Control

Correlational analysis showed that the thought control strategies of worry and punishment were found to be significantly associated with higher scores on the EAT, the BDI and the BAI and punishment was found to be associated with higher scores on the restraint scale. In addition the strategy of reappraisal was significantly associated with higher scores on the BAI and total scores on the thought control questionnaire were associated with higher scores on the EAT and BAI. However these correlations were all at a low level, except the correlation between depression and worry which was of modest significance.

The results found in the current study are consistent with results from other research using the thought control questionnaire, where the strategies of worry and punishment have

invariably been linked with emotional distress and clinical symptomatology (Wells and Davis, 1994; Warda and Bryant, 1998; Amir, Cashman and Foa, 1997). As a result of previous research it was predicted that depression and anxiety would be linked to the strategies of worry and punishment. However, in addition the current research has found an association between the strategies of worry and punishment and total score on the thought control questionnaire and an increased vulnerability to eating disorders. Higher scores on the restraint scale were also associated with the punishment strategy.

As described previously, thoughts appraised as unwanted or unpleasant are frequently subjected to thought control (Wells and Davis, 1994). Thought control requires the manipulation of attentional focus away from the distressing thought and as described is a function of the S-REF (Wells and Matthews, 1994). However it is these attempts at mental control themselves which set processes in motion, which lead to the failure of mental control (Wegner and Pennebaker, 1993). In particular thought control is associated with "rebound effects", meaning that the likelihood of further intrusion is increased. This subsequent failure of thought control can lead to further distress as it can often confirm existing negative beliefs. Furthermore thought control may prevent the disconfirmation of maladaptive beliefs. Worry as a strategy of thought control focuses on replacing the current distressing thought with other worries or more minor negative thoughts. The use of worry as a maladaptive strategy is well described in the literature (e.g. Wells and Matthews, 1994; Roemer and Borkovec, 1993; Wells, 1995) and there is specific evidence that worry may increase the frequency of subsequent intrusions concerning the stressor (Wells and Papageorgiou, 1998). Punishment strategies include punishing oneself for having the thought or telling oneself that something bad will happen if the thought occurs. Punishment is less well described in the literature. However, if as the strategies suggest, the thought is associated with self weakness or threat of negative events, then it is likely that these thoughts will be associated with even greater emotional distress and if reoccurring will likely be subject to even greater attempts at control and subsequently greater rebound effects.

Consistent with the findings in this study, previous research has found that individuals with eating disorders are more self punishing than those without eating disorder (Lovell and Hill, 1994). Similarly frequent worry about food and eating has also been noted in individuals with eating disorders (Smead and Richert, 1990). Furthermore worry and punishment strategies fit with the descriptions of perfectionism, low self esteem, dichotomous thinking and rigid control in eating disorders (Fairburn and Cooper, 1989), which suggest that craving thoughts will be viewed as a weakness or failure and so need to be continually monitored and punished if occurring. Similarly restrained eating as a measure of unsuccessful dieting has been shown to be associated with negative feelings about personality and behaviour (Hickford et al, 1997), a tendency towards disinhibition and weight fluctuations (Herman and Polivy, 1984). This suggests more frequent diet and weight relapses, which may be both a cause and a consequence of punishing thought control.

Contrary to expectation, dieters reporting binge eating were not found to use significantly different thought control strategies to dieters not reporting binge eating. However as the mean number of binges reported in the last six months was only 1.39, this group does not represent clinical binge eating or frequent episodes of out of control eating behaviour, which may then require or be the result of greater thought control. Again social desirability was found to confound reports of binge eating, which may also reduce the likelihood of any findings. It may be that if a group of more frequent bingers was studied significant results would be found.

The S-REF model proposes that individual appraisals of craving influence both the use of thought control and the choice of strategy used. However the current study is not able to make links between individual dimensions of craving and specific subscales of the thought control questionnaire. This is primarily because the thought control questionnaire provides a generic measure of the thought control processes individuals' employ to deal with unwanted or unpleasant thoughts rather than control strategies which are specific to

craving thoughts or thoughts about food. Furthermore appraisals are not specific to individuals and so will limit any correlations.

4.2.3.3 Indepth Exploration of the Metacognitive Dimensions of Craving

The clinical interview study was designed to provide a more specific description of the experience of craving, beliefs about craving, self beliefs and control strategies in a group of dieters who experience frequent cravings.

Descriptors of the craving experience were without exception negative and centered on affect associated with the craving, issues related to control, the taste and consumption of the craved for food and the perceived relationship of the craving to self. Secondly beliefs about craving focused on themes of negative self inference, control, rebellion and others. Beliefs about self were predominantly negative and concentrated on themes of attractiveness, weakness, failure and worthlessness. Finally participants described using both cognitive and behavioural control strategies. Behavioural strategies comprised of distraction, social control and regulated eating and cognitive strategies consisted of punishment, thought neutralising and positive thinking. However two participants expressed predominantly positive self beliefs, more neutral beliefs about craving and more positive strategies of control. A relationship could generally be observed between an individual's description of the craving experience, their beliefs about craving, their beliefs about self and their subsequent control strategies.

Considering the interviewed sample was derived from a non clinical population the degree of negative self beliefs found, was relatively high. However as has been described levels of emotional distress and dysfunctional eating behaviour were generally higher in the interviewed sample than in the study sample. The negative self beliefs found in the current study were similar in content to self beliefs found in studies of clinical samples (e.g. Cooper, Todd and Wells, 1998; Wells and Hackman, 1993). The importance of the "conjunction" of self beliefs with beliefs specific to presenting symptoms has been described by Wells and Hackman (1993) and Cooper et al (1998). In the current study the

observed link between beliefs about self, beliefs about cravings and descriptors of the craving experience further highlights this point.

Wells (1995) suggests that both the appraisal of the content of thought and the appraisal of the process of cognition contribute to emotional disorders. The findings of the current study show that both beliefs about the content of craving thoughts, for example beliefs that craving thoughts are "weak" or "self destructive", and beliefs about the process of craving, for example it is "out of my control" or "it needs attending to straight away" were elicited. Wells' model (1995) describes how differences in the appraisal of thoughts lead to different emotional, behavioural and cognitive responses to the thought and can perpetuate clinical disorders. The appraisal of cognition is described as being particularly important in conditions characterised by uncontrollable cognition (Wells, 1995). In the current sample the issue of cravings being out of control and needing to be controlled was predominant throughout the sample. This suggests that appraisal of craving thoughts will be particularly significant in this case. Furthermore thought control strategies result from specific appraisals of cognitions, in particular thoughts appraised as unwanted and unpleasant (Wells 1995) as in craving thoughts in this sample.

4.3 THEORETICAL AND CLINICAL IMPLICATIONS

The results of the current study highlight the role of appraisal and thought control in dysfunctional eating behaviour and emotional distress. As described, craving thoughts were found to be a commonplace experience and not, in themselves, associated with either dysfunctional eating behaviour or distress. However the appraisal of the craving thought and the subsequent method of thought control does appear to be associated with dysfunctional eating behaviour and emotional distress.

Wells (1995) in his metacognitive model of generalised anxiety disorder has described the development of negative beliefs and metacognition as marking the transition from non problematic worry to problematic worry. In same way the negative appraisal and

subsequent control of craving thoughts may elucidate some of the difference between normal dieters and eating disordered dieters. Existing cognitive behavioural theories of eating disorders emphasise the role of dysfunctional beliefs about food, eating, weight and shape in the development and maintenance of anorexia nervosa and bulimia nervosa (Fairburn and Cooper, 1989). The current research suggests that locating existing cognitive behavioural models in a wider information processing context may help further understanding and treatment approaches to disordered eating. Cravings can be seen as subjective cognitive experiences that represent a primary motivational process in behaviour. From a cognitive behavioural conceptualisation craving is proposed as an innocuous cognitive phenomenon and rather, it is the way in which craving thoughts are appraised and dealt with, which is theoretically and clinically a more meaningful focus of analysis.

There is wide agreement that the treatment of choice for bulimia nervosa is some form of cognitive behavioural therapy (Fairburn and Cooper, 1989), although evidence of the superior efficacy of this mode of treatment is uncertain (Fairburn and Cooper, 1989). Cognitive behavioural treatments tend to emphasise the control of symptoms (Wells and Matthews, 1994) and include the education of coping strategies designed to help clients cope with thoughts of food and craving thoughts. Both the S-REF and schema models predict that the provision of control strategies is likely to be most effective when they modify existing dysfunctional self knowledge. However, as described, thought control can often prevent the disconfirmation of existing maladaptive beliefs and lead to "rebound effects". For example, the appraisal of a craving thought as a threat to dieting or a threat to self control over eating, may lead to the suppression of this thought. Thought suppression then triggers monitoring, which primes representations of stimuli and makes intrusions more likely. Rumination in the form of active worry is also a problematic strategy as negative appraisal is then perseverative and attentionally demanding. This again means that disconfirmatory evidence cannot be processed and so the focus of the worry will not be disconfirmed.

Clinically the S-REF model suggests that thought control of unwanted or unpleasant thoughts should be avoided. In its place "a metacognitive detachment from thoughts, while maintaining objective awareness of them" (Wells and Matthews, 1994) is encouraged. This is termed "disconnected mindfulness". Consequently this would mean encouraging clients to let craving thoughts into consciousness and try not to appraise or process them, particularly not in a negative manner. This will then reduce the demands on information processing resources and free up resources for disconfirmatory processing and modification of beliefs. A successful response to craving may help facilitate beliefs about self control and potentially decatastrophise the significance of the craving experience. This will be most effective when an effect is exerted on metacognition so the individual gains perceived control over on line processing (Wells and Matthews, 1994).

4.4 Limitations and Research Recommendations from the Current Study

4.4.1 Design

The fundamental difficulty with any cross sectional correlational research design is that the causal direction of relationships cannot be ascertained. For example, it may be that dieters' appraisal of the craving experience as unpleasant, leads to increased emotional distress or alternatively that higher levels of emotional distress may lead to the craving experience being appraised as unpleasant. Longitudinal research or use of structured equation modeling may help further the understanding of this, as it would help to provide a directional model of the factors involved. Furthermore the design of the current study did not allow the potentially confounding effects of depression or anxiety on the relationship between thought control strategies, appraisal of craving and eating behaviour to be examined. It would be important in future research to test this by gaining information on psychiatric history and using multivariate analysis to partial out the these potential confounds.

Cross sectional correlational research is also susceptible to time of measurement effects. For example, the influences of immediate historical events such as information provided by Weight Watchers relating to their particular ethos of dieting, which may influence reporting on variables. Replication of the current study using different samples of dieters would add weight to the findings gained here and decrease the influence of such confounding variables.

4.4.2 Sample

The current sample was selected exclusively from local Weight Watchers groups and therefore uncertainty exists about how representative the dieters in this group are of dieters in the general population. In the current study attendance at Weight Watchers formed the requirement for inclusion in the study and hence provided the definition of dieting used. However 5% (n=6) of the sample were at or below their target weight and hence were not dieting to lose weight but rather to maintain their current weight and 33% (n=27) were within 5kg of their target weight. Hence it may be that attendance at Weight Watchers is too loose a definition of dieting and this may have weakened the findings. If further research was conducted a stricter definition of dieting could be implemented to correct this weakness. Furthermore it may be that Weight Watchers attracts dieters who experience more difficulty than average in dieting and therefore would be more susceptible to eating difficulties and emotional distress. Alternatively a Weight Watchers sample, as a result of attending weekly meetings may have greater knowledge about healthy dieting, increased support in dieting and increased monitoring of food intake, which may reduce susceptibility to eating disorders and emotional distress. However no research providing information about the characteristics of members of Weight Watchers could be found. In addition, as in the majority of psychological research, the sample recruited was self selecting which again may influence the degree of emotional distress or eating disturbance in the sample group. Furthermore some Such factors influence the generalisability of the research findings. However, as a fairly large sample comprised of individuals with a wide range of membership time at Weight Watchers, drawn from fifteen separate meetings, with different group leaders was studied, the weakening factors mentioned above are likely to

be minimised. However, as with all research the replication of the current study would assess the generalisability of the current findings to other groups of dieters.

The non clinical nature of the current sample meant that differences between groups in analysis are likely to have been reduced. For example the mean number of binges in the last six months in dieters reporting binge eating was 1.39. Hence any differences between the group reporting binge eating and those not reporting binge eating is not likely to be as substantial or as noticeable as if the binge eating group reported weekly or more frequent binges. Similarly scores on the EAT and BDI were relatively low, meaning that more severely depressed or eating disordered individuals were not represented in the current sample. This again means that the significance of any analysis involving these groups is reduced. However, in spite of this, significant results were found, which suggests that substantially bigger differences may be found if the appraisal of craving and thought control strategies were compared between more widely differentiated groups. In particular further research comparing eating disordered populations with non eating disordered populations would be interesting. Wider group differentiation may also further understanding of the specific effects of particular appraisals and control strategies to disorders.

4.4.3 Measures

The thought control questionnaire (Wells and Davis, 1994) is a generic measure of the thought control processes employed by an individual to deal with unwanted and unpleasant thoughts. In this way it provides a generic predisposition to thought control and not a measure specific to thoughts about the particular area being studied, in the current case, craving thoughts about food. It can be seen by comparing individual responses on the questionnaire with specific reports of control strategy given in interview that these are not always consistent. For example participant 023 reported frequently using the punishing strategy of thinking of herself as "really fat". However her score on the punishment subscale of the thought control questionnaire was relatively low. It is likely

that the significance of the results would increase if a specific measure was used, as dieters with eating dysfunction may use thought control more frequently in relation to food thoughts than unwanted thoughts in general and may use strategies specific to these thoughts. However, currently, the thought control questionnaire is the only available measure of thought control. Furthermore it is likely that the significance of results would be impeded rather than artificially elevated by using this measure and so the significant results found in the current study are likely to be reliable. Further research looking at the specific strategies used to control craving thoughts in dieting and eating disordered populations would provide clearer information and facilitate clinical treatment with these groups. In addition more knowledge and research about the specific implications of different strategies of thought control is needed. In particular the current questionnaire would benefit from further information about the implications of the identified strategies to facilitate better interpretation of the results. Furthermore greater knowledge about the link between specific strategies and thought suppression is required, as this is not currently clear.

It is acknowledged that the validity and reliability of the dimensions of craving rating scales are not known. However, as described, ratings scales are a frequently used method of assessing factors in cognitive behavioural clinical assessment (Kirk, 1996) and the method used is known to have good clinical validity (Papageorgiou and Wells, 1999). The scales were based on Papageorgiou and Wells (1999) scales for assessing metacognitive dimensions of anxious and depressive thoughts and adapted for craving thoughts using the literature on craving and bingeing (e.g. Strickney et al, 1999). It is possible that if time had allowed for a prior study to be undertaken, a more specific measure could have been developed. Future research could use a diary technique to collect live appraisals of cravings, which would give a much more specific measure of individual appraisals. If this was combined with specific detailing of thought control procedures this would also help further the understanding of the specific links between appraisal and thought control. In the current research the interview study was designed to explore specific beliefs about craving in greater detail and highlight the need for further research in this area. The use of

the rating scale was generic and retrospective of the craving thoughts. It is acknowledged that "retrospective measurement of cognition relies on recognition rather than recall processes and therefore may be more susceptible to selective memory biases or demand characteristics". (Clarke 1988). As mentioned previously, rating each craving at the time of occurrence would minimise this bias. However this was not possible in the time allowed for the current study. Furthermore as food craving has been shown to be a frequent experience it is likely that frequent and very recent memories of craving experiences could be drawn upon and thus reduce this error.

As described previously scores on the social desirability scale were found to be significantly correlated with scores on the BDI, BAI, RS, the social control subscale of the TCQ, ratings of the unpleasant and intrusive nature of the craving experience and ratings that cravings are related to anxiety, anger and shame. In addition social desirability scores were found to be significantly lower in dieters reporting binge eating than not reporting binge eating. Hence social desirability is potentially confounding reporting on these variables. However in the current case this would mean that significance levels in analysis involving these variables may be reduced rather than artificially elevated and producing false results. It may be that the current Weight Watchers sample was more susceptible to socially desirable responses than other general dieters would be. The ethos at Weight Watchers of controlled food intake and weekly monitoring of weight and eating habits may mean that reporting more difficult eating behaviour is more difficult and perceived as a greater failure. Hence replication of the current study with different groups of dieters may reduce this bias in responding and produce more accurate results.

4.4.4 Procedure

Completion of all questionnaires was carried out during Weight Watchers meetings. This meant that privacy and time for completion of questionnaires was potentially compromised. This may lower the accuracy of reporting. However the majority of participants were happy to complete the questionnaires in meeting situation and did so

prior to the actual start of the meeting. Alternatives to this, such as allowing participants time to take questionnaires home to complete is likely to have proved unfeasible due to the well known low response rates in research which relies on returned data. Again the setting for completion of questionnaires may have increased the likelihood of socially desirable responses and further research in a different setting may reduce this.

5.4.5 Analysis

There are difficulties in using post hoc groups in tests of difference. In the current study the groups being compared were often very different in size. Most significantly the 15 dieters not experiencing food cravings compared with 110 dieters who did experience cravings. This discrepancy between group size raises the question of whether a representative sample was provided in the smaller group and may influence the significance of analyses. However the biggest difference was in relation to cravers and non cravers, analysis of which did not make up the major part of the study and previous research can confirm this finding which adds weight to the findings. Additionally, as mentioned previously, the degree of clinical disorder being measured in certain groups was relatively low. It is likely that greater degrees of clinical symptomatology would have increased the significance in predicted relationships. Further research specially designed to compare appraisal and control of craving thoughts between eating disordered and non eating disordered groups would correct this difficulty.

A further problem in the current study may be the number of analyses that were performed for each hypothesis. A large number of comparisons may increase the risk of type 1 error. However the choice of statistical tests was limited by data that was not normally distributed and so requiring the use of non parametric statistics. This meant that using multivariate statistics to examine the effects of interactions between variables was not possible. However a Bonferroni correction was used to reduce this error.

5 CONCLUSION

The current study explored the relationship between dieters' appraisals of food cravings, thought control strategies, dysfunctional eating behaviour and emotional distress. Consistent with recent research on food cravings (e.g. Hill and Heaton-Brown, 1994; Gendall et al, 1998a), the current study has found the experience of craving in a sample of dieters to be relatively commonplace and not in itself associated with either emotional distress or dysfunctional eating behaviour. However, ratings of dimensions of the craving experience were found to be different between dieters experiencing cravings with eating dysfunction or emotional distress than dieters experiencing cravings without difficulties. Similarly the use of particular thought control strategies were found to be different in dieters with eating dysfunction or emotional distress than dieters without difficulties In addition the interview study provided further evidence for the importance of appraisal and control to the experience of the craving. This part of the study also highlighted the role of self beliefs in the appraisal, control and experience of craving.

In line with recent research which has highlighted the role of appraisal and thought control in emotional disorder, the current study has emphasised a cognitive behavioural conceptualisation of craving. This proposes that the appraisal and control of craving thoughts are theoretically and clinically a more meaningful focus of analysis than the cravings themselves. In addition the current research suggests that locating existing cognitive behavioural models of eating disorders in a wider information processing context may help further understanding and treatment approaches to disordered eating. In particular a "metacognitive detachment" from unpleasant craving thoughts may help promote control and facilitate the modification of negative appraisals and dysfunctional beliefs.

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University of Leicester

Centre for Applied Psychology
Clinical Section

The Ken Edwards Building
University Road
Leicester LE1 7RH · UK
Tel: +44 (0)116 252 2162 (General Enqs)
Tel: +44 (0)116 252 2492 (Placement Enqs)
Fax: +44 (0)116 223 1059

DIETERS THOUGHTS ABOUT CRAVING AND EATING

I am a Doctoral Trainee in Clinical Psychology. Part of this training includes completing a doctoral research project. My research aims to gain more understanding of the experience of food cravings in dieters and how people cope with these cravings.

Study 1

- Participation in the study will involve completing seven questionnaires, which should take about twenty minutes.
- These questionnaires will then be collected from you before you leave the meeting.
- Participation is voluntary and completely anonymous.
- You will not be asked to write your name or any other identifying information on the questionnaires.
- This information will then be coded and scored and entered on to a computer database. Following this the original questionnaires will be destroyed.

If you would like to participate in the research please complete the attached consent form and return it to me and I will give you the six questionnaires to be completed during the meeting and returned to me.

Study 2

- I am also looking for ten people who would be willing to take part in a longer semi structured interview with me, to discuss their views about cravings.
- The interviews will take place at Weight Watchers meetings in a private room and last for about twenty minutes.
- If you would like to take part in this part of the research, please add your name and telephone number to the consent form.
- I will then contact ten people at random by phone and arrange a convenient time for the interview to take place.
- This interview will be audiotaped to allow a second marker (my supervisor) to check my ratings of the information gained.
- Following this process all tapes will be immediately wiped.
- Participation is voluntary
- Tapes will be coded and securely stored and no names or other identifying information will be kept with them

If you have any further questions please do not hesitate to ask.

Thank you for your help

Joanne Newbolt
Trainee Clinical Psychologist

Supervised by

Dr. Konstantine Loumidis
Lecturer in Clinical Psychology and
Chartered Clinical Psychologist

University of Leicester

Centre for Applied Psychology
Clinical Section

The Ken Edwards Building
University Road
Leicester LE1 7RH · UK
Tel: +44 (0)116 252 2162 (General Enqs)
Tel: +44 (0)116 252 2492 (Placement Enqs)
Fax: +44 (0)116 223 1059

Consent Form

Code Number .....

Researcher's Name **Joanne Newbolt, Trainee Clinical Psychologist**
Research Title **Dieters Thoughts about Craving and Eating**

1. I have read the information leaflet and the nature of the study has been explained to me. I understand this information and what taking part in the study will involve.
2. I am aware that all information given during in the questionnaire responses will be confidential and used only for the purposes of research.
3. I also understand that the information used in the research will not allow myself to be recognised in any way.
4. I understand that my participation is voluntary and that I am able to withdraw from the study, without giving reasons.

Study 1: Questionnaire study

I give my consent to participate in the study

Signed..... Date.....

Study 2: Semi structured Interview study

I am aware that not everyone consenting to this part of the study will be asked to participate.

I am aware that this interview will be audiotaped and that tapes will be listened to by a second marker (my supervisor). Following this tapes will be immediately wiped.

I would be willing to take part in a semi structured interview at a later date

Name..... Signed.....

Date..... Telephone Number.....

If you have any further questions or would like further information please contact
Joanne Newbolt, Trainee Clinical Psychologist, Centre for Applied Psychology – Clinical section, University of Leicester, Leicester Tel. (0116) 252 2466

Appendix III **The Food Craving Questionnaire (Gendall, Sullivan, Joyce and Bulik, 1997a)**

Age _____ **Male** [ ] **Female** [ ]	**Height** _____
Race _____	**Current Weight** _____
Marital status _____	**Ideal Weight** _____
Your Occupation _____	**Highest weight** _____
Partners Occupation _____	**Lowest weight** _____

How long have you been attending weight watchers? .....

How long have on been on your current diet? .....

How much weight have you lost in this time? .....

How much of the last five years has been spent on a diet? .....

Have you ever experienced an *intense desire to eat* a specific food or type of food?

No [ ] Yes[ ] If yes please describe the food(s)

Have you ever experienced a *strong urge to eat* a specific food or type of food?

No [ ] Yes[ ] If yes please describe the food(s)

Have you ever experienced a *craving* for a specific food or type of food?

No [ ] Yes[ ] If yes please describe the food(s)

Have you experienced a strong urge/intense desire/ a craving to eat a specific food within the past 3 months

No [ ] Yes[ ]

Have you experienced a strong urge/intense desire/ a craving to eat a specific food solely during pregnancy

No [ ] Yes[ ] I am currently pregnant [ ]

Have you experienced a strong urge/intense desire/ a craving to eat a specific food solely premenstrually

No [ ] Yes[ ]

It is currently the week before your period is due No [ ] Yes[ ]

I am currently experiencing premenstrual tension No [ ] Yes[ ]

How often do you experience a strong urge /intense desire/a craving to eat a specific food

[ ]daily [ ]weekly [ ]fortnightly [ ]once a month or less often

At worst how strong are these urges/intense desires/cravings to eat specific foods

[ ]weak [ ]moderate [ ]strong

How often do you eat the foods that you have a strong urge /intense desire / a craving to eat

[ ]always [ ]sometimes [ ]rarely [ ]never

Do you eat the food faster than usual

[ ]slower [ ]same [ ]faster

If the food you have a strong urge /intense desire / a craving to eat is unavailable do you feel anxious or uncomfortable?

No [ ] Yes[ ]

When you have a strong urge /intense desire / a craving to eat a specific food will any other foods satisfy that urge?

No [ ] Yes[ ] If yes describe the alternative foods that could satisfy that urge

When you have a strong urge /intense desire / a craving to eat a specific food will anything else satisfy that urge? For example cigarettes, alcohol, drugs

No [ ] Yes[ ] If yes describe the alternative that could satisfy that urge

Approximately how many units of alcohol do you drink per week? .....
(I unit = ½ a pint, 1 glass of wine or 1 serving of a spirit)

Do you ever use alcohol to try and control a strong urge /intense desire / a craving to eat a specific food? Yes [ ] No [ ]

Do you currently smoke? Yes [ ] No [ ]

If yes approximately how many per day .....

Do you ever use cigarettes to try and control a strong urge /intense desire / a craving to eat a specific food? Yes [ ] No [ ]

Do you currently take any drugs? Yes [ ] No [ ]

If yes please give details .....

Do you ever use drugs to try and control a strong urge /intense desire / a craving to eat a specific food? Yes [ ] No [ ]

Do you currently take any antidepressant or tranquillising medication Yes [ ] No [ ]

If yes please give details .....

Appendix IV **The Thought Control Questionnaire (Wells and Davies, 1994)**

Most people experience unpleasant, and/or unwanted thoughts (in verbal and/or picture form), which can be difficult to control. We are interested in the techniques that you **generally** use to control such thoughts. Below are a number of things that people do to control these thoughts. Please read each statement carefully, and indicate how often you use each technique by **circling** the appropriate number. There are no right or wrong answers. Do not spend too much time thinking about each one.

1: NEVER
2: SOMETIMES
3: OFTEN
4: ALMOST ALWAYS

When I experience an unpleasant/unwanted thought:

1.	**I call to mind positive images instead**	1	2	3	4
2.	**I tell myself not to be stupid**	1	2	3	4
3.	**I focus on the thought**	1	2	3	4
4.	**I replace the thought with a more trivial bad thought**	1	2	3	4
5.	**I don't talk about the thought to anyone**	1	2	3	4
6.	**I punish myself for thinking the thought**	1	2	3	4
7.	**I dwell on other worries**	1	2	3	4
8.	**I keep the thought to myself**	1	2	3	4
9.	**I occupy myself with work instead**	1	2	3	4
10.	**I challenge the thoughts validity**	1	2	3	4
11.	**I get angry with myself for having the thought**	1	2	3	4
12.	**I avoid discussing the thought**	1	2	3	4
13.	**I shout at myself for having the thought**	1	2	3	4
14.	**I analyse the thought rationally**	1	2	3	4
15.	**I slap or pinch myself to stop the thought**	1	2	3	4
16.	**I think pleasant thoughts instead**	1	2	3	4
17.	**I find out how my friends deal with these thoughts**	1	2	3	4
18.	**I worry about more minor things instead**	1	2	3	4
19.	**I do something that I enjoy**	1	2	3	4
20.	**I try to reinterpret the thought**	1	2	3	4
21.	**I think about something else**	1	2	3	4
22.	**I think more about minor problems I have**	1	2	3	4
23.	**I try a different way of thinking about it**	1	2	3	4
24.	**I think about past worries instead**	1	2	3	4
25.	**I ask friends if they have similar thoughts**	1	2	3	4
26.	**I focus on different negative thoughts**	1	2	3	4
27.	**I question the reasons for having this thought**	1	2	3	4
28.	**I tell myself that something bad will happen if I think the thought**	1	2	3	4
29.	**I talk to a friend about the thought**	1	2	3	4
30.	**I keep myself busy**	1	2	3	4

Appendix V The Eating Attitudes Test (Garner and Garfinkel, 1979, 1982)

Please check a response for each of the following questions

1. Am terrified about being overweight	Always	Usually	Often	Sometimes	Rarely	Never
2. Avoid eating when I am hungry.	Always	Usually	Often	Sometimes	Rarely	Never
3. Find myself preoccupied with food.	Always	Usually	Often	Sometimes	Rarely	Never
4. Have gone on eating binges where I feel I may not be able to stop.	Always	Usually	Often	Sometimes	Rarely	Never
5. Cut my food into small pieces.	Always	Usually	Often	Sometimes	Rarely	Never
6. Aware of the calorie content of foods I eat.	Always	Usually	Often	Sometimes	Rarely	Never
7. Particularly avoid food with a high carbohydrate content (bread, rice, potatoes, etc.)	Always	Usually	Often	Sometimes	Rarely	Never
8. Feel that others would prefer if I ate more.	Always	Usually	Often	Sometimes	Rarely	Never
9. Vomit after I have eaten.	Always	Usually	Often	Sometimes	Rarely	Never
10. Feel extremely guilty after eating	Always	Usually	Often	Sometimes	Rarely	Never
11. Am preoccupied with a desire to be thinner.	Always	Usually	Often	Sometimes	Rarely	Never
12. Think about burning up calories when I exercise.	Always	Usually	Often	Sometimes	Rarely	Never
13. Other people think I'm too thin.	Always	Usually	Often	Sometimes	Rarely	Never
14. Am preoccupied with the thought of having fat on my body.	Always	Usually	Often	Sometimes	Rarely	Never
15. Take longer than others to eat my meals.	Always	Usually	Often	Sometimes	Rarely	Never
16. Avoid foods with sugar in them.	Always	Usually	Often	Sometimes	Rarely	Never
17. Eat diet foods.	Always	Usually	Often	Sometimes	Rarely	Never
18. Feel that food controls my life.	Always	Usually	Often	Sometimes	Rarely	Never
19. Display self-control around food.	Always	Usually	Often	Sometimes	Rarely	Never
20. Feel that others pressure me to eat.	Always	Usually	Often	Sometimes	Rarely	Never
21. Give too much time and thought to food.	Always	Usually	Often	Sometimes	Rarely	Never
22. Feel uncomfortable after eating sweets.	Always	Usually	Often	Sometimes	Rarely	Never
23. Engage in dieting behaviour.	Always	Usually	Often	Sometimes	Rarely	Never
24. Like my stomach to be empty.	Always	Usually	Often	Sometimes	Rarely	Never
25. Have the impulse to vomit after meals.	Always	Usually	Often	Sometimes	Rarely	Never
26. Enjoy trying new rich foods.	Always	Usually	Often	Sometimes	Rarely	Never

Appendix VI The Restraint Scale (Polivy, Herman and Warsh 1978)

Please read each question carefully, and answer by <u>circling</u> the appropriate response.

1.	**How often are you dieting**	Never	Rarely	Sometimes	Often	Always
2.	**What is the maximum amount of weight (in pounds) you have ever lost in a month**	0-4 pounds	5-9 pounds	10-14 pounds	15-19 pounds	20+ pounds
3.	**What is the maximum weight gain in a week?**	0-1 pounds	1.1-2 pounds	2.1-3 pounds	3.1-5 pounds	5.1+ pounds
4.	**In a typical week, how much does your weight fluctuate?**	0-1 pounds	1.1-2 pounds	2.1-3 pounds	3.1-5 pounds	5.1+ pounds
5.	**Would a weight fluctuation of 5 pounds affect the way you live your life?**	Not at all	Slightly	Moderately		Extremely
6.	**Do you eat sensibly in front of others and splurge alone?**	Never	Rarely	Sometimes	Often	Always
7.	**Do you give too much time and thought to food?**	Never	Rarely	Sometimes	Often	Always
8.	**Do you have feelings of guilt after overeating?**	Never	Rarely	Sometimes	Often	Always
9.	**How conscious are you of what you are eating?**	Not at all	Slightly	Moderately		Extremely
10.	**How many pounds over your desired weight were you at your maximum weight?**	0-1 pounds	1-5 pounds	6-10 pounds	11-20 pounds	21+ pounds
11.	**Have you gone on eating binges during which you ate a lot of food in a short period of time? (Eating much more than most people would eat under the circumstances).**	NO [__] YES [__] If YES, on average, how many Times per month in the last 6 months?				
12.	**During these binges did you feel that your eating was out of control?**	NO [__] YES [__] If YES, on average, how many Times per month in the last 6 months?				
13.	**Have you ever made yourself sick (vomited) to control your weight or shape?**	NO [__] YES [__] If YES, on average, how many Times per month in the last 6 months?				
14.	**Have you ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?**	NO [__] YES [__] If YES, on average, how many Times per month in the last 6 months?				
15.	**Have you ever suffered or have been treated for an eating disorder such as**	Anorexia [__]; bulimia [__]; obesity [__]; If YES, when?				

Appendix VII **The Marlowe-Crowne Social Desirability Scale, Short Form MC-3 (Reynolds 1982)**

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false to you personally, please circle the appropriate box.

1. It is sometimes hard for me to go on with my work if I am not encouraged	True	False
2. I sometimes feel resentful when I don't get my way	True	False
3. On a few occasions I have given up doing something because I thought too little of my ability	True	False
4. There have been times when I felt like rebelling against people in Authority even though I knew they were right	True	False
5. No matter who I am talking to I am always a good listener	True	False
6. There have been occasions when I took advantage of someone	True	False
7. I am always willing to admit it when I make a mistake	True	False
8. I sometimes try to get even rather than forgive and forget	True	False
9. I am always polite even to people who are disagreeable	True	False
10. I have never been annoyed when people express ideas very different from my own	True	False
11. There have been times when I was quite jealous of the good fortune of Others	True	False
12. I am sometimes irritated by people who ask favours of me	True	False
13. I have never deliberately said something that hurt someone's feelings	True	False

Appendix VIII The Dimensions of Craving Thoughts Rating Scale

Choose the rating which best describes what you usually believe or feel about CRAVING THOUGHTS. Write the number in the space before the statement.

0 10 20 30 40 50 60 70 80 90 100

NOT AT ALL EXTREMELY SO

1. I usually find craving thoughts to be *unpleasant experiences*	
2. I usually find craving thoughts to be *intrusive* (i.e. they seem to just pop into my mind)	
3. I usually find craving thoughts to be *controllable*	
4. I usually find craving thoughts to be *tolerable*	
5. I usually find craving thoughts to be *distressing*	
6. I usually find craving thoughts *interfere with my life*	
7. I usually find craving thoughts to be *difficult to resist*	
8. I usually find that craving thoughts make me feel anxious	
9. I usually find that craving thoughts make me feel depressed	
10. I usually find that craving thoughts make me feel angry	
11. I usually find that craving thoughts make me feel ashamed	
12. I usually find that craving thoughts make me feel guilty	

APPENDIX IX

Craving Interview

Introduction to interview.

- Thank you for volunteering to be interviewed
- The aim of the interview is to explore your experience of food cravings in more detail. The interview discussion will last about 15-20 minutes
- Confidential and anonymous, name or other identifying details will not be included in the research
- The interview will be tape recorded for research purposes and will be evaluated by my supervisor. All tapes will be wiped after this process has occurred
- Any questions

Setting Questions

1) When was the last time that you experienced a craving for a food?

2) Is this a typical example of a craving experience for you?
If yes proceed to qu. 3
If no what is a more typical example of a craving experience?

3) Where were you at the time?

4) Can you remember how were you feeling at the time?

5) What did you crave?

6) How long did the craving last?

8) Did you eat the craved for food?

9) Was the craving satisfied by this....., if no what happen after this?

10) If didn't eat what made the craving subside?

11) How felt afterwards?

Experience of cravings

12) When you have a craving for ....., how would you describe the experience?

13) How do you usually feel?

6) What were you thinking about when you were craving.....?
What sort of images/pictures did the craving cause?
If only positive thoughts/images ask re anything negative and vice versa

12) Is craving food a pleasant or unpleasant experience

15) Does it bother you to experience a craving – is the thought wanted/unwanted

13) Does it cause you distress to have craving thoughts

what do you think it is about the craving that makes you feel.....
(e.g. anxious)?

e

f What thoughts do you usually have at these times/what goes through your mind at these times?

18) What images do you have at these times

19) Explore most salient thoughts and feelings further, (both good and bad thoughts and images) e.g.

What does it mean to you to feel/think .....?

What is it about feeling/thinking.....that is so bad?

How does feeling/thinking.....make you feel/think about yourself?

What do you usually do when you feel like that?

What helps/what makes it worse?

What would be the worst thing that could happen in that situation?

Controlling Craving Thoughts

20) What strategies do you use to help you resist your cravings?

21) Which strategies are most effective

22) What is it about.....that helps stop you from eating

23) What does it mean to you to think.....

24) Can you remember a time when you ate the craved for food, what strategies were you using at those times

25) What did you say to yourself to allow yourself to eat?
What excuses did you use

Experience of Eating the Craved for Food

26) What happens if you are having a craving for ..... and then you eat .....?

27) How would you describe the experience?

28) How do you usually feel?

29) What thoughts do you usually have when eating the craved for food/what goes through your mind?

30) What thoughts would be changed by eating .....?

How do you usually feel afterwards

What do you think about yourself if you have eaten what you craved

As above explore the most salient thoughts and feelings further

Experience of Resisting the Craved for Food

31) What happens if you are having a craving for..... and you can't eat.....?

32) How would you describe the experience?

33) How would you feel?

34) What thoughts are going through your mind?

35) What thoughts would be changed by resisting.....?

36) What do you do to stop yourself from eating when you experience a craving?

37) What do you say to yourself/imagine that helps

38) What do you say to yourself/imagine that doesn't help

39) How do you usually feel afterwards?

40) What do you think about yourself if you have resisted what you craved?

Again explore thoughts and feelings by backward chaining

Coping Strategies

41) How do you usually cope with craving thoughts?

42) Do you try to control your craving thoughts?

43) What strategies do you use?

44) Are they usually successful?

45) When/in what situations are you most likely to be able to control craving thoughts?

46) In what situations are strategies to control craving thoughts least likely to be successful?

Appendix X

Descriptive Statistics of Quantitative Variables of the Whole Sample

Measure	N	Minimum	Maximum	Mean	SD
Age	109	14	70	38.17	13.96
Time at Weight Watchers (in weeks)	124	0	832	57.43	118.46
No. of months on a diet in last 5 years	110	0	60	31.03	21.87
BMI	119	21	48	28.85	4.90
Ideal-current wt discrep.	117	-3	67	13.49	11.20
BDI	116	0	45	10.72	10.04
BAI	126	0	54	8.23	8.82
EAT	126	0	45	12.77	10.02
RS	114	7	33	21.13	4.94
SDS	124	1	12	7.31	2.84
TCQ – Distraction	119	1	4	1.84	0.60
TCQ – Social Control	118	1	3	2.44	2.78
TCQ – Worry	117	1	4	1.84	0.60
TCQ – Punishment	120	1	4	1.65	0.50
TCQ – Reappraisal	116	1	4	2.12	0.60
TCQ – Total Score	111	36	93	61.78	10.89
Dimensions of craving					
Unpleasant	102	0	100	30.15	29.20
Intrusive	102	0	100	41.23	32.61
Controllable	102	0	100	54.34	31.27
Tolerable	102	0	100	54.00	29.92
Distressing	102	0	100	29.38	31.01
Interfere with Life	102	0	100	25.20	27.66
Difficult to Resist	103	0	100	45.62	28.18
Anxious	103	0	100	29.45	28.64
Depressed	102	0	100	30.00	29.25
Angry	102	0	100	21.85	27.49
Ashamed	102	0	100	23.82	29.58
Guilty	102	0	100	32.21	33.32

BMI=Body Mass Index
SDS=The Social Desirability Scale, Short Form MC-3 (Reynolds 1982)
BAI= Beck Anxiety Inventory (Beck, Epstein, Brown and Steer, 1988)
BDI= Beck Depression Inventory II (Beck, Steer and Brown, 1996)
EAT= Eating Attitudes Test- 26 (Garner & Garfinkel, 1979, 1982)
RS= The Restraint Scale (Polivy, Herman & Warsh, 1978)

Appendix XI

Spearmans rho Intercorrelations of Dimensions of Craving

Dimension of Craving	Unpleasant	Intrusive	Controllable	Tolerable	Distressing	Interfere with Life	Difficult to Resist	Anxious	Depressed	Angry	Ashamed	Guilty
	Rho	rho	rho	rho	Rho	rho	rho	rho	rho	rho	rho	rho
Unpleasant	1.0	0.60**	0.00	0.80	0.49**	0.56**	0.49**	0.57**	0.55**	0.44**	0.45**	0.46**
Intrusive	0.60**	1.00	-0.04	0.00	0.36**	0.40**	0.51**	0.39**	0.39**	0.42**	0.33**	0.40**
Controllable	0.00	-0.04	1.0	0.66**	-0.14	-0.14	-0.07	-0.14	-0.18	-0.22	-0.18	-0.24
Tolerable	0.08	0.00	0.66**	1.0	-0.37	-0.03	0.01	0.07	-0.07	-0.04	-0.10	-0.14
Distressing	0.49**	0.36**	-014	-0.04	1.0	0.61**	0.34**	0.59**	0.49**	0.49**	0.53**	0.47**
Interfere with life	0.56**	0.40**	-0.14	-0.03	-0.61**	1.0	0.59**	0.71**	0.71**	0.58**	0.49**	0.46**
Difficult to Resist	0.49**	0.51**	-0.07	0.01	0.34**	0.59**	1.0	0.55**	0.52**	0.43**	0.38**	0.50**
Anxious	0.57**	0.39**	-0.14	0.07	0.59**	0.71**	0.55**	1.0	0.74**	0.64**	0.50**	0.45**
Depressed	0.55**	0.39**	-0.18	-0.07	0.49**	0.71**	0.52**	0.74**	1.0	0.66**	0.64**	0.60**
Angry	0.44**	0.42**	-0.22**	-0.04	0.49**	0.58**	0.43**	0.64**	0.66**	1.0	0.64**	0.53**
Ashamed	0.45**	0.33**	-0.18	-0.10	0.53**	0.49**	0.38**	0.50**	0.64**	0.64**	1.0	0.75**
Guilty	0.46**	0.40**	-0.24**	-0.14	0.47**	0.46**	0.50**	045**	0.60**	0.53**	0.78	1.0

Appendix XII

Spearman's rho Correlations of Potentially Confounding Variables

Variable	SDS	BMI	Ideal-Current wt discrep.
	rho	rho	rho
BDI	-0.21*	0.04	0.07
BAI	-0.24**	-0.05	-0.05
EAT	-0.16	0.08	0.10
RS	-0.23**	0.10	0.16
TCQ – Distraction	0.04	-0.09	-0.10
TCQ – Social Control	-0.21*	0.04	-0.07
TCQ – Worry	-0.11	-0.02	-0.09
TCQ – Punishment	-0.12	0.03	0.02
TCQ – Reappraisal	-0.10	-0.08	0.00
TCQ – Total score	-0.14	-0.05	-0.09
Dimensions of craving			
Unpleasant	-0.28**	-0.10	-0.03
Intrusive	-0.20*	-0.05	0.03
Controllable	-0.02	-0.02	-0.04
Tolerable	-0.02	-0.06	-0.05
Distressing	-0.13	-0.11	-0.05
Interfere with Life	-0.16	-0.03	0.01
Difficult to Resist	-0.16	0.07	0.15
Anxious	-0.21*	0.01	0.01
Depressed	-0.12	-0.01	0.00
Angry	-0.27**	0.05	0.07
Ashamed	-0.19*	0.07	0.12
Guilty	-0.13	-0.02	0.03

**= significant correlation

BMI=Body Mass Index
SDS=The Social Desirability Scale, Short Form MC-3 (Reynolds 1982)
BAI= Beck Anxiety Inventory (Beck, Epstein, Brown and Steer, 1988)
BDI= Beck Depression Inventory II (Beck, Steer and Brown, 1996)
EAT= Eating Attitudes Test- 26 (Garner & Garfinkel, 1979, 1982)
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Appendix XIII

Statistical Tests of Difference in SDS and BMI Scores between Dieters who Reported Binge Eating in the Past Six Months (n=40) and Dieters not Reporting Binge Eating in the Last Six Months (n=65)

Variables	Binged with in the past six months		t
	Yes (n=40)	No (n=65)	
	M (SD)	M (SD)	
SDS	6.53 (2.71)	7.68 (2.92)	2.02
BMI	29.17 (4.30)	28.54 (5.25)	-0.61

BMI=Body Mass Index
SDS=The Social Desirability Scale, Short Form MC-3 (Reynolds 1982)

Statistical Test of Difference in Actual Ideal Weight Discrepancy between Dieters who Reported Binge Eating in the Past Six Months (n=36) and Dieters not Reporting Binge Eating in the Last Six Months (n=62)

Variables	Binged with in the past six months		U
	Yes (n=40)	No (n=65)	
	M (Median) SD	M (Median) SD	
Actual Ideal wt	13.83 (13.50)	12.81 (11.00)	974.00
discrep. (in kgs)	9.88	11.84	

Appendix XIV

Descriptive Statistics of Quantitative Variables in Sample Two

Measure	n	Minimum	Maximum	Mean	SD
Age	8	20	66	35.38	15.21
Time at Weight Watchers (in weeks)	10	4	260	72.70	103.00
No. of months on a diet in last 5 years	9	3	60	39.67	25.80
BMI	10	23	42	29.30	6.25
Ideal-current wt discrep.	10	0	40	14.90	13.68
BDI	10	0	31	12.80	9.67
BAI	10	2	24	12.30	8.83
EAT	10	6	45	18.10	11.97
RS	10	17	30	23.90	4.01
SDS	10	2	11	7.0	3.13
TCQ – Distraction	9	1	3	2.39	0.64
TCQ – Social Control	9	2	3	2.57	0.60
TCQ – Worry	8	1	3	1.65	0.73
TCQ – Punishment	9	1	3	1.70	0.61
TCQ – Reappraisal	9	1	4	2.54	0.91
TCQ – Total Score	8	43	90	65.13	14.72
Dimensions of craving					
Unpleasant	8	10	100	57.50	36.55
Intrusive	8	30	90	65.00	25.63
Controllable	8	0	80	45.25	30.76
Tolerable	8	3	80	46.63	26.51
Distressing	8	0	100	46.88	35.55
Interfere with Life	8	10	100	41.25	32.27
Difficult to Resist	8	20	99	67.67	25.23
Anxious	8	20	90	57.50	27.12
Depressed	8	20	90	56.25	27.22
Angry	8	4	80	29.25	25.27
Ashamed	8	0	100	60.00	39.28
Guilty	8	10	100	60.00	37.80

BMI=Body Mass Index
SDS=The Social Desirability Scale, Short Form MC-3 (Reynolds 1982)
BAI= Beck Anxiety Inventory (Beck, Epstein, Brown and Steer, 1988)
BDI= Beck Depression Inventory II (Beck, Steer and Brown, 1996)
EAT= Eating Attitudes Test- 26 (Garner & Garfinkel, 1979, 1982)
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