

The Type and Frequency of Metacognitions in Women dieting, not dieting, and with Anorexia Nervosa.

A thesis submitted in partial fulfilment of the requirements for

a Master's Degree of Science

in Psychology

at the University of Canterbury

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2013

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Acknowledgements

I would like to express my appreciation to a number of people and organizations without whom I could have not completed this thesis.

Firstly, thanks goes to my supervisor, Janet Carter, for her guidance and for pushing me to achieve. I would also like to thank Rachel Lawson and the Clinical Team at the South Island Eating Disorder Services Unit for their help in recruiting participants for this study.

Secondly, I would like to thank my family, friends, and office mates for their unwavering support and encouragement. A special thanks goes to Aimee Richardson, who gave her time and dedication towards the study.

Lastly, I would like to give my gratitude to the University of Canterbury for generously providing me with a Masters Scholarship, without which the completion of this thesis would have been an endless struggle.

Abstract

Metacognitions play a crucial role in the development and maintenance of psychiatric disorders, such as depression and anxiety. Its function in anorexia nervosa (AN), however, has been neglected. Examining the role of metacognitions in AN may prove useful for developing the AN conceptualization currently lacking. Additionally, it may provide a desperately needed new route for AN treatment, as no efficacious treatment for adult AN is available to date. This study aimed to build on preliminary findings suggesting that individuals with AN are characterized by the cognitive attentional syndrome (CAS), the vital component in the Self-regulatory Executive Function (S-REF) model underlying metacognitive processes. Hence, quantitative and qualitative measures of individuals with AN, dieting, and non-dieting adult women were examined to ascertain whether these groups embodied differences in their metacognitive frequency and nature. ANOVA, bivariate correlation, and ANCOVA were used for data analysis. Findings showed that the AN sample experienced higher overall metacognitions; particularly negative metacognitions and metacognitions around control. When anxiety and depression were controlled for, however, the association became non-significant. Nonetheless, anxious and depressive symptoms are greatly intertwined with eating symptoms and increased metacognitions in the AN sample are still highly plausible. Metacognitive themes endorsed by the AN sample were around sociability and control. Thought control strategies were found to be the same in all groups; however, the AN sample endorsed a higher utilization of punishment and a lower utilization of distraction. Several limitations including small AN sample size and no psychiatric control group should be taken into account. Overall, however, findings suggested that, because the AN sample was characteristic of the CAS and the S-REF model, dysfunctional metacognitions may be worth targeting in AN treatment.

Introduction: The Type and Frequency of Metacognitions in Women dieting, not dieting, and with Anorexia Nervosa

Research on metacognition has grown substantially in the last few decades (Efklides, 2008). Upon review, the breadth of psychological fields discussing metacognitive research becomes noticeable: metacognition is examined in theory of mind in developmental psychology (e.g. Lysaker et al., 2011; Tuch, 2011), metamemory analysed in cognitive and experimental psychology (e.g. Castel, McGillivray, & Friedman, 2012; Cosentino, Metcalfe, Holmes, Steffener, & Stern, 2011), and self-regulated learning discussed in educational psychology (e.g. Efklides, 2011; Postholm, 2011) to name but a few. Naturally, metacognitive research has also been undertaken in the field of clinical psychology (e.g. Dimaggio et al., 2011; Gumley, 2011). This research on metacognitions is extensive due to the fact that metacognitions are inevitably intertwined with consciousness and awareness of mental states (Koriat, 2007). Indeed, metacognitions are at the root of social interaction, every day memory, and scientific thinking (King, 1998). A concept so fundamental to daily living that may be able to provide insight into the development and maintenance of psychiatric disorders is crucial to study and understand in order to progress in the field of clinical psychology.

Wells (2009a, p. 105) explained metacognitions as “cognitive factors that monitor, interpret and control thinking”. The term metacognitions first surfaced in 1979, when Flavell described knowledge of a person’s own cognitive processes, including metacognitive knowledge, experiences, goals, and actions (Flavell, 1979). In later years, Wells (1995, 1999, 2000, 2009b) refined these to incorporate metacognitive knowledge, metacognitive experiences, and metacognitive strategies.

Despite the large amount of literature on metacognitions, its role in Eating Disorders has been neglected. This study, therefore, investigates the role metacognitions play in the maintenance and development of anorexia nervosa (AN) by comparing questionnaire results across three different samples of adult women: those dieting, those not dieting, and patients with AN. Dieting and non-dieting women were recruited from a University; AN patients from an Eating Disorder Service. Similarities and differences in metacognitive knowledge, experiences, and strategies are examined by analysing the quantitative and qualitative questionnaire results between the participant groups. Next, implications for the future understanding, conceptualization, and treatment of AN are discussed. AN in particular was selected for study, as a need for further research on an underlying conceptualization and effective treatment is required. No one treatment intervention for women with AN has reached the status of an efficacious treatment (Hay, 2004; Mitchell, Steffen, Cook Myers, & Roerig, 2005). Although Cognitive Behaviour Therapy (CBT) is often used, its lack of evidence for this population remains a concern; hence, the search for new treatment interventions is vital.

This thesis focuses solely on AN, not on any other eating disorders. Bulimia nervosa (BN) was excluded because the usefulness and effectiveness of CBT for BN, as well as the underlying cognitive model for BN have been confirmed in a large multicentre study (Agras, Walsh, Fairburn, Wilson, & Kraemer, 2002). Additionally, Interpersonal Therapy has been shown to be just as efficacious a treatment; however, a slightly longer timeframe is needed to produce similar results (Hay & Bacaltchuk, 2000). Eating Disorder Not Otherwise Specified (ED-NOS), even though it is the most frequent Eating Disorder diagnosis given (Fairburn & Bohn, 2005), was also excluded because it is currently poorly understood (Cooper, 2005) and would exceed the scope of this research.

Thesis Structure

This thesis is presented in five chapters. Chapter I is an introductory chapter encompassing a general thesis overview: a background of this study; the purpose and significance of the research undertaken; and the aims of this research. Chapter II outlines a definition of terms; a description of the underlying theoretical framework; a literature review; and hypotheses for this study. Chapter III describes the methodology utilized in this study, including the selection of participants, the data collection process, materials used, and the data analysis procedures. Chapter IV presents the study findings. Descriptive statistics, ANOVA, bivariate correlation, and ANCOVA are displayed, examined, and interpreted. Lastly, Chapter V provides a summary of the entire study; a discussion of the study findings; implications of these findings for theory and practice; study conclusions; and recommendations for future research.

Context and Background

The importance of metacognitions in various psychiatric disorders has been established (e.g. Dimaggio et al., 2011; García-Montesa, Pérez-Álvarez, Balbuenac, Garcelán, & Cangas, 2006; Lysaker et al., 2010; Wells, 2000). The knowledge gained has been utilized to develop specific interventions, such as Metacognitive Therapy (MCT) for generalized anxiety disorder (GAD; see Wells, 1995, 2008, 2009b) and Depression (Wells, 2009b; Wells et al., 2007). Similar problematic metacognitions present in mood and anxiety disorder patients appear to be prominent in AN patients, and hence an in-depth investigation of whether targeting metacognitions decreases eating disorder symptoms is warranted. Problematic metacognitions include worry (Levinson & Rodebaugh, 2012; Pallister & Waller, 2008), rumination (Cowdrey & Park, 2011; Cowdrey & Park, 2012; Wolff & Serpell, 1998); attention to threat stimuli (Bruha, 2010; Fairburn, Shafran, & Cooper, 1999; Shafran,

Fairburn, Robinson, & Lask, 2003); unhelpful coping strategies, such as emotional avoidance (Corstorphine, Mountford, Tomlinson, Waller, & Meyer, 2007; Schmidt & Treasure, 2006; Wildes, Ringham, & Markus, 2010) and thought suppression (Geller, Cockell, Hewitt, Goldner, & Flett, 2000; Hambrook et al., 2011); and a perseverative thinking style (Abbate-Daga et al., 2011; Tchanturia, Morris et al., 2004). These traits will each be looked at in turn in the literature review.

Purpose and Significance

The current study on metacognitive processes in AN is an expansion on the few preliminary studies that have examined this topic. Previous studies found significantly increased levels of metacognitive dysfunction, as measured by the Metacognitive Questionnaire (MCQ-30) (Cooper, Grocutt, Deepak, & Bailey, 2007; Konstantellou & Reynolds, 2010; McDermott & Rushford, 2011), and indicated the need for further and more detailed validation of findings. This thesis appeared to be the next logical line of inquiry in order to ascertain whether metacognitions in AN patients are qualitatively or quantitatively different from dieting and non-dieting controls to warrant metacognitive intervention. Acquiring further information about the type, extent, and frequency of metacognitions may help to explain how AN develops and how it is maintained. Studying metacognitions may give insight into certain mechanisms or particular risk factors that perhaps lead dieting women to develop AN. Alternatively, protective metacognitive processes that provide resilience towards AN may be ascertained in dieting participants. The methodology of this study, while also incorporating the use of the MCQ-30 (Wells & Cartwright-Hatton, 2004), includes various other qualitative and quantitative measures related to metacognition, such as the Thought Control Questionnaire (Wells & Davies, 1994) in order to gather detailed results and answer the study questions.

The lack of effective or efficacious interventions in the treatment of AN becomes evident when conducting research (Hay, 2004; Mitchell et al., 2005). Although a variety of interventions are utilized to treat adults with AN, evidence for the superiority of any particular intervention is lacking (Bulik, Berkman, Brownley, Sedway, & Lohr, 2007): Pharmacological interventions alone for treating AN are inappropriate (Biederman et al., 1985; Kaye et al., 2001; Klibanski, Biller, Schoenfeld, Herzog, & Saxe, 1995), family therapy is only supported in adolescent samples (Hay, 2004; Smith & Cook-Cottone, 2011), cognitive analytic therapy (CAT) has limited effectiveness (Dare, Eisler, Russell, Treasure, & Dodge, 2001; Treasure et al., 1995), and CBT was only found to be promising after weight restoration (F. Carter et al., 2005; Channon, de Silva, Hemsley, & Perkins, 1989; Pike, Walsh, Vitousek, Wilson, & Bauer, 2003). Additionally, neither inpatient nor outpatient treatment display greater treatment efficacy (Biederman et al., 1985; Meguerditchian et al., 2010), leaving mental health professionals ambivalent about choosing the most appropriate treatment intervention for AN.

Aims

The principal aims of this research are as follows:

1. To examine the frequency of metacognitions between dieting, non-dieting, and adult women diagnosed with AN.
2. To explore qualitative similarities and differences in metacognitions between dieting, non-dieting, and AN diagnosed adult women in both type and frequency.
3. To examine the degree of utilization, function, and success of using metacognitive control strategies between dieting, non-dieting, and adult women diagnosed with AN.
4. To ascertain whether metacognitive components perhaps contribute to the development or maintenance of AN.

Literature Review

Anorexia Nervosa

Anorexia nervosa (AN) is categorised as one of three eating disorders alongside bulimia nervosa (BN), and Eating Disorder not otherwise specified (ED-NOS) in the current Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000). AN is a debilitating and often long-term struggle for individuals living with the disorder. According to the DSM-IV-TR (American Psychiatric Association, 2000), AN is characterized by a triad of symptoms: extremely low body weight comparative to age and height, an intense fear of gaining weight, and a negatively distorted self- and body-image. AN is classified into two subtypes: the restricting type, and the binge-eating/purging type. Hence, two clinical presentations can be observed.

The AN restricting type typically has an early onset in adolescence and often includes either amenorrhea or abnormal menses. Food restriction lies at the core of the restricting subtype and individuals often consume less than 1000 calories a day. As a consequence of food restraint, the body weight of someone with AN restricting type is significantly below average. Weight tends to lie somewhere between 50% or 60% of the expected weight when taking age and height into consideration (American Psychiatric Association, 2000).

The binge-eating/purging subtype of AN differentiates itself from the restricting type by including the criteria of binge-eating and/or engaging in behaviours to compensate for weight gain, known as purging. Purging behaviours include self-induced vomiting, misusing laxatives, and misusing diuretics and/or other purgatives. This binge-eating/purging subtype differs from BN solely through significantly lower Body Mass Index (BMI; American Psychological Association, 2000).

Because of the egosyntonic nature of AN, denial of eating and weight problems are common. Obsessive compulsive and perfectionistic personality traits are often observed, and

are evident through tasks such as rigid exercise routines and stringent dietary restrictions (Hersen, Turner, & Beidel, 2007).

The course and prognosis of AN is highly variable and has the tendency to shift from one subtype to another. A significant portion of individuals who are first diagnosed with the restricting subtype of AN, develop binge eating or purging behaviours and are, thus, reclassified into the binge-eating/purging subtype. Such shifts usually occur within the first five years of AN onset, whereas other individuals may warrant a later diagnostic change to BN. The course of AN typically unfolds in one of three ways: either recovery after a single episode, a fluctuating pattern of weight gain and relapse, or chronic deterioration over multiple years (American Psychological Association, 2000).

In the past, AN has been viewed as an exclusively Western disorder. This is certainly no longer the case, as studies show a rise of AN cases in other cultures, such as Japan and China, where women are increasingly exposed to westernization and cultural change (Khandelwal & Saxena, 1990; Lee, 1996; Loue & Sajatovic, 2004; Rieger, Touyz, Swain, & Beumont, 2001). Individuals with AN have the highest mortality rate of all psychiatric conditions (Morris & Twaddle, 2006; Sullivan, 1995), not to mention significant functional impairment (Finfgeld, 2002; Sue & Birmingham, 2003). The rate of 0.5% is often used as a valid lifetime prevalence regarding AN (American Psychiatric Association, 2000); however, figures are steadily rising (Lee, 1996). In fact, a study in 2006 (Bulik et al., 2006) reported an increased AN lifetime prevalence rate of 1.2% for women, and 0.29% for men, demonstrating urgent research need for AN. Treatment guidelines are still tentative (Hay, 2004). Therefore, metacognitions may help to give a better understanding of the development and/or maintenance factors of AN.

Therapy for Anorexia Nervosa

Treatment efficacy for AN appears to be moderate at best and ineffective at worst. Recovery rates vary from study to study. Long-term outcome studies indicate recovery rates ranging from 25% to 70% (Eckert, Halmi, Marchi, Grove, & Crosby, 1995; Lowe et al., 2001; Steinhausen, 2002; Strober, Freeman, & Morrell, 2002). Higher recovery rates have been found in adolescent samples, most likely due to the lower chronicity of AN in the adolescent age range (Bulik et al., 2007). Family therapy frequently demonstrates this high success rate for adolescent samples (Lock, 2011; Smith & Cook-Cottone, 2011). However, as mentioned previously, no firm conclusions about treatment efficacy in adults can be drawn from any pharmacological or psychotherapeutic interventions (Mitchell et al., 2005).

Studies carried out in such uncertain and inconclusive terrain are infiltrated by numerous research limitations. These include: limited sample sizes, high attrition rates, inadequate or lacking randomization procedures, differences in standard care, intertwining of treatment interventions, vagueness of illness stage, insufficient distinction between pre or post weight restoration, and flawed methodologies (see Bulik et al., 2007; Guarda, 2008; Mahon, 2000). Nevertheless, CBT appears to be the most popular treatment option for adult AN patients in many settings (Roth & Fonagy, 2005). This is probably due to CBT's general popularity as a psychotherapeutic treatment intervention as well as the fact that the effectiveness of CBT for BN has been firmly established (Wilson, Fairburn, Agras, Walsh, & Kraemer, 2002).

Being an egosyntonic disorder, AN brings with it many barriers when conducting treatment. Battling with various levels of engagement is very common (Cooper, 2005). Individuals with AN are often ambivalent about seeking treatment and changing their eating behaviour (Gale, Holliday, Troop, Serpell, & Treasure, 2006). Frequently, pressure from

family members or friends, rather than personal motivation, persuades individuals with AN to attend treatment services (Vitousek, Watson, & Wilson, 1996). Resistance is typical throughout treatment, which unfortunately increases the probability of treatment discontinuation (Mahon, 2000). High attrition rates have been consistently found (e.g. Steiner, Mazer, & Litt, 1990; Zeeck, Hartmann, Buchholz, & Herzog, 2005); in a few studies they have exceeded 50% (Vandereycken & Pierloot, 1983; Woodside, Carter, & Blackmore, 2004).

Research into the field of metacognitions in AN is, therefore, fitting. Other treatment modalities must be explored. Supporters of metacognitive treatments advocate that merely modifying maladaptive cognitions is unlikely to prove effective if the cognitive processes underlying these thoughts are neglected (McDermott & Rushford, 2011). An underlying AN model as a basis for AN intervention is lacking and must be developed. Metacognitive principles explaining the development and maintenance of AN appear to hold promise in the literature.

The Underlying Metacognitive Model: The Self-regulatory Executive Function (S-REF)

Past cognitive explanations of psychiatric disorders have centred around the content of thoughts rather than on the process of thinking about thoughts. Dysfunctional thoughts and beliefs have been targeted to address the issue of psychopathology. While schema theory and cognitive therapy address the content of people's thoughts, these theories do not explain thinking styles and thought patterns. To explore these aspects, beliefs about thoughts and individual strategies of controlling thoughts must be discerned. This is where metacognitive beliefs become relevant and help explain AN.

Metacognitive dysfunction rests upon the Self-regulatory executive function model (S-REF; Wells & Matthews, 1994; See Figure 1). S-REF aims to express the “*reciprocal*

causal interplay between multiple components of cognition, including beliefs, metacognitions, attentional control, on-line processing, and self-regulation (Wells, 2000, p. 15). The S-REF model proposes that cognitive processes are distributed across three interacting levels: low level processing, cognitive style, and the meta-system (Wells, 2000, 2009a, 2009b).

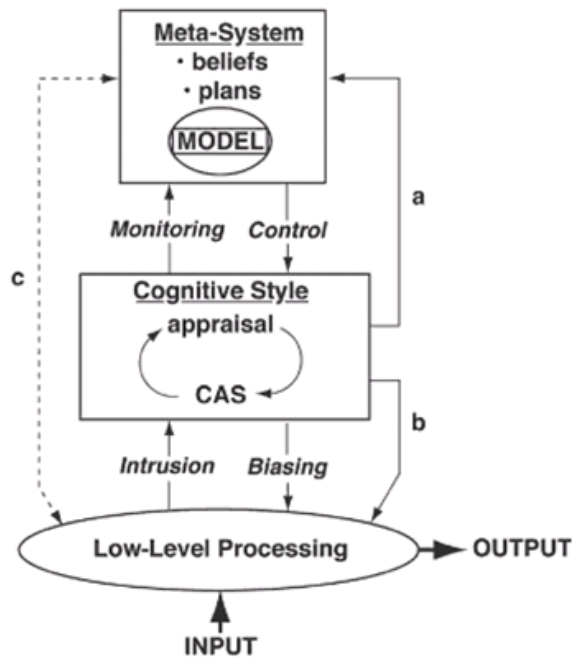


Figure 1: The Self-Regulatory Executive Function Model taken from Wells (2009)

Lower level processing is an automatic and reflexive process. It is stimulus driven and functions outside of conscious awareness, occasionally reaching into consciousness. Cognitive style is the conscious appraisal of events and controls thoughts and actions. It is dependent on attentional resources to execute cognitive processes. This cognitive processing is usually voluntary: the individual is consciously aware of the processing. However, processing may also weave out of conscious awareness, for example when psychopathology is present in the individual. The meta-system is required for on-line processing, as it cannot function independently. The cognitive level relies on self knowledge from the meta-system to guide it. The meta-system can therefore be described as a store of metacognitions, that is,

self-knowledge stored in long term memory. This meta-system guides cognitive processing toward one's goal of an activated plan. Arrow a of Figure 1 illustrates the effect of appraisals and coping behaviour on beliefs. For example avoiding feared experiences, such as anxiety, prevents an individual discovering that experiencing that anxiety is in fact harmless. Arrow b depicts the effect of coping and thinking styles on emotion- and lower-level processing. For example, worrying maintains emotional arousal and blocks emotional processes. Arrow c signifies the interplay between the lower level processing and the meta-system (Wells, 2000, 2009a, 2009b)

S-REF processing is initially instigated automatically. This automatic processing can be generated internally by negative, threat-related thoughts or externally by threat stimuli. Once activated, the store of self-knowledge, which is lodged in long term memory, is accessed to generate threat appraisals and to select coping strategies. The activated knowledge base is comprised of broad plans for appraisal and coping, which are modified and tailored to the particular situation at hand. These, in turn, are dependent on the feedback of success or failure regarding the processes adopted. Therefore, metacognitions guide S-REF processing and the reciprocal effects of processing thoughts and beliefs in long term memory (Wells, 2000, 2009a, 2009b).

Usually, S-REF activity is short-lived. It does not take long to self regulate and to choose a strategy that successfully manages a feeling of discrepancy. An individual either chooses a task-focused coping strategy or alternatively, modifies an existing belief. For example, if hungry, self-knowledge guides our appraisal of hunger and directs an action in order to return to a feeling of satiety: we eat. When psychopathology is implicated, however, this process changes. The person suffering from a psychiatric disorder has difficulties achieving a self-regulatory goal, signifying that the S-REF cycle has become more pervasive. Failure to attain goals may rest on a number of factors: inappropriate coping strategies may

be selected; negative self-knowledge may maintain or perpetuate repeated negative self-appraisals of oneself and one's current state; inappropriate goals may be selected; or external constraints may be problematic. These difficulties can be resolved if the individual displays flexibility in changing either their behaviour or beliefs. In psychopathology, however, the individual's goals are often inflexible and rigid. Indeed, effective self-regulation may seem impossible. The individual's scope for action and cognition is limited; inappropriate goals may act as barriers. Therefore, dealing with the dysfunction and attempting to restructure cognition often fails (Wells, 2000). S-REF activity is, thus, either maintained, prolonged, or repeated.

Numerous factors contribute to this: the difficulty of bringing threats under personal control; self-control problems due to the environment or external stimuli; or, as is most common, individual factors. Examples of such individual factors include faulty appraisals concerning internal control, utilization of unhelpful coping strategies, and dysfunctional self-knowledge pertaining to self-regulation or unrealistic goals. One of the most important factors according to this model is the contribution of metacognitive beliefs. For example, an individual may believe that worry or rumination represents a desirable and/or an effective coping strategies for self-regulation (Wells, 2000). Both positive and negative metacognitive beliefs influence someone's appraisals, in turn guiding cognitions and subsequent actions (Wells & Cartwright-Hatton, 2004). The metacognitive component, therefore, contributes to the development and maintenance of psychopathology due to various ineffective response styles, such as suppression or avoidance. Such ineffective response styles and maladaptive strategies use up valuable processing resources without providing information to disconfirm faulty appraisals or negative beliefs. Instead, the individual becomes more self-focused, sensitive to biases, and fails to implement other, more effective strategies (Wells, 2000).

Cognitive Attentional Syndrome (CAS)

At the core of the S-REF model is that psychopathology is developed and/or maintained by a particular toxic style of thinking called Cognitive Attentional Syndrome (CAS; Wells, 2009b). Feelings of sadness, anger, anxiety, or worthlessness are felt by everyone at various times in their lives but are usually isolated and fleeting. The CAS, however, locks people experiencing psychopathology into a repetitive and prolonged pattern of negative thoughts or sensations so that feelings of sadness, anger, anxiety, or worthlessness tend to be more common and permanent. The CAS may, therefore, be characterized by a perseverative thinking style and attentional preoccupation with threatening stimuli, worry, rumination, and/or unhelpful coping strategies. Once caught in this negative pattern of thinking, negative emotions tend to be maintained and/or strengthened. This, in turn, preserves the individual's sense of threat (Wells, 2000, 2009a).

The CAS arises from erroneous knowledge and beliefs that are metacognitive in nature, and led by the meta-system. CAS may, hence, lead to psychological disturbances in several different ways: CAS appraisals and coping behaviours may have a negative effect on beliefs, CAS thinking style and coping may have a negative effect in low-level automatic and emotion-level processing, or the CAS may influence the relationship between higher and lower processing (e.g. retrieval of knowledge) (Wells, 1999). This way, the S-REF model explains how dysfunctional metacognitions may lead to and/or perpetuate disorders, such as AN.

Cognitive Attentional Syndrome (CAS) in AN

Central aspects in the CAS thought process suggested to uphold disorders such as AN are examined below. These include: worry and rumination; attention to threat stimuli;

unhelpful strategies, such as emotional avoidance and suppression of thoughts; and a perseverative thinking style.

Worry and Rumination. Worry and Rumination appear to be salient in many psychiatric disorders, including Eating Disorders (Ehrings & Watkins, 2008; Watkins, 2008). Worry, constitutes “*a chain of thoughts and images, negatively affect-laden and relatively uncontrollable* (Brokovec, Robinson, Pruzinsky, & DePree, 1983, p. 10)”. Worrying represents an attempt to resolve an issue, whose outcome is uncertain and which contains the possibility of negative consequences. Worry about negative evaluation, in particular, is reported to predict disordered eating above other fears and worries (Levinson & Rodebaugh, 2012). In fact, social phobia is elevated in patients with AN (DeKaye, Bulik, Thornton, Barbarich, & Masters, 2004; Pallister & Waller, 2008). Anxiety disorders in general are also much higher in patients with AN than in controls (Pallister & Waller, 2008); lifetime prevalence rates as high as 83% have been suggested (Godart, Flament, Lecrubier, & Jeammet, 2000). GAD statistics too, have been significant: Individuals with AN have a 30% to 50% lifetime prevalence rate of developing GAD (Godart et al., 2003; Lilenfeld et al., 1998). Due to this, GAD theories have been applied to AN: chronic worry states, triggered by interceptive cues, social evaluation, and food/weight related cues can manifest themselves as hypervigilance relating to weight and shape changes. Natural fluctuations in shape and weight may consequently lead to the cognitive misinterpretation of future threat and harm (Hildebrandt, Bacow, Markella, & Loeb, 2010).

Rumination characterises thoughts that passively focus an individual’s attention to negative symptoms and pessimistic implications of these symptoms (Nolen-Hoeksema, 1998). Rumination has most notably been studied with regards to depression (Lyubomirsky & Nolen-Hoeksema, 1993) and has been shown to predict its onset (Robinson & Alloy, 2003; Roelofs et al., 2009), maintenance (Lara, Klein, & Kasch, 2000; Nolen-Hoeksema, 2000),

and recurrence (Roberts, Gilboa, & Gotlib, 1998; Watkins et al., 2007). Broadly speaking, rumination is divided into two aspects that may perform independent functions in an individual's thinking processes: the first is reflection; the second, brooding.

While reflection has been associated with adaptive coping strategies, insight, and behaviour change (Surrence, Miranda, Marroquin, & Chan, 2009), brooding is seen as an information processing strategy related to maladaptive emotion regulation, symptom persistence, and the failure to achieve goals (Burwell & Shirk, 2007; Hayes et al., 2004; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Rumination about eating, shape, and weight represents a core feature of EDs (Wolff & Serpell, 1998). Various research (Cowdrey & Park, 2011; Cowdrey & Park, 2012; Rawal, Park, & Williams, 2010) found that AN patients displayed positive beliefs about the benefits of rumination and increased brooding. The focus on brooding may reflect an attention bias in AN patients to attend more to discrepant information, that is, current vs. ideal states (Park, Dunn, & Barnard, 2011). This is not surprising given the emphasis of weight, shape, and eating preoccupation in the DSM-IV AN diagnostic criteria (American Psychiatric Association, 2000). Neuro-imaging and behavioural studies have repeatedly verified the presence of attentional biases and hypervigilance to food or body-related cues in AN patients (Brooks, Prince, Stahl, Campbell, & Treasure, 2011). Such preoccupation with food, weight, and shape, and the discrepancy individuals with AN perceive due to their cognitive distortions inextricably links worry and rumination with their disorder.

Attention to threat stimuli. Evidence suggests that food and weight carry different connotations for those with and without AN (Bruha, 2010). In AN, eating and weight gain is seen as a threat that must constantly remain under scrutiny: excessive focus is placed on internal events, external events, and negative information about shape, weight, and food. Unfortunately, this focus increases awareness of threats, negative affect, and anxiety (Wells,

2008). Bruha (2010) argued that those with AN symptoms have difficulty with, and are less likely to positively manage their thoughts, sensations, and feelings with regards to eating. Individuals with AN appear to display difficulties acting with awareness and consequently make decisions based on faulty rationale or errors in judgement. Little forethought or consequential thinking seems to be actively present in the cognitive processes of individuals with AN. Additionally, individuals with AN are substantially more judgemental about food, their body, and eating leading to decisions that are potentially harmful, such as purging (Bruha, 2010). Hypervigilance to threat monitoring in AN patients can manifest itself in body checking (Shafran et al., 2003), which is characterised by frequent weighing, frequent mirror checks, or comparing one's weight and shape to other people's (American Psychiatric Association, 2000). Information obtained from body checking is seen as a threat to control, which acts to maintain dietary restriction (Fairburn et al., 1999). Body checking lies in direct opposition to body avoidance, a strategy also commonly adopted (described below). Together, these strategies work to increase body preoccupation, body dissatisfaction, and overvaluation of shape and weight and are inextricably seen as threatening (Fairburn et al., 1999).

Unhelpful Coping Strategies of Avoidance and Suppression. Unhelpful coping strategies, most saliently avoidance and suppression, play a role in the development and/or maintenance of AN. Avoidance is used as a way to regulate inner emotional experiences. This strategy is problematic, however, because it is inconsistent in regulating emotions and cognitions, and, thus, does not provide the individual with unambiguous evidence to combat erroneous beliefs (Wells, 2008). In particular, *experiential avoidance* has been found to be an important aspect of AN's underlying pathology (Lavender & Anderson, 2010; Lavender, Gratz, & Tull, 2011; Rawal et al., 2010).

Experiential avoidance refers to the avoidance of undesired internal events. These include feelings, thoughts, memories, behavioural disposition, and bodily sensations (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Experiential avoidance is suggested to be an important maintaining factor in AN, particularly the avoidance of emotions, emotional memories, and intimate relationships (Schmidt & Treasure, 2006). This type of avoidance has been observed in individuals with AN and has been shown to increase after AN's onset (Schmidt, Evans, Tiller, & Treasure, 1995).

The factor in experiential avoidance most pronounced is emotional avoidance. Individuals with AN tend to avoid negative emotions significantly more than controls (Corstorphine et al., 2007; Hambrook et al., 2011; Wildes et al., 2010). Individuals with AN endorse the idea that outwardly presenting negative emotions is unacceptable (Schmidt & Treasure, 2006). Possessing negative beliefs about expressing and experiencing emotions appears to be one of the core features of AN (Hambrook et al., 2011), possibly due to fear of rejection or being criticised by others (Schmidt & Treasure, 2006). Avoidance further extends to the negative feelings and thoughts about weight and shape (Geller et al., 2000). So called *body avoidance* refers to the avoidance of seeing one's weight or shape (Shafran et al., 2003) by refusing to be weighed, wearing baggy clothes, or covering mirrors in the house (American Psychological Association, 2000). Engaging in these avoidance strategies prevents those with AN from disconfirming their worst weight and shape related fears (Salkovskis, 1991). Interestingly, similar avoidance behaviour has also been found for positive emotions (Corstorphine et al., 2007; Forbush & Watson, 2006). This is also known as an aspect of '*self-silencing*' (Jack & Dill, 1992): an important predictor of drive for thinness and body dissatisfaction (Buchholz et al., 2007).

Suppression and avoidance, although different, still show considerable overlap. Individuals with AN have been reported to suppress negative feelings, in particular to

preserve close relationships (Geller et al., 2000; Hambrook et al., 2011). Their own thoughts and feelings tend to be minimized in favour of significant other's thoughts and feelings. Schmidt and Treasure (2006) proposed that avoidance too, may serve to prevent conflict and preserve relationships. When individuals with AN do experience specific emotions, they display difficulties with tolerating negative affect and distress. This, in turn, may lead them to use food to regulate their internal experiences, be it through restricting or binging (Corstorphine, 2006). It is becoming clear that individuals with AN rely heavily on metacognitive control strategies, such as distraction, thought suppression, and trigger avoidance in an attempt to control their negative emotions (Woolrich, Cooper, & Turner, 2008). The use of these unhelpful strategies has been demonstrated by self-report questionnaires as well as qualitative analyses (Cockell, Geller, & Linden, 2002; Gale et al., 2006; Nordbø, Espeset, Gulliksen, Skårderud, & Holte, 2006; Serpell, Treasure, Teasdale, & Sullivan, 1999).

Perseverative Thinking Style. A further hypothesis within the AN literature is that cognitive flexibility is inversely related to eating disorder behaviour and can predict health outcomes (Wendell, Masuda, Price, & Anderson, 2010). Various studies have found individuals with AN to possess a perseverative thinking style in (Abbate-Daga et al., 2011; Tchanturia, Breceelj Anderluch et al., 2004), particularly in tasks requiring simple alternation and perceptual shifting (Tchanturia, Morris et al., 2004). Indeed, cognitive inflexibility in the form of perseveration, mental rigidity, preoccupation with details, and difficulty adapting may be seen as a personality factor ingrained in those with AN (Strober, 1980). Subjective attitudes of those with AN were positively correlated with intolerance of uncertainty (Konstantellou & Reynolds, 2010). Not only significantly elevated cognitive rigidity, but behavioural rigidity too, has been found to be present in those with AN (Zastrow et al., 2009). These rigid strategies may prevent successful behaviour change in treatment - even in

motivated patients (Tchanturia, Serpella, Troop, & Treasure, 2001). Thus, a model of psychological (in)flexibility has been proposed and advocated for as a treatment target (Merwin et al., 2010).

A deficit in the aspect of set-shifting, in particular, has been noted (Easter & Tchanturia, 2011; McAnarney et al., 2011; Roberts, Tchanturia, & Treasure, 2010; Steinglass, Walsh, & Stern, 2006; Tchanturia, Morris et al., 2004). Set-shifting refers to the ability of cognitively shifting between mental tasks, responses, or sets. It requires the inhibition or adaptation of previous thinking patterns and is vital for behavioural flexibility, in which a person is required to adapt their behaviour to the ever-changing demands of the external environment (Wilson, 2004). A meta-analysis in 2007 further asserted that individuals with AN demonstrated suboptimal performance in set-shifting compared to controls (Roberts, Tchanturia, Stahl, Southgate, & Treasure, 2007). These deficits have been established in various laboratory tasks (e.g. Fassino et al., 2002; Lauer, 2002; Tchanturia, Morris et al., 2004; Tchanturia, Serpell, Troop, & Treasure, 2001) and possible neuropsychological correlates have been identified (Nakazato et al., 2010; Nakazato et al., 2009). Indeed, various studies have suggested problems in set-shifting to be an endophenotypic trait of individuals with AN (Holliday, Tchanturia, Landau, Collier, & Treasure, 2005; Roberts et al., 2007; Southgate, Tchanturia, & Treasure, 2005; Tchanturia, Morris et al., 2004; Tenconi et al., 2010). Even once recovered, those with a history of AN, still show deficits in set-shifting (Tchanturia, Morris et al., 2004). Furthermore, familial evidence of set-shifting deficits have been reported (Holliday et al., 2005; Roberts et al., 2010). Collaboratively, studies suggest that cognitive inflexibility is a risk factor (Holliday et al., 2005) as well as a maintenance factor (Schmidt & Treasure, 2006; Steinglass et al., 2006) for AN.

Taken together, these factors come together to characterise a toxic way of thinking, the CAS. As the CAS is derived from an individual's metacognitive beliefs that become activated in problematic situations, maladaptive metacognitive beliefs must be modified in order to remove the CAS.

Metacognitions

Metacognitions answers the question of what controls one's thoughts. In other words, metacognitions determine whether our thoughts are dismissed or whether they are dwelled upon, potentially leading to prolonged and deeper distress if the latter approach is selected. Wells (2009b) points out that "*metacognitions are responsible for healthy and unhealthy control of the mind (p.1)*". Emphasis lies not with the thought content, but rather with the thought patterns: instead of focusing on *what* a person thinks, the focus rests on *how* that person thinks. This '*how*' establishes felt emotions and the control one has over them. Metacognitions are divided into three aspects: knowledge and beliefs; experiences; and strategies. These three aspects are by no means independent but function together as an integrated whole (Wells, 1995, 2008, 2009a). The three metacognitive aspects are looked at in turn.

Metacognitive Knowledge. Metacognitive knowledge refers to the theories and beliefs one has about one's own thinking. This knowledge consists of beliefs about different thoughts but also about a person's power of concentration and memory efficiency. Metacognitive knowledge can be split into two different types: explicit and implicit knowledge. Explicit knowledge can be verbally expressed, as in the thought "Worrying is dangerous and uncontrollable". Implicit knowledge on the other hand cannot usually be expressed verbally. Rather, implicit knowledge acts as rules that guide a person's thinking. Examples include the allocation of attention, the use of heuristics when forming judgements,

and searching through memories. Alongside these two aspects of metacognitive knowledge, there are a further two content domains: positive and negative metacognitive beliefs (more details below). Positive beliefs refer to the advantages of engaging in cognitive activities, which may pertain to ineffective coping strategies, such as rumination. Negative metacognitive beliefs are concerned with the uncontrollability, importance, dangerousness, and pessimistic meaning of thoughts (Wells, 1995, 2008, 2009a).

Metacognitive Experiences. Metacognitive experiences are feelings and situational appraisals individuals have of their mental status (Wells, 2009a). Metacognitive experiences include: subjective feelings, such as the tip of the tongue effect; and appraisals or judgements of the meaning of particular thoughts or events. In other words, metacognitive experiences are a conscious interpretation and labelling of cognitive experiences (Wells, 1995, 2008, 2009a).

Metacognitive Strategies. Lastly, metacognitive strategies are specific responses that are performed to control and alter thinking with the ultimate goal being cognitive and emotional self-regulation. Depending on which strategy is selected, cognitive activity is modified, intensified, or suppressed. A number of strategies are aimed at reducing negative emotions or thoughts by altering cognitions, while other strategies utilize distraction, positive thinking, and suppression. In psychopathology, the strategies employed by individuals are usually attempts to control the nature of their thinking. These include suppression, avoidance, rumination, and predicting the future. Unfortunately, these strategies have been found to be counterproductive in the long term (Wells, 1995, 2008, 2009a).

Positive and Negative Metacognitions

As mentioned, metacognitions encompass two different poles: positive and negative metacognitions. Positive metacognitions are concerned with the usefulness of strategies, such

as threat monitoring, worry, or rumination. These beliefs may appear reasonable at first. By catastrophizing, an internal sense of being able to effectively deal with the range of possible threats that arise may be harboured. Such beliefs, however, become maladaptive in the long-run and prolong the CAS by using up valuable processing resources, prolonging self-focused processing, and by disrupting or biasing other processes, such as emotional processing. In the same vein, negative metacognitions exacerbate the CAS. These negative metacognitions refer to the negative meaning and significance of internal cognitive events: the uncontrollability of thoughts, as well as the importance and danger of these thoughts. The CAS persists because negative metacognitive beliefs lead to negative and threatening interpretations of internal events, and because of a lack of attempting control (Wells, 2000, 2009b).

Taken together, metacognitions are present in every person's thought process - consciously and unconsciously. However, some individuals with certain psychiatric disorders appear to display different metacognitions compared to individuals without disorders. These may include pervasive, ruminative thinking styles, active worrying, and inapt attentional priorities that fail to neutralize or modify maladaptive thoughts and beliefs (Wells, 1995, 2008, 2009a).

Metacognitive Research across Disorders

Research on metacognitions in relation to psychopathology appears to have expanded considerably within the last decade when conducting a literature search. Numerous studies exist around metacognitions and the maintenance of generalized anxiety disorder (Wells, 1995, 1999), for which the metacognitive model was originally designed. These studies were able to conceptualize the aetiology and the maintaining metacognitive factors of GAD: Type I worry focuses on the content of the worries, and Type II worry, worrying about worry, is

termed meta-worry. Meta-worry is the mechanism responsible for creating psychopathology from common unpathological worrying (Wells, 1995).

Various other studies have also shown a causal or cross-sectional relationship between metacognitive dimensions and psychopathology. For instance, authors studying Schizophrenia argue that a deficit in metacognition, that is, difficulties with thinking about thinking, leads to functional impairment in individuals suffering from Schizophrenia (Lysaker et al., 2010; Lysaker et al., 2011). The same has been found in other psychotic disorders (Morrison & Wells, 2003).

In individuals who abuse substances, metacognitions appear to mediate substance use and may create a barrier for treatment (Toneatto, 1999). It was found that individuals dependent on alcohol scored higher than controls on positive and negative beliefs about emotional and cognitive self-regulation, negative beliefs about uncontrollability and negative beliefs about cognitive harm (Spada & Wells, 2010). Overall, there appeared to be a strong link between metacognitive factors and problem drinking (Spada, Moneta, & Wells, 2007; Spada & Wells, 2005, 2006; Spada, Zandvoort, & Wells, 2007).

A study on problem gambling and metacognition asserted that the metacognitive constructs of positive and negative beliefs about uncontrollability and danger of thoughts were vital to the maintenance of problem gambling (Lindberg, Fernie, & Spada, 2011).

Metacognitive aspects are implicated in many other psychopathologies, such as obsessive-compulsive disorder (García-Montesa et al., 2006; Hermans, Martens, De Cort, Pieters, & Eele, 2003; Janeck, Calamari, Riemann, & Heffelfinger, 2003; Wells & Papageorgiou, 1998), post-traumatic stress disorder (Roussis & Wells, 2006; Vassiliki, Nicholas, & Wells, 2001), hypochondriasis (Bouman & Meijer, 1999), and depression (Papageorgiou & Wells, 2001b; Papageorgiou & Wells, 2003; Wells, 2009b).

Non-clinical samples and metacognitions have also been investigated and a positive relationship was found. These studies included individuals undergoing stress and negative emotionality (Spada, Nikčević, Moneta, & Wells, 2008), procrastination (Spada, Hiou, & Nikcevic, 2006), test anxiety (G. Matthews, Hillyard, & Campbell, 1999; Spada, Nikcevic, Moneta, & Iresond, 2006), and smoking behaviour (Spada, Nikčević, Moneta, & Wells, 2007).

Metacognitive Research in AN

Following a detailed search, few sources examining metacognitions in AN patients were identified. Some earlier studies, whether intentionally or not, examined individual aspects of metacognitions in eating disorder samples. For instance, at the time the DSM-III was in use, Clark, Feldman, and Channon (1989) carried out early research looking at dysfunctional thinking in women diagnosed with an eating disorder. Although the authors' aim was to investigate the nature of negative cognitions in eating disorders, self-report questionnaires additionally inquired about the controllability and the beliefs participants possessed about their negative thoughts related to their eating disorder. Controllability and beliefs about thoughts are two aspects that are descriptive of and of interest in metacognitive research. After controlling for frequency of negative thoughts, those with eating disorders reported, among other things, that they believed their thoughts to be more realistic and more uncontrollable than controls. This early study, therefore, suggested the presence of significant differences in the internal dialogue of women with an eating disorder compared to women without an eating disorder. Such research demonstrates the relevance of metacognitions in Eating Disorders in general; however, it appears that research relating to metacognitions and AN has been overlooked and is only just starting to accumulate.

In 2002, Turner and Cooper aimed to look at cognitions in individuals with eating disorders, yet also incorporated questions that were metacognitive in nature. Results showed that those with AN, besides having more cognitions about eating, shape, and weight, also reported more negative assumptions related to self acceptance and acceptance by others. AN patients tended to consider these beliefs to be more true, more distressing, and displayed more negative self-beliefs as well as more assumptions relating to uncontrollability of eating and over-eating. These results were, thus, suggestive of significant differences in cognitive characteristics between the three groups; findings that aligned with Clark, Feldman, and Channon's study (1989) 13 years prior.

In 2007, Cooper, Grocutt, Deepak, and Bailey conducted a preliminary study examining the presence of metacognitions in women with a history of AN. Compared to both control groups, women with a history of AN scored higher on the metacognitive questionnaires. Scores of uncontrollability and danger; need for control; cognitive confidence; and cognitive self-consciousness were elevated, indicating that four out of the five metacognitive constructs were significantly higher in the AN group. One exception pertained to levels of positive beliefs about metacognitions. This construct was not significantly different between samples. Furthermore, no significant difference in scores of dieting and non-dieting participants was found in terms of levels of metacognitions, revealing these elevations to be exclusive to women with a history of AN. This study seems to be one of the first of its kind to directly assess metacognitions in eating disorders and showed that the topic clearly warranted further study.

Indeed, a year later, building on these findings, Woolrich, Myra, Cooper, and Turner (2008) conducted another preliminary study analysing a similar sample group. Findings appeared to suggest that although metacognitive appraisals and control strategies were present in all three samples, those with AN exclusively tended to believe that their thoughts

were uncontrollable and abnormal. Moreover, those with AN used metacognitive control strategies significantly more often but were unfortunately less successful at attending to their bodies, attending to others, and using thought reappraisal. Interestingly, half of the AN group reported utilizing such strategies to deliberately feel worse about themselves. This strategy perhaps acted as a motivator or used due to particular benefits metacognitions were believed to bring. The advantages and disadvantages individuals with AN endorsed about their thoughts were directly addressed in this study through qualitative questionnaires. Woolrich, et al. (2008), hence, suggested that metacognitions may play a role in AN, particularly in its maintenance by reinforcing negative self evaluations.

A more recent study by Konstantellou and Reynolds (2010) investigated both the aspect of metacognitions and intolerance of uncertainty, comparing a non-clinical sample of individuals with normal and problematic eating attitudes. Results indicated that those with problematic eating attitudes showed elevated scores on three of the five metacognitive factors, the total metacognition score, as well as intolerance of uncertainty. Furthermore, the authors found a positive correlation between metacognitions and intolerance of uncertainty. Findings suggested that intolerance of uncertainty and metacognitions played a vital role in Eating Disorders and seemed to indicate a maladaptive cognitive style. Thus, both appear worth targeting in treatment interventions.

In 2011, McDermott and Rushford published a succinct study measuring dysfunctional metacognitions in women with AN compared to women in a control group. Findings from self-report questionnaires indicated that women with AN reported a higher score on metacognitive dysfunction: four out of five metacognitive constructs were significantly elevated compared to the control group. These findings appear to be consistent with Cooper et al (2007), who also found all but 'positive beliefs about worry' to be elevated. McDermott and Rushford's (2011) study adds to the literature that metacognitive dysfunction

may be a considerable factor in the maintenance of AN; hence metacognitions may be an effective treatment target.

Overall, almost all metacognitive studies relating to AN found increased scores on at least three, if not four of the five metacognitive constructs: need for control, cognitive confidence, cognitive self consciousness, and negative beliefs about uncontrollability and danger of worry. This study expanded on this research by adding other related measures looking at rumination and reflection; positive and negative beliefs about rumination; thought control; depression, and anxiety. Moreover, qualitative questions were completed by participants for a more in-depth review examining relevant metacognitive themes.

Measuring Metacognitions

In order to measure metacognitions in this study, the Metacognitive Questionnaire 30 (MCQ-30; Wells & Cartwright-Hatton, 2004) and the Thought Control Questionnaire (TCQ; Wells & Davies, 1994) were utilized. These questionnaires measure the following metacognitive aspects: positive beliefs about worry (MCQ-30); negative beliefs about uncontrollability and danger of worry (MCQ-30); cognitive confidence (MCQ-30); need for control (MCQ-30); cognitive self-consciousness (MCQ-30); distraction (TCQ); punishment (TCQ); reappraisal (TCQ); worry (TCQ); and social control (TCQ). Each of these aspects is briefly explained below.

The MCQ-30 contains five measurable aspects. (1) Positive beliefs about worry measures the degree to which a person believes worry or a perseverative thinking style is useful, helps to solve problems, or helps to avoid unpleasant situations . The measure also encompasses items examining the degree to which a person believes that worrying is a necessary trait of a normal/pleasant person. (2) Negative beliefs about uncontrollability and danger of worry measures the extent to which a person believes worry or a perseverative

thinking style to be uncontrollable and mentally or physically dangerous. A person scoring high on this facet believes that a prerequisite to function well as a person is to be able to control one's worrying. (3) Cognitive confidence refers to having confidence in one's own cognitive skills, namely attentional functioning, memory, and reality monitoring. (4) Need for control measures the extent to which a person believes that aversive consequences will occur if a thought is not controlled; therefore, certain thoughts must be suppressed. A person high on this aspect holds negative beliefs about thoughts in general and may embody themes around superstition, responsibility, or punishment. (5) Cognitive self-consciousness measures a person's tendency to monitor thoughts and focus on internal thinking processes (Cartwright-Hatton & Wells, 1997).

The Thought Control Questionnaire also contains 5 measurable aspects. These are (1) Worry, in which perseverative thinking is utilized to attempt to control thoughts, e.g., "I dwell on other worries". (2) Punishment is used in order to control a thought through an aversive stimuli on the self, e.g. pinching, swearing, hitting (Ree, 2010). Both worry and punishment embody maladaptive control strategies and are associated with a predisposition to psychopathology (Wells & Davies, 1994). (3) Both behavioural and cognitive distraction is used to distract from a thought an individual does not wish to think about e.g., "I think pleasant thoughts instead". (4) Reappraisal challenges the validity of an unwanted thought (Ree, 2010). (5) Social control utilizes reassurance from others, e.g., "I ask my friends if they have similar thoughts". Distraction, reappraisal, and social control appear to be markers of positive psychological health markers. They may, under some circumstances, buffer against emotional vulnerability (Wells, 2000; Wells & Davies, 1994).

Study Hypotheses

Following on from the metacognitive research, the hypotheses for this study are as follows:

1. The AN group will display a higher frequency of metacognitions than the dieting and non-dieting group. Specifically, four of the metacognitive factors on the MCQ-30 ('need for control', 'cognitive confidence', 'cognitive self consciousness', and 'negative beliefs about uncontrollability and danger of worry') will be significantly elevated in the AN group compared to the dieting and non-dieting group. It is expected that the fifth factors of 'positive beliefs about worry' will not be different across the groups.
2. It is expected that there will be a positive correlation between metacognitions and rumination, and metacognitions and worry in all three group, as suggested in the literature.
3. The AN group will display more negative metacognitive control strategies than the dieting and non-dieting group, as measured by the TCQ.
4. Anxiety and depression will not have a significant effect on the metacognitive findings across the three groups.
5. As qualitative data on metacognitions and AN is lacking, the qualitative data will be analysed inductively, as opposed to inspected via hypothesis-testing.

Summary

Reviewing the existing literature in relation to metacognitions and AN, it becomes clear that more research on this topic is vital for a new or additional conceptualization of AN. AN is a chronic, debilitating psychiatric illness, for which no efficacious treatment is currently available, despite its seriousness. Although CBT is often used to treat adult women with AN, support for this treatment type is very limited; hence, the search for alternative

treatments is needed. The answer may lie with targeting dysfunctional metacognitions instead of merely targeting dysfunctional cognitions. Metacognitions are cognitive factors monitoring, interpreting, and controlling thinking, or to state it simply: thinking about thinking (Wells, 2009a). The importance of both positive and negative metacognitions has been identified in psychological disorders (e.g. Dimaggio et al., 2011; García-Montesa et al., 2006; Lysaker et al., 2010; Wells, 2000), particularly in GAD (Wells, 1995, 2008, 2009b). Preliminary studies show a potential value of targeting metacognitions in eating disorders (Cooper et al., 2007; Konstantellou & Reynolds, 2010; McDermott & Rushford, 2011; Woolrich et al., 2008) and this thesis build on these novel findings.

This study aims to examine the frequency and nature of metacognitions across women dieting, not dieting, and with a diagnosis of AN. The Self-regulatory executive function (S-REF) model represents the underlying metacognitive model and serves to provide an explanatory framework of how metacognitive dysfunction can lead to general psychopathology, or in this case, AN. At the core of the S-REF model is a particularly toxic thinking style: the CAS. This study examines whether the S-REF embodies a valid model that can explain how AN is developed and/or maintained.

This research aims to fill some of the gaps and battle some of the limitations of previous studies. Firstly, a larger sample compared to earlier studies will be recruited so as to make the findings more generalisable and representative of the population. Secondly, this study will be controlling for anxiety and depression, in order to rule out symptoms and metacognitions not related to AN. Thirdly, qualitative analysis will expand on the quantitative analysis by identifying the specific advantages and disadvantages of having worried or anxious thoughts about shape, weight, and eating across the three sample groups.

Method

The purpose of the study was to examine the nature and extent of metacognitions in relation to weight, shape, and eating in a sample of female university students currently not dieting, dieting, and in adult females diagnosed with AN.

Participants

Three groups of participants were recruited: non-dieting female students, dieting female students, and female AN patients. While non-dieters acted as the first control group, non-dieters were included in the study as a second control group. Dieters share various concerns typical of individuals with an ED, and it was considered important to determine whether both groups displayed similar scores on relevant measures.

The first group included 60 non-dieting adult females, without a history of eating disorder behaviours or current psychiatric disorders. The mean age of women in this group was 21.38 ($SD = 5.87$). The mean BMI was 22.37 ($SD = 3.93$).

The second group comprised 55 non-symptomatic adult female dieters who followed a standard weight reduction diet and set strict rules about their eating over the previous four weeks or more. Women with current or historic eating disorders or psychiatric disorders were excluded. The mean age for this group was 23.44 ($SD = 8.06$). The mean BMI was 23.78 ($SD = 4.30$).

The third group consisted of 16 female inpatients and outpatients from the South Island Eating Disorder Services (SIEDS), New Zealand with a primary diagnosis of AN. These women were initially approached about the study by their case managers, and consequently contacted by the researchers. The mean age for this group was 24.0 ($SD = 6.00$) and the mean BMI was 17.24 (1.93).

Data Collection Procedure

Ethical approval was obtained from the Upper South A Regional Ethics Committee. Refer to Appendix A.

University student participants were recruited in three ways: via emails; via flyers (See Appendix B) that were pinned on notice boards around the University; and via a first year psychology student participant pool, in which course credit was granted upon study participation. Each recruitment procedure included information about the nature of this study and its inclusion criteria. Dieting and non-dieting female participants were to be at least 18 years of age, fluent in the English language, have no current diagnosis of a mental disorder, nor a previous eating disorder diagnosis of less than five years.

Patients with AN were recruited via their case manager, who initially informed them about the study. Patients displaying interest were subsequently followed up via email or their case manager. During initial contact with participants, an exclusion criteria screening was performed. AN participants were to be at least 18 years of age, diagnosed with current AN, and fluent in the English language. A suitable time was subsequently set up for the participants to complete the questionnaires at the SIEDS, and for University students to fill out questionnaires at the University.

Prior to study participation, each participant received an information sheet (See Appendix C) with detailed information about the study and its procedure, and a consent form (See Appendix D) to sign as a prerequisite for study participation. Upon completion, each participant either received a reimbursement Countdown supermarket voucher or course credit. University students were given these at the researchers' office; patients with AN received these at the SIEDS.

Materials

Nine questionnaires were used in this study. Alongside this, six qualitative questions were asked.

The Metacognitive Questionnaire-30 (MCQ-30). The Metacognitive Questionnaire-30 (MCQ-30; Wells and Cartwright-Hatton 2004) is a 30 question self-report measure, derived from the 65-item MCQ (Cartwright-Hatton & Wells, 1997), concerned with beliefs people have about their thinking. The MCQ-30 assesses five factors of metacognitions. These include cognitive confidence (e.g. “*I do not trust my memory*”), cognitive self-consciousness (e.g. “*I will be punished for not controlling certain thoughts*”), need to control thoughts (e.g. “*My worrying thoughts persist, no matter how I try to stop them*”), positive beliefs about worry (e.g. “*Worrying helps me to get things sorted out in my mind*”), and negative beliefs about worry (e.g. “*It is bad to think certain thoughts*”). Answers are indicated on a 4-point Likert scale (1 = *Do not agree* to 4 = *Agree very much*). This multidimensional instrument is well documented, has a factor structure that is consistent with the original scale, and possesses good psychometric properties. Alpha coefficients range from .72 to .93, and MCQ-30 subscales were positively correlated with trait anxiety and pathological worry. No gender differences were found.

The Positive Beliefs about Rumination Scale (PBRS) (See Appendix E). The Positive Beliefs about Rumination Scale (PBRS; Papageorgiou & Wells 2001a) is a nine-item scale that assesses positive metacognitive beliefs about rumination (e.g. “*Ruminating about my feelings helps me to understand past mistakes and failures*”). Answers are indicated on a 4-point Likert scale (1 = *Do not agree* to 4 = *Agree very much*) and total scores range from 9 to 36. Psychometric analysis shows a one factor solution, alongside good psychometric validity and reliability. The internal consistency produced an alpha of .89 and test-retest stability over

a 6-week interval indicated a score of .85. The PBRS shows meaningful associations with other self-report scales measuring positive beliefs about worry, anxiety, rumination, and depression. Furthermore, the PBRS is able to effectively distinguish patients suffering from recurrent depression from patients with other disorders, such as social phobia, agoraphobia, and panic attacks.

The Negative Beliefs about Rumination (NBRS) (See Appendix F). The Negative Beliefs about Rumination Scale (NBRS; Papageorgiou and Wells 2001b) is a 13-item questionnaire measuring two types of negative metacognitive beliefs, indicating a two factor solution. The first is regarding the harmfulness and uncontrollability of rumination (e.g., “*Rumination about my problems is uncontrollable*”), while the second concerns itself with the social and interpersonal consequences of rumination (e.g. “*People will reject me if I ruminate*”). Answers are indicated on a 4-point Likert scale (1 = *Do not agree* to 4 = *Agree very much*) with total scores ranging from 13 to 52. Internal consistency for harmfulness and uncontrollability, and consequences of rumination demonstrate .80 and .83 respectively. Test-retest stability is acceptable. Meaningful associations were found between the NBRS and indices of negative beliefs about worry, rumination, and depressive symptoms in other measures. The NBRS is further able to discriminate between patients with depression and patients with other disorders, such as social phobia, panic disorder, and agoraphobia.

Thought control questionnaire. The Thought Control Questionnaire (TCQ; Wells & Davies, 1994) is a 30-item self-report measure, marked on a 4-point Likert scale (1 = *never* to 4 = *almost always*). It examines various techniques employed by individuals to control unpleasant or unwanted thoughts. These include cognitive and behavioural distraction (e.g. “*I think pleasant thoughts instead*” and “*I do something that I enjoy*”), social control (e.g. “*I don’t talk about the thought to anyone*”), worry (e.g. “*I think about past worries*”), punishment (e.g. “*I punish myself for thinking the thought*”), and re-appraisal (e.g. “*I*

logically reason it out”). Good validity and reliability is reported. Internal consistency ranges from .64 to .79, with low correlation coefficients, indicating that the subscales measure empirically distinct constructs. Test-retest coefficients range from .67 to .83. No gender differences were detected.

The Penn State Worry Questionnaire (PSWQ) (See Appendix G). The Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) was designed to assess trait symptoms of pathological worry. This measure evaluates the tendency to worry, the intensity of worry, the uncontrollability of worry, and the generalisability of worry. The PSWQ contains 16 items, which are rated from 1 = *not at all typical* to 5 = *very typical*. Total scores range from 16 to 80. The PSWQ demonstrates a high degree of internal consistency, ranging from .89 to .93 for anxiety disorder patients, and from .91 to .95 for community samples. Test-retest reliability proved to be good and ranged from .75 over a 2-week interval to .92 over an 8-10 week interval. Convergent validity also appeared to be good. The PSWQ was moderately to highly correlated with other questionnaires measuring worry, such as the Worry Scales Questionnaire ($r=.59$) and the Student Worry Scale ($r=.67$).

The Rumination and Reflection Questionnaire (RRQ) (See Appendix H). The Rumination and Reflection Questionnaire (Trapnell & Campbell, 1999) is a 24-item subscale measuring self-attentiveness and its reasons. Rumination measures self-attentiveness that is motivated by injustices to the self or by perceived threats or losses (e.g. “*I don’t waste time rethinking things that are over and done with*”), while reflection measures self-attentiveness that is motivated by interest in the self or by curiosity (e.g. “*Sometimes it is hard for me to shut off thoughts about myself*”). Answers about the extent of an individual’s rumination and reflection traits are marked on a 5-point Likert Scale (1 = *strongly disagree* to 5 = *strongly agree*). Total scores range from twelve (low rumination) to 60 (high rumination). The reliability is very good ($\alpha=.90$ and .91) with a mean inter-item correlation of .48 for

rumination and .43 for reflection. The RRQ's validity is supported by correlations with instruments measuring self-consciousness, depression, anxiety, negative autobiographical memories, neuroticism, and negative affect.

The Eating Disorder Examination- Questionnaire-4 (EDE-Q4) (See Appendix I). The Eating Disorder Examination- Questionnaire-4 (Fairburn & Beglin, 1994) is a 38 item self-report questionnaire derived from the semi-structured EDE interview. The EDE-Q4 uses a 7-point Likert Scale ranging from 0 = *no days* to 7 = *every day* and encompasses four subscales. These include restraint (e.g. "*Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight?*"), eating concerns (e.g. "*Have you had episodes of binge eating?*"), shape concerns (e.g. "*Have you definitely wanted your stomach to be flat?*"), and weight concerns (e.g. "*Have you had a definite fear that you might gain weight or become fat?*"); allowing for a Global Score when all four subscales are examined in combination. Participants fill out the frequency of engaging in eating disordered behavior over a four week timeframe. The EDE-Q4 has similarly good validity ($r=.9-$ to $.95$) and reliability ($\alpha=.68$ to $.9$) when compared to the EDE interview. A study using the EDE-Q4 among undergraduate women (Mond, et al., 2004) found internal consistencies ranging from $.78$ to $.93$ and test-retest correlations for the four subscales ranged from $.81$ to $.84$.

The Eating Attitudes Test-26 (EAT-26) (See Appendix J). The Eating Attitudes Test (Garner and Garfunkel, 1979) is a 26-item self-report questionnaire designed to assess a range of attitudes and behaviours present in AN and BN. The EAT-26 is an adaptation from its original 40-item version. Answers are marked on a 6-point Likert Scale ranging from *Always* to *Never* with total scores ranging from 0 to 72. Three subscales are measured and include Dieting (relating to avoidance of fattening foods and the preoccupation with being thinner, e.g. "*Engage in dieting behavior?*"), Bulimia and Food Preoccupation (relating to thoughts about food and indications of bulimia, e.g. "*Aware of the calorie content of foods*

that I eat”), and Oral Control (relating to self-control of eating and perceived pressure from others to gain weight, e.g. “*Vomit after I have eaten*”). The EAT-26 displays good reliability and validity (Garner, et al., 1982). Internal consistency shows $\alpha = .90$ and a validity coefficient of .85. The EAT-26 possesses an accuracy rate of at least 90% in separating individuals with and without eating disorders, using DSM-IV diagnostic criteria. Additionally, the EAT-26 is able to differentiate among eating disordered, symptomatic, and asymptomatic patients.

The Depression, Anxiety, and Stress Scale (DASS) (See Appendix K). The Depression, Anxiety, and Stress Scale (Lovibond & Lovibond, 1995) is a three subscaled, 42-itemed self-report questionnaire, providing a highly discriminant measure of depression (e.g. “*I couldn't seem to experience any positive feeling at all*”) and anxiety (e.g. “*I felt I was close to panic*”). It examines the unique and unrelated aspects of these two disorders and also incorporates stress (e.g. “*I found it difficult to relax*”); a feature common to both depression and anxiety. Participants rate their answers on a scale ranging from 0 = *did not apply to me at all* to 3 = *applied to me very much, or most of the time*. Validity and reliability were found to be good (Akin & ÇetİN, 2007). Internal consistencies for depression, anxiety, and stress were .96, .89, and .93 respectively. Convergent validity was found to be highly correlated with the Beck Depression Inventory (.74) as well as the Beck Anxiety Inventory (.81). Test-retest reliability amounted to .48.

Along with general demographics questions (See Appendix L), participants were asked qualitative questions assessing metacognitions:

- 1) What are the advantages of having negative/anxious thoughts about your eating?
- 2) What are the disadvantages of having negative/anxious thoughts about your eating?

- 3) What are the advantages of having negative/anxious thoughts about your weight?
- 4) What are the disadvantages of having negative/anxious thoughts about your weight?
- 5) What are the advantages of having negative/anxious thoughts about your shape?
- 6) What are the disadvantages of having negative/anxious thoughts about your shape?

Data Analyses

Participants' responses were scored and both quantitative and qualitative analyses were performed using IBM SPSS Statistics software. Descriptive statistics were used to compare the groups across variables.

For the quantitative data, a one-way analysis of variance (ANOVA) was carried out to compare the frequency of metacognitions across the samples. Bivariate correlation was performed to determine the nature of the correlation between metacognitions and rumination, and metacognitions and worry. Analysis of covariance (ANCOVA) was also performed to control for anxiety and depression, so as to establish whether these variables have a significant effect on the nature of metacognitive processes. Overall, the incidence of missing data was less than 1% (0.763%). Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. No such violations were found.

Qualitative analysis was carried out using thematic analysis, which included identifying a limited number of themes that adequately reflected textual data. Participant answers across all groups were recorded on pieces of paper according to the question

answered so all answers could be examined together for each question. Commonalities became apparent while looking across answers in all three groups. Subjective themes were generated independently by both the author and another researcher and recorded. Each researcher created her own themes that made sense to her in relation to the data. Both generated sets of themes were then compared and combined in a way that best covered all qualitative answers. As one researcher generated more numerous and specific themes and the other fewer and more general themes, a middle ground was reached and used for thematic analysis. Data was then coded simultaneously by both researchers to ensure agreement on answers and themes and to increase reliability. Descriptive statistics were used to determine the frequency of themes in participants' answers in the three groups. A one-way ANOVA was used to identify any significant differences in metacognitive themes between the three groups.

Results

This section will firstly outline the quantitative results, examining descriptive statistics, one-way ANOVAs, and correlation analyses. Secondly, the qualitative analyses will be described, including themes and theme frequencies.

Quantitative Analysis

Table 1 presents the demographic variables for all three groups. Results indicate that there were no statistically significant differences between any of the three samples in terms of age, education, ethnicity, or marital status.

Table 1
Demographic Variables of Age, Education, Ethnicity and Marital Status in Non-Dieting Women, Dieting Women, and Women with Anorexia Nervosa

	<u>Non-Dieting</u>		<u>Dieting</u>		<u>Anorexia Nervosa</u>		<i>p</i> =
	M (SD)	% (N)	M (SD)	% (N)	M (SD)	% (N)	
<i>Years</i>							
Age	21.38 (5.87)		23.44 (8.06)		24.0 (6.00)		0.19
High School	4.83 (0.56)		4.84 (0.43)		4.94 (0.25)		0.73
University	1.60 (2.13)		1.56 (1.84)		1.67 (1.61)		0.98
Tertiary Ed	0.20 (0.54)		0.26 (0.59)		0.19 (0.40)		0.80
<i>Ethnicity</i>							
NZ Euro		68.3 (41)		63.6 (35)		100 (16)	0.28
Maori		3.3 (2)		3.6 (2)		0 (0)	
Chinese		8.3 (5)		3.6 (2)		0 (0)	
Indian		1.7 (1)		1.8 (1)		0 (0)	
Other		13.3 (8)		12.7 (7)		0 (0)	
Multiple		5.0 (3)		14.5 (8)		0 (0)	
<i>Marital Status</i>							
Married		10.0 (6)		14.5 (8)		12.5 (2)	0.76
Divorced		1.7 (1)		1.8 (1)		6.3 (1)	
Never Married		88.3 (53)		83.6 (46)		81.3 (13)	

As shown in Table 2, there are a variety of statistically significant differences between the three groups on BMI; all DASS scores; both problematic eating scales (EAT-26 and EDEQ-4); NBRs; RRQ Rumination subscale; PSWQ; TCQ Distraction and Punishment

subscales, MCQ-30 ‘negative beliefs about worry’ and ‘need to control thoughts’ subscales as well as the total MCQ-30 score. Post hoc Tukey analyses showed that the AN group’s means were statistically higher compared to both the dieting and non-dieting group, with the exception of BMI, which was statically lower in the AN group compared to the controls. The few exceptions were results from the RRQ Rumination subscale and the TCQ Distraction and Punishment subscales, in which the AN group was statistically different only from the non-dieting group. Results from the two problematic eating scales, demonstrated that the dieting and non-dieting group were also statistically different from each other, suggesting eating symptoms to be continuous rather than dimensional in relation to the three groups.

Table 2

Body Mass, Mood, Stress, Anxiety, Eating, and Metacognitive Variables measured in the non-dieting, dieting, and AN groups

	Non-Dieting	Dieting	AN	F	p<
BMI	22.37 (3.93)	23.78 (4.30)	17.24 (1.93)	16.34	0.00*
DASS total	20.67 (19.03)	27.52 (23.29)	67.60 (30.18)	26.70	0.00*
Depression	5.77 (7.13)	7.94 (8.80)	22.38 (13.16)	23.17	0.00*
Anxiety	5.32 (5.42)	6.80 (6.53)	16.06 (9.90)	17.20	0.00*
Stress	9.58 (8.60)	12.73 (9.75)	27.20 (10.00)	21.73	0.00*
EAT-26	6.53 (6.90)	13.87 (11.36)	39.81 (16.29)	64.16	0.00*
PSWQ	50.78 (13.53)	51.49 (14.00)	63.93 (8.78))	5.80	0.00*
PBRs	18.82 (6.94)	19.49 (6.47)	18.31 (5.72)	0.25	0.78
NBRs	20.78 (7.45)	20.15 (6.38)	27.06 (8.55)	6.05	0.00*
RRQ Rumination	39.47 (9.78)	14.29 (9.05)	45.81 (6.41)	3.10	0.05*
RRQ Reflection	40.28 (9.87)	39.52 (11.16)	33.63 (6.65)	2.80	0.07
TCQ Total	62.60 (8.60)	63.09 (7.27)	61.38 (6.82)	0.30	0.74
Distraction	15.07 (2.83)	14.50 (2.50)	13.06 (3.07)	3.46	0.03*
Punishment	9.20 (2.45)	9.74 (3.24)	11.63 (2.73)	4.62	0.01*
Re-appraisal	14.12 (3.23)	14.54 (2.99)	12.44 (3.27)	2.78	0.07
Worry	9.97 (3.14)	10.19 (3.02)	11.81 (2.86)	2.35	0.10
Social Control	14.25 (4.50)	13.74 (4.50)	12.44 (3.54)	1.09	0.34
MCQ Total	58.28 (12.70)	55.98 (15.97)	71.07 (16.90)	6.30	0.00*
Positive Beliefs	11.60 (4.07)	10.84 (3.90)	13.50 (4.26)	2.74	0.07
Negative Beliefs	11.05 (4.19)	10.91 (4.20)	16.93 (4.32)	13.29	0.00*
Cognitive Confidence	11.10 (4.06)	11.04 (5.07)	12.44 (4.70)	0.63	0.53
Need for Control	10.42 (3.31)	9.81 (3.95)	14.81 (4.42)	11.44	0.00*
Cognitive Self-consciousness	14.12 (4.51)	13.45 (4.46)	13.31 (3.91)	0.41	0.67
EDEQ-4	1.44 (1.23)	2.57 (1.04)	3.83 (1.17)	32.12	0.00*

Hypothesis 1

The first hypothesis stated that the AN group would display more metacognitions than the control groups as measured by the MCQ-30; specifically in the subscales of ‘need for control’, ‘cognitive confidence’, ‘cognitive self consciousness’, and ‘negative beliefs about uncontrollability and danger of worry’, whereas ‘positive beliefs about worry’ was hypothesized to be similar across all groups. This hypothesis was partially supported: the AN group was significantly different from the dieting and non-dieting group, displaying higher overall metacognitive frequency (See Figure 2). Specifically, the higher frequency related to the subscales measuring negative metacognitions and need for control, whereas the other subscales were non-significant (refer to Table 2). As shown in table 2, there was a significant difference in the total MCQ-30 score between the three groups at the $p < 0.05$ level, with a greater mean for the AN group compared to the dieting and non-dieting groups. Despite reaching statistical significance, the actual difference in mean scores was quite small. The effect size, calculated using eta-squared was 0.09, indicating a small effect size. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for the AN group ($M=71.07$, $SD=16.90$) was significantly larger than the dieting ($M=55.98$, $SD=15.97$) and non-dieting group ($M=58.28$, $SD=12.70$). Measured effect sizes were 0.17 for ‘negative beliefs about uncontrollability and danger of worry’ and 0.15 for ‘need for control’.

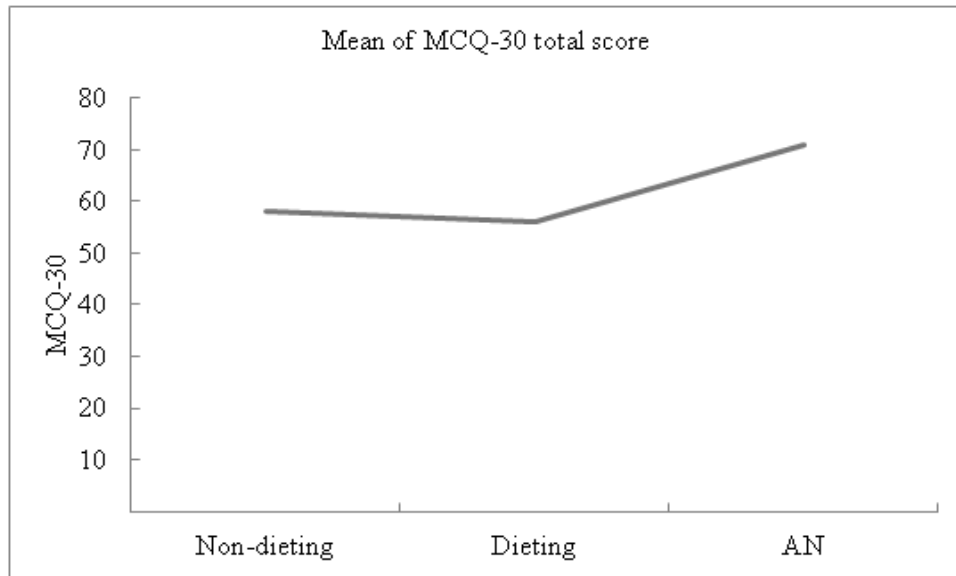


Figure 2: Mean score of the dieting, non-dieting, and AN groups on the total MCQ-30 questionnaire

Furthermore, a one-way ANOVA examining the NBRS and PBRS scores showed a significant difference between the three groups at the $p < 0.05$ level (See Table 2). The post hoc Tukey analysis demonstrated a significantly higher mean in the NBRS in the AN group ($M=27.06$, $SD=8.55$) compared to the non-dieting ($M=20.78$, $SD=7.45$) and dieting group ($M=20.15$, $SD=6.38$). The PBRS results were non-significant (See Table 1).

Hypothesis 2

The second hypothesis predicted a positive correlation between metacognitions and rumination, and metacognitions and worry in all groups. These hypotheses were partially supported.

There was a strong positive correlation between rumination and metacognitions in the AN ($r=0.52$, $n=15$, $p < 0.05$), dieting ($r=0.63$, $n=54$, $p < 0.001$), and non-dieting groups ($r=0.56$, $n=60$, $p < 0.001$).

A different pattern was found for the three groups and worry. Specifically, no association was found between worry and metacognitions in the AN group, $r=0.40$, $n=14$, $p=0.081$ (ns). However, a moderately strong positive correlation was found in the dieting group, $r=0.45$, $n=54$, $p<0.001$. A strong positive correlation was found between worry and metacognitions in the non-dieting group, $r=0.672$, $n=59$, $p<0.001$.

Hypothesis 3

The third hypothesis predicted more negative metacognitive control strategies in the AN group compared to the dieting and non-dieting group. As can be seen in Table 2, ANOVA failed to show a significant result between the three groups in the total TCQ scores ($F=0.297$, $p=0.744$), thus this hypothesis was unsupported. However, two subscales were found to be significant: the ‘Distraction’ and ‘Punishment’ subscales (See Figures 3 and 4). The effect sizes, calculated using eta-squared were 0.05 for distraction and 0.07 for punishment, indicating medium effect sizes. Post-hoc comparisons using the Tukey HSD test indicated that the AN group scored lower on the ‘Distraction’ subscale and higher in the ‘Punishment’ subscale than the non-dieting group.

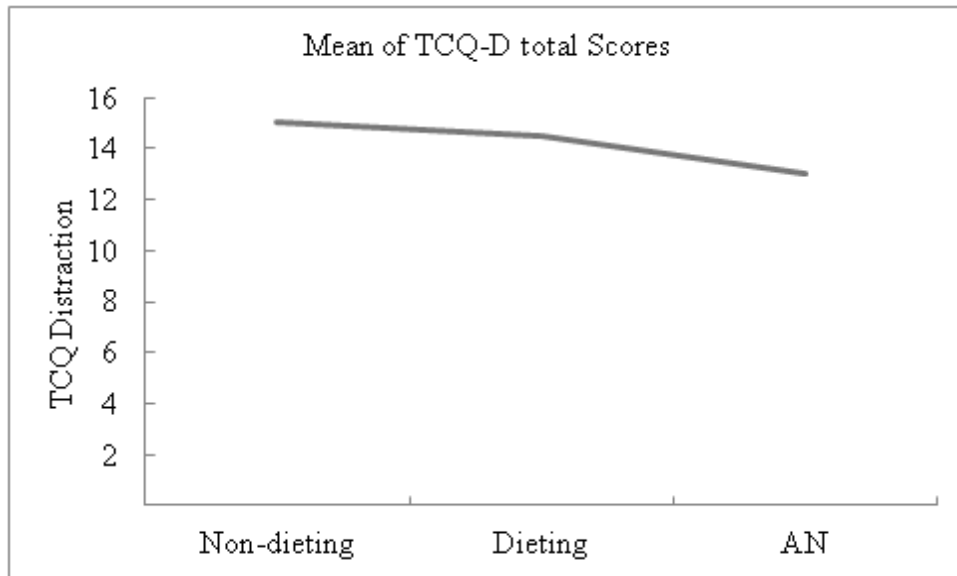


Figure 3: Mean scores in the dieting, non-dieting, and AN groups on the TCQ Distraction subscale

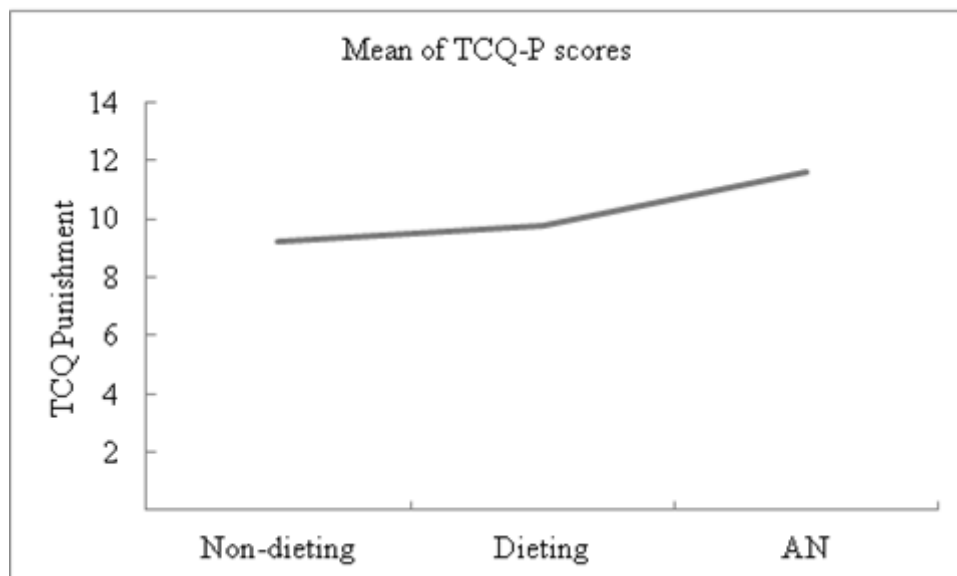


Figure 4: Mean scores in the dieting, non-dieting, and AN groups on the TCQ Punishment subscale

Hypothesis 4

Finally, the fourth hypothesis that the three group results for metacognitions remain statistically similar when anxiety and depression were controlled for was not supported. A one-way between-groups analysis of covariance (ANCOVA) was conducted to control for anxiety and depression when analysing the relationship between metacognitions and the three groups. The independent variable was the group type (AN, dieting, non-dieting), and the dependent variable consisted of the total score on the MCQ-30. Participants' DASS depression and DASS anxiety scores were used as two separate covariates in this analysis. Preliminary checks were conducted to ensure that there were no violations of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate. Significant differences were found when controlling for both depression and anxiety. While metacognitive findings were significant between the three groups without controlling for depression ($F=6.788$, $p < .005$), they became non-significant when controlling for depression ($F=1.619$, $p = .204$). The correlation with depression showed significant findings ($F=2.865$, $p < 0.001$). Similarly, findings were significant between the three groups without controlling for anxiety ($F=7.060$, $p < .05$), but again became non-significant when controlling for anxiety ($F=2.020$, $p = .137$). The correlation with anxiety showed significant findings ($F=51.924$, $p < 0.001$).

Qualitative Analysis

The thematic analysis revealed seven categories that captured the positive and negative metacognitions about weight, eating, and shape identified by participants in all three groups. The seven identified themes were: Physical health implications, emotional implications, social implications, practical implications, cognitive implications, diet-focused implications, and appearance-focused implications. Positive metacognitions were elicited by

asking about advantages of having negative/anxious thoughts about weight, eating, and shape, while negative metacognitions were elicited by asking about disadvantages of having negative/anxious thoughts about weight, eating, and shape. Below are quotation examples for each of the themes. Each quotation is followed by the participants' identification numbers in brackets.

Theme 1: Physical Health Implications. These metacognitions affect health behaviour, for example:

- [An advantage of having negative/anxious thoughts about eating is that it] “stop[s] me from being tempted by unhealthy food” (AN7).
- [An advantage of having negative/anxious thoughts about weight is that it] “instils a desire in me to not necessarily lose weight but to gain fitness, tone, and muscle while slimming” (D24).
- [An advantage of having negative/anxious thoughts about shape is that you] “try to achieve the shape you want through exercise and healthy eating” (D11).
- [A disadvantage of having negative/anxious thoughts about eating is that] “I constantly feel hungry and sick” (D4).
- [A disadvantage of having negative/anxious thoughts about weight is that] “it becomes the only thing you care about, you lose sight of what is healthy and do anything to lose weight” (D14)
- [A disadvantage of having negative/anxious thoughts about shape is that it] “make[s] it harder to eat all food groups in moderation” (D38).

Theme 2: Affective Implications. These metacognitions affect the way you feel about yourself, for example:

- [An advantage of having negative/anxious thoughts about eating is that] “it allows you to become more aware of [...] why it makes you feel a certain way. This could, in turn, make you stop eating foods that make you anxious” (ND28).
- [An advantage of having negative/anxious thoughts about weight is that you] “may be more open to accepting or seeking medical help if here is a problem” (ND54).
- [An advantage of having negative/anxious thoughts about shape is that] “I can make myself feel good using loose, baggy clothing” (D9).
- [A disadvantage of having negative/anxious thoughts about eating is that] “it is [...] exhausting and upsetting and leads to secondary emotions, like sadness, anger, and guilt” (AN13)
- [A disadvantage of having negative/anxious thoughts about weight is that it] “makes me self-conscious, [...], makes me feel overweight” (AN9).
- [A disadvantage of having negative/anxious thoughts about shape is that you are] “never happy with how you are” (AN2).

Theme 3: Social Implications. These metacognitions affect social interaction and social activities, for example:

- An advantage of having negative/anxious thoughts about eating is that] “I can stop myself from overeating at functions and gatherings” (D17).
- [An advantage of having negative/anxious thoughts about weight is that]... N/A
- [An advantage of having negative/anxious thoughts about shape is that]... N/A

- [A disadvantage of having negative/anxious thoughts about eating is that it] “inhibits [my] ability to eat out with people” (AN5).
- [A disadvantage of having negative/anxious thoughts about weight is that it] “makes me want to isolate myself” (AN14).
- [A disadvantage of having negative/anxious thoughts about shape is that] “I don’t like to try on new clothes or purchase new clothes in front of my friends” (D6).

Theme 4: Practical Implications. These metacognitions have practical implications in daily life, affecting the way you complete daily activities, for example:

- [An advantage of having negative/anxious thoughts about eating is that] “I spend less money at the supermarket” (D34).
- [An advantage of having negative/anxious thoughts about weight is that it] “can motivate me to plan ahead so that I have the time and resources to eat healthily” (D38)
- [An advantage of having negative/anxious thoughts about shape is that it] “saves money [because I] try to walk rather than taking a bus” (D61).
- [A disadvantage of having negative/anxious thoughts about eating is] “having to plan my food each day” (D50).
- [A disadvantage of having negative/anxious thoughts about weight is that I am] “not able to enjoy things that I used to” (AN10).
- [A disadvantage of having negative/anxious thoughts about shape is] “constantly self-checking: standing side-on in the mirror looking at stomach, checking cellulite, checking fluid retention” (AN8).

Theme 5: Cognitive Implications. These metacognitions affect the way you think about yourself and view things, for example:

- [An advantage of having negative/anxious thoughts about eating is that you are] “more able to think about what you are eating; awareness” (AN6).
- [An advantage of having negative/anxious thoughts about weight is that it makes me] “think about what I am eating and how this is going to affect my body” (ND6)
- [An advantage of having negative/anxious thoughts about shape is that it] “gives you a better perception about [your] body” (D15)
- [A disadvantage of having negative/anxious thoughts about eating is that it] “makes me indecisive and unable to make logical decisions” (AN3).
- [A disadvantage of having negative/anxious thoughts about weight is that I think] “that I am not worthy of having a guy or to get married” (D37)
- [A disadvantage of having negative/anxious thoughts about shape is that you develop] “unrealistic views about your body image” (D46).

Theme 6: Diet-focused implications. These metacognitions affect the way you think about dietary restriction, for example:

- [An advantage of having negative/anxious thoughts about eating is that it] “defers overeating, bingeing, eating when bored/emotional” (D24).
- [An advantage of having negative/anxious thoughts about weight is that you are] “able to keep a lower weight that ‘normal’” (AN5).
- [An advantage of having negative/anxious thoughts about shape is that] “it makes me want to work harder to get the body I want” (D5)

- [A disadvantage of having negative/anxious thoughts about eating is that I set] “punishments, such as “I won’t eat for the rest of the day” (D26).
- [A disadvantage of having negative/anxious thoughts about weight is that it] “makes me feel like I should be lighter and makes me not want to eat” (D43).
- [A disadvantage of having negative/anxious thoughts about shape is that it] “makes me want to lose weight” (AN9).

Theme 7: Appearance focused implications. These metacognitions affect the way you think and feel about your appearance, for example:

- [An advantage of having negative/anxious thoughts about eating is]... N/A
- [An advantage of having negative/anxious thoughts about weight is that] “it shows that you are taking care and pride in your appearance” (AN13).
- [An advantage of having negative/anxious thoughts about shape] “allows me to purchase more flattering items rather than clothing that just isn’t designed for my shape at all” (D52).
- [A disadvantage of having negative/anxious thoughts about eating is that it leads to] “distorted body image; causes possible worsening of image state” (ND4).
- [A disadvantage of having negative/anxious thoughts about weight is that it makes me] “nervous about how I look in togs” (D50).
- [A disadvantage of having negative/anxious thoughts about shape is that you become] “too attentive to makeup, clothing, etc. to compensate for anxious thoughts” (D38)

A category of ‘other’ was used to represent a catch-all category for themes that fell out of the range of generated themes.

Under this category, only participants in the AN group described a common subtheme of control as both positive and negative metacognitions. For example, in terms of positive metacognitions, one participant with AN wrote that an advantage of having negative/anxious thoughts about eating/weight/shape was that they “keep me in control of what I am eating [...] I am less likely to lose control of what I put into my body (AN13)”. Another participant indicated that they “help keep my weight under control (AN12)”. Examples of disadvantages of having negative/anxious thoughts about eating/weight/shape were that they lead to a “feeling of losing control (AN6)”. Implications regarding a sense of control were not identified either in the dieting or non-dieting group.

Figure 5 displays the mean frequency of identified advantages and disadvantages of metacognitions in the three groups, as ascertained from the qualitative data.

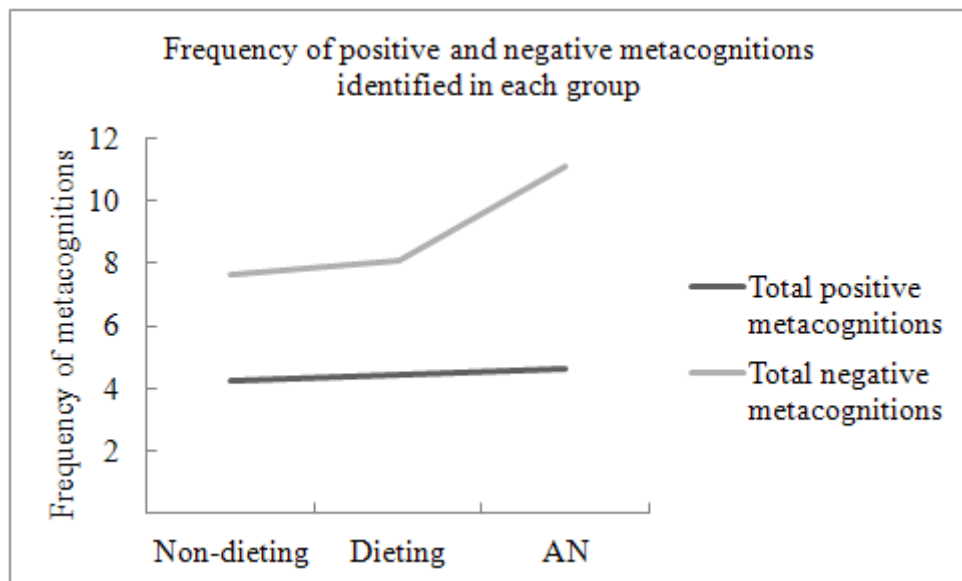


Figure 5: Mean frequency of identified positive and negative metacognitions in the dieting, non-dieting, and AN groups

As can be seen in Figure 5, the AN groups displayed more total negative metacognitions than the dieting and non-dieting groups. A one-way ANOVA and post-hoc

comparisons show significantly larger total negative metacognitive beliefs of AN participants (M=11.19, SD=60.15) compared to non-dieting (M=8.08, SD=4.15) and dieting participants (M=7.67, SD=4.03) at the $p<0.05$ level. The effect size, calculated using eta-squared was 0.09, indicating a small effect size. The frequency of the total positive metacognitions appeared to be non-significant.

Figure 6 depicts the positive and negative metacognitions more specifically between groups and eating, shape, and weight. A one-way ANOVA shows a significant difference in the negative metacognitions in relation to eating between the three groups at the $p=0.001$ level. The post-hoc Tukey comparison suggested that the AN group identified significantly higher negative mean metacognitions around eating (M=4.13) than the dieting (M=2.36) and non-dieting (M=2.63) group. The effect size, calculated using eta-squared was 0.11., indicating a small effect size. Although non-significant, the other negative metacognitions around weight and shape show a similar trend.

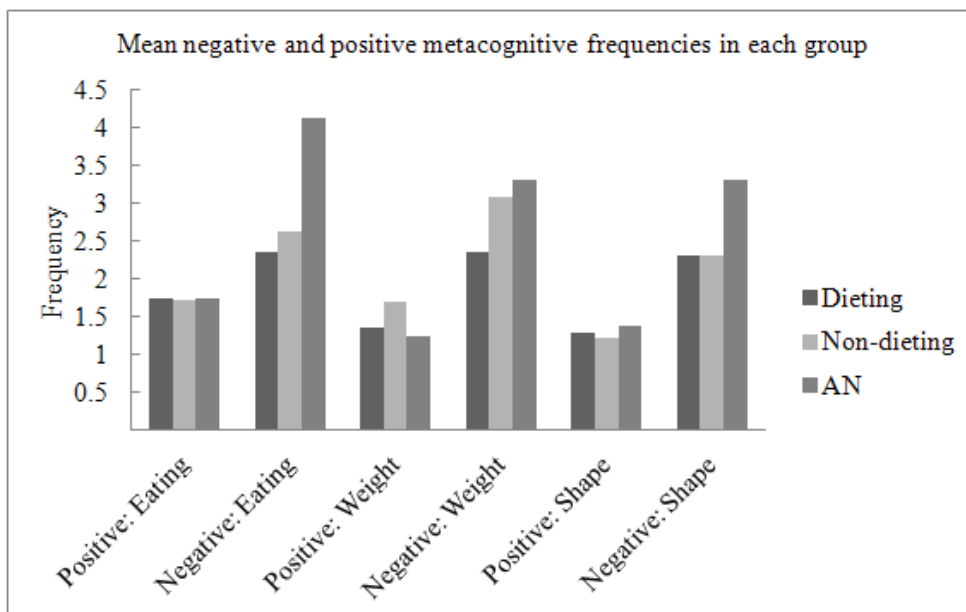


Figure 6: The mean number of positive and negative metacognitions about eating, shape, and weight between the dieting, non-dieting, and AN groups.

Furthermore, when looking between the groups at the different themes, significant differences were found, as illustrated in Figures 7 and 8. For metacognitive advantages, significant differences were found for the following themes: physical implications, social implications, and diet-focused implications. The post-hoc Tukey test demonstrated a significant differences between the non-dieting group and the other two groups for physical implications at the $p>0.05$ level. A significant difference between the dieting and non-dieting group at the $p<0.01$ level for diet-focused implications and a difference for social implications between the AN group and the other two groups at the $p<0.05$ was found.

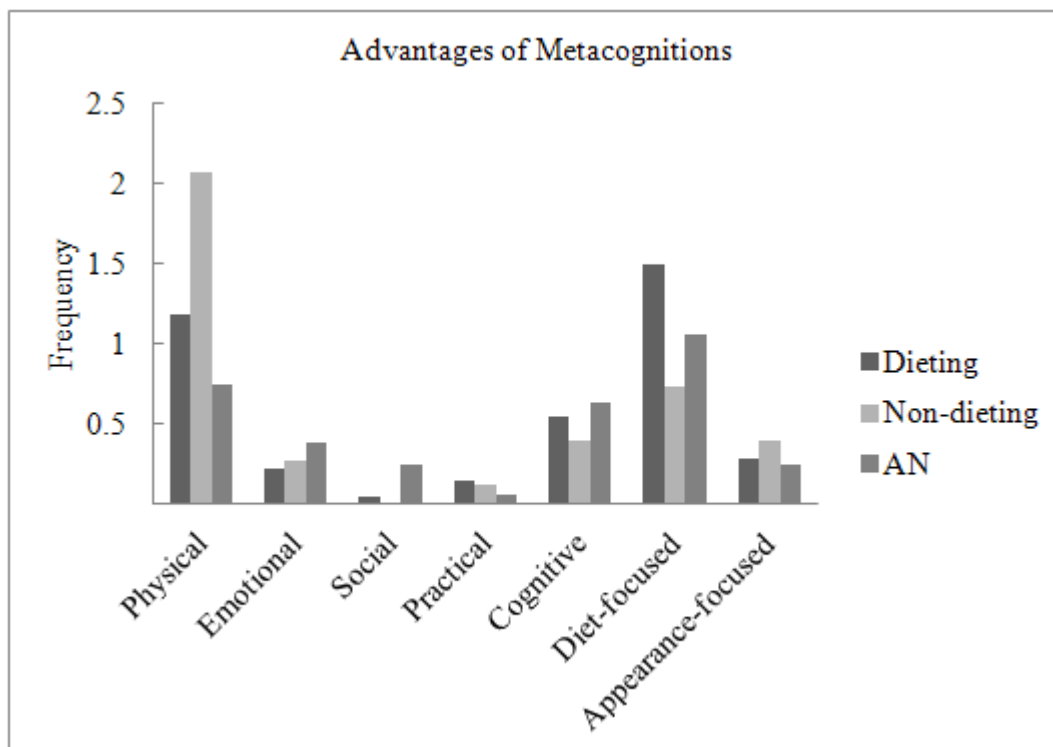


Figure 7: Mean number of identified advantages of metacognitions in the dieting, non-dieting, and AN group

Different results were demonstrated for identified disadvantages of metacognitions between the three groups (See Figure 8). A one-way ANOVA and post-hoc Tukey test suggested a significant difference in appearance-focused implications, at the $p < 0.01$ level between the dieting and non-dieting group, with the higher frequency indicated in the dieting group. No other significant differences were found. However, looking at Figure 8, a notable trend emerges, showing more frequently identified negative metacognitions around emotional and cognitive implications in the AN group compared to the other two groups.

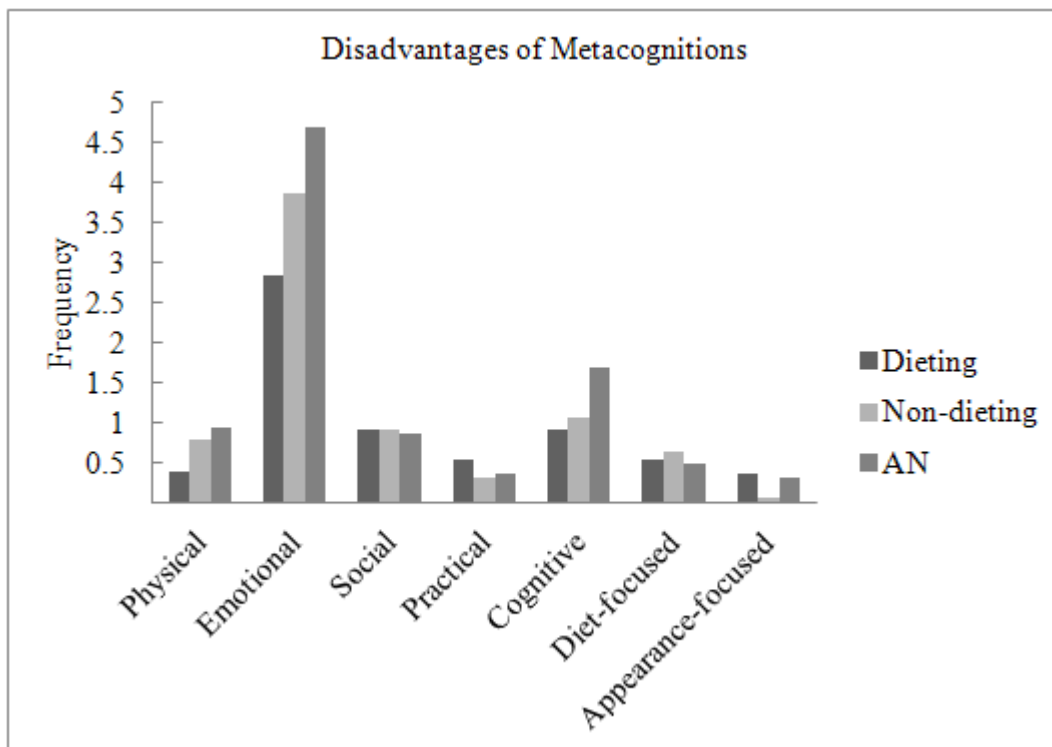


Figure 8: Mean number of identified disadvantages of metacognitions in the dieting, non-dieting, and AN group

Discussion

This thesis examined the nature and frequency of metacognitions in three different samples: women dieting, women not dieting, and women with a diagnosis of AN. Dieting and non-dieting women were recruited from the University of Canterbury, while AN participants were recruited from the SIEDS. Each participant completed a booklet of questionnaires and was reimbursed with course credit or a supermarket voucher. This study aimed to answer a variety of questions about the quantitative and qualitative nature of metacognitions in relation to AN, as well as deducing any similarities and differences compared to dieting and non-dieting samples.

The study revealed numerous significant differences between the groups. The first three hypotheses were partially supported. Hypothesis one: The AN group obtained higher scores in two of the five MCQ-30 subscales, instead of three to four of five, as hypothesized. However, the hypothesis that the factor of ‘positive beliefs about worry’ would be similar across the groups was supported. Hypothesis two: While the hypothesis of a positive correlation between rumination and metacognitions across all three groups was supported, the hypothesis predicting a positive correlation between worry and metacognitions across all groups was only partially supported, as a positive correlation was not found in the AN group. Hypothesis three: The hypothesis was not supported, as the AN group did not display more negative metacognitive control strategies as evidenced by the TCQ. However, the AN group did display higher levels in the punishment subscale and lower levels of the distraction subscale of the TCQ compared to the other two groups. Each hypothesis and its related study findings will now be discussed in turn. Hypothesis four: The fourth hypothesis, suggesting that anxiety and depression would have no effect on metacognitive findings across the three groups, was not supported.

Findings: Hypothesis 1

Analysing the nature of metacognitions between the groups yielded some important results. The AN group showed more metacognitions compared to the dieting and non-dieting group in the MCQ-30 total score, the ‘negative beliefs about uncontrollability and danger of worry’ subscale, and the ‘need for control’ subscale. No elevations were found in the ‘cognitive confidence’ and ‘cognitive self-consciousness’ subscales. Hence, the hypothesis of the AN group displaying higher MCQ-30 scores in three to four out of five subscales was not quite supported. The other subscales of ‘cognitive confidence’ and ‘cognitive self-consciousness’ were not elevated in the AN group; however, a similar elevated trend was observable. The lack of association between the two subscales and the AN group may be due to low sample size of the AN group.

These findings were mainly consistent with earlier studies (Cooper et al., 2007; McDermott & Rushford, 2011; Turner & Cooper, 2002), which showed three or four MCQ-30 subscale elevations in the AN sample, excluding ‘positive beliefs about worry’. Hence, results appeared to suggest that women with AN possess a higher frequency of metacognitions than dieting or non-dieting women, particularly when it comes to negative metacognitions and metacognitions around control. These findings suggest that, compared to controls, women with AN exhibit the CAS, which includes the aforementioned metacognitive components. This CAS arises from erroneous metacognitive knowledge and beliefs. Because of such a perseverative thinking style, typified by attentional preoccupation with threatening stimuli, worry, rumination, and/or unhelpful coping strategies, people become locked into a repetitive and prolonged pattern of negative thoughts or sensations. These negative feelings then become more common and permanent (Wells, 2000, 2009a).

The results appear to distinguish the AN sample from the non-AN sample and provides general support for Wells' S-REF model, particularly concerning dysfunctional beliefs about worry and maladaptive attempts at thought control. These findings contribute to the evidence that maladaptive metacognitions present a generic vulnerability factor for psychological disorders (McDermott & Rushford, 2011). Specifically, findings indicate the high extent to which women with AN perceive their thoughts as uncontrollable and dangerous, and also how such metacognitions may characterize the psychopathology of AN.

Findings: Hypothesis 2a

As hypothesized, there was a positive association between rumination and metacognitions in all three groups. The results indicate that the more one ruminates, the more metacognitions occur, and vice versa. Similarly, when rumination decreases, so do metacognitions.

Here, rumination and metacognitions were measured generally, that is, not specific to eating, shape, or weight. Much research has linked rumination and metacognitions, supporting this finding. Various authors have ascertained that beliefs about rumination's usefulness is a determinant as to whether rumination will occur, and individuals who hold a higher frequency of these beliefs report increased rumination (Moulds, Yap, Kerr, Williams, & Kandris, 2010; Papageorgiou & Wells, 2003). Individuals tend to associate rumination both negatively and positively as an effective coping strategy. This, in turn, serves to maintain the cycle of dysfunctional cognitions and potential psychopathology (Cowdrey & Park, 2011; Cowdrey & Park, 2012; Rawal et al., 2010). In reality, however, rumination embodies an information processing strategy that leads to maladaptive emotion regulation, symptom persistence, and the failure to achieve goals (Burwell & Shirk, 2007; Hayes et al.,

2004; Treynor et al., 2003). The qualitative analysis in this study also suggests that the frequency of positive metacognitions is very similar in all three groups, showing no relationship with group membership, possibly explaining the similarities regarding rumination in all three groups.

Findings: Hypothesis 2b

A strong association was found between worry and metacognitions in the non-dieting group and a moderate association was found between worry and metacognitions in the dieting group; however, no association between worry and metacognitions was found in the AN group. Hence, the hypothesis of a positive correlation between worry and metacognitions in all groups was not quite supported. These results appear to suggest that in the dieting and non-dieting groups the more one worries, the more metacognitions occur, and vice versa. Similarly, when worrying decreases, so do metacognitions. However, this was not found to be the case for the AN sample and there appears to be a distinction between individuals with and without AN regarding this association.

Worry itself is a common experience in both clinical and nonclinical samples (Davey, 1994; A. Matthews, 1990), as even in nonclinical samples, worry can lead to significant impairments, potentially increasing metacognitive thinking (Yılmaz, Gençöz, & Wells, 2008). The fact that the correlation was stronger in the non-dieting sample may be explained by an increased use of cognitive control strategies in the dieting and AN group. Increased cognitive control may lead to subjective decreases in worry that become evident in self-report answers. Woolrich et al. (2008) suggested that individuals with AN heavily rely on metacognitive control strategies, for example distraction, thought suppression, and trigger avoidance. These study findings show a higher utilization of punishment and a lower

utilization of distraction in the AN group, perhaps contributing to an explanation towards these findings (See hypothesis three).

A positive correlation between worry and metacognitions in the dieting group was an expected finding because worry represents a desirable and effective coping strategy for self regulation in the chronic dieting population (Wells, 2000). Indeed, interceptive cues, social evaluation, and food/weight related cues can trigger chronic worry states and can manifest themselves as hypervigilance relating to weight and shape changes. This may consequently lead to the cognitive misinterpretation of future threat and harm (Hildebrandt et al., 2010), which characterises CAS and metacognitions.

Interestingly, the AN sample showed no such association. There may be various reasons for this finding. As the TCQ showed elevated punishment techniques and reduced distraction techniques, these may embody successful thought control strategies that could account for the non-existent association between worry and metacognitions in the AN group. Successful control strategies might diffuse the worries rather than the individual continuing to think about their potential meaning, and may, in turn, lead to metacognitive processes. Furthermore, in the AN group, worry may be more specific to eating, weight, or shape than in the dieting and non-dieting group. These worries, therefore, may be followed by regulatory actions, such as exercising or purging, to diffuse the worries. The dieting and non-dieting group may alternatively use regulatory cognitive processes to manage their worries.

In a different vein, those with AN may utilize more avoidance strategies than the control groups to regulate their emotional experiences. Experiential avoidance has been found to be a crucial factor in AN's underlying pathology (Lavender & Anderson, 2010; Lavender et al., 2011; Rawal et al., 2010). Moreover, individuals with AN endorse the idea that outwardly presenting negative emotions is unacceptable, possibly due to a fear of being criticized or rejected by others (Schmidt & Treasure, 2006). As well as this, individuals with

AN may have limited insight into their worry and metacognitive processes, thus accounting for the division between the controls and the AN group.

Lastly, the lack of association may be an effect of the sample, as the significance of r is strongly influenced by sample size. Small sample sizes often obtain moderate correlations but do not reach statistical significance at the traditional $p < 0.05$ level. It is plausible that this is the case with this finding, where $r = 0.40$, $n = 14$, $p = 0.081$ (ns). Indeed, the AN sample only reached 16 participants in this study, which is a noticeably smaller sample than the control groups of $n = 55$ and $n = 60$.

Findings: Hypothesis 3

Results between the three groups on the TCQ failed to show an association between the three groups in the total TCQ scores. However, two subscales were found to be different in the AN group: the ‘Distraction’ and ‘Punishment’ subscales. Specifically, the AN group used less distraction techniques and more punishment techniques than the dieting and non-dieting group. Hence, the hypothesis was partially supported. There are numerous possible reasons as to why no differences were found in the total TCQ score between the three groups.

Wells and Davies (1994), the creators of the TCQ, established that thought control is a frequent experience in both clinical and non-clinical populations. Numerous other authors have also described thought control as a relatively normal phenomenon (Rachman & de Silva, 1987; Salkovskis & Harrison, 1984; Wells & Morrison, 1994). Furthermore, the TCQ is not specific to eating, shape, or weight, but rather inquires about general unpleasant or unwanted thoughts. The normality of thought control strategies concerning general life experiences may explain the lack of differences identified between the three groups in the overall TCQ scores.

Nonetheless, two differences between the AN group and the control groups were demonstrated in the results: the first showed that the AN group appeared to use less distraction techniques than the non-dieting group. In the literature, distraction has been conceptualized as potentially helpful or at least neither adaptive nor maladaptive (Wells, 2000; Wells & Davies, 1994) but also as harmful if it characterises suppression (Wegner, Schneider, Carter, & White, 1987). Generally, distraction's helpfulness may depend on the type of distraction utilized, that is, whether distraction is used as an approach or as an avoidance strategy. A maladaptive approach appears to be 'unfocused distraction' used in suppression, which in the long-term increases distressing thoughts. In contrast, an adaptive approach appears to be 'focused distraction', which employs only a limited amount of distracters and can reduce the frequency of distressing thoughts (Wegner et al., 1987). It may be the case that on the one hand, the AN group used less adaptive distraction techniques, or on the other hand, that the treatment the AN group were receiving at the time helped them to decrease unhelpful cognitive control techniques. Studies analysing the type of distraction used in these samples would be of benefit to the understanding of AN and the impact of cognitive control techniques on eating disorder symptoms.

The second important finding was that the AN group used more punishment techniques as a means of cognitive control than the non-dieting group. Wells (1994) states that self-punishment is a technique used by individuals to suppress unwanted thoughts and has been associated with general measures of psychopathology and emotional vulnerability. Therefore, the use of punishment to control cognition is associated with a predisposition to emotional difficulties, which may include AN. It may also explain the study findings and the reason for non-significant findings in the dieting and non-dieting group.

Results further suggest that the dieting group's scores with regards to distraction and punishment lie between the AN and the dieting group. This finding could suggest that there may be a dimensional rather than a taxonic relationship between the non-AN and AN population, with the dieting population perhaps manifesting the middle ground between the two. Indeed a review has concluded that although binge eating and possibly purging is taxonic, the restricting subtype of AN is continuous with normalcy (Williamson, Gleaves, & Stewart, 2005). These findings concerning cognitive control appear to support this.

Findings: Hypothesis 4

When controlling for depression and anxiety in all three groups, findings appear to suggest that both anxiety and depression substantially contribute to the relationship between metacognitions and group affiliation (not dieting, dieting, AN). Thus, the hypothesis that group results remain similar when anxiety and depression were controlled for was not supported. This finding appeared to demonstrate that metacognitions cannot be predicted by eating behaviour independent of anxious and depressive symptoms.

There are a variety of reasons as to why prominent emotional experiences, such as depression and anxiety interact with metacognitions between the three groups. Firstly, as previous findings of this thesis indicate, metacognitions and rumination are positively associated. Rumination has most notably been studied with regards to depression (Lyubomirsky & Nolen-Hoeksema, 1993) and has been strongly implicated in its onset (Robinson & Alloy, 2003; Roelofs et al., 2009), its maintenance (Lara et al., 2000; Nolen-Hoeksema, 2000), and its recurrence (Roberts et al., 1998; Watkins et al., 2007). It is, hence, understandable that the level of depression and the level of metacognitions would strongly correlate with one another.

Secondly, the CAS is characterized by feelings of low mood and anxiety. These emotional experiences are, thus, at the heart of the very model that generates metacognitive processes: the S-REF (Wells, 2000, 2009a). A close association between eating, depressive, and anxiety symptoms that take up metacognitive resources is, therefore, highly likely.

Thirdly, the importance of metacognitions has been firmly established in psychiatric disorders, such as depression and anxiety (e.g. Dimaggio et al., 2011; García-Montesa et al., 2006; Lysaker et al., 2010; Wells, 2000). As similar problematic metacognitions are present in mood, anxiety, and eating disorder patients, it can be difficult to separate out the individual disorders from the metacognitive processes. Additionally, there is a very high chance of individuals with eating disorders having a comorbid depressive or anxious disorder (DeKaye et al., 2004; Halmi et al., 1991; Levinson & Rodebaugh, 2012; Swinbourne et al., 2012). For example, anxiety disorders are much higher in patients with AN than in controls (Pallister & Waller, 2008) with lifetime prevalence rates as high as 83% (Godart et al., 2000). Hence, GAD theories have been applied to AN. Chronic worry states, triggered by interceptive cues, social evaluation, and food/weight related cues can manifest themselves as hypervigilance relating to weight and shape changes (Hildebrandt et al., 2010). Therefore, it is probable that eating and emotional disorder symptoms are often overlapping. Metacognitive processes are most likely operating across disorder symptoms and strictly distinguishing anxious and depressive symptoms from an ED can at times be unfeasible and impractical.

Qualitative Data

The qualitative analysis revealed differences in metacognitions between the three groups. The AN group displayed more total negative metacognitions than the other two groups; however, there was no difference in the total positive metacognitions between the

groups. These findings were supported by the elevated scores found on the NBRS, but not in the PBRS for the AN group as well as AN group elevations found in the MCQ-30 (see Table 2). As mentioned above, the finding that those with AN displayed more negative but not more positive beliefs is supported by previous studies (Cooper et al., 2007; McDermott & Rushford, 2011; Turner & Cooper, 2002).

When comparing the positive and negative metacognitions more specifically between groups and eating, shape, and weight, one significant difference was found: the AN group identified significantly higher negative metacognitions around eating than the dieting and non-dieting group. This may be because food and eating take on a different value for those with AN compared to those without AN. Indeed, neuroimaging studies have found that individuals with AN, as well as those who have recovered from AN, have increased neural responses to both aversive and rewarding food stimuli compared to controls (Brooks, O'Daly et al., 2011; Brooks et al., 2012; Cowdrey, Park, Harmer, & McCabe, 2011). Additionally, individuals with AN appear to experience pre-meal anxiety (Soussignan, T., Rigaud, Royet, & Schaal, 2010; Steinglass et al., 2010) and decreased pleasure to food stimuli (Toa, Soussignan, Rigaud, & Schaal, 2010). Differing neuronal activity found in the above studies may underlie cognitive biases towards food and ruminations about cognitive control (Brooks et al., 2012). While non-significant, the same trend of increased frequency of negative metacognitions relating to weight and shape was observed in the AN group. Again, sample size may have hampered finding significant relationships within these variables.

When analysing the results yet more closely, differences were found between the three groups when separating out the different themes identified for positive and negative metacognitions. Positive metacognitive differences in relation to the themes were:

(1) The non-dieting group identified more positive metacognitions relating to physical health than the other two groups. This may be because non-dieting individuals may see

dieting, along with exercising, as something positive to generally improve their physical health. Answers regarding this theme portrayed ideas of a general healthy lifestyle change or a loss of unwanted weight. Contrarily, dieting and AN women may see dieting in more restricting terms to attain their goal weight, which may not necessarily be in the healthy range, particularly in the AN group. Hence, differing reasons for dieting are most likely taken into account in each group when answering the qualitative metacognitive questions. Furthermore, those women not dieting were thinking of hypothetical reasons why someone may wish to diet. Because they represent the non-clinical control group, more sinister or pathological reasons for dieting may not come to mind. Metacognitions in individuals with psychopathology may encompass cognitive confidence, cognitive self-consciousness, need to control thoughts, as well as negative beliefs about worry (Wells & Cartwright-Hatton, 2004), whereas individuals in the control group may possess differing, perhaps more 'harmless' metacognitions, such as positive metacognitions regarding fitness.

(2) The dieting group identified more positive diet-focused metacognitions than the non-dieting group. This makes sense, given that being on a diet will invariably yield more dieting thoughts than not being on a diet. Results indicate that the AN group lies somewhere in the middle of the two groups. Such findings could be explained by the fact that the AN group was undergoing treatment at the time. Thus, diet-focused metacognitions may have decreased as a result of treatment gains. However, as AN is a chronic illness, in which cognitive mechanisms are very difficult to change, these women with AN are bound to still be thinking heavily about their eating behaviour as well as dietary restrictions. This may lead them to possess less metacognitions about dietary restriction than the dieting group; however, still have increased metacognitions about dietary restriction than the non-dieting group. Furthermore, successful dieting may reduce distress caused by a negative body image.

Metacognitions assisting in the dieting process are, thus, valued, making these cognitive processes especially difficult to discontinue.

(3) The AN group identified more socially-related metacognitions compared to the other two groups. Literature on sociability and AN indicates that those with AN have significant interpersonal problems (J. C. Carter, Kelly, & Norwood, 2012). Furthermore, eating is often a highly social occasion and peculiar eating habits often draw unwanted attention. The DSM-IV-TR (APA, 2000) describes associated descriptive features of AN to be social isolation, concerns about eating in public, and limited social spontaneity, supporting the idea that those with AN exhibit more social and interpersonal metacognitions than controls. This makes sense, given that social phobia is elevated in patients with AN compared to the non-clinical population (DeKaye, Bulik, Thornton, Barbarich, & Masters, 2004; Pallister & Waller, 2008). Additionally, AN is an illness that can at times be painfully obvious to outsiders. Unpleasant experiences of unwanted advice, awkward explanations, or fear of rejection and criticism can make socially related activities uncomfortable at best and terrifying at worst. Therefore, having increased socially-related metacognitions in the AN group is understandable.

Negative metacognitive differences in relation to the themes were:

(1) The dieting group identified more appearance related metacognitions than the non-dieting group. Similar to dieting related metacognitions, it is plausible that the dieting group is focused more on appearance-related metacognitions, as appearance takes a huge focus when on a diet, particularly a restricting diet aimed at losing weight.

(2) Although not reaching statistical elevations, a notable trend emerged, showing more frequently identified negative metacognitions around emotional and cognitive implications in the AN group compared to controls. Again, non-statistical result may have been obtained due

to the smaller sample size of the AN group. Psychopathology primarily constitutes difficulties regulating emotions and cognitions. It makes sense that those with AN, particularly due to the CAS would experience a higher frequency of metacognitions relating to emotions and cognitions than the control groups.

(3) One theme came through in the participants' answers that was only identified in the AN group: The theme of control, which AN participants identified as both positive and negative metacognitions. These findings are supported by a significant finding for the AN group in the 'Distraction' and 'Punishment' subscales of the TCQ and in the 'need for control' subscale of the MCQ-30. It appears that AN mostly gives affected individuals a sense of control; however, at the same time it also occasionally results in a feeling of being controlled, or being taken over (Serpell et al., 1999). Those with AN may find metacognitive strategies that give them a sense of control advantageous in the short-term; however, in the long-term leads to the maintenance of AN, given that these thoughts lead to long-term constrictions (Woolrich et al., 2008). It has been argued that the perception of uncontrollability in individuals with AN is a central part of AN pathology; not just related to disorder-specific cognitions but to AN individuals' thinking processes in general (Fairburn, Cooper, Shafran, & Wilson, 2008; McDermott & Rushford, 2011)

Everything considered, the fact that the dieting and the AN group have heightened negative or anxious thoughts about eating, weight, and shape is valued by them. These metacognitions can act as motivators to continue to restrict eating and hence to lose weight, which such individuals often find desirable (Woolrich et al., 2008). It is also the reason why it is so difficult to change these thought patterns and why targeting metacognitions seems important.

Summary and Conclusion

Overall, it appears that AN women experience quantitative and some qualitative differences in metacognitions compared to dieting and non-dieting women; whereas there are few differences between dieters and non-dieters. These findings imply that metacognitions are fundamentally different between those with AN and those without AN.

Taken together, the findings indicate that women with AN have a more maladaptive cognitive style than dieting and non-dieting women, which over time sustains psychological distress. This maladaptive cognitive style includes a much higher frequency of metacognitions; increased metacognitive themes about control and social experiences; increased thought control strategies concerning punishment; and decreased thought control strategies concerning distraction. Distorted cognitions relating to eating, shape, and weight may hence be preserved due to maladaptive metacognitive styles (Konstantellou & Reynolds, 2010). Woolrich et al. (2008) found that AN patients tended to think that having negative or anxious thoughts about their eating, weight, or shape was evidence that their thoughts were dangerous or abnormal, which, in turn, reinforced their use of metacognitive control strategies, as well as potentially confirming their inability to cope with such thoughts.

The results may be able to contribute to the knowledge of whether metacognitive components contribute to the development or maintenance of AN, and hence, whether dysfunctional metacognitions are worth targeting in therapy.

This accumulating evidence appears to suggest that Wells' CAS is supported for AN. These findings indicate that, relative to a non-clinical sample, women with AN exhibit CAS characterized by dysfunctional beliefs about worry and rumination, heightened attention to threat stimuli, unhelpful coping strategies, and a preservative thinking style. Therefore, it appears that Wells' S-REF model (Wells, 2009b) is supported: psychopathology is associated with the CAS and deems metacognitions as a generic vulnerability factor for

psychopathology. From this, tentative conclusions can be drawn. Dysfunctional, especially negative, metacognitions appear to perhaps contribute to the development of AN by representing risk factors for AN. It is also highly likely that metacognitions contribute to the maintenance of AN through the cyclical CAS.

Because of the metacognitive differences compared to non-AN samples, it would appear that targeting dysfunctional metacognitions in psychotherapy would be beneficial.

Limitations

There are various limitations of this study, which must be acknowledged. Firstly, no distinction was made between healthy and unhealthy dieters. Future studies may want to analyse the diet plans of dieting individuals to ascertain whether their dieting behaviours represent problematic or non-problematic eating behaviour. This may, in turn, assist in predicting problematic eating attitudes. Different dieting techniques may well have a significant effect on study findings and may separate those dieting individuals that are more closely related to the AN population in terms of eating, weight, and shape attitudes, and those perhaps more closely related to non-dieting individuals. Such research could give more insight into the AN restricting continuum.

Secondly, there was no association between metacognitions and the three groups when anxiety and depression were controlled for. Therefore, more research on separating out or examining the different intensities of metacognitions regarding depressive, anxious, and eating disorder symptoms would be beneficial. Moreover, while anxiety and depression were controlled for, other factors remain uncontrolled but may potentially have a substantial effect on findings, such as comorbidity or length of treatment in the AN sample.

Thirdly, another good practice method in such a study would be to include a psychiatric control group in order to compare AN with another psychiatric sample. It would

then be possible to detect any similarities and differences between the psychiatric samples and ascertain whether findings may be due to solely AN symptomatology or to psychopathology in general.

Fourthly, this study is plagued by general limitations present in many research studies: namely the limitations of using self-report measures and the degree of generalizability afforded to study findings. Self-report answers may be inaccurate due to exaggeration, or embarrassment of revealing private information, and hence participants may answer in socially desirable ways. Participants may be inaccurate in reporting some details due to forgetfulness and human error. As well as this, self-report measures can be biased by participants' state of mind or affect, and may have produced different answers had they been experiencing a different state of mind or emotion at the time (Robins, Fraley, & Krueger, 2007). Response validity can be strengthened in future studies by additionally implementing implicit measures and the use of methods to improve reliability for the qualitative analysis, such as inter-rater reliability.

The generalizability of the findings may also represent another limitation. The disorder of AN is fortunately not overly common; however, this meant that obtaining enough willing participants for the study was somewhat difficult, and, hence, this study sample of AN participants only reached 16. Because of this small sample size it may be a stretch to be able to accurately generalize to the entire AN population. Establishing a large, multi-site study could determine if these study findings are replicable. Furthermore, the AN group sample was substantially smaller than the dieting and non-dieting sample; thus, the power to find group differences between the groups was reduced (Tchanturia, Morris et al., 2004). It may, hence, be possible that further changes in metacognitions may not have been detected and a larger sample may be needed to identify such changes.

Strengths

This study also had a number of strengths. Firstly, other important differences between the three groups were found, which were not directly addressed via hypothesis testing. These findings, nevertheless, remain important and provide additional information that distinguishes the AN group from the dieting and non-dieting group. Statistically significant differences were found between the AN group and the two control groups for BMI and both problematic eating scales (EAT-26 and EDEQ-4). The fact that BMI was lower and problematic eating scales indicated higher scores for the AN group supports a true difference in eating attitudes and subsequent weight loss between the eating disordered and the control groups, making the study valid in measuring an ED sample compared to a non-ED sample.

Secondly, the study also included numerous quantitative questionnaires, making it fairly thorough. Incorporated questionnaires were all standardized tests, making the study easily replicable. Because of its thoroughness, important variables influencing the results (depression and anxiety) were able to be controlled for; something that has been neglected in other studies.

Lastly, this is the first study known to date that has analysed and compared qualitative metacognitions in AN patients, dieting, and non-dieting women. The scene has now been set for further investigations regarding metacognitive themes in the clinical population that may prove to be beneficial for psychological conceptualization and potential treatment targets.

Practical and Theoretical Implications

The findings of this study add to the knowledge pool of metacognitions in AN and may directly assist in clinical practice. Knowledge about metacognitions, cognitive control

strategies, and coping mechanisms may aid in understanding the development of AN or may even be indicated in early warning signs of a potentially rapidly deteriorating mental illness. This metacognitive research may prove to be a useful addition to research tools utilized to investigate metacognitions, their origin, and maintenance in eating disorders. It may aid in providing a possible metacognitive profile for patients with AN, which can be beneficial for clinical conceptualization.

As this study found that AN patients experienced an increased frequency of metacognitions and a different metacognitive nature than dieting and non-dieting women, metacognitions concerning control and social/interpersonal factors may play an important role in individual patients' formulations and may, thus, inform treatment. With these findings in mind, an intervention could be implemented as a supplement to an already existing treatment, or as a stand-alone treatment, particularly for women who are showing limited success in cognitive behaviour based treatments. Clinical intervention may focus on challenging maladaptive metacognitive styles to decrease eating pathology.

Future Directions

Based on the qualitative analyses of metacognitive themes, a modified version of the MCQ-30 specifically relation to AN or EDs could be generated. This modified version could include a variety of negative metacognitions while excluding positive metacognitions that have been shown to be similar across AN and non-AN samples. Taking into account the qualitative data, specific themes around control and social/interpersonal factors could be incorporated into the questionnaire. This way, more specific and relevant information on metacognitions in this population could be ascertained and could potentially be used in AN conceptualization or treatment intervention, perhaps in the form of MCT. Additionally, a small preliminary multiple baselines study could be implemented pre and post-treatment to

determine whether, if metacognitive frequency and themes were to decrease, ED symptoms would follow suit. Continuing to examine the function of metacognitions in AN may aid those living with AN and decrease their suffering. The future looks hopeful, as closely studying metacognitions has led to metacogitively-based treatments that have helped countless other individuals suffering from mental illness find the road to recovery.

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Appendix A: Ethical Approval



Upper South A Regional Ethics Committee

c/- Ministry of Health

Montgomery Watson Building

6 Hazeldean Road

Christchurch

Phone: (03) 974 2304

Email: uppersoutha_ethicscommittee@moh.govt.nz

28 November 2011

Dr Janet Carter
Room 510, Dept. of Psychology
University of Canterbury
Private Bag 4800
Christchurch

Cc: Jaimee Kleinbichler

Jaimee.kleinbichler@pg.canterbury.ac.nz

Dear Dr Carter

Ethics ref: URA/11/09/052 (please quote in all correspondence)
Study title: The type and frequency of metacognitions in patients with Anorexia Nervosa, dieting, and non-dieting females
Investigators: Dr J Carter, R Lawson, J Kleinbichler

This study was given ethical approval by the Upper South A Regional Ethics Committee on 21 November 2011. A list of members of the Committee is attached.

Approved Documents

- Information sheet and consent form dated 2/11/11
- Review of questionnaires
- Demographics form
- MCQ-30
- PBRS
- NBRS
- Thought control questionnaire
- PSWQ
- Eating attitudes Test (EAT-26)
- Eating Questionnaire (EDE-Q4)
- Advertisement

This approval is valid until 28 February 2013, provided that Annual Progress Reports are submitted (see below).

Amendments and Protocol Deviations

All significant amendments to this proposal must receive prior approval from the Committee. Significant amendments include (but are not limited to) changes to:

- the researcher responsible for the conduct of the study at a study site
- the addition of an extra study site
- the design or duration of the study
- the method of recruitment
- information sheets and informed consent procedures.

Significant deviations from the approved protocol must be reported to the Committee as soon as possible.

Annual Progress Reports and Final Reports

The first Annual Progress Report for this study is due to the Committee by 30 November 2012. The Annual Report Form that should be used is available at www.ethicscommittees.health.govt.nz. Please note that if you do not provide a progress report by this date, ethical approval may be withdrawn.

A Final Report is also required at the conclusion of the study. The Final Report Form is also available at www.ethicscommittees.health.govt.nz.

Statement of compliance

The committee is constituted in accordance with its Terms of Reference. It complies with the [Operational Standard for Ethics Committees](#) and the principles of international good clinical practice.

The committee is approved by the Health Research Council's Ethics Committee for the purposes of section 25(1)(c) of the [Health Research Council Act 1990](#).

We wish you all the best with your study.

Yours sincerely



Alieke Dierckx

Administrator

Upper South A Regional Ethics Committee

Uppersoutha_ethicscommittee@moh.govt.nz

List of members of the Upper Region A Ethics Committee, November 2011

Liz Richards (Chair)	Consumer Representative Lay member	Female
Angelika Frank-Alexander	Community Representative Lay member	Female
Allison Franklin	Consumer representative Lay member	Female
Jane Kerr	Researcher Health Professional Member	Female
Ellen McCrae	Pharmacist Health Professional member	Female
Edie Moke	Maori representative Lay member	Female
Barbara Nicholas	Ethicist Lay member	Female
Christine Robertson	Health Practitioner Health Professional member	Female
Martin Than	Researcher Health Professional Member	Male
Jinny Willis	Health Practitioner Health Professional member	Female

Edie Moke was not present at the meeting of 21 November 2011.



28 November 2011

Alieke Dierckx (Administrator) Date

FEMALE PARTICIPANTS WANTED!



We are looking for **diETING** and **non-diETING** females to participate in a study about metacognitions (the way people think about their thoughts) relating to their shape, weight, and eating.

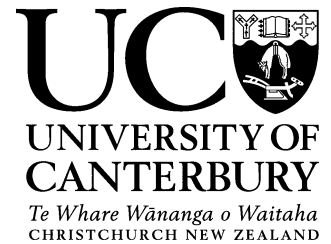
Participants will be asked to complete several questionnaires that inquire about their thinking processes regarding shape, weight and eating. The information that participants provide will be compared with identical questionnaires given to females with Anorexia Nervosa. This research will help us understand more about the factors that maintain eating disorders and how these factors are similar or different between dieting and non-dieting females.

The study will take about 30 minutes. Participants will receive a reimbursement of a \$5 Countdown supermarket voucher.

If you are interested in participating in this study or would like to know more, contact jaimie.kleinbichler@pg.canterbury.ac.nz. I can also be found in room 711 of the Psychology building and on Ext. 3638

Study on Metacognitions: jaimie.kleinbichler@pg.canterbury.ac.nz
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Information Sheet



**A comparison of thinking processes (metacognitions)
in Anorexia Nervosa, dieting and non-dieting females**

You are invited to take part in a research study being conducted as part of a Masters Thesis for the University of Canterbury. Researchers at the University of Canterbury Jaimee Kleinbichler (thesis student) and Janet Carter (thesis supervisor) are conducting this study in collaboration with Rachel Lawson, Clinical Head of the South Island Eating Disorders Services Unit. This study will help us understand how metacognitive processes contribute to maintaining symptoms of Anorexia Nervosa as well as how metacognitions are similar or different in women dieting and in those not dieting. Metacognitions are positive and negative beliefs people hold that influence the way in which thoughts are regulated and experienced.

The study will be conducted at the University of Canterbury and the South Island Eating Disorder Service. Approximately 100 dieting and non-dieting females will be recruited at the University for this study. About 20 participants will be recruited at the South Island Eating Disorders Services Unit, and an additional 6-12 participants from the South Island Eating Disorders Services Unit will be filling out questionnaires at pre and post treatment. Our aim is to examine the nature and extent of metacognitions in relation to weight, shape, and eating in a sample of female university students currently dieting, not dieting, and in adult females diagnosed with Anorexia Nervosa.

Inclusion/Exclusion criteria

Participants from the University of Canterbury and from the South Island Eating Disorders Services Unit must be female and at least 18 years of age to take part in this study.

Participation

Your participation is entirely voluntary (your choice). You do not have to take part in this study. If you do agree to take part, you are free to withdraw from the study at any time, without having to give a reason. Recruitment for this study will continue until mid 2012. Please feel free to take until May (University participants) or July (South Island Eating Disorder Services participants) of 2012 to decide if you would like to participate. If you decide to participate, we would ask you to fill out a number of questionnaires. You do not have to answer all the questions, and you may stop at any time.

About the study

You will be asked to answer a number of questions regarding demographics (age, education, ethnicity, height, weight etc.), metacognitions, worry, and rumination (rumination refers to contemplation or reflection, which may become persistent and recurrent worrying or brooding). We will also ask for information regarding your thoughts, feelings and behaviours about eating, mood, and anxiety. Filling out these questionnaires will take about 20 - 30 minutes.

Benefits, risk, and safety

Participation in this project will increase our understanding of metacognitions in dieting and non-dieting samples, the role metacognitions play in Anorexia, and the association of metacognitions with the expression of Anorexia symptoms. We will be able to identify harmful metacognitions that perhaps lead to and maintain mental health problems and understand how the content, extent, and frequency of metacognitions compare across the three groups studied. With this information on metacognitions, we may potentially be able to determine specific risk or protective factors for Anorexia Nervosa.

When filling out the questionnaires, certain questions about personal details may upset or disturb you. If you find that you identify any problems that you are worried about, you have any queries, or would like to talk to somebody, we will be readily available to do so. If needed, we can discuss possible appropriate referral options with you.

If you have any queries or concerns regarding your rights as a participant in this study, you may wish to contact an independent health and disability advocate:

Free phone: 0800 555 050

Free fax: 0800 2 SUPPORT (0800 2787 7678)

Email: advocacy@hdc.org.nz

Confidentiality

Please note that all information provided for this study will be treated with the utmost confidence. Participation in this study is anonymous. All personal information will be securely stored, and accessible only by the investigators of this study. No material that could personally identify you will be used in any reports that will subsequently be written.

Reimbursement

All participants will receive a \$5 Countdown supermarket voucher upon completion of the questionnaires.

Information regarding the findings of this study

Although individual results will be kept strictly confidential, a summary of the findings from this research will be made available to all of the participants and we will be pleased to send you a copy upon completion of the study. The overall results gathered will be used for the purpose of this study and will contribute to the scientific knowledge on the effects that metacognitions have in the expression and maintenance of Anorexia Nervosa symptoms.

Statement of approval

This study has received ethical approval from the Upper South A Regional Ethics Committee, ethics reference number URA/11/09/052.

Please feel free to contact the researchers if you have any questions about this study.

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Consent Form



**A comparison of thinking processes (metacognitions)
in Anorexia Nervosa, dieting and non-dieting females**

I have read and I understand the information sheet for volunteers taking part in this study designed to examine the nature and extent of metacognitions in relation to weight, shape, and eating in a sample of female university students currently dieting and not dieting, and in adult females diagnosed with Anorexia Nervosa.

I have had the opportunity to discuss this study. I am satisfied with the answers I have been given.

I have had the opportunity to use whānau support or a friend to help me ask questions and understand the study.

I understand that taking part in this study is voluntary (my choice), and that I may withdraw from the study at any time.

I understand that my participation in this study is confidential and that no material that could identify me will be used in any reports on this study.

I have had time to consider whether to take part in the study.

I know who to contact if I have any concerns about the study.

I know who to contact if I have any questions about the study in general.

I wish to receive a copy of the results (circle one).

Yes No

If Yes, please provide email address:

I would like the researcher to discuss the outcomes of the study with me. Yes No

I would like my GP to be informed of my participation in this study Yes No

I would like my GP to receive a summary of my individual results from the questionnaires I complete. Yes No

If yes, please record your GPs name, address, and phone number below:

I (.....*full name*) hereby consent to take part in this study.

Signature:

Date:

Project explained by:

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Appendix E: The Positive Beliefs about Rumination Scale (PBRs)

PBRs

Instructions: Most people experience depressive thoughts at times. When depressive thinking is prolonged and repetitive it is called *ruminat*ion. This questionnaire is concerned about the beliefs that people have about rumination. Listed below are a number of these beliefs. Please read each belief carefully and indicate how much you *generally* agree with each one. Please circle the number that best describes your answer. Please respond to all of the items.

The rating scale is as follows:

- 1 Do not agree
- 2 Agree Slightly
- 3 Agree Moderately
- 4 Agree Very Much

1	In order to understand my feelings of depression I need to ruminate about my problems	1	2	3	4
2	I need to ruminate about the bad things that have happened in the past to make sense of them	1	2	3	4
3	I need to ruminate about my problems to find the causes of my depression	1	2	3	4
4	Ruminating about my problems helps me to focus on the most important things.	1	2	3	4
5	Ruminating about the past helps me to prevent future mistakes and failures	1	2	3	4
6	I need to ruminate about my problems to find my answers to my depression	1	2	3	4
7	Ruminating about my feelings helps me to understand past mistakes and failures	1	2	3	4
8	Ruminating about my depression helps me to understand past mistakes and failures	1	2	3	4
9	Ruminating about the past helps me to work out how things could have been done better	1	2	3	4

Appendix F: The Negative Beliefs about Rumination (NBRS)

NBRS

Instructions: Most people experience depressive thoughts at times. When depressive thinking is prolonged and repetitive it is called *rumination*. This questionnaire is concerned about the beliefs that people have about rumination. Listed below are a number of these beliefs. Please read each belief carefully and indicate how much you *generally* agree with each one. Please circle the number that best describes your answer. Please respond to all of the items.

The rating scale is as follows:

- 1 Do not agree
- 2 Agree Slightly
- 3 Agree Moderately
- 4 Agree Very Much

1	Ruminating makes me physically ill	1	2	3	4
2	When I ruminate I can't do anything else	1	2	3	4
3	Ruminating means I'm out of control	1	2	3	4
4	Everyone would desert me if they knew how much I ruminate about myself.	1	2	3	4
5	People will reject me if I ruminate	1	2	3	4
6	Ruminating about my problems is uncontrollable	1	2	3	4
7	Ruminating about my depression could make me kill myself	1	2	3	4
8	Ruminating will turn into a failure	1	2	3	4
9	I cannot stop myself from ruminating	1	2	3	4
10	Ruminating means I'm a bad person	1	2	3	4
11	It is impossible not to ruminate about the bad things that have happened in the past	1	2	3	4
12	Only weak people ruminate	1	2	3	4
13	Ruminating can make me harm myself	1	2	3	4

Appendix G: The Penn State Worry Questionnaire (PSWQ)

The Penn State Worry Questionnaire (PSWQ)

Instructions: Rate each of the following statements on a scale of 1 ("not at all typical of me") to 5 ("very typical of me"). Please do not leave any items blank.

	Not at all typical of me					Very typical of me				
	1	2	3	4	5	1	2	3	4	5
1. If I do not have enough time to do everything, I do not worry about it.										
2. My worries overwhelm me.										
3. I do not tend to worry about things.										
4. Many situations make me worry.										
5. I know I should not worry about things, but I just cannot help it.										
6. When I am under pressure I worry a lot.										
7. I am always worrying about something.										
8. I find it easy to dismiss worrisome thoughts.										
9. As soon as I finish one task, I start to worry about everything else I have to do.										
10. I never worry about anything.										
11. When there is nothing more I can do about a concern, I do not worry about it any more.										
12. I have been a worrier all my life.										
13. I notice that I have been worrying about things.										
14. Once I start worrying, I cannot stop.										
15. I worry all the time.										
16. I worry about projects until they are all done.										

Appendix H: The Rumination and Reflection Questionnaire

RRQ

Instructions:

For each of the statements, please indicate your level of agreement or disagreement by circling one of the scale categories to the right of each statement. Use the scale as shown below:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
1. My attention is often focused on aspects of myself I wish I'd stop thinking about.	1	2	3	4	5
2. I always seem to be "re-hashing" in my mind recent things I've said or done.	1	2	3	4	5
3. Sometimes it is hard for me to shut off thoughts about myself.	1	2	3	4	5
4. Long after an argument or disagreement is over with, my thoughts keep going back to what happened.	1	2	3	4	5
5. I tend to "ruminate" or dwell over things that happen to me for a really long time afterward.	1	2	3	4	5
6. I don't waste time re-thinking things that are over and done with.	1	2	3	4	5
7. Often I'm playing back over in my mind how I acted in a past situation.	1	2	3	4	5
8. I often find myself re-evaluating something I've done.	1	2	3	4	5
9. I never ruminate or dwell on myself for very long.	1	2	3	4	5
10. It is easy for me to put unwanted thoughts out of my mind.	1	2	3	4	5
11. I often reflect on episodes in my life that I should no longer concern myself with.	1	2	3	4	5
12. I spend a great deal of time thinking back over my embarrassing or disappointing moments.	1	2	3	4	5
<hr/>					
13. Philosophical or abstract thinking doesn't appeal to me that much.	1	2	3	4	5
14. I'm not really a meditative type of person.	1	2	3	4	5
15. I love exploring my "inner" self.	1	2	3	4	5
16. My attitudes and feelings about things fascinate me.	1	2	3	4	5
17. I don't really care for introspective or self-reflective thinking.	1	2	3	4	5
18. I love analyzing why I do things.	1	2	3	4	5
19. People often say I'm a "deep", introspective type of person.	1	2	3	4	5
20. I don't care much for self-analysis.	1	2	3	4	5
21. I'm very self-inquisitive by nature.	1	2	3	4	5
22. I love to meditate on the nature and meaning of things.	1	2	3	4	5
23. I often love to look at my life in philosophical ways.	1	2	3	4	5
24. Contemplating myself isn't my idea of fun.	1	2	3	4	5

Appendix I: Eating Disorder Examination Questionnaire 4 (EDE-Q4)

Eating Questionnaire (EDE-Q4)

The following questions are concerned with the PAST FOUR WEEKS ONLY (28 DAYS). Please read each question carefully and circle the appropriate number on the right. Please answer **all** the questions.

On how many days out of the past 28 days.....	No days	1-5 days	6-12 days	13- 15 days	16- 22 days	23- 27 days	Every day
1. Have you been deliberately <u>trying</u> to limit the amount of food you eat to influence your shape or weight?	0	1	2	3	4	5	6
2. Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?	0	1	2	3	4	5	6
3. Have you <u>tried</u> to avoid eating any foods which you like in order to influence your shape or weight?	0	1	2	3	4	5	6
4. Have you <u>tried</u> to follow definite rules regarding your eating in order to influence your shape or weight; for example, a calorie limit, a set amount of food, or rules about what or when you should eat?	0	1	2	3	4	5	6
5. Have you wanted your stomach to be empty?	0	1	2	3	4	5	6
6. Has thinking about food or its calorie content made it much more difficult to concentrate on things you are interested in; for example, read, watch TV, or follow a conversation?	0	1	2	3	4	5	6
7. Have you been afraid of losing control over eating?	0	1	2	3	4	5	6
8. Have you had episodes of binge eating?	0	1	2	3	4	5	6
9. Have you eaten in secret? (do not count binges)	0	1	2	3	4	5	6
10. Have you definitely wanted your stomach to be flat?	0	1	2	3	4	5	6
11. Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; for example read, watch TV or follow a conversation?	0	1	2	3	4	5	6
12. Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
13. Have you felt fat?	0	1	2	3	4	5	6
14. Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

15. On what proportion of times that you have eaten have you felt guilty because the effect on your shape or weight? (do not count binges) (circle the number which applies).

0 – One of the times
1 – A few of the times
2 – Less than half the times
3 – Half the times
4 – More than half the times
5 – Most of the time
6 – Every day

16. Over the past four weeks (28 days), have there been any times when you have felt that you have eaten what other people would regard as an unusually large amount of food given the circumstances? (please put appropriate number in box).

0 – No
1 – Yes

17. How many such episodes have you had over the past four weeks?

18. During how many of these episodes of overeating did you have a sense of have lost control over your eating?

19. Have you had other episodes of eating in which you have had a sense of having lost control and eaten too much, but have not eaten an unusually large amount of food given the circumstances?

0 – No
1 – Yes

20. How many such episodes have you had over the past four weeks?

21. Over the past four weeks have you made yourself sick (vomit) as a means of controlling your shape or weight?

0 – No
1 – Yes

22. How many times have you done this over the past four weeks?

23. Have you taken laxatives as a means of controlling your shape or weight?

0 – No
1 – Yes

24. How many times have you done this over the past four weeks?

25. Have you taken diuretics (water tablets) as a means of controlling your shape or weight?

0 – No
1 – Yes

26. How many times have you done this over the past four weeks?

27. Have you exercised hard as a means of controlling your shape or weight?

0 – No
1 – Yes

28. How many times have you done this over the past four weeks?

Over the past four weeks (28 days) - please circle the number which best describes your behaviour -	Not at all		Slightly		Moderately		Markedly
29. Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
30. Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
31. How much would it upset you if you had a to weigh yourself once a week for the next four weeks?	0	1	2	3	4	5	6
32. How dissatisfied have you felt about your weight?	0	1	2	3	4	5	6
33. How dissatisfied have you felt about your shape?	0	1	2	3	4	5	6
34. How concerned have you been about other people seeing you eat?	0	1	2	3	4	5	6
35. How uncomfortable have you felt seeing your body; for example, in the mirror, in shop window reflections, while undressing or taking a bath or shower?	0	1	2	3	4	5	6
36. How uncomfortable have you felt about others seeing your body; for example, in communal changing rooms, when swimming or wearing tight clothes?	0	1	2	3	4	5	6

Appendix J: The Eating Attitudes Test-26 (EAT-26)

Eating Attitudes Test (EAT-26)

Age: _____ Current Weight: _____ Highest weight (excluding pregnancy): _____

Sex: _____ Height: _____ Lowest Adult Weight: _____ Ideal Weight: _____

✓ Please choose one response by marking a check to the right for each of the following statements:	Always	Usually	Often	Some times	Rarely	Never	Score	
1. Am terrified about being overweight.	—	—	—	—	—	—		
2. Avoid eating when I am hungry.	—	—	—	—	—	—		
3. Find myself preoccupied with food.	—	—	—	—	—	—		
4. Have gone on eating binges where I feel that I may not be able to stop.	—	—	—	—	—	—		
5. Cut my food into small pieces.	—	—	—	—	—	—		
6. Aware of the calorie content of foods that I eat.	—	—	—	—	—	—		
7. Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)	—	—	—	—	—	—		
8. Feel that others would prefer if I ate more.	—	—	—	—	—	—		
9. Vomit after I have eaten.	—	—	—	—	—	—		
10. Feel extremely guilty after eating.	—	—	—	—	—	—		
11. Am preoccupied with a desire to be thinner.	—	—	—	—	—	—		
12. Think about burning up calories when I exercise.	—	—	—	—	—	—		
13. Other people think that I am too thin.	—	—	—	—	—	—		
14. Am preoccupied with the thought of having fat on my body.	—	—	—	—	—	—		
15. Take longer than others to eat my meals.	—	—	—	—	—	—		
16. Avoid foods with sugar in them.	—	—	—	—	—	—		
17. Eat diet foods.	—	—	—	—	—	—		
18. Feel that food controls my life.	—	—	—	—	—	—		
19. Display self-control around food.	—	—	—	—	—	—		
20. Feel that others pressure me to eat.	—	—	—	—	—	—		
21. Give too much time and thought to food.	—	—	—	—	—	—		
22. Feel uncomfortable after eating sweets.	—	—	—	—	—	—		
23. Engage in dieting behavior.	—	—	—	—	—	—		
24. Like my stomach to be empty.	—	—	—	—	—	—		
25. Have the impulse to vomit after meals.	—	—	—	—	—	—		
26. Enjoy trying new rich foods.	—	—	—	—	—	—		
Total Score =								
Behavioral Questions:								
In the past 6 months have you:							Yes	No
A. Gone on eating binges where you feel that you may not be able to stop? (Eating much more than most people would eat under the same circumstances) If you answered yes, how often during the worst week: _____								
B. Ever made yourself sick (vomited) to control your weight or shape? If you answered yes, how often during the worst week: _____								
C. Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape? If you answered yes, how often during the worst week? _____								
D. Ever been treated for an eating disorder? When: _____								

EAT-26 From: Garner et al. 1982, *Psychological Medicine*, 12, 871-878); adapted by D. Garner with permission.

Appendix K: Depression, Anxiety, and Stress Scale (DASS)

<h1>DASS</h1>		<i>Name:</i>	<i>Date:</i>
<p>Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you <i>over the past week</i>. There are no right or wrong answers. Do not spend too much time on any statement.</p>			
<p><i>The rating scale is as follows:</i></p> <p>0 Did not apply to me at all 1 Applied to me to some degree, or some of the time 2 Applied to me to a considerable degree, or a good part of time 3 Applied to me very much, or most of the time</p>			
1	I found myself getting upset by quite trivial things	0	1 2 3
2	I was aware of dryness of my mouth	0	1 2 3
3	I couldn't seem to experience any positive feeling at all	0	1 2 3
4	I experienced breathing difficulty (eg, excessively rapid breathing, <input type="checkbox"/> breathlessness in the absence of physical exertion)	0	1 2 3
5	I just couldn't seem to get going	0	1 2 3
6	I tended to over-react to situations	0	1 2 3
7	I had a feeling of shakiness (eg, legs going to give way)	0	1 2 3
8	I found it difficult to relax	0	1 2 3
9	I found myself in situations that made me so anxious I was most <input type="checkbox"/> relieved when they ended	0	1 2 3
10	I felt that I had nothing to look forward to	0	1 2 3
11	I found myself getting upset rather easily	0	1 2 3
12	I felt that I was using a lot of nervous energy	0	1 2 3
13	I felt sad and depressed	0	1 2 3
14	I found myself getting impatient when I was delayed in any way <input type="checkbox"/> (eg, lifts, traffic lights, being kept waiting)	0	1 2 3
15	I had a feeling of faintness	0	1 2 3
16	I felt that I had lost interest in just about everything	0	1 2 3
17	I felt I wasn't worth much as a person	0	1 2 3
18	I felt that I was rather touchy	0	1 2 3
19	I perspired noticeably (eg, hands sweaty) in the absence of high <input type="checkbox"/> temperatures or physical exertion	0	1 2 3
20	I felt scared without any good reason	0	1 2 3
21	I felt that life wasn't worthwhile	0	1 2 3

Reminder of rating scale:

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

22	I found it hard to wind down	0	1	2	3
23	I had difficulty in swallowing	0	1	2	3
24	I couldn't seem to get any enjoyment out of the things I did	0	1	2	3
25	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
26	I felt down-hearted and blue	0	1	2	3
27	I found that I was very irritable	0	1	2	3
28	I felt I was close to panic	0	1	2	3
29	I found it hard to calm down after something upset me	0	1	2	3
30	I feared that I would be "thrown" by some trivial but unfamiliar task	0	1	2	3
31	I was unable to become enthusiastic about anything	0	1	2	3
32	I found it difficult to tolerate interruptions to what I was doing	0	1	2	3
33	I was in a state of nervous tension	0	1	2	3
34	I felt I was pretty worthless	0	1	2	3
35	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
36	I felt terrified	0	1	2	3
37	I could see nothing in the future to be hopeful about	0	1	2	3
38	I felt that life was meaningless	0	1	2	3
39	I found myself getting agitated	0	1	2	3
40	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
41	I experienced trembling (eg, in the hands)	0	1	2	3
42	I found it difficult to work up the initiative to do things	0	1	2	3

Appendix L: General demographics questions used

**A comparison of thinking processes (metacognitions)
in Anorexia Nervosa, dieting and non-dieting females**



Please complete the following information:

Note: You do not have to answer all the questions in this booklet and you may stop at any time.

Are you currently dieting in an attempt to lose weight? (please circle)

Yes No

If yes, describe your current diet plan.

How long have you been dieting?

What dieting rules are you trying to following, whether or not you are successful?

What is your date of birth?

How many years of high school have you completed?

How many years of University have you completed?

How many years of other tertiary education have you completed?

Please specify what type of tertiary education you completed.

What ethnicity do you identify with? *Please tick one or more boxes.*

- NZ European
- Maori
- Samoan
- Cook Island Maori
- Tongan
- Niuean
- Chinese
- Indian
- Other (*please specify*):

What is your current marital status?

- Married (or living together 1+ years)
- Separated
- Divorced
- Widowed
- Never married

What is your current weight (*kg*)?

What is your current height (*m*)?

The following questions are regarding your eating, weight and shape. Take as much space as you need to answer these questions. If you run out of room, more paper will be provided for you.

1a. What are the **advantages** of having negative/anxious thoughts about your eating?

1b. What are the **disadvantages** of having negative/anxious thoughts about your eating?

2a. What are the **advantages** of having negative/anxious thoughts about your weight?

2b. What are the **disadvantages** of having negative/anxious thoughts about your weight?

3a. What are the **advantages** of having negative/anxious thoughts about your shape?

3c. What are the **disadvantages** of having negative/anxious thoughts about your shape?