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EMOTION PROCESSING DEFICITS IN DISORDERED EATING BEHAVIOURS

by

Andreea Cristina Andreescu

A Dissertation
submitted to the Faculty of Graduate Studies
through the Department of Psychology
in Partial Fulfillment of the Requirements for
the Degree of Doctor of Philosophy at the
University of Windsor

Windsor, Ontario, Canada

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Emotion Processing Deficits in Disordered Eating Behaviours

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ABSTRACT

This study explored the relationship between disordered eating patterns (i.e., dieting, binging, and binge/purging) and emotion processing deficits (i.e., perceived emotion intensity, emotion regulation, and self-compassion). The sample consisted of 209 undergraduate participants who completed a series of self-reports measuring concepts of emotion processing and disordered eating. Additionally, they described an upsetting event and their subsequent coping to feel better. Results indicated that higher levels of disordered eating are associated with higher emotional processing deficits, specifically high levels of perceived emotion intensity, difficulty regulating affect, and diminished self-compassion. Furthermore, emotion regulation mediated the relationship between emotion intensity and disordered eating. Each disordered eating type was associated with a specific profile of emotion regulation difficulties. High levels of self-compassion were associated with low levels of disordered eating and low levels of emotion processing deficits. Self-compassion was therefore identified as a significant factor in understanding the interplay between emotion processing and disordered eating patterns.

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CHAPTER ONE

Introduction

In the current Western culture, the struggle to maintain weight and control food intake is ubiquitous and influences people as early as childhood. Up to 25 % of elementary school girls report dieting on a regular basis and almost 50% of the same sample of girls acknowledge that their wish to lose weight originates in the pictures and portrayals of women from fashion magazines (Smolak, 2011). Over time, occasional dieting behaviours may give way to more drastic weight loss/maintenance strategies. Neumark-Sztainer (2005) found that over 50% of teenage girls engage in problematic weight regulation behaviours such as skipping meals, fasting, and taking laxatives or diuretics. Furthermore, these behaviours progress to partial or full-blown eating disorders for up to 25% of chronic dieters (Shisslak, Crago, & Estes, 1995.) The prevalence of clinical level eating disorders as defined by DSM –IV in the general population is estimated to range between 0.6 and 4.5% across the three eating disorders categories (Hudson, Hiripi, Pope & Kessler, 2007), with a mortality rate of up to 9.6% (Smink, van Hoeken, & Hoek, 2012).

Research to date identifies that pathological eating behaviours are associated with emotional dysregulation. Even at sub-clinical levels, restricted eating is associated with anxiety, depression, problematic alcohol consumption, and unstable self-concept (Abebe, Lien, Rogersen, & van Soest, 2012). At clinical levels of eating pathology, the experience of negative emotions is associated with engagement in eating disorder behaviours (Stice, 2002), suggesting that persons who develop eating disorders struggle to regulate their emotions. Stice (2002) found that the induction of emotions such as anger, sadness, fear, and guilt was associated with a significant increase in body dissatisfaction even if the emotions in question were not related

initially to body shape or size. Persons with binge eating disorder also show a reliance on their eating disorder when experiencing unpleasant emotions; as individuals describe, binging allows them to dissociate from these emotions (Franko, Wonderlich, Little, & Herzog, 2004). Similarly to binging, severe dieting or restricting is associated with emotion dysregulation, as the induction of negative emotions in severe dieters is associated with increased food restriction which in turn is associated with overeating and/or purging, followed further by additional negative emotions (Stice, 1994).

The current study explored the connection between emotion dysregulation and eating pathology in general as well as the specific associations between features of disordered eating and elements of emotion regulation deficits.

The Experience of Emotion and Disordered Eating

Clinical Observations

The relationship between eating disorders and emotion dysregulation was initially noted in early clinical writings whereby patients diagnosed with anorexia nervosa exhibited a poor ability to identify and trust their own feelings. Bruch (1962) first described that her patients exhibited a "marked deficiency in identifying emotional states" (p. 191), including the expression of anxiety and depression, which often remained unnoticed as the disorder developed, but became apparent in treatment. Bruch (1973) theoretized that the infant develops his or her sense of self and body identity through interactions with the mother. If the mother does not respond to the child's needs in a consistent manner, the child does not develop adequate perceptual and conceptual awareness and knowledge of the self, including bodily states. An example of an inappropriate response would be offering food to comfort a negative emotion, leading to the child's confusion of the difference between biological and emotional cues. In the

absence of inner guidelines for autonomy and sense of one's needs, the person relies on external contingencies in order to experience effectiveness and to regulate negative emotions such as rituals and adherence to beauty norms.

A similar line of thought comes from Selvini-Palazolli (1978) whose patients with anorexia nervosa reported repeated invalidating experiences from overly critical and overbearing mothers such that the patients failed to develop emotion expression skills. In adolescence, the patients' inability to express emotions is associated with feelings of depression and helplessness. True to her psychoanalytic training, Selvini-Palazzoli suggested that an individual projects the "bad" internalized mother onto her body, which then becomes a symbolic representation of the "bad object" and needs to be controlled. In essence, the eating pathology is the patient's attempt to control the bad object and protect the sense of self.

These clinical observations led Garner, Olmstead and Polivy (1983) to include a subscale on interoceptive awareness in their Eating Disorder Inventory – a measure that focused on the behavioural and psychological traits associated with anorexia nervosa. Interoceptive awareness was defined as a lack of confidence in recognizing and identifying emotions as well as sensations of hunger or satiety (Garner et al., 1983). In one subsequent study, these authors compared individuals with anorexia nervosa with ballet dancers – who are notoriously preoccupied with weight and body shape. While both groups scored high on preoccupation with weight and shape, the clinical group scored significantly higher than the ballet dancers on the interoceptive awareness subscale, highlighting the strong association between disordered eating and difficulties identifying emotions and other internal states (Garner, Olmstead, & Garfinkel, 1983).

While the initial writing focused on the psychological difficulties of severe restricters, Garner, Garfinkel and Bemis (1982) offered clinical observations on the behaviour of anorexic

individuals who endorsed binging. They noted that often clients described the need to eat in stressful circumstances, and that successful treatment entailed a strong focus on discriminating and identifying emotions and formulating non-food coping strategies. Additional disordered behaviours, such as vomiting and laxative use were seen by Garner and colleagues as reinforcing the pathology by providing a way to "repair" the overeating episode, minimizing the guilt induced by overeating (Garner et al., 1982).

In her comparison of anorexia nervosa and obesity as two equally troubling phenomena, Bruch (1975) identified that both categories of patients may use eating to respond to non-nutritional needs and that they resort to this coping resource instead of identifying the correct need and addressing it with a non-food-related behaviour. Similarly to her anorexic patients, Bruch noticed that obese patients "are unable to recognize hunger, or to distinguish it from other states of bodily tension or emotional arousal" (1975, p.160).

Qualitative Studies in Support of Clinical Observations

Starting from these clinical writings, qualitative studies have since explored emotion processing features associated with eating disorders. Serpell, Treasure, Teasdale, and Sullivan (1999), asked participants diagnosed with anorexia nervosa to write letters addressed to their eating disorder, personified as a friend or an enemy. While participants were able to describe several negative aspects related to their pathology, such as social isolation and loss of control over their lives, they also noted that restricting allowed them to avoid or stifle emotions (Serpell et al., 1999). Binging and purging behaviours also serve to calm negative emotions in participants diagnosed with bulimia nervosa (Jeppson, Richards, Hardman and Granley, 2003). Jeppson and colleagues (2003) interviewed eight participants who endorsed behaviours such as severe dieting, binging, and purging. The participants' reports revealed that binge cycles were

triggered by negative emotions such as shame, guilt, anger, sadness, and loneliness. Binging was described as offering comfort, soothing, and nurturance while binge/purge cycles were described as offering an escape from stressors.

In 2009, Fox interviewed 11 women diagnosed with anorexia nervosa, five of the restrictive subtype and six of the binge/purge subtype. Analyses of interview content revealed that in their formative years, most participants witnessed others, usually parents, expressing anger in unpredictable and destructive manner often coupled with violence. Resulting from this negative experience, participants described learning that anger was a scary, "toxic" emotion, which needed to be avoided. Participants also described a scarcity of emotion expression within their family environment, such that the emotions other than anger were often denied or ignored (Fox, 2009). In general, individuals harboured the belief that expressing emotions would likely lead to rejection by others. From this, Fox theoretised that, in order to protect themselves, these individuals devised a series of alternative emotion control strategies. Binging and/or purging was described as removing anger. Restricting was used as a distractor from sadness and general negative affect, as well as a soothing mechanism, lending a temporary increase in self-esteem, sense of accomplishment, and positive affect (Fox, 2009). These qualitative studies shed further light on the relationship between emotion regulation and eating pathology and supported emotion processing as a necessary focus of treatment interventions.

Does Disordered Eating Reflect Intense Emotions, Underdeveloped Emotion Regulation, or Diminished Self-Compassion?

Framing key emotional processing difficulties as constructs of interest for current study.

The general consensus based on clinical observations as well as qualitative studies is that eating pathology appears to be related to emotional needs of some kind, albeit in a dysfunctional manner. Accounts of feeling overwhelmed by emotion indicate that persons with eating disorders may experience their emotions as unbearable and therefore attempt to use such pathological behaviours to stifle the intensity of their emotions. The question follows as to whether persons with eating disorders experience emotions as intolerably intense, or they are unable to employ adequate emotion regulation and self-compassion skills to down-regulate their distress. As such, three concepts of interest warranted further review of the literature: emotion intensity, emotion regulation, and self-compassion. Emotional intensity refers to the strength or magnitude of a person's emotional experience (Larsen & Diener, 1987). As per Larsen and Diener's (1987) definition, persons experiencing high emotion intensity react more intensely to daily events, evidence quick and frequent shifts in their mood throughout the day, and focus more on the emotional content and meaning of events than do persons with a low emotion intensity.

On the other hand, patients with disordered eating behavior may not have developed a functional set of emotion regulation skills to allow them to manage otherwise normal levels of emotions. Fox (2009) advanced the explanation that the scarcity of suitable emotion regulation

skills modeled by parents in childhood would have prevented the individuals from developing self-soothing and distress tolerance strategies. In this context, disordered eating behaviours serve a function of avoidance or suppression of distress by orienting the person away from the source of stress, which in turn diminishes the intensity of negative emotions. Additionally, the comforting quality of eating or the achievement quality of dieting and exercising soothes the person and lends to positive emotions.

In conjunction with these two emotion processing difficulties (i.e., overly intense emotional experiences, and inadequate emotion regulation skills), persons with eating disorder symptoms seem to struggle to maintain a self-compassionate attitude towards themselves at times of distress. Self-compassion is defined as the tendency to treat oneself during times of distress with: (a) self-kindness instead of judgmental self-criticism, (b) openness to the experience of distress instead of experiential avoidance, and (c) awareness that struggles are a normal part of the human experience instead of an isolating event (Neff, 2003). Gilbert (1998) provided a theoretical model for explaining the under-development of self-compassion by which early experiences of abuse, criticism, or lack of support and warmth lend a tendency towards self-criticism during times of distress. Gilbert argues that in the context of a stressful, insecure, or threatening childhood environment, the person does not learn to adaptively explore the external world, be mindful of their internal world of emotions, and use internal and external means of soothing distress (Gilbert, 2010). As such, eating disorders may be hypothesized to serve functional purposes of compensating for the underdeveloped regulatory system by over-relying on short-term soothing behaviours such as eating, and exercising, or on achievement-based behaviours such as protracted dieting and weight loss (Goss & Allan, 2014).

Framing disordered eating in terms of target behaviors rather than diagnosis.

Relevant empirical research to date has focused on exploring emotion regulation deficits across diagnostic categories for eating pathology (e.g., comparing participants with anorexia nervosa, bulimia nervosa, and binge eating disorder) or within specific eating disordered groups (e.g., binge eating disorder compared to healthy controls, or comparing subtypes of bulimia nervosa). When creating comparisons to a category of eating disorders, researchers have often collected data from clinical or subclinical participants based on their endorsement of specific behaviour patterns such as dieting, binging/overeating, or engagement in binge/purge cycles. In such studies, participants may have received clinical diagnoses of eating disorders, however, the researchers usually focused on the specific features associated with each pathological behaviour, moving away from the global diagnoses as such. For example, while Lehman and Rodin (1988) compared participants with bulimia nervosa to normal controls in terms of their access to regulation strategies, their sample was only constituted of participants with binge/purge behaviours, therefore their conclusions could only be applied to individuals endorsing this subcategory of behaviours. Similarly, Claes, Vandereycken, and Vertommen (2005) compared participants with anorexia nervosa with healthy controls, but advanced specific findings about dimensions of personality associated with restricting vs. binge/purge subtypes.

To frame the current study, a case can be made that a new approach for reviewing previous studies would focus on specific clusters of *behaviours,* instead of *diagnostic* categories. Therefore, the literature review will be organized according to the predominant pathological eating behaviour in question: dieting, severe restriction, binging, binge/purge cycles. The examination of groupings of behaviours allows for comparisons both cross-diagnostically and across levels of severity (clinical to subclinical). Table 1 includes an overview of the proposed

formulation of groupings to be considered when exploring extant research. This grouping of behaviors will also be used as a basis for the design of the current study.

Table 1.

Grouping of eating pathology behaviour used for the literature review and current study design

Grouping of disordered eating behavior	Characteristics of group membership	Potentially relevant DSM classification
Dieting	Endorsement of restricted diet; Occasional meal skipping or fasting; Exercising for weight control.	Sub-clinical level: Anorexia Nervosa – Restrictive subtype
Restricted eating	Severely restricted food intake; Frequent meal skipping or fasting; Obligatory / compulsive exercising.	Clinical level: Anorexia Nervosa – Restricting subtype
Binging	Endorsement of binging (eating a large quantity of food in a short period of time with a sense of loss of control); May diet, fast, or exercise for weight control.	Sub-clinical or clinical level: Bulimia Nervosa – non-purge subtype Binge eating disorder
Binging/Purging	Endorsement of binging; Endorsement of purging: vomiting, use of laxatives, or diuretics.	Subclinical or clinical level: Anorexia Nervosa- Binge/purge subtype Bulimia Nervosa- Purge subtype

Dieting

Studies exploring dieting as a behaviour cluster have included sub-clinical participants. These participants endorsed skipping meals or undertaking restrictive diets in order to lose weight as well as marked concern with weight and body shape (Stice, Nemeroff, & Shaw, 1996; Herman & Polivy, 1975; Polivy, Herman, & McFarlane, 1994). Research to date using this behaviour as a grouping criterion has focused mostly on exploring emotion regulation skills and self-compassion in particular, while no studies have specifically focused on assessment of dieters' emotion intensity.

Emotion regulation. In a correlational study, Stice and colleagues (1996) explored the relationship between body dissatisfaction, restrained eating, and negative emotions in a population of dieting undergraduate participants. They found that negative emotions coupled with dietary restraint mediate the relationship between body dissatisfaction and bulimic symptoms, accounting for 71% of the variance in bulimic symptomatology. Furthermore, the indirect path from body dissatisfaction to bulimic symptoms through negative affect was stronger than the indirect path between body dissatisfaction and eating pathology through dietary restraint. Based on these findings, it appears that emotion regulation mechanisms exerted a unique effect on eating pathology beyond that of dietary restraint.

This relationship was explored in experimental studies that subjected participants to a mood induction task and tested their emotional experience as well as post-test food intake. In a study by Herman and Polivy (1975), female participants were distributed to a high anxiety condition, where they expected to receive a painful electric shock, or a low anxiety condition, where the shock was described as mild. Both dieters and non-dieters indicated, in their self-

reports, comparable levels of anxiety in anticipation of the shock. During a subsequent taste test, restrained eaters in the high-threat condition ate slightly more than restrained eaters in the low-threat condition (Herman & Polivy, 1975). In contrast, non-dieting participants ate less when distressed than they did in the low-threat condition, confirming that normal eaters decrease their food intake in conditions of stress. These findings are similar with results obtained by Baucom and Aiken (1981) or Frost and colleagues (1982). In a later similar study that employed a speech preparation task to induce negative affect, Polivy, Herman, and McFarlane (1994) found that restrained eaters in the stress condition ate more cookies than did unrestrained eaters in the same condition, regardless of the taste (regular or bitter). Furthermore, restrained eaters in the anxiety condition ate more cookies than restrained eaters in the neutral condition, again regardless of the cookie taste. The study did not provide an analysis of the difference in emotion experience between restrained and unrestrained eaters in each of the stress conditions, which leaves unknown whether dieters experienced more negative emotions than did non-dieters. However, this study offers support for the concept that eating in response to distress is not contingent upon the taste and function of food, but it may correspond to an emotion regulation need.

Self-Compassion. In a correlational study employing undergraduate students who indicated engaging in dieting behaviours, Wasylkiw, MacKinnon, and MacLellan (2012) found that increased self-compassion was associated with decreased body preoccupation and concern about weight and with increased appreciation of one's body regardless of self-esteem levels. Furthermore, self-compassion accounted partially for the influence of body preoccupation on depressive symptomatology. Lastly, increased self-compassion was associated with less guilt

over breaking a diet by eating foods perceived to be unhealthy. This study underscores the protective function of self-compassion against diet-related guilt and body dissatisfaction.

Restriction

Research focused on this cluster of behaviours included participants who endorsed severely limiting their food intake and reported frequently skipping meals, fasting, and exercising in order to lose weight. Given this increased level of dietary restriction, participants had a very low body weight and had obtained a clinical diagnosis of anorexia nervosa (Brockmeyer, Holforth, Bents, Kammerer, Herzog, & Friedrich, 2012). As with studies focused on dieters, research to date on severe restricting has explored emotion regulation and self-compassion, but not the perception of emotion intensity.

Emotion regulation. Brockmeyer and colleagues (Brockmeyer, Bents, Holtforth, Pfeiffer, Herzog, & Friedrich, 2012) compared participants with current clinical levels of anorexia to participants fully recovered from the disorder, clinical controls with either depression or anxiety disorder, and healthy controls. Both anorexia groups self-reported greater emotion regulation difficulties than did healthy controls. Furthermore, both anorexia groups showed levels of emotion regulation impairment comparable to clinical participants diagnosed with a mood or anxiety disorder. Similar findings emerged from a study that required participants with anorexia nervosa and healthy controls to recall a sad event. Participants with anorexia nervosa used significantly more negative emotions words than their healthy counterparts, indicating a negative emotional processing bias (Brockmeyer, et al., 2012b). Within the clinical group, lower body weight was associated with a more scarce recall, containing fewer negative emotions, which suggests that diminished weight serves to buffer from emotional distress.

Self-Compassion. Little research has been conducted regarding the relationship between restricted eating and self-compassion. A correlational study by Ferreira, Pinto-Gouveia, and Duarte (2013) compared clinical participants diagnosed with anorexia, bulimia, and eating disorders not otherwise specified to healthy controls, with a focus on "drive for thinness" – one of the main features of restrictive eating. Predictably, the clinical participants scored higher on measures of drive for thinness, depressive symptomatology, and self-criticism than did healthy controls. Additionally, they scored significantly lower on the self-compassion measure than their non-restricting counterparts. In examining the influence of external shame on drive for thinness, self-compassion was a partial mediator for the nonclinical sample but a full mediator for the clinical sample, accounting for 21% of the variance of drive for thinness. Furthermore, in the non-clinical sample, self-compassion did not mediate the relationship between body dissatisfaction and drive for thinness. In contrast, self-compassion was a full mediator in the clinical sample, accounting for 31% of the variance in the drive for thinness for these participants. This study helps distinguish between pathological and normative levels of body dissatisfaction and dieting behaviours, suggesting the clinical levels of these eating pathology dimensions are uniquely connected with increased self-criticism and with diminished acceptance and non-judgmental attitudes.

In another correlational study using sub-clinical participants, Magnus, Kowalski, and McHugh (2010) focused on the obligatory exercise. Obligatory exercise is viewed as a mandatory activity such that negative feelings of irritability, or sadness arise when a scheduled exercise session is not completed. Although the sample was not assessed for other disordered eating dimensions, obligatory exercising is frequently associated with eating pathology. Results indicated that self-compassion was negatively associated with obligatory exercising, while

controlling for self-esteem. Analyses also revealed that self-compassion was linked with greater intrinsic motivation and lower social body anxiety, suggesting that cultivating self-compassion may protect from developing a compulsive exercising mentality, driven by low self-esteem and socially pressures (Magnus et al., 2010).

Binging

A very large proportion of research on disordered eating has focused on this behaviour cluster, providing a wealth of information regarding this group's emotional processing difficulties. Studies included both clinical and sub-clinical participants who reported primarily engaging in binging behaviours. Sub-clinical participants were selected based on their endorsement of occasional binging or overeating with a sense of loss of control. Clinical participants would have received a diagnosis of bulimia nervosa or binge-eating disorder, according to the diagnostic manuals used at the time when these studies were conducted. The following studies will be grouped based on the primary areas of interest: emotion intensity, emotion regulation, and self-compassion.

Emotion Intensity. In a correlational study of non-clinical participants, Lingswiler, Crowther, and Stephens (1987) compared the mood and food records of undergraduate students who self-identified as binging or non-binging. While the groups were not different on overall anxiety and depression, participants who reported binging showed greater range in emotion intensity ratings than did non-bingers. They also reported significantly more frequent binge eating episodes when experiencing a negative mood than their counterparts who did not report binging (Lingswiler et al., 1987). In a similar study with subclinical participants, self-monitoring records of stress levels showed that those who engaged in occasional binging rated daily hassles as more frequent and more intense than did those with normal eating patterns (Crowther, Sanfter,

Bonifazi, & Shepherd, 2001). In another sub-clinical study, Freeman and Gil (2004) found that participants who binged rated hassles to be more stressful than did non-binging participants, indicating that they experienced the challenges of daily living to be particularly difficult compared to normal eaters. In this context, binging occurred more frequently on days rated as particularly eventful. Whiteside and colleagues (2007) found that limited emotion regulation strategies and lack of emotional clarity accounted for a significant proportion of the variance in binge eating over and above food restriction and dissatisfaction with body and weight. Compared to healthy controls, subclinical participants endorsing binging behaviours also indicated that they had difficulty changing their persistent negative moods.

Using a mixed design employing sub-clinical participants, Koo-Loeb, Costello, Light, and Girdler (2000) devised a complex study involving self-ratings of stress coping, a 24-hour monitor for mood and biological markers (urinary cortisol levels), as well as a mood induction task consisting of a speech preparation assignment. Participants with bulimic tendencies exhibited increased physiological stress response prior to the task, as well as after it. As an aside, the study did not record self-reported emotion during the mood induction therefore it is not known whether the participants' subjective state matched the physiological data. During the 24 hours after mood induction, participants with bulimic symptoms also exhibited markers of higher physiological stress than did non-binging participants. Similarly, they also rated their daily stressors as more intense than did participants in the low bulimia group. In sum, the finding indicated that participants with subclinical levels of eating pathology experience an increased cardiovascular reactivity to stressors as well as increased subjective experience of daily negative emotions compared to normal eaters.

Fox and Harrison (2008) employed an emotion induction task by which 50 female undergraduates were required to recall details of a past event where they felt angry. Comparing their post-induction anger ratings, they found that participants who endorsed bulimic symptoms reported significantly higher levels of state anger and need to suppress anger than did healthy controls. Although neither controlled for the stressor's nature and intensity as strictly as it would be possible in a controlled induction, Fox and Harrison, as well as Koo-Loeb and colleagues found that people with binging tendencies subjectively report higher levels of emotion than do people with normal eating habits.

Cattanach, Malley, and Rodin (1988) obtained a different result when they grouped undergraduate participants according to the presence or absence of binging symptoms. The participants underwent four experimental stressors including reading a vignette about an interpersonal conflict, a vignette about social isolation, an audiovisual task, and being told that they would have to deliver a speech to an audience. The authors compared pre- and post-mood induction changes in reported negative emotion experience, heart rate, and blood pressure – each within and between experimental groups. Although eating disordered participants reported increased *urges* to binge after exposure to the interpersonal stressors (represented by the two vignettes), there were no corresponding differences in physiological markers between the two experimental groups in the social vignette conditions. Of note, participants in the binging group tended to report higher levels of anger, depression, tension, and dysphoria across all stress-inducing conditions than did control participants, but the difference between groups did not reach statistical significance. These findings indicate that people with disordered eating patterns may rate their emotions as reaching higher levels than people with healthy eating patterns, though this arousal is not manifested in their physiological markers.

Lastly, in a clinical study, Hilbert and colleagues explored binging behaviours in participants diagnosed with bulimia and binge eating disorder (Hilbert, Vögele, Tuschen-Caffier, & Hartmann, 2001). Participants underwent an emotion induction task consisting of recalling the details of a personally painful and emotional event. Clinical participants reported more sadness than controls did. Of particular interest, while all participants experienced a subjective increase in sadness followed by a subsequent recovery after the task, binge eating disorder participants still reported post-task levels that were higher than baseline. In contrast, controls and bulimic participants returned to their pre-exposure emotion levels. This suggests that participants who only binge experience not only a larger increase in negative emotional experience, but that they remain "distressed" for longer than those who may resort to compensatory behaviours, or their non-clinical counterparts. Despite these subjective ratings, no significant physiological differences were found, as measured by cardiac markers and skin conductance level. Altogether, most of these studies indicate that while binge eaters and non-binge eaters may not differ on overall physiological markers of negative emotions intensity, binge eaters report perceived fluctuations of mood, indicative of quick shifts in emotion, both positive and negative.

Emotion Regulation. Studies that explored the use of binging as a method for self-soothing and down-regulating emotions found that the more intolerable negative emotions are deemed by an individual, the more likely they are to resort to coping through binging as a fast acting self-soothing mechanism (Anestis, Selby, Fink & Joiner, 2007). Furthermore, Hayaki (2009) explored the specific expectations regarding the consequences of eating on future emotional experience and behaviour in a sample of undergraduate females with binging tendencies. The findings showed that negative reinforcement eating expectancies such as

expectation that eating manages distress and alleviates boredom explained 12.4% of the variance in binging symptoms beyond any shared relationship with other indicators of global emotion dysregulation such as alexithymia and experiential avoidance. Furthermore, the final model, including expectancies that eating manages negative affect, alexithymia, and experiential avoidance explained 40% of the variance in binging. Of particular importance, the expectation that binging decreases negative emotions contributed significantly to the hierarchical regression model.

Laboratory studies focused on both sub-clinical and clinical populations advanced mixed findings, as some studies found that mood induction was followed by increased food intake, while others did not. Aubie and Jarry (2009) investigated food intake following a weight-related mood induction in non-clinical binging participants. Undergraduate participants read teasing vignettes about either weight or competence, followed by a taste rating. Although both binging and control participants indicated similar increase in emotional distress, only binging participants increased their food intake, and the increase was significantly higher in the weight-related teasing condition than in the competence-related vignette. This study carefully controlled for the kind of stressor associated with increased food intake while also identifying that both controls and disordered eating participants experience comparable levels of negative emotions, yet only binge eaters resorted to eating in order to manage their negative state.

In a clinical study by Levine and Marcus (1997) employing the speech preparation task as an emotion induction, both high bulimia participants as well as their healthy control counterparts in the stress condition showed an increase in food intake, compared to clinical and control participants in the neutral mood condition. At the same time, there was no significant difference in food intake between high bulimia females and healthy controls in the experimental condition,

indicating that when distressed, both groups reacted in similar manner (Levine & Marcus, 1997). Thus, this study suggests negative findings: distress was related to increased eating in both clinical and non-clinical groups.

Telch and Agras (1996) divided participants with binge eating disorder and healthy controls into two experimental conditions. The negative mood condition required participants to recall a salient negative event from their recent history, while participants in the neutral mood condition recalled a neutral situation. Following the mood induction, participants were invited to help themselves to various buffet foods. A mood rating scale was employed before the mood induction, after the induction/before the food intake, and after food intake. Comparisons between clinical and nonclinical groups revealed that binge eating disorder participants ate significantly more than the healthy controls regardless of the mood induction condition. In terms of emotional reactivity, no significant differences were found between the emotional responses of binging or non-binging participants. This study failed to find a direct relationship between negative mood and eating disorder behaviours as observed in a laboratory setting.

Self-Compassion. Considering that the relationship between self-compassion and eating behaviours is a relatively new area of research, only one study to date can be brought forth. In this correlational study, undergraduate students provided information regarding their ability to show self-compassion and self-acceptance as well as their tendencies to engage in binge eating. Self-compassion was positively correlated with self-acceptance and negatively correlated with both emotion intolerance and binge eating severity (Webb & Forman, 2013). The findings suggest that self-compassionate and non-judgmental attitudes protect against engagement in overeating/binging behaviours.

Binge/purging

Studies of this behaviour cluster included both clinical and sub-clinical participants who reported engaging in binge/purging cycles. These participants may have endorsed engaging in other behaviours such as dieting, excessive exercising, however, the focus of the research was the binging and purging cycle. Most studies included clinical participants who were diagnosed with anorexia nervosa- binge/purge subtype or bulimia nervosa – purging type, while one study included sub-clinical participants based on their endorsement of occasional binging and purging. The following research will be grouped based on the primary areas of interest: emotion intensity, emotion regulation, and self-compassion.

Emotion Intensity. Sherwood, Crowther, Wills and Ben-Porah (2000) provided correlational evidence supporting the association between intense negative emotions and binging. Female undergraduates in the study were grouped based on endorsement of binge/purge cycles and compared against healthy controls. Participants recorded their emotions immediately preceding and following a binge episode, as well as any purging behaviours within one hour of the binge episode. Compared to healthy controls, participants who engaged in binging were more likely to report the occurrence of negative events prior to binging as well as a higher intensity of the negative emotions preceding the binge as compared to non-binge instances. At the same time, when exploring the emotion fluctuations pre and post binge, the researchers found that ratings indicated high intensity of emotions at both pre and post-binge measurement, suggesting that the eating episode did not improve their emotional experience. Of interest, their emotions were rated as significantly lower at the one-hour post-binge mark compared to the pre-binge measurement. This finding suggests that the negative feelings secondary to the binge

compounded the initial "upset" emotional state and that purging was potentially used as a means of "fixing" the binge.

In a clinical study employing ecological momentary assessment, females diagnosed with bulimia nervosa recorded mood and bulimic behaviour details into palmtop computers for two weeks (Crosby, Wonderlich, Engel, Simonich, Smyth, & Mitchell, 2009). Latent growth mixture modeling of the participant's diary entries revealed a several daily mood patterns. The patterns significantly associated with binging were: high and stable negative emotional experience throughout the day; low negative mood at the beginning of the day, followed by increases to moderate negative mood in the middle and end of the day; and high levels of negative mood at the beginning and end of the day, with a relatively low level in the middle of the day. Purging occurred for days characterized by high and stable negative emotions or increasing negative emotions. In short, high intensity or increasing intensity of negative emotional experience led to the onset of binging, purging or both later in the day.

Emotion Regulation. Studies exploring emotion regulation deficits and eating pathology included solely clinical participants. In an older but seminal study, Lehman and Rodin (1989) explored the relationship between food-related behaviours and self-soothing in women diagnosed with bulimia – binge/purge subtype, severe dieters and healthy controls. Lehman and Rodin proposed that persons with bulimia nervosa use eating as a means to cope with distress, as eating an enjoyable food is a self-comforting and supportive activity. Self soothing involving food provided 30% of the stress coping strategies for binging participants, in contrast to 19% for restricting participants and 21% for controls. Of note, participants in the binging group also endorsed significantly fewer non-food related self-nurturing skills compared to healthy controls and restrainers, suggesting that they rely on their disordered eating as one of their few effective

coping mechanisms. In contrast, restricting participants indicated non-food related self-nurturing strategies, although it was not clear from the measures used whether these strategies were adaptive. Lastly, binging participants also indicated a lower ability to experience positive events than their restricting or control counterparts, indicating that they do not deem ordinarily pleasurable daily activities as leading to an improvement in their emotional experience.

Alpers and Tuschen-Caffier (2001) explored the relationship between binging and mood using hourly self-reports of mood, desire to eat, and hunger in participants diagnosed with bulimia and healthy controls. They found that clinical participants exhibited a strong relationship between negative feelings and the desire to eat in the absence of hunger, suggesting that eating served a non-nutritional function. However, in reporting mood fluctuations and food intake for a period of two weeks, clinical participants endorsed an increase in negative emotions immediately after a binge and then a significant decrease after engaging in a compensatory behaviour such as purging. Thus, while negative affect is followed by the desire to binge, it appears that after binging, there is an increase in negative emotion, which is managed by engaging in purging behaviour. In short, this study seems to underscore the complex relationship between emotion regulation and the different steps, as well as different kinds, of disordered eating behaviors.

In another clinical correlational study, bulimic participants reported a significant decrease in anxiety levels after a binge and purge cycle, while sadness levels did not improve (Steinberg, Tobin, and Johnson, 1990). Racine and Wildes (2013) found that in a sample of patients with anorexia, impulse control and emotional awareness difficulties significantly predicted engagement in the binge-purge cycle above and beyond any other emotion dysregulation

difficulties suggesting that this set of behaviours is used as a fast acting, impulse driven strategy to deal with negative emotions.

Across the disordered eating behaviour groupings reviewed so far, research brings support to the notion that individuals with disordered eating tendencies struggle to manage their emotions in an adaptive manner. They seem to perceive their emotions as intolerably intense and resort to maladaptive coping such as binging, purging, or dieting, in an attempt to down-regulate the distress.

Cross-diagnostic eating pathology

Aside from studies that explore specific behavioural clusters, a large portion of research on eating pathology compared emotion processing traits across eating disorder diagnoses and their subtypes: anorexia, bulimia, and binge eating disorder. These studies further underscore the diagnostic overlap of diagnostic entities suggesting that a more productive research approach would distance from diagnostic classifications and instead focus on pathological behaviour clusters. Their findings are essential to the current study as they proceeded beyond studying emotion regulation as a whole and furthered the exploration of emotion processing deficits by focusing on the specific types and levels of emotion regulation skills within each diagnostic category and subtype.

Emotion Regulation. In a self-report study including 124 females diagnosed with anorexia - restrictive subtype, anorexia – binge/purge subtype, and bulimia, high levels of anxiety and depression were associated with increased exercising (Penas-Lledo, Vaz Leal, & Waller, 2002). While all three groups reported working out excessively, the relationship between emotion and exercise was significant only for individuals with anorexia-restrictive

subtype, suggesting that women who binge (diagnosed with anorexia- binge/purge, or bulimia) may resort to other coping strategies.

In exploring emotion regulation differences between anorexia (restrictive and binge/purge), bulimia, and binge eating disorders, Vervaet, van Heeringen, & Audenaert (2004) explored temperamental dimensions such as novelty seeking, harm avoidance, persistence, self-directedness, cooperativeness, and self-transcendence. Their between-group analyses indicate that anorexia binge/purge patients were significantly different from bulimia and binge eating participants on dimensions of emotional eating, and novelty seeking. Furthermore, within the anorexia diagnosis, restricting participants scored lower on emotional clarity, while binge/purge participants scored higher on emotional eating and self-directedness. In comparison to the purely restricting group, bulimia participants scored higher on dimensions of novelty seeking, but lower on self-directedness and compassion. Vervaet and colleagues identified that even restricting participants with limited/occasional binge/purging cycles were significantly different from purely restricting participants in terms of novelty seeking and self-directedness. This study was one of the first of its kind to highlight qualitative and quantitative differences in emotion regulation among eating disorder diagnostic subgroups.

In a subsequent study assessing the association between eating disorders and affect intensity as well as emotion regulation difficulties, women diagnosed with anorexia (restrictive and binge-purge subtypes), bulimia (purging and non-purging types), and binge eating disorder were compared with three control groups (borderline personality disorder, major depression disorder and no diagnosis; Svaldi et al., 2012). Compared to healthy controls, persons with eating disorders (including: anorexia, bulimia, each of their subtypes, and binge eating disorder) reported higher levels of emotion intensity. However, all clinical participants also reported

overall increased difficulties with emotion regulation, as illustrated by higher intolerance of emotions, less emotional awareness and clarity, decreased use of functional emotion regulation strategies, and increased use of dysfunctional strategies, as compared to healthy controls. Furthermore, there were no significant differences between the three eating disorder diagnostic categories on any of the emotion regulation and intensity variables. However, researchers reported trends, which could potentially provide some initial discriminatory elements amongst the eating pathology clusters. Specifically, participants in the binge eating disorder group endorsed a higher capacity to tolerate and accept negative emotions. They also showed a better capacity to engage in functional emotion regulation strategies than did participants with anorexia and bulimia. In contrast, participants who compensate by purging seem to struggle with tolerating and regulation emotions compared to the other participant groups. Despite these significant results, the study did not discriminate between purely restricting and binge/purge participants in the anorexia group, nor between non-purge and binge/purge participants in the bulimia group, thus leaving questions unanswered about the differences between these subgroups.

A later study by Brockmeyer, Skunde, Wu, Bresslein, Rudofsky, Herzog, & Friedrich (2014) attempted to further clarify the differences between eating disorder diagnostic categories in terms of emotion processing. Additionally, the study sought to address Svaldi's methodological drawbacks such as the small sample size and the merging of restricting and binge/purging subtypes of anorexia nervosa. Participants diagnosed with anorexia nervosa (binge purge or restricting), bulimia nervosa, or binge eating disorder as well as healthy and obese controls completed questionnaires measuring their difficulties regulating emotions and depressive symptomatology. They found that generally, clinical participants indicated greater

difficulties with emotions and lower mood than healthy or obese controls. Participants with binge eating disorder seemed to be at the low end of emotion dysregulation, compared to anorexia or bulimia participants. When examining clinical subcategories, it was found that participants did not differ significantly on dimensions of non-acceptance and awareness of emotional experience or goal-directed behavior. Most differences were registered in the impulse control subscale, with participants with anorexia binge/purge being more impulsive than restricting participants. While anorexia binge/purge was at the high extreme of impulsivity and binge eating disorder at the low end, no differences were found between anorexia-restrictive type, and bulimia.

In a similar study, Lavender, Wonderlich, Peterson, Crosby, Engel and colleagues (2014) explored emotion regulation difficulties in participants with clinical and subclinical bulimia and found that impulsivity alone was the strongest predictor of bulimic symptomatology. Additionally, they found that high levels of goal-driven behaviours were positive associated with compulsive exercising. These findings may indicate that exercising becomes a goal, albeit unrelated to the source and potential problem solving of the initial stressor. At the same time, goal-driven behaviours were inversely correlated with purging incidence, suggesting that engagement in purging may not be a premeditated and intentional action, but an impulsive behaviour.

Lastly, Danner, Sternheim, and Evers (2014) conducted a correlational study with clinical participants diagnosed with anorexia, bulimia, and binge eating disorders. They found that participants in the binge eating disorder group scored the lowest levels of trait anxiety, while no significant differences were found across the anorexia and bulimia groups. Participants with anorexia (both subtypes) differed significantly from participants with bulimia in terms of

emotion suppression self-reports, but bulimia and binge eating participants did not differ from each other at a statistically significant level. The lowest scores for cognitive reappraisal were found in the bulimia group. The significant and specific findings associated with subtypes of eating disorder diagnoses led the authors to suggest that further study of the subgroups may be a more valuable source of information than research on mixed eating disorders group, as had been previously done.

Self-compassion. In a sub-clinical study with a correlational design, Tylka, Russell, and Neal (2015) explored disordered eating as a general construct and its association with self-compassion and thin-ideal internalization. Participants were females in the general community and the disordered eating construct was measured as a total score of the Eating Attitudes Test, with no particular attention to clinical categories, or specific disordered eating features. Researchers found that low self-compassion correlated directly with strong thin-ideal internalizations and that the self-compassion acted as a buffer in the relationship between media-related body image pressures and the internalization of the thin-ideal. Additionally, high levels of self-compassion also diminished the strength of the relationship between media pressures and disordered eating, therefore serving as a protecting factor against internalizing socially-mediated risk factors for the development of clinical levels of eating pathology.

Another study explored differences in eating patterns and self-compassion in participants diagnosed with anorexia (restrictive and binge/purge subtypes), bulimia, and eating disorder not otherwise specified, as well as healthy controls from a local university participant pool (Kelly, Vimalakanthan, & Carter, 2014). In the sub-clinical sample, low levels of self-compassion was the strongest predictor of disordered eating after controlling for body mass index and self-esteem. Clinical participants exhibited significantly elevated levels of fear of self-compassion,

which was defined by Gilbert (2010) as avoidance or apprehension towards self-compassionate attitudes, coupled with the belief that one does not deserve self-compassion. In the clinical sample, fear of self-compassion was the strongest predictor of eating pathology. No further differentiation was conducted amongst the three types of eating disorder categories. This study further underscores the impact of self-compassion on disordered eating across the pathology continuum and highlights the fear of becoming self-compassionate and non-judgmental as a unique factor associated with clinical level eating disorders.

In a mixed design study (Breines, Toole, Tu, & Chen, 2014), undergraduate female participants were asked to complete a four-day diary evaluating daily their self-compassion levels and general eating patterns, including dietary restrictions, binging, and use of compensatory means for controlling weight. Results indicate that on days when self-compassion was rated high, disordered eating behaviours were less frequent. The relationship remained significant when controlling for self-esteem suggesting that self-compassion is a protective factor against disordered eating. The correlational nature of the study did not allow for further exploring of the direction of the relationship between these constructs. In the mood induction portion of the study, undergraduate participant were asked to describe an aspect of their body that they disliked, completed a series of self-reports regarding body shame, self-esteem, and disordered eating, and at the end of the task, were encouraged to consume chocolate candies while completing a neutral word search. Participants who restrained the consumption of chocolates completed a form explaining their reasons. Results indicated that for participants who restrained their consumption of chocolate, self-compassion was inversely associated with endorsement of weight-gain concerns and self-punishment as motives for not eating. Self-compassion, therefore, appears to buffer against disordered eating as it allows for a more

forgiving and healthier set of eating attitudes.

Rationale for the Current Study: A New Perspective on the Empirical Findings

Emotion Processing in Relation to Disordered Eating. Empirical research on eating disorders draws strong connections between eating pathology and emotion intensity, emotion regulation, and self-compassion. Studies conducted to date have not yet clarified whether persons with eating disorders experience emotions as intolerably intense, or they are unable to regulate emotions due to impaired regulatory skills, or both. Qualitative studies, where participants were allowed to "tell the story" of their eating disorder, revealed that these participants describe their symptomatology as occurring when they were emotionally distraught (Fox, 2009; Serpell et al., 1999; Jeppson et al., 2003). These behaviours allowed them to "stifle" their negative emotions and eventually feel better to some degree. Based on the participants' free recall account, it appears that disordered eating behaviours are used as protection themselves from negative emotions, but there is no clear consensus whether participants experience emotions as unbearable, or if they do not have access to appropriate regulatory skills, or both.

Quantitative data such as in correlational or experimental designs further provide information regarding the interplay of emotion processing deficits and self-compassion in eating pathology. *Emotion intensity* has been explored in studies focused mostly on binging and binge/purge behaviours or in cross-diagnostic designs. The overarching finding has been that in correlational studies, participants with clinical and subclinical disordered eating tendencies rate their emotions as more intense and intolerable than their healthy counterparts do, and that the onset of binging or binge/purge cycles is associated with high subjective levels of distress (Lingwiler et al., 1987; Crowther et al., 2001, Freeman & Gil, 2004; Sherwood et al., 2000; Svaldi et al., 2012). Of course, the use of self-reports to measure emotion begs the question of

whether the high distress evaluation is part of one's perception and reporting of the experience or whether it is accompanied with a corresponding higher level of physiological activity. Findings related to this second question have been inconsistent. With the exception of one study (Koo-Loeb et al., 2001), other experimental studies that used physiological measures of distress did not show convergence with self-report data collected within the same study (Fox & Harrison, 2008; Cattanach et al., 1988). Specifically, while participants reported that their emotions are particularly intense, their physiological markers were not different from the ones of the healthy controls. One possible explanation for this inconsistency refers to the fact that pen-and-paper measures capture the subjective experience of arousal, while the experimental studies above measured the bodily-expressed change in arousal. As such, the question may not refer to the *actual* emotion intensity, but rather to the *perceived* intensity as described by the participants. At the same time, a case may be made that the individual acts based on the perception of emotion intensity, rather than only based on the physical arousal level. Therefore, the question of perceived emotion intensity is a valid line of inquiry for the current study.

Emotion regulation deficits have been consistently identified as significantly associated with disordered eating in studies focusing specific pathological groups based on behaviors such dieting, restricting, binging, and binge/purging, as well as in cross-diagnostic studies. Correlational and experimental studies highlight the fact that participants who diet increase their food intake when distressed (Baucom & Aiken, 1981, Polivy et al, 1994) and experience a subsequent improvement in their emotional experience (Ogden & Wardle, 1991). In a study focused specifically on severe dietary restriction, significant dieting has also been associated with emotion regulation difficulties and it appears that the cognitive changes that are associated

with extremely low body mass may provide a different kind of buffer against the visceral experience of negative emotions (Brockmeyer et al., 2012).

Binging as well as binge/purge cycles have been reliably found to be used as a means of down-regulating emotions, as clinical and subclinical participants indicated they expected that eating would improve their negative mood and that they relied on food-related coping more frequently than compared to other strategies (Hayaki, 2009; Anestis et al., 2007; Lehman & Rodin, 1989). Alpers and colleagues (2001) identified clearly that binging occurs in the absence of hunger, substantiating the claim that this behaviour is used for non-nutritional purposes. In laboratory studies, the findings were more inconsistent (pointing to a potential issue with methodology that is not the object of the current study).

Self-compassion is also significantly associated with various behaviours related to eating pathology. In subclinical participants, higher levels of self-compassion predicted lower body preoccupation and increased endorsement of healthy body and diet attitudes (Wasylkiw et al., 2012; Tylka et al., 2015). At clinical levels, self-compassion became a protective factor against internalization of severe thinness ideals, and endorsement of extreme dietary rules and guilt-driven exercising – life threatening behaviours in anorexia nervosa (Ferreira et al., 2013; Magnus et al., 2010). Self-compassion also appeared to facilitate forgiveness and diminish shame, helping avoid binging or purging behaviours as punishments for dietary mistakes (Kelly et al., 2014; Braines et al., 2014). As such, self-compassion is shaping as a key element in understanding disordered eating and formulating prevention as well as treatment interventions.

The Study of Eating Disorder Diagnoses vs. Disordered Eating Behaviours. The use of diagnostic categories may not be as helpful as focusing directly on target behaviours. The

symptomatology of participants across the different nosological categories and their subtypes suggests significant differences in emotional and cognitive functioning.

Penas-Lledo and colleagues (2002) found that both severe dieters and participants who binge engage in excessive exercising (despite their problem behavior being dramatically different), but only the former use this behaviour to regulate their emotions. In another study, Vervaet and colleagues (2004) found significant temperamental and regulatory differences between clinical participants diagnosed with anorexia nervosa (restricting and binge/purge) and bulimia nervosa, on a series of measures for personality characteristics and eating pathology. Of note, even participants who mostly restricted but binged/purged occasionally were significantly different in terms of novelty seeking and goal-orientation from participants who only restricted/exercised. These findings indicate qualitatively different presentations between these two groups for disordered behaviors, perhaps more than between formal diagnoses. Similar significant differences in terms of cognitive reappraisal, emotion suppression, impulsivity, and emotional eating were identified across the three diagnostic categories and their subtypes (Danner et al., 2014). Vervaet and colleagues (2004) noted that non-purging bulimics appear to be more similar to persons with binge eating disorder than to purging bulimics.

Studies comparing persons who binge and purge with persons who only purge found them to share a significant level of similarities in terms of psychological distress, suicidality, mood lability, pathology severity and prognosis (Garner, Garner, & Rosen, 1993; Keel & Striegel-Moore, 2009). Thus, a different way of grouping participants could be to consider those who purge (even if they do not binge) as being in the same behavioural group as those that binge/purge.

Altogether, these studies point to the fact that the use of diagnostic categories alone in the study of emotions related to eating disorders may overlook aspects of pathology that are connected to the actual behaviours. The current study seeks to clarify differences between pathological behaviours clusters despite their overlap across diagnostic categories. We speculate that these differences may be informative for the understanding of the qualitative and quantitative differences between various eating pathology behaviours as well as the formulation of appropriate treatment approaches. The disordered eating groupings formulated for this study were therefore taken as those presented above in table 1.

The Study of Clinical vs. Sub-clinical Samples. The current study, furthermore, aimed to explore these differences in a *subclinical* sample of participants, whose endorsement of disordered eating behaviours could be considered problematic to the extent that they are indicative of potential risk for more severe, clinical levels of eating pathology. Eating disorders are currently conceptualized in the literature as discrete pathological entities, yet there is increasing support that disordered eating in general falls on a continuum, with asymptomatic eating behaviour at one end, and clinical symptoms of eating disorder at the other. Mild, subclinical behaviours of abnormal eating would therefore fall in the middle (Mickley, 2004). Several studies have supported the notion that subclinical and clinical clusters of behaviour differ quantitatively, not qualitatively (Lowe, Gleaves, Di-Simone-Weiss, Feurfeuson, Gayda, Kolsky, et al., 1996; Franko & Omori, 1999; Tylka & Subich, 1999; Dancyger & Garfinkel, 1995; Stice, Killen, Hayward, & Taylor, 1998). When comparing normal eaters with partial syndrome participants and clinical participants, these researchers included measures of disordered eating, as well as other associated symptoms such as depression, anxiety, dysfunctional cognitions, and emotion instability and dysregulation. Participants in the clinical group scored consistently

higher on these measures, followed by a partial syndrome group participants, while normal controls scored the lowest. Stice, Ziemba, Margolis, & Flick (1996) compared high school and college students categorized as clinical, subclinical or controls based on self-reports on a bulimia measure. Both clinical and sub-clinical participants endorsed significantly higher levels of disordered eating, ideal-body internalization, body dissatisfaction, dietary restraint, and negative emotional experience than their healthy counterparts.

These findings support the validity of studying subclinical clusters of disordered eating and indicate that results of research with subclinical populations may be generalized (at least to a certain extent) to the clinical population. For the purposes of the current study and in order to meet the adequate sample size criterion necessary for statistical significance of the findings, participants were selected from the general population. While it was expected that some of the participants may have met criteria for a clinical eating disorder, participants were not formally diagnosed for the purposes of this study. Based on participants' self-reports on a measure of eating disorder symptoms, they were clustered in subclinical eating behaviour groups as described in table 1. Of note, considering the sub-clinical level of disordered eating behaviours included in the current study, it was expected that we would not capture a sufficient number of restricting participants to create a restricting group. As noted above, severe food restriction is associated with clinical levels of eating pathology, characteristic of the diagnostic category of anorexia nervosa- restricting subtype. It should be noted that the prevalence of anorexia nervosa (both subtypes) in the general population is very low, ranging from 0.9-2.2% (Keski, 2008), therefore few, if any, such participants would self-select for the study. On the other hand, research seems to suggest that dieting may be construed as a less severe manifestation of restriction (Tylka & Subich, 1999; Dancyger & Garfinkel, 1995) considering that consistent

dieting may become increasingly stringent and eventually lead to the full blown symptom associated with anorexia-restrictive subtype. As such, it was deemed acceptable to create a dieting group that would include problematic dieters as well as any potential severe restricters.

Goals of Present Study

In examining the evidence to date and formulating directions for research, the need becomes apparent for a study of the differences in emotion processing and self-compassion across types of disordered eating. At the same time, no study to date has investigated differences in emotion processing as they are manifested across the actual *behaviours* characterized by disordered eating: dieting, restricting, binging, and binge/purging. This directs the framework of inquiry for the current study. Furthermore, the main goal of this study was to explore the emotion processing deficits of individuals *at risk* of developing clinical eating disorders. The aim is to generate findings that inform both the prevention of eating disorders as well as future directions for improvement of the treatment interventions of sub-clinical and clinical eating pathology.

Hypotheses

Rationale for hypothesis 1: Intensity of perceived emotion and emotion regulation. Based on existing research, it appears that persons with eating disorders rate their stressors as intense and that the intensity of negative affect is correlated with the occurrence of disordered eating behaviours such as binging (Crowther et al., 2001, Freeman & Gil, 2004). These ratings point to the fact that such persons may become overwhelmed by their emotions and resort to maladaptive coping in response. In their study of a clinical sample, Svaldi and colleagues (2012) found that participants with eating disorders rated the intensity of their emotions significantly higher than did normal controls. The same study revealed that clinical participants reported higher levels of emotion dysregulation than did normal eaters (Svaldi et al., 2012). Their

findings were supported by numerous other correlational and experimental studies (Whiteside et al., 2007, Hayaki, 2009, Lehman & Rodin, 1989, Sherwood et al., 2000). No study to date has explored the potential mediating role of emotion dysregulation in the relationship between emotion intensity and eating pathology.

***Hypothesis 1a*:** There will be a significant positive correlation between eating pathology and perceived emotional intensity, such that participants with higher eating disorder scores will indicate higher levels of emotion intensity, while participants with lower eating disorder scores will indicate lower levels of emotion intensity.

Hypothesis 1b: There will be a significant positive correlation between eating pathology and emotion dysregulation. That is to say, participants with higher level of eating disorder scores are expected to report higher levels of emotion dysregulation.

Hypothesis 1c: There will be a significant negative correlation between eating pathology and self-compassion, such that participants with higher scores on the eating disorder measure will score lower on adaptive self-compassion.

Hypothesis 1d: Emotion dysregulation will mediate the relationship between emotion intensity and eating pathology.

Rationale for hypothesis 2: The relationship between disordered eating behaviours and the experience of emotion intensity, emotion regulation, and self-compassion. Several elements of emotion dysregulation and intensity have been significantly correlated with specific eating pathology behaviours. In terms of *emotion intensity* experience, no studies have specifically focused on dieting or restricting participants. For both clinical and sub-clinical binging and binge/purge behaviours, extant research has identified that these behaviours are associated with perceived high levels of emotional intensity, such that participants report strong

emotions (Lingswiler et al., 1987; Crowther et al,. 2001; Sherwood et al., 2000). Research to date does not provide further discrimination between binging and binge/purge participants in terms of this emotional processing dimension.

In researching *emotion regulation deficits*, Brockmeyer (2012) found that restrictive participants exhibited a negative recall bias, suggesting a propensity towards awareness of negative emotions, although extremely low body mass index was associated with less negative recall, functioning as an emotional buffer (Brockmeyer et al., 2013). Additionally, these behaviours were significantly correlated with lower levels of emotional clarity (Vervet et al., 2004) and higher levels of goal-driven behaviours (Lavender et al., 2014). Research focused on binging indicated an association between binging and higher levels of suppression of emotional suppression (Levine & Marcus, 1997), novelty seeking and self-criticism (Vervaet et al., 2004). At the same time, emotional tolerance and access to some adaptive coping were deemed somewhat higher for this group than for restricting and binge/purging groups (Svaldi et al., 2012). Lastly, binge/purge behaviours have been associated with a paucity of adaptive soothing coping (Lehman & Rodin, 1989), self-directedness (Vervaet et al., 2004), and binge-purge participants were generally deemed the most distressed, intolerant of emotions (Svaldi et al., 2012) and impulsive (Brockmeyer et al., 2014).

In terms of *self-compassion abilities*, the general consensus is that lower levels of self-compassion are associated with a higher level of eating pathology, yet no study has been designed to provide more differentiation between eating pathology categories and subtypes. Considering the research to date about emotion processing and eating pathology, several tentative hypotheses can be made

***Hypothesis 2a*:** Participants in the dieting/restricting group will be differentiated from the other groups by lower scores on scales measuring emotional awareness and emotional clarity. They are also expected to score lower on measures of emotional intolerance.

***Hypothesis 2b*:** Participants in the binging group will be differentiated from the other groups by higher scores on access to emotion regulation strategies, as well as medium levels of emotion intolerance and awareness.

***Hypothesis 2c*:** Participants who only binge/purge will be characterized by high levels of emotional intensity and need to control emotional experience, non-acceptance of emotion, and impulsivity. They are also expected to score lowest on goal-directed behaviours and self-compassion compared to all other groups.

CHAPTER TWO

Methods

Participants

A total of 260 females were recruited from the University of Windsor Participant Pool. These participants were undergraduate students who registered for the study in exchange for bonus marks in psychology courses. Participants were divided into four groups based on their response pattern on the Eating Disorder Diagnostic Scale (EDDS; Stice, Telch & Rizvi, 2000). The four groups are: a) participants who restrict and/or engage in exercising for the purpose of weight control; b) participants who binge and do not engage in purging behaviours; c) participants who binge and/or who purge by vomiting or using laxatives; d) and healthy controls. For a review of these EDDS response criteria for the disordered eating groups, see Table 3. The procedure for determining these groups is described in the data analysis section.

Measures

Measures of disordered eating symptoms

The SCOFF Questionnaire (SCOFF; Morgan, Reid, & Lacey, 1999) is a 5-item self-report measure, designed to screen for eating disorders. Its name reflects the key words associated with each of the 5 questions (S = sick/vomit; C = control lost during eating; O = one stone/14 lbs lost in the last 3 months; F = belief of being fat; F = food as dominating his/her life). Items are answered in a "Yes/No" forced choice manner. A sample item is: "Do you worry you have lost control over how much you eat?" Two or more positive answers are considered indicative of eating pathology. The scale was tested on a sample of persons with diagnosed anorexia and bulimia as well as normal control from local colleges in London, UK (Morgan et al., 1999). It yielded a sensitivity of 100% for anorexia and bulimia as well as a specificity of 87.5% for controls (Morgan et al., 1999).

Eating Disorders Diagnostic Scale (EDDS; Stice, Telch & Rizvi, 2000) is a 20-item self-report measure that assesses DSM-IV criteria for anorexia, bulimia, and binge eating disorder. Item questions are formulated in three different manners: forced choice (Yes/No answers), 7-point Likert scale and frequency of behaviours. A type of sample items includes: "Have you felt fat?" with a response choice on a 7-point likert scale. A "Yes/No" forced response item is: "During the past 6 months, have there been times when you felt you have eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances." Lastly, a third type of sample items includes: "How many time per week on average over the past 3 months have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating" – with response choices between 0 and 14.

Scoring follows an algorithm, resulting in a probable diagnosis of anorexia, bulimia, and binge eating disorder. The scale showed good validity and reliability when applied to a complex set of participants, including a sample of participants diagnosed with eating disorders, a sample of participants with subthreshold symptoms of eating disorders as well as a sample of non-eating disorder participants (Stice et al., 2000). For the purposes of this study, an adapted scoring template for determining the four groups has been created, based on the initial scoring templates offered by Stice and colleagues (2000) and Fisher, Martinez and Stice (2004). Additionally, based on the guidelines of Fisher and colleagues (2004), a total composite score was calculated, indicating general eating disorder pathology. Stice and colleagues (2000) found that this scale has good discriminant and convergent validity, high internal consistency ($\alpha = .89$), and high test-retest reliability for an interval of one week (rs ranged from .89 to .98). Similarly, internal consistency coefficient was excellent ($\alpha = .89$). Criterion validity was estimated at $k = .83$, which indicates that diagnostic agreement between EDDS and were compared successfully with results from the SCID-III-R interview module for eating disorders (Stice et al., 2000).

Measures of emotion intensity

Emotion Intensity Scale (EIS; Bachorowski & Braaten, 1994) is a 30-item scale that assesses the typical intensity of everyday emotions, either positive (joy, liveliness etc) or negative (anger, sadness). Respondents identify the intensity of certain emotional reactions. Items are rated on a 5-point Likert scale, ranging from 1 (indicating minimal emotional reactions) to 5 (indicating a very strong emotional reaction). The total score is obtained by summing the individual item scores. Higher total scores indicated more emotional reactivity. A sample item of the scale is: "I say or do something I should not have done. I feel: (1) It has little effect on me; (2) A twinge of guilt; (3) Guilty; (4) Very guilty; (5) Extremely guilty." The scale

has been reported to have good discriminant and convergent validity. It also has a high internal consistency (α = .90) and acceptable test-retest reliability for an interval of nine weeks (rs ranged from .57 to .84; Bachorowski & Braaten, 1994).

Affective Control Scale (ACS; Williams, Chambless, & Ahrens, 1997) is a 42-item scale measuring fear of experiencing strong emotions. Items are rated on a 7-point Likert scale, ranging from 1 (extreme disagreement) to 7 (extreme agreement). The summation of scores reflects stronger secondary emotional reaction to the initial experience of emotion. The ACS also offers four subscales pertaining to the following emotions: anger, positive affect, depressed mood and anxiety. A sample item is: "I am afraid that I will hurt someone if I get really furious." The psychometric qualities of the ACS indicate that it demonstrates adequate internal consistency. Reliability statistics for the scale are satisfactory (α ranging between .72 and .91 for the four subscales). Similarly, test-retest reliability coefficients for a period of two weeks were deemed sufficient by the authors (rs ranging between .66 and .78 for the four subscales; Williams et al., 1997).

Measures of emotion regulation

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 35-item self-report measure of emotion dysregulation. The items are rated on a 5-point Likert scale ranging from 1 ("Almost never") to 5 ("Almost always"), and higher scores reflect higher use of these emotion regulation strategies. The DERS also offers a total score reflecting the use of unhelpful emotion regulation. A sample item from the Lack of emotional awareness subscale is: "I pay attention to how I feel" (reversed scored). A sample item from the Lack of emotional clarity subscale is: "I have no idea how I'm feeling". From the Non-acceptance of emotional responses subscale, an example item is formulated as: "When I'm upset, I become angry with

myself for feeling that way". Reflecting Impulse control difficulties, a sample item is: "When I'm upset, I become out of control." An example item from the Difficulties orienting towards a goal subscale consists of: "When I'm upset, I have difficulty focusing on other things". Lastly, a sample item from the Limited access to emotion regulation strategies subscale includes: "When I'm upset, my emotions feel overwhelming." The scale has good discriminant and convergent validity, high internal consistency ($\alpha = .93$) and good test-retest reliability for a time period ranging between four and eight weeks (rs ranging from. 57 to .89; Gratz & Roemer, 2004.)

Self-Compassion Scale-Short Version (SCS; Raes, Pommier, Neff, & Van Gucht, 2011) is a 12-item scale measuring an individuals' ability to accept feelings of suffering while showing oneself connection and concern (Neff, 2003). The scale offers six components (subscales) of self-compassion. Items reflecting Self Kindness include: "I try to be understanding and patient towards those aspects of my personality I don't like." Items reflecting Self-Judgment include: "I am disapproving and judgmental about my own flaws and inadequacies." An item reflecting Common Humanity is: "I try to see my failings as part of the human condition". A sample item for Isolation is: "When I'm feeling down, I tend to feel like most other people are probably happier than I am". A sample item for Mindfulness includes: "When something painful happens, I try to take a balanced view of the situation". Lastly, an item reflecting Over-Identification is: "When I fail at something important to me, I become consumed by feelings of inadequacy". Items are rated on a 5-point Likert scale, ranging from 1 ("Almost Never") to 5 ("Almost Always"). Subscale scores are obtained by summing the respective item scores. The total self-compassion score is obtained by reversing the negative subscale items (pertaining to Self-Judgment, Isolation, and Over-Identification) and adding them to the remaining sub-scale scores. Higher scores indicate the individual's ability to be warm, supportive and understanding towards

oneself in times of hardship. The scale has sufficient internal consistency (α = .86). No test-retest reliability has been reported (Raes et al., 2001).

Complexity of Emotion Regulation Scale (CERS, Pascual-Leone, Gillespie, Orr, & Harrington, 2015) is a newly developed measure of emotion regulation. The measure can be used as an continuous, wherein the coder appraises the complexity of emotion regulation behaviours on a continuum ranging from maladaptive to limited to complex regulation, as well as a categorical scale, wherein the coder can assess each qualitatively different emotion regulation skill. Coding is based on four dimensions: action tendency, expression, adaptive need, and meaning. Narratives are rated on an eight point scale, ranging from -1 (maladaptive behaviour) to 6 (complex integration of immediate soothing and meaning making). The rating scale can also be collapsed to four points for a more parsimonious data analysis. The four points include: maladaptive strategies (e.g., self-harm, substance abuse), no action to soothe (e.g., rumination and passivity), general strategies (e.g., pleasant distraction, avoidance), and specific strategies (e.g., meaning making, reappraisal). The measure has been tested on clinical and sub-clinical samples yielding a test-retest reliability coefficient ranging from 0.79 to 0.83, as well as adequate convergent validity with measures of depressive symptoms, anxiety, and general psychological distress (Pascual-Leone et al., 2015).

Additional measures

Body Mass Index (BMI) is calculated by dividing weight (measured in kilograms) by height (measured in meters) squared. Although formerly used as a measure for medical risk in eating disorders (Keys, Fidanza, Karvonen, Kimura, Taylor, 1972), recent research indicates that medical risk would be better assessed by a variety of physiological and physical markers

(Treasure, 2009). At the same time, the Diagnostic and Statistical Manual – V continues to employ BMI as a factor in the research and diagnosis of eating disorders.

The Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1979) is a 10-item scale measuring beliefs and attitudes regarding general self-worth. The items are rated on a 4-point Likert scale ranging from 1 ("Strongly Disagree") to 4 ("Strongly Agree). Higher scores reflect higher self-esteem. A sample item from the scale is: "On the whole, I am satisfied with myself". The scale has good discriminant and convergent validity, high internal consistency ($\alpha = .82$). Test-retest reliability was satisfactory and ranged between .85 at two weeks and .74 at ten months (Silber & Tippett, 1965, Rosenberg, 1979).

The Beck Depression Inventory (BDI-II; Beck, Steer, Ball, & Ranieri, 1996) is a 21-item scale measuring depressive symptoms. The scale explores affective, cognitive and neurovegetative symptoms of depression. Items are rated on a 4-point Likert scale ranging from 0 (absence of symptom) to 3 (most severe level of the symptom). The total score is obtained by summing the item scores. Scores under 10 indicate minimal symptomatology, scores between 10 and 18 indicate mild symptomatology, scores between 19-28 indicate moderate symptomatology, and scores over 29 indicate severe symptomatology. An example item is: "Sadness: (0) I do not feel sad. (1) I feel sad much of the time. (2) I am sad all of the time. (3) I am so sad or unhappy that I can't stand it." The scale shows good discriminant and convergent validity, and high internal consistency (α ranging between .73 and .92). Test-retest reliability for nonclinical populations ranged between .60 and .90, while the reliability for clinical populations ranged between .48 and .82.

Body Esteem Scale for Adolescents and Adults (BESAA; Mendelson, Mendelson, & White, 2001) is a 23-item scale measuring self-evaluations of a person's appearance and body.

Three subscales compose the scale, including Appearance (general satisfaction with one's appearance), Weight (satisfaction about one's weight), and Attribution (evaluations attributed to appearance and body). Items on the Appearance subscale include: "I am pretty happy about the way I look". An example of an item on the Weight subscale is: "Weighing myself depresses me", while an item on the Attribution subscale is: "I think my appearance would help me get a job". Items are rated on a five point Likert scale ranging from 0 ("Never") to 4 ("Always") and certain items require reverse scoring. Total scale score as well as subscale scores are obtained by summation of the item ratings after reversal of the appropriate items. Higher scores reflect higher levels of satisfaction and esteem. The scale demonstrated high internal consistency and discriminant validity in a nonclinical sample (Mendelson et al., 2001) and had a three month test-retest reliability coefficient ranging between 0.83 and 0.92 for the three subscales (Mendelson et al., 2001).

Demographic and mental health history questionnaire was designed for the current study and collects personal information such as age, ethnicity, years of education, previous exposure to treatment, previous mental disorder diagnoses, in particular whether the participants has had a diagnosis of an eating disorder and if so, whether treatment was attended (See Appendix I).

Writing task

The writing task employed for this study was meant to provide additional information in the form of narrative data to the quantitative data collected through standardized tests. As noted above in the methodological suggestions for existing eating disorders research, there is a strong reliance on correlational studies employing pen-and-paper measures. This task allowed participants to describe in their own words their coping strategies when experiencing distress, thus creating a more naturalistic data collection. The task was derived from the Pennebaker's

expressive writing task (Pennebaker, 2002, Pennebaker, Kiecolt-Glaser, & Glaser, 1988). It required the participant to describe, in 250-300 words, an emotionally difficult event. The narrative included the description of the event, with as many details as the person can remember. Participants were asked to also focus on how they coped with the event, asking for a particular emphasis on self-soothing techniques as well as perception of the intensity of their emotions. Instructions for this component of the task were as follows:

> "In the space provided, please write down your deepest thoughts and feelings about a specific difficult event. In your writing, we'd like you to really let go and explore your very deepest thoughts and feelings. You might tie your topic to your relationships with others, including parents, lovers, friends, or relatives. We'd also like you to focus on your specific thoughts, feelings and behaviours at the time. Specifically, focus on how intense your emotions were, as well as what measures you employed in order to feel calm, soothed, or generally better. Once you begin writing, continue to do so without stopping for the entire 15 minutes without regard to spelling, grammar, or sentence structure. All of your writings will be completely confidential." (adapted from Pennebaker, et al., 1988)

The expressive writing narratives were used for content analysis along the dimensions of emotion expression, emotion awareness, and self-compassion. The narratives were coded using the Complexity of Emotion Regulation Scale (CERS, Pascual-Leone et al., 2015; see Apprendix J).

Procedure

All participants were recruited from the University of Windsor Psychology Participant Pool. The advertisement for the study was designed to not indicate directly the purpose of

exploring disordered eating and emotion regulation in order to avoid capturing a narrow range of self-selected participants with a particular interest in eating disorders. Instead, the advertisement read that this was study regarding emotion processing and lifestyle choices, formulated in a manner that included the interest of a wide range of students. The sole inclusion criterion was gender, as the study selected for female participants only. Participants completed the study online using the FluidSurvey.com website account provided through the University of Windsor. This website's database is located in Canada. The page of the survey contained a short description of the study, including the purpose, contents and estimated time of completion (i.e., 55-60 minutes.) Participants were required to read the consent form and check an "I agree" box to ascertain that they were willing to continue into the survey. Participants had an option to pause the survey and return to it at a later date. For this purpose, each survey page contained the option to "Save and Return Later." If this option was chosen, the participant was asked to enter her email address and she received an email containing a link to her saved survey. The completion time offered through the Participant Pool was limited to two weeks for the participant to receive the full credit point.

Participants completed a demographic and mental history questionnaire, as well as the self-report measures described above. Afterwards they were asked to complete the expressive writing task (as described above). Completion of all the above measures required approximately 55-60 minutes (including the expressive writing task). At the end of the survey, participants were directed to a separate page where they were offered a resource page for community counseling centres and received participation credit.

Ethical considerations. The study was reviewed and received ethics clearance through the University of Windsor Ethics Board. A few notes regarding the anonymity and safety

safeguards follow. In order to maintain anonymity, participants were not required to enter their name at any time throughout the survey. After completion of the study survey, they were directed to a different web page where they entered personal information in order to receive the appropriate credit points. The two web pages could not be connected therefore the researcher would not be able to match the participants' IDs to their survey data. At any time (up until completion of the individual's data collection) participants had the right to withdraw from the study as participants by selecting a "Discard data" option which directed participants to the list of community counselling services and the crediting page.

Although participants completed tasks that elicited an emotional reaction, a case can be made that the degree of emotional activation was unlikely to reach an unmanageable level and therefore would not constitute a risk to the participants, considering that participants were not in crisis and therefore, were likely able to cope with the distress of the task. Nonetheless, the mood neutralizing effects of the description of coping strategies likely mitigated the arousal originating from the recall of a negative event, as it has been previously recommended (Pascual-Leone, Singh, and Scoboria (2010) Lastly, in order to address the needs of participants who, as a result of participating in this study, were considering seeking additional assistance, a list of community-based resources was be provided in the consent form as well as at the end of the survey, including local facility specialized in the treatment of eating disorders. Of the 260 participants, none contacted the researcher to indicate distress and/or request further help following the engagement in this study.

CHAPTER THREE

Results

Sample Size

The minimum sample size of 200 had been established based on meeting the sample size requirements for regression and MANOVA (Green, 1991; Tabachnik & Fidell, 2007; Field, 2005.) As per these recommendations, the sample size for a regression with a maximum of 18 predictors (i.e., sum of the measure subscales as above) is the higher of two calculations: 50+8*K = 194 (where K is the number of predictors) for testing the model or 104+K = 122 for testing individual predictors. Similarly, the recommendations for MANOVA refer to ensuring that the number of cases per cell exceeds the number of variables leading to a suggested minimum sample size of 72. The largest minimal requirement was chosen leading to a sample size goal of 200. This sample size is considered "fair" for conducting a cluster analysis as per Comrey and Lee (1992).

Overview of the Results

The current study investigated differences in experience of emotion intensity and emotion regulation for participants with disordered eating behaviours, including dieting, binging, and purging. The results are organized by the two hypotheses, followed by ancillary analyses resulting from the findings for the second hypothesis, and lastly, an overview of the analyses of the narrative data. Analyses planned for each hypothesis are detailed in Table 2.

Table 2.

Planned statistical analyses for testing the study hypotheses

Hypothesis number	Planned analyses	Variables
Hypothesis 1	Correlation	- Disordered eating: SCOFF total score, Eating Disorder Diagnostic scale composite score - Emotion intensity: Emotion Intensity Scale total score, Affective Control Scale total score - Emotion regulation: Difficulties with Emotion Regulation Scale total score - Self-compassion: Self-compassion Scale total score
	Mediation analysis	- Predictor variable: Emotion Intensity Scale total score - Outcome variable: SCOFF - Mediator variable: Difficulties with Emotion Regulation Scale total score
Hypothesis 2	Multivariate analysis of variance (MANOVA)	- Dependent variables: Emotion Intensity Scale (positive and negative emotions), Affective Control Scale (positive emotions, anger, fear, and sadness), Difficulties with Emotion Regulation Scale (acceptance, clarity, awareness, goal-orientation, impulsivity, and access to strategies), and Self-Compassion Scale total score - Independent variables: Eating Disorders Diagnostic Scale groups (dieting, binging, binge/purging, and controls)

Explanation of the Eating Disorder Diagnostic Scale Scoring Template

Considering that the study focuses on pathological behaviours of dieting, binging, and purging instead of diagnostic groups, the scoring of the Eating Disorder Diagnostic Scale was modified. The template for the scoring scheme used herein is based on the scoring syntax and theory of Stice, Telch, and Rizvi (2000) and Stice, Fisher, and Martinez (2004). The former introduced a basic syntax for scores that identified clinical levels of eating pathology grouped as anorexia nervosa, bulimia nervosa, and binge eating disorder. The second article was the main source for the new syntax, as it presented syntaxes not only for clinical presentations, but for the subclinical ones also. For the purposes of our study, which included participants from the general populations – ostensibly at subclinical levels of eating pathology, Stice, Fisher, and Martinez's syntax provided the benchmarks for discriminating between healthy controls and subclinical disordered eating participants. Below is a comparative table (Table. 3) detailing the differences in conceptualizing the pathology clusters (current study) vs. original groupings (as per Stice et al., 2000; 2004)[1].

[1] The original scoring by Stice and colleagues (2004) provided cutoffs for configurations of symptoms defining subclinical levels of anorexia, bulimia, and binge eating disorders. A few of these cutoffs were problematic: items #2 (fear of ganing weight), #3 (undue influence of weight on self- esteem) and #4 (undue influence of shape on self-esteem) required a minimum score of 1 for indicating "at risk" cognitions. These very minimal cutoffs seemed to create the possibility that *most* participants would indicate such concerns and be unduly included in the "at risk" groups. Furthermore, although the scoring syntax provided by Stice and colleagues (2004) provided scoring cutoffs for items 2, 3, and 4, these items were not used in the remainder of the syntax, therefore they did not weigh into the configuration of items defining either of the three eating diagnoses. In our scoring, we considered these items as defining of risky eating patterns and included them. However, in an effort to be conservative and avoid mis-inclusion of healthy participants in the disordered eating groups, the minimal cutoff was changed to 2 for each item. Analyses were run with groups based on cutoffs of 1 (syntax 1) as well as cutoffs of 2 (syntax 2). Results were generally very similar, suggesting that our modification was appropriate. Of note, with syntax 2, three variables became non-significant in the multivariate analyses for hypothesis 2. This suggests that these three variables may have been weaker predictors of disordered eating.

Table 3.

Comparative Table of EDDS scoring scheme (Original vs. Current Study)

Original scoring scheme (Stice, et al., 2000, 2004)	Adapted scoring scheme
Anorexia Nervosa – clinical levels: a) Height and weight data on items 19 and 20 resulting in a BMI of less than 17.5 b) Score of 4 or greater on item 2 (fear of gaining weight) c) Score of 4 or greater on items 3 or 4 (undue influence of weight and shape on self-esteem) d) Answer "Yes" to item 21 (presence of amenorrhea)	**Dieting group:** a) Score of 2 or greater on item 2 (fear of gaining weight) b) Score of 2 or greater on items 3 and 4 (undue influence of weight and shape on self-esteem) c) Score of 1 or greater on items 17 and 18 (skipping meals and engaging in excessive exercising)
Binge Eating Disorder – clinical levels: a) Answer "Yes" to item 5, 6 (eating binges with loss of control and consumption of large amount of food) b) Score of 2 or greater on item 7 (frequency of binge per 6 months) c) Answer "Yes" to at least 3 of the items 9, 10, 11, 12, and 13 (binge eating behaviours) d) Answer "Yes" to item 14 (distress regarding binge eating) e) Answer "No" to items 15, 16, 17, 18 (engagement in purging, laxative use, diuretic use, and excessive exercising)	**Binging group** a) Score of 2 or greater on items 3 and 4 (undue influence of weight and shape on self-esteem) b) Answer "Yes" to item 5, 6 (eating binges with loss of control and consumption of large amount of food) c) OR Score of 1 or greater on item 7 or 8 (frequency of binge per 6 months) c) Answer "Yes" to at least 4 of the items 9, 10, 11, 12, 13, 14 (binge eating) If either items 15, 16, register a positive answer, the person is grouped into the Purging category.
Bulimia Nervosa – clinical levels: a) Answer "Yes" to item 5, 6 (eating binges with loss of control and consumption of large amount of food) b) Score of 2 or greater on item 8 (frequency of binge per 3 months) c) Score of 8 or greater on at least one of the items 15, 16, 17, 18 (engagement in purging, laxative use, diuretic use, and excessive exercising) d) Score of 4 or greater on items 3 or 4 (undue influence of weight and shape on self-esteem)	**Binge/purging group** a) Score of 2 or greater on items 3 or 4 (undue influence of weight and shape on self-esteem) b) Score of 1 or greater on at least one of items 15, 16, (engagement in purging, laxative use, and diuretic use) This cluster preempts the Restrictive and Binging group (i.e., if a participant meets criteria for Dieting but also indicates any occurrence of purging or purging combined with binging, she will be moved in the Purging category)

Considering that the current study sample was taken from the general population, it was presumed that participants are normal eaters, unless they indicate a minimum number of pathological behaviours, which would then place them in one of the three groupings of people with disordered eating behavior. Specifically, based on Stice and colleagues (2004), a subclinical level of binge eating disorder (the original scoring of EDDS) is represented by score of 1 on both items 5 and 6 – reflecting the association between binge eating and loss of control, score of minimum 1 on item 7 – frequency of binge, at least 3 on the sum of items 9-13 – binge behaviours, and score of 1 on item 14 – distress associated with binging. In the current study, the scoring criteria for the *binging* grouping includes items 3 and 4 – relationship between body image and self-esteem characteristic for BN, agreement to items 9-14 – binge behaviour characteristics, as well as agreement with items 5 and 6, *or* 7 and 8 – binge frequency. The "or" clause was included because some participants indicated they do not binge in items 5 and 6, but indicated a frequency of binging in items 7 and 8.

The original scoring template for anorexia nervosa (Stice et al., 2000, Stice et al., 2004) was exclusively based on the calculation of BMI and the absence of menses. For the purposes of the current study, the scoring template for *dieting* behaviours included the DSM-IV TR criteria regarding fear of gaining weight, undue influence of weight and shape on self-esteem, severe dietary restriction and engagement in excessive exercising. The purpose of the scoring scheme was to isolate restricting behaviours (diagnostically identified as anorexia-restricting) from other disordered behaviours shared with the other diagnostic entities, such as binging and purging.

Lastly, the *purging* group scoring template was modified from the original scoring scheme of bulimia nervosa and anorexia nervosa (Stice et al., 2004) to include participants who restrict and purge – diagnostically resembling anorexia-purging type as well as participants who

would fit with the bulimia-purging type. As such, the criteria for the purging group included undue influence of weight and shape on self-esteem, binging, and engagement in purging compensatory behaviours such as vomiting or misuse of laxatives and diuretics.

Based on this scoring scheme, the dieting category was preempted by the binging category, while the purge category preempted both restricting and binging categories. That is to say, if a participant met all criteria for the Dieting group, but also indicated a minimal occurrence of purging, she was placed in the Purging group. Similarly, if a participant indicated excessive exercising as well as a minimal incidence of binging, then she was placed in the Binging group.

The departure from the original scoring by Stice and colleagues (2004) may undermine the reliability and validity of the groupings. While this change may be considered a limitation to this study, it was the only feasible option for using the scale to determine clusters of pathological behaviour as defined for the current study instead of diagnostic clusters, as the original scale was meant to determine. At the same time, according to Thompson (2004), the modification of inventories for the purposes of research is deemed an acceptable manipulation, provided the researcher offers transparency about the modification procedure.

Data Preparation and Clean Up

The initial sample size included 260 cases. Prior to analysis, all cases were examined for two initial validation criteria: a completion time of minimum 25 minutes and agreement with two verification statements that were embedded within the survey questionnaires. The completion time requirement was calculated based on the average amount of time necessary for this author as well as two undergraduate volunteers to complete the entire survey. The minimum participation cutoff time was rounded off to 25 minutes.

Verification questions have been found to be sufficiently strong to identify insufficient effort responding (Huang, Curran, Keeny, Poposki, & DeShon, 2011). The two verification questions were formulated as such: "Please answer 'Strongly agree' to this item" and were placed randomly within two questionnaires with a format similar to these questions. Only surveys that recorded agreement to these questions and with a time of completion over 25 minutes were considered valid. Based on these two validity criteria, 46 cases were eliminated from further analyses. An additional five other cases were eliminated after being identified as multivariate outliers based on Mahalanobis distance, $p < .001$. Final sample size at the beginning of the data analysis contained 209 participants. All analyses were conducted using SPSS for Macintosh, version 21 (2012).

Individual characteristics. Participants were female, between 17 and 44 years of age, with a mean age of 21 years. The ethnic distribution was as follows: 64.5% Caucasian, 10.7% Asian, 8.9% Middle Eastern, 5.6% Black, and 9.8% another ethnicity (e.g., mixed, African, South American, Arab, Carribean). The majority of 161 participants (75.6%) did not report having any previous psychiatric diagnosis while 16 participants (7.5%) reported having received a diagnosis of anxiety, 17 participants (8%) suffered from depression, 7 (3.3%) were diagnosed with an eating disorder, and 11 participants (5.2%) reported being given some other psychiatric diagnosis during their lifetime. Based on their answer patterns on the Eating Disorder Diagnostic Scale, two of the seven participants with a previous diagnosis of an eating disorder were identified as belonging to the binging group, and the remaining five to the purging group. Participants' mean body mass index (BMI) was 24.33 and ranged between 16.4 and 55.8.

Predictor variables. The predictor and covariate variables were examined for data entry errors and were corrected for mixed measurement entries such as pounds/kilograms and

inches/centimeters. The entries also were examined for missing values and out of range data. No out of range entries were identified. Missing values in the dataset were examined for randomness using Little's Missing Completely at Random test (Little, 1998). Results of this test indicated that most scales contained random missing data, however, the Affective Control Scale did not pass this test. Examination of the missing values for this scale revealed that items 8 and 13 were missing three answers each, but that the distribution of the missing data was not across the same participants. Considering that the missing data for these two items appeared random at a visual inspection, the scale was subjected to the same data replacement procedure as the other scales. One case contained 14 missing entries for the Emotion Intensity Scale (EIS). These entries were not replaced, and the case was excluded from analyses including the EIS. For both Emotion Intensity Scale and Affective Control Scale, the number of cases missing was under the minimum acceptable cutoff of 5%, as per Tabachnik & Fidell (2007). In order to maximize the usable data, missing values were replaced as follows: missing values in questionnaires with subscale scores were replaced by the respective participant's subscale mean, while missing values in questionnaires with total scale scores were replaced by the respective participant's scale mean. Mean substitution was chosen as a preferred missing value management method as it is conservative and does not change the value of the mean for the distribution (Tabachnik & Fiddell, 2007). Univariate outliers were identified based on normality testing and box plot examination. They were reduced to the nearest non-outlier data value.

The assumption of normality was verified by examination of the histograms and normality tests. While histograms revealed normal distributions, the Shapiro Wilk test was significant for lack of normality. As per Field (2006) and Tabachnik and Fidell (2007), normality tests are unreliable for large samples over 200 and evaluation of the histograms is

recommended. Upon further examination of the specific kurtosis and skewness coefficients, it appeared that only the body mass index variable exhibited an extreme skewness factor of 1.98 while all other variables remained close to normality, with skewness values ranging between -0.532 and 0.570. An inverse transformation was applied to the Body Mass Index (BMI) variable in order to meet the normality assumption. Although other transformations were applied to this variable, an inverse transformation appeared to be most successful in normalizing BMI, obtaining a skewness value of -0.259. All other methods yielded highly negatively skewed distributions. Lastly, considering recent research indicating that BMI distribution is slightly positively skewed (Nevill & Holder, 1995), the inverse transformation of the variable seemed the most appropriate treatment for this variable, achieving the closest distribution to the one suggested by Nevill and Holder (1995).

In preparation for the regression and multivariate analyses, the total scores and subscale scores of Emotion Intensity Scale (EIS), Affective Control Scale (ACS), Difficulties with Emotion Regulation Scale (DERS), and Self-Compassion Scale (SCS) were examined. The assumption of lack of multicollinearity was met, as the greatest VIF value was close to normal at 4.831 (Myers, 1990) and the greatest tolerance value of 0.207 was considered significantly greater than 0.2 (Menard, 1995). No influential cases were identified based on Cook's distance and DFBeta values. The independence of errors assumption was also met, based on a Durbin-Watson test (Field, 2005). Lastly, examination of the plots for predicted and residual z values indicated that the homoscedasticity assumption also was met.

Participants' means and standard deviations on the study variables after correction for data entry errors are presented below in Table 4.

Table 4.

Means, standard deviation, and range of variables used in the current study

Variable	Range	Mean	SD
Emotion Intensity Scale (Positive Emotions)	34-64	50.10	6.28
Emotion Intensity Scale (Negative Emotions)	39-78	56.29	8.14
Emotion Intensity Scale (Total Score)	78-136	106.28	11.71
Affective Control Scale – Anger	1.88-6.13	3.68	.93
Affective Control Scale – Positive	1.23-5.23	3.20	.83
Affective Control Scale – Sadness	1-6.75	3.67	1.29
Affective Control Scale – Anxiety	1.50-6.33	3.92	1.02
Affective Control Scale – Total	1.68-5.88	3.60	.85
Difficulties with Emotion Regulation Scale – Acceptance	6-30	15.04	6.02
Difficulties with Emotion Regulation Scale – Goal Orient.	5-25	16.03	4.94
Difficulties with Emotion Regulation Scale – Impulse Control	6-30	12.59	5.11
Difficulties with Emotion Regulation Scale – Awareness	6-25	14.14	3.96
Difficulties with Emotion Regulation Scale – Strategies	8-38	19.37	7.57
Difficulties with Emotion Regulation Scale – Clarity	5-24	12.16	4.34
Difficulties with Emotion Regulation Scale – Total	37-167	89.49	25.25
Self-compassion Scale – Total	1.1-4.58	2.81	.70
Rosenberg Self-esteem Scale	7-30	17.31	3.96
Beck Depression Inventory	.00-47	15.46	11.35
Body Mass Index	16.40-55.79	24.21	5.49
Body Esteem Scale for Adolescents and Adults - Appearance subscale	.00-40	18.86	8.87
Body Esteem Scale for Adolescents and Adults - Weight subscale	.00-32	12.33	8.50
Body Esteem Scale for Adolescents and Adults - Attribution subscale	2-20	11.10	3.75
Body Esteem Scale for Adolescents and Adults - Total	3-90	42.39	18.63

Note: The measures included in this study were clustered as follows: emotion intensity measures (Emotion Intensity Scale, Affective Control Scale), emotion regulation measure (Difficulties with Emotion Regulation Scale), self-compassion (Self-Compassion Scale), additional measures (Body Mass Index, Beck Depression Inventory, Rosenberg Self-Esteem Scale, Body Esteem Scale for Adolescents and Adults).

Preparing for inferential statistics and hypothesis testing. In preparation for the discriminant and cluster analyses, the subscale scores and total scores of Emotion Intensity Scale (EIS), Affective Control Scale (ACS), Difficulties with Emotion Regulation Scale (DERS), and Self-Compassion Scale (SCS) were examined. Significant correlations were identified between the subscales of EIS, ACS, and DERS and the total score of the respective scale. In order to avoid multicollinearity, the total scores of the measures were not included in discriminant and cluster analyses as the subscale scores yielded more specific information about types of emotions experienced, and various difficulties with regulation. Given that Levene's test for homogeneity of variance was significant for EIS Positive, ACS Sadness, ACS Anxiety, and DERS Impulse Control, it was recommended that these variables be transformed and retested for this assumption (Field, 2005). Log transformation of ACS Sadness and Anxiety as well as square root transformation of DERS Impulse appeared to meet the assumption, however no transformations of the EIS Positive subscale scores were satisfactory. Interpretation of results including EIS Positive scores was performed with caution.

Hypothesis 1: Disordered Eating and Emotional Functioning

Restating hypothesis 1, three separate sub-hypotheses were formulated. Hypothesis 1a predicted that a significant positive correlation will exist between eating pathology, measured by SCOFF and EDDS composite score, and perceived emotional intensity, measured by EIS total score and ACS total score. Hypothesis 1b stated that a significant positive correlation will exist between eating pathology – SCOFF and EDDS composite score, and emotion dysregulation, measured by DERS total score. Hypothesis 1c stated that a significant negative correlation will be identified between eating pathology, represented by the SCOFF and EDDS composite score;

and self-compassion, measured by SCS total score. Lastly, hypothesis 1d stated that emotion regulation will mediate the relationship between emotion intensity and disordered eating.

Correlations. An initial exploratory correlation was conducted solely between the emotion intensity and emotion regulation variables. Significant correlations were identified and are illustrated in table 5.

Table 5.

Hypothesis 1 analyses: Correlations between emotion regulation (DERS), affective control (ACS), emotion intensity (EIS), and self-compassion (SCS).

	EIS	ACS	DERS	SCS
EIS	--			
ACS	0.31*	--		
DERS	0.37*	0.77*	--	
SCS	-0.29*	-0.61*	-0.71*	--

Note: *$p < 0.001$, N = 209; EIS = Emotion Intensity Scale, ACS = Affective Control Scale, DERS = Difficulties with Emotion Regulation Scale, SCS = Self-compassion Scale.

In order to address hypotheses 1, a correlation analysis was computed using the variables EDDS composite score and SCOFF, and the total scores of EIS, ACS, DERS, and SCS. No significant correlations were identified between the emotion intensity/dysregulation and the EDDS composite score. For further detail, see Table 6.

In interpreting the EDDS composite score, Krabbenborg, Danner, Larse, van der Veer, van Elburg, and colleagues (2011) suggested that a cutoff score of 16.5 to successfully discriminates clinical participants from controls and no cutoff was provided for subclinical levels of risky eating. In effect, this measure is employed as part of the diagnostic assessment for eating pathology and therefore, it may not be suitable for exploring subclinical disordered eating patterns. In the current study, the EDDS composite score ranged from 0.01 to 27.22, with a mode of 3.63. These data suggested that most of our sample exhibited sub-clinical eating behaviours and the EDDS composite score was not a sufficiently sensitive measure for them. On the other hand, the SCOFF questionnaire is an alternate measure of eating pathology. As noted in the methods section, SCOFF scores range from 0 to 5, with 2 as a minimal indicator of "at risk" eating patterns. Furthermore, the SCOFF is routinely used as a screener for disordered eating and may be sensitive enough to detect tendencies to pathological behaviours in the general population (sensitivity ranging from 87 to 100%, Morgan, Reid, & Lacey, 1999). Considering that the current study employed a sub-clinical sample, the SCOFF is an appropriate measure to explore eating pathology tendencies. A correlation between SCOFF and the variables of emotion processing revealed a positive correlation between this measure of problematic eating and ACS, EIS, and DERS. Similarly, a significant negative correlation was found between disordered

eating and SCS. This correlation indicates that higher disordered eating scores are associated with reports of higher levels of affective control, emotion dysregulation, and depressive symptomatology. In contrast, higher disordered eating is inversely correlated with reported self-compassion. Table 6 below illustrates these correlations.

Table 6.

Hypothesis 1a and 1b analyses: Correlations between managed eating (SCOFF and EDDS) and emotion regulation (DERS), affective control (ACS,) emotion intensity (EIS), and self-compassion (SCS).

Measure	Disordered eating measured by SCOFF	Disordered eating measured by EDDS composite score
Emotion Intensity Scale (EIS)	.162 ((p = .019)	-.065 (p = .348)
Affective Control Scale (ACS)	.429 (p < .001)	-.029 (p = .678)
Difficulties with Emotion Regulation Scale (DERS)	.502 (p < .001)	.013 (p = .856)
Self-Compassion Scale (SCS)	-.477 (p < .001)	.082 (p = .238)

Note: Measures are clustered as follows: emotion intensity (EIS and ACS), emotion regulation (DERS), self-compassion (SCS)

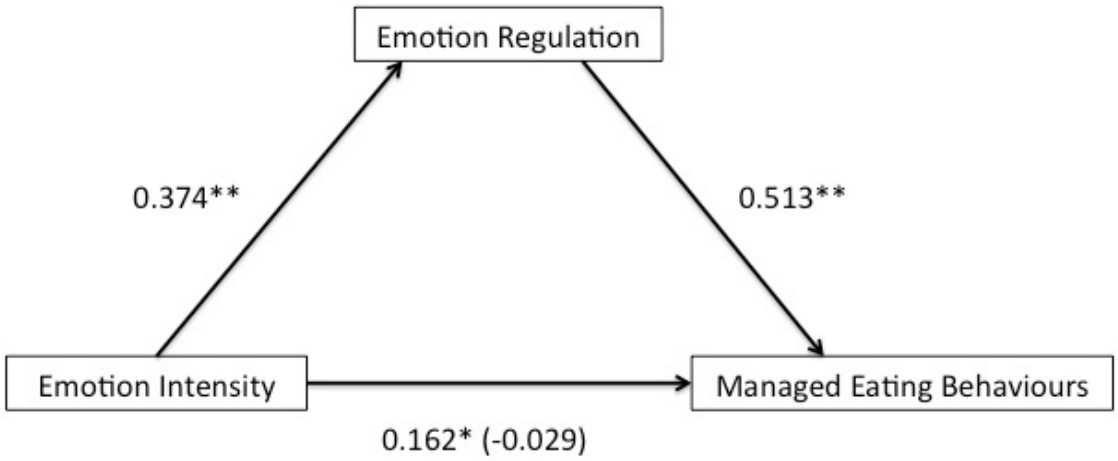
Mediation analysis. In addressing hypothesis 1d, a mediation analysis was conducted according to Preacher and Hayes methodology (2004), wherein SCOFF scores represented the outcome, Emotion Intensity Scale (EIS) total score represented the predictor, and Difficulties with Emotion Regulation (DERS) total score represented the mediator. For the purposes of this mediation analysis, EIS and DERS were the only variables selected as they were the most representative measurements of the target constructs: experience of emotion intensity and emotion dysregulation, respectively. The total effect of emotion intensity on disordered eating was significant, $c = 0.162$, $t(207) = 2.368$, $p < 0.001$. Emotion intensity predicted the mediating variable, emotion regulation: $a = 0.374$, $t(207) = 5.803$, $p < 0.001$. When controlling for emotion intensity, emotion regulation predicts eating pathology, $b = 0.513$, $t(207) = 7.891$, $p < 0.001$. The estimated direct effect of emotion intensity on eating pathology, mediated by emotion regulation was $c' = -0.029$, $t(208) = -0.451$, $p = 0.652$ (Figure 1.)

The indirect effect, *ab* was 0.02, which was deemed significant by the Sobel test (1982), $z=4.67$, $p = 0.001$. Using the Preacher and Hayes (2004) indirect effect assessment procedure, a bootstrapping analysis was performed wherein 5000 samples were requested. For this accelerated and bias-corrected confidence interval of 95%, the lower limit was 0.01 and the upper limit was 0.03.

Considering that both *a* and *b* coefficients were statistically significant, the boostrapping confident interval for *ab* did not include zero, and the Sobel test was significant, the indirect effect of emotion intensity on eating pathology mediated by emotion regulation is significant. The direct path from emotion intensity through emotion regulation to disordered eating (*c'*) was rendered non-significant, which supports a full mediation relationship.

Figure 1.

Hypothesis 1c analysis: Mediation analysis between emotion intensity, emotion regulation, and managed eating behaviours.



Note: Standardized regression coefficients for the relationship between emotion intensity and disordered eating patterns as mediated by emotion regulation. The standardized regression coefficient between emotion intensity and managed eating, controlling for emotion regulation is in parantheses. *$p < 0.05$; **$p < 0.001$.

Hypothesis 2: Specific Emotion Processing Deficits and Types of Risky Eating Behaviour

Recapping the second hypothesis, three sub-hypotheses were offered. Hypothesis 2a stated that participants in the Dieting group will be differentiated from the other groups on the basis of lower scores on scales measuring emotional awareness (DERS Aware of emotions), emotional clarity (DERS Clarity of emotions), and acceptance of emotions (DERS Acceptance or emotions). Hypothesis 2b suggested that participants in the Binging-only group will be differentiated from participants in the dieting, binging/purging, and control groups based on higher scores on access to emotion regulation strategies (DERS access to strategies). Lastly, hypothesis 2c posited that participants in the Binging/Purging group will be differentiated from the dieting, binging, and control groups on the basis of high distress ratings (EIS Negative), impulsivity (DERS Impulse control), non-acceptance of emotions (DERS Non-acceptance of emotions as well as all ACS subscales). They were also expected to have the lowest scores on self-compassion (SCS) and orientation in goal-directed behaviours (DERS Goal).

Multivariate analysis of variance. In order to test hypothesis 2, a between-subjects MANOVA was conducted. Dependent variables were DERS subscales (Acceptance, Impulse control, Clarity of Emotions, Access to Strategies, and Goal orientation), ACS subscales (Sadness, Anger, Anxiety, Positive emotions), EIS subscales (Positive emotions, Negative emotions), and SCS (total score). The independent variable was EDDS eating pathology, which divided participants in four groups: binge, purge, diet, and control. While the SCOFF total score was used as a measure of eating pathology for the first hypothesis, for the remainder of the analyses, the EDDS was used to group participants based on their eating patterns in the groups of

binge, purge, diet, and controls, respectively. The criteria for the grouping procedure are presented in Table 3.

All variables were entered simultaneously. There were no univariate or multivariate within-cell outliers at $p < 0.001$. Assumptions of normality, linearity, and multicollinearity were satisfactory. Levene's test was significant for EIS Positive emotions, ACS Sadness, ACS Anxiety, and DERS Impulse control, indicating that these variables did not meet the homogeneity of variance assumption. The usual procedure for achieving homogeneity of variance/covariance is to transform the variables and rerun the test (Field, 2005). Affective Control Scale (ACS) and Difficulties with Emotion Regulation Scale (DERS) subscales were subjected to a variety of transformation, however only log transformed ACS subscales and square root transformed DERS subscale yielded a nonsignificant Levene's test, therefore, meeting the assumption successfully. Emotion Intensity Scale (EIS) positive emotions remained significant regardless of the transformation employed therefore results including this subscale will be interpreted cautiously. According to Field's recommendations (2005), EIS positive emotion scores remained part of the MANOVA, however, they were integrated in the analyses using Brown-Forsythe or Welchs's *F* adjustments. There were no significant differences between BF or W's *F* values and MANOVA results, therefore the results of EIS in the MANOVA will be reported herein. In evaluating the homogeneity of covariance assumption, Box's *M* was significant at $p < 0.001$. As such, the assumption of homogeneity of covariance is met and Wilks' Lambda may be used.

With the use of the Wilks' criterion, the combined dependent variables were significantly different by eating pathology category: $F(39, 572) = 2.373$, $p < 0.001$. The results reflected a partial $\eta^2 = .14$. Independent univariate one-way ANOVA analyses showed significant main

effects for disordered eating group for perception of emotional intensity for negative emotions (EIS negative), affective reaction emotions (ACS anger, positive emotions, sadness, and anxiety), difficulties regulating emotions (DERS acceptance of emotions, goal orientation, access to strategies, clarity, and impulse control), and self-compassion (SCS). See table 7 for details.

Table 7.

Hypothesis 2 analysis: MANOVA comparing disordered eating groups across perception of emotion intensity, emotion dysregulation, secondary emotional reactions, and self-compassion.

Source	*SS*	*F*	*p*	η2
EIS Negative	1087.15	5.84	0.001	0.08
ACS Anger	7.14	2.78	0.042	0.04
ACS Positive	6.63	3.28	0.022	0.04
ACS Sadness	0.38	8.81	0.000	0.11
ACS Anxiety	0.15	6.12	0.001	0.08
DERS Accept	674.51	6.71	0.000	0.09
DERS Goal	287.17	4.10	0.008	0.05
DERS Strategies	1251.00	7.99	0.000	0.10
DERS Clarity	273.75	5.11	0.002	0.01
DERS Impulse	0.07	10.33	0.000	0.13
SCS	14.56	11.07	0.000	0.14

Note: df = 3, dferror = 205.: DERS = Difficulties with Emotion Regulation Scale, EIS = Emotion Intensity Scale, ACS = Affective Control Scale, SCS = Self-Compassion Scale.

Post hoc comparisons of the eating pathology groups revealed that the four groups registered on a continuum: the control participants fall at one extreme (indicative of minimal emotional dysregulation and maximal self-compassion), followed by participants in the dieting category, then participants in the binging category. Finally, participants in the purging group fell at the other extreme (indicative of high levels of emotion dysregulation and minimal abilities to self-soothe). Participants in the dieting groups did not differ significantly from controls, although subscale scores for ACS anger and anxiety, as well as DERS goals approached significance. For ease of interpretation, these relationships are illustrated in table 8.

Table 8.

Significant differences in perception of emotion intensity, emotion dysregulation, and self-compassion among the four disordered eating groups

Dependent Variable	Groups	Means	95% Confidence Intervals	
			Lower Bound	Upper Bound
Emotion Intensity Scale – positive	Control	50.95	49.65	52.25
	Dieting	50.27	47.63	52.91
	Binging	49.21	47.60	50.82
	Purging	49.32	47.32	51.33
Emotion Intensity Scale – negative	Control	53.80	52.17	55.44
	Dieting	56.85	53.54	60.16
	Binging	57.83	55.81	59.85
	Purging	59.47	56.95	61.98
Affective Control Scale – positive	Control	3.13	2.96	3.309
	Dieting	3.10	2.76	3.45
	Binging	3.09	2.88	3.31
	Purging	3.58	3.13	3.84
Affective Control Scale – anger	Control	3.49	3.30	3.70
	Dieting	3.63	3.24	4.02
	Binging	3.80	3.56	4.03
	Purging	3.97	3.67	4.27
Affective Control Scale – sadness (Log transformed)	Control	0.61	0.60	0.64
	Dieting	0.60	0.55	0.66
	Binging	0.66	0.63	0.70
	Purging	0.72	0.70	0.76
Affective Control Scale – fear (Log transformed)	Control	0.65	0.63	0.67
	Dieting	0.69	0.65	0.73
	Binging	0.70	0.67	0.72
	Purging	0.72	0.70	0.75
Difficulties with Emotion Regulation Scale – awareness	Control	13.72	12.90	14.54
	Dieting	14.45	12.78	16.12
	Binging	14.34	13.32	15.36
	Purging	14.63	13.36	15.90
Difficulties with Emotion Regulation Scale – non-accept	Control	13.60	12.40	14.80
	Dieting	14.59	12.15	17.02
	Binging	15.13	13.65	16.62
	Purging	18.60	16.75	20.45
Difficulties with Emotion Regulation Scale – Impulsivity (Square root transformed)	Control	0.30	0.29	0.31
	Dieting	0.28	0.27	0.30
	Binging	0.27	0.26	0.29
	Purging	0.25	0.23	0.26
Difficulties with Emotion Regulation Scale – goal	Control	14.70	13.70	15.71
	Dieting	16.68	14.65	18.71
	Binging	18.95	15.70	18.20
	Purging	17.40	15.84	18.94
Difficulties with Emotion Regulation Scale – strategies	Control	17.52	16.02	19.02
	Dieting	18.22	15.20	21.26
	Binging	19.47	16.61	21.32
	Purging	24.27	21.96	26.58
Difficulties with Emotion Regulation Scale – clarity	Control	11.15	10.27	12.03
	Dieting	11.09	9.31	12.86
	Binging	12.98	11.90	14.06
	Purging	13.92	12.57	15.27
Self-compassion Scale	Control	3.07	2.93	3.21
	Dieting	2.95	2.67	3.23
	Binging	2.59	2.41	2.76
	Purging	2.45	2.24	2.66

Note: Bolded variables yielded significant differences, $p < 0.05$. DERS = Difficulties with Emotion Regulation Scale, EIS = Emotion Intensity Scale, ACS = Affective Control Scale, SCS = Self-Compassion Scale.

Analyses supplementary to MANOVA: Discriminant analysis. Tabachnik and Fidell (2007) point out that an analysis customarily conducted in conjunction with MANOVA is the discriminant analysis. While in MANOVA, the question is whether group membership is associated with specific dependent variables, the discriminant analysis explores whether the dependent variables can be combined to predict group membership. It also explores the minimum number of dimensions that significantly describe differences between groups. In order to clarify how the four EDDS groups differ based on unique combinations of the dependent variables, the discriminant analysis was conducted with the following predictor variables: Emotion Intensity Scale (positive and negative emotions), Affective Control Scale (positive emotions, anger, anxiety, sadness), Difficulties with Emotion Regulation Scale (clarity of emotions, goal orientation, acceptance of emotions, impulse control, awareness of emotions, strategies for regulation) and Self-compassion Scale. The grouping variable was the Eating Disorder Diagnostic Scale. In examining the initial output, the assumption of equal covariances was not met. In order to compensate for this assumption, the discriminant analysis was run again on separate covariance matrices (Tabachnik & Fidell, 2007). The analysis yielded three discriminant functions, with a combined Wilk's Lambda $F(39, 209) = .642$, $\chi^2 = 81.856$, $p < 0.001$. After removal of the first function, the Wilk's Lambda became non-significant, suggesting that only the first function discriminates significantly in the model. This function accounted for 65% of the variance between predictors and groups. This first canonical function discriminates normal controls and dieters (C, R) from binge and purge participants (B, P). The second function had a Wilk's Lambda $F(24, 209) = .848$, $\chi^2 = 32.946$, $p=0.105$, while the third functions had a Wilk's Lambda $F(11, 209) = .943$, $\chi^2 = 11.689$, $p=0.387$.

The structure matrix of correlations between predictors and discriminant function suggests that the best predictor for discriminating between control+dieting participants and binge+binge/purge participants are self-compassion, difficulty controlling impulses, and emotional reaction to sadness, as shown in table 9. Loadings less than .50 are not interpreted or reported.

Table 9.

Discriminant analysis: Structure matrix of correlations between predictors and discriminant functions.

Source	Correlations of predictor variables with discriminant functions
SCS	0.702
DERS Impulse	0.612
ACS Sadness	-0.548

Note: Structure matrix of the significant correlations between predictors of emotion processing deficits and disordered eating groupings determined by the sole significant discriminant function. This result indicates the significant variables by which the significant function discriminates between participants. Only the significant variables are included, i.e., loadings greater or equal to 0.50. Canonical R = .493; Eigenvalue = .32

Summarizing these findings, the discriminant analysis grouped dieting and control participants (grouping 1) and binging and purging participants (grouping 2). Grouping 1 is characterized by higher self-compassion (SCS), as well as lower levels of impulse control difficulties (DERS Impulse), and lower distress secondary to sadness (ACS Sadness) when compared to grouping 2. These significant differences are summarized in Table 10.

Table 10.

Discriminant analysis: between-group differences on impulsivity, fear of sadness, and self-compassion for discriminant analysis groupings.

Source	F	p	Function grouping	Mean	Standard deviation	95% Confidence Interval	
						Upper Bound	Lower Bound
DERS Impulse	21.801	0.000	1	0.29	0.04	0.29	0.30
			2	0.26	0.05	0.25	0.27
ACS Sadness	19.673	0.000	1	0.61	0.12	0.59	0.64
			2	0.69	0.11	0.66	0.71
SCS	31.732	0.000	1	3.05	0.70	2.92	3.18
			2	2.53	0.62	2.41	2.66

Note: df = 1, dferror = 207. The subscale variables had been deemed as significant between-group variables by the sole significant function, which discriminated between 1: control and dieting participants and 2: binging and binge/purging participants. Measures: DERS = Difficulties with Emotion Regulation Scale, ACS = Affective Control Scale, SCS = Self-Compassion Scale.

In validating the results of the discriminant analysis, a percentage for the group prediction to occur by maximum chance was calculated at 36.36% (Hair, Anderson, Tatham, & Black, 1998). An acceptable model will exceed this percentage by at least 25% (Hair, et al., 1998) corresponding to a percentage of 45.45%. This model classified groups correctly in 56.9% of cases, which exceeds the minimum cutoff required. With the use of cross-classification procedure for the total usable sample of 209 women, 25% of cases were withheld from calculation of the classification functions. For the 75% of the cases from which the functions were derived, the model classified them correctly in 47.8% of cases. This value is above the acceptable cutoff and indicates that this model reliably discriminates between groups. At the same time, further validation of the model using the Press's Q statistic obtained a value $Q = 65.71$ which is above the acceptable cutoff with $p < 0.001$ (Hair et al., 1998), indicating that this model as a whole discriminates adequately amongst sample participants, grouping them into the two categories noted above. Of note, the cutoff and classification validity of the analysis are calculated for the entire model - for all three functions together, regardless of their significance levels.

The discriminant analysis model correctly identified 78.9% of control participants. However, of the dieting participants, only 18.2% were correctly identified, while the largest proportion of dieting participants were erroneously grouped as controls (50%). Binging participants were largely correctly identified (50.8%) while the next largest proportion was erroneously classified as the control grouping (32.2%). Lastly, purging participants were correctly identified in 36.8% of cases while the largest proportion was erroneously classified in

the control grouping (47.4%), as noted in Table 11. Again, these percentages were calculated for the entire model, taking into account all three functions simultaneously.

Table 11.

Discriminant analysis classification results

	ED category	Predicted Group Membership				Total
		Control	Restrict	Binge	Purge	
Count and %age	Control	71	1	13	5	90
		78.9%	1.1%	14.4%	5.6%	100%
	Diet	11	4	7	0	22
		50%	18.2%	31.8%	.0%	100%
	Binge	19	2	30	8	59
		32.2%	3.4%	50.8%	13.6%	100%
	Purge	18	0	6	14	38
		47.4%	0%	15.8%	36.8%	100%

Note: This classification reflects the model of the discriminant analysis. Although only the first function is statistically significant, the model classification is based on all three functions concomitantly. The group classification percentages are read left to right. 56.9% of original grouped cases were correctly classified, exceeding the minimum cutoff level of 47.8%.

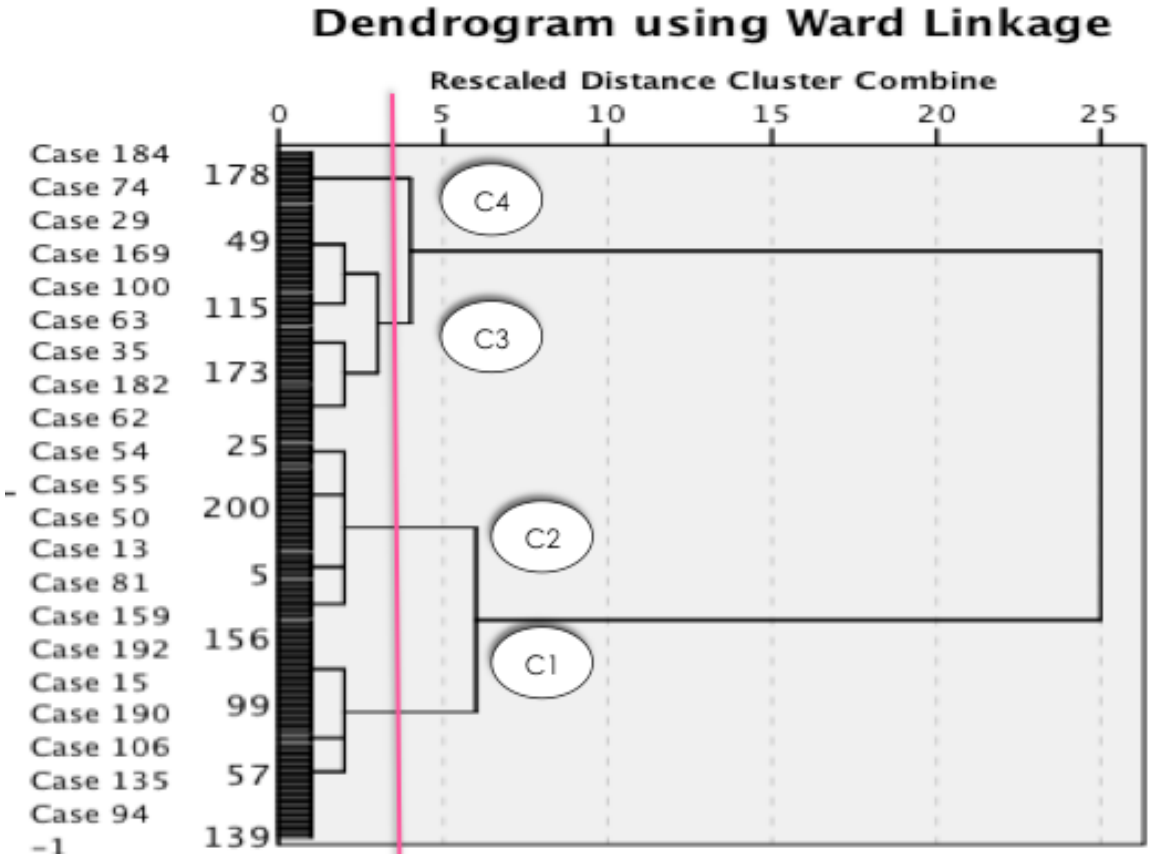
Ancillary Analyses – Cluster Analysis

Considering the initial results of the multivariate analyses, it was of interest to also examine the variables of emotional processing bottom-up to explore whether this revealed alternate groupings. Given the relative novelty of comparing individuals who diet, binge, and purge in the absence of diagnostic grouping, there is limited a priori knowledge about the difference between these groups. As such, a cluster analysis would allow to classify the data regarding these participants' experience of emotion intensity and regulation into meaningful groupings, which can, afterwards, be correlated with each particular disordered eating behaviour group. This analysis was admittedly not planned based on the formulation of the hypotheses, however, it was deemed that the information provided by a cluster analysis would complement the multivariate analysis findings.

Determining clusters based on emotion intensity and emotion regulation variables. The variables included in this analysis are: Emotion Intensity scale (EIS), Affective Control Scale (ACS), Difficulties with Emotion Regulation Scale (DERS), and Self-compassion Scale (SCS). As a first step, a hierarchical cluster analysis was performed, using Ward's method, which yielded two viable clustering options: four or five clusters (See Figure 2).

Figure 2.

Cluster analysis dendogram



Note: The vertical line indicates the cutoff of the clusters after the *k* means analysis. The clusters are as follows: C1 = Cluster 1 (Well Regulated); C2 = Cluster 2 (Confused about Feelings); C3 = Cluster 3 (Emotionally Reactive); C4 = Cluster 4 (Unregulated and Unsoothed).

Determining the final clusters. Using the elbow method, the option of four clusters was selected as statistically appropriate (see Mooi & Saarstedt, 2011, p. 254). A second step was to employ a *k* means clustering technique to determine the four clusters and the participants' distribution within them. According to Mooi and Sarstedt (2011), after determining the optimal number of clusters, the data can be subjected to a second hierarchical analysis or a *k* means analysis, both with the set number of clusters specified. This step allows one to explore the characteristics of the clusters. The k means is ostensibly superior to the hierarchical analysis as it is less affected by outliers and clustering errors. It is also recommended for ratio data, such as in the current study (Mooi & Sarstedt, 2011).

Examining the relationship of the clusters to emotion intensity and regulation variables. A one-way ANOVA was conducted to determine the significance of each of the 13 variables to the clustering model. All variables were different between groups at a significance level $p < 0.01$. Tukey's post hoc tests were employed to further define the clusters characteristics. The first or "the Well Regulated" cluster (N = 86) was characterized by high self-compassion, moderate experience of positive emotions, and low experience of negative emotions and emotion dysregulation. The second or "the Confused about Feelings" cluster (N = 47) was characterized by high perceived intensity of both positive and negative emotions, and moderate levels of self-compassion, but also low levels of emotion clarity and emotions. The third group or "the Emotionally Reactive " (N = 48) experiences strong emotion reactions secondary to sadness, as well as a general lack of specificity in describing emotions, combined with low experience of positive emotions and self-compassion abilities. The fourth group or the "Dysregulated and Unsoothed" cluster (N=28) was the most severely impaired group,

characterized by elevations on all measures of emotion dysregulation, and emotion intensity, coupled with markedly low self-compassion. Further details are provided in table 12.

Table 12.

Cluster analysis results: distribution of variables of emotion regulation, emotion intensity, and self-compassion within the four clusters

Dependent Variables	Clusters	Means (SD)	95% Confidence Intervals	
			Lower Bound	Upper Bound
Emotion Intensity Scale – positive	C1 (Well Regulated)	49.36 (5.29)	48.23	50.50
	C2 (Confused about Feelings)	54.31 (4.13)	53.10	55.52
	C3 (Emotionally Reactive)	44.89 (5.85)	43.18	46.58
	C4 (Unregulated and Unsoothed)	54.17 (5.38)	52.08	56.26
Emotion Intensity Scale – negative	C1 (Well Regulated)	49.87 (4.73)	48.85	50.88
	C2 (Confused about Feelings)	61.35 (5.31)	59.79	62.91
	C3 (Emotionally Reactive)	56.03 (4.98)	54.58	57.47
	C4 (Unregulated and Unsoothed)	67.99 (5.55)	65.84	70.14
Affective Control Scale – positive	C1 (Well Regulated)	2.82 (0.70)	2.68	2.98
	C2 (Confused about Feelings)	3.04 (0.68)	2.84	3.24
	C3 (Emotionally Reactive)	3.60 (0.85)	3.35	3.85
	C4 (Unregulated and Unsoothed)	3.9 (0.83)	3.65	4.18
Affective Control Scale – anger	C1 (Well Regulated)	3.17 (0.71)	3.02	3.32
	C2 (Confused about Feelings)	3.85 (0.83)	3.61	4.10
	C3 (Emotionally Reactive)	3.93 (0.94)	3.66	4.21
	C4 (Unregulated and Unsoothed)	4.52 (0.82)	4.20	4.84
Affective Control Scale – sadness (Log transformed)	C1 (Well Regulated)	0.56 (0.09)	0.54	0.58
	C2 (Confused about Feelings)	0.64 (0.10)	0.61	0.67
	C3 (Emotionally Reactive)	0.74 (0.08)	0.72	0.77
	C4 (Unregulated and Unsoothed)	0.76 (0.07)	0.74	0.79
Affective Control Scale – fear (Log transformed)	C1 (Well Regulated)	0.62 (0.08)	0.60	0.63
	C2 (Confused about Feelings)	0.69 (0.06)	0.67	0.71
	C3 (Emotionally Reactive)	0.73 (0.06)	0.71	0.75
	C4 (Unregulated and Unsoothed)	0.76 (0.07)	0.73	0.79
Difficulties with Emotion Regulation Scale – awareness	C1 (Well Regulated)	13.23 (3.75)	12.42	14.03
	C2 (Confused about Feelings)	13.24 (3.85)	12.11	14.37
	C3 (Emotionally Reactive)	15.64 (3.43)	14.64	16.64
	C4 (Unregulated and Unsoothed)	15.85 (4.44)	14.13	17.58
Difficulties with Emotion Regulation Scale – non-accept	C1 (Well Regulated)	10.80 (4.02)	9.93	11.66
	C2 (Confused about Feelings)	14.01 (3.79)	12.90	15.13
	C3 (Emotionally Reactive)	18.92 (4.15)	17.71	20.12
	C4 (Unregulated and Unsoothed)	23.17 (4.38)	21.48	24.87
Difficulties with Emotion Regulation Scale – Impulsivity (Sqr rt. Transf.)	C1 (Well Regulated)	0.32 (0.03)	0.31	0.33
	C2 (Confused about Feelings)	0.28 (0.04)	0.27	0.29
	C3 (Emotionally Reactive)	0.24 (0.03)	0.23	0.26
	C4 (Unregulated and Unsoothed)	0.23 (0.03)	0.22	0.24
Difficulties with Emotion Regulation Scale – goal	C1 (Well Regulated)	12.86 (3.78)	12.05	13.68
	C2 (Confused about Feelings)	16.28 (4.19)	15.05	17.51
	C3 (Emotionally Reactive)	18.36 (4.15)	17.16	19.57
	C4 (Unregulated and Unsoothed)	21.35 (3.43)	20.02	22.68
Difficulties with Emotion Regulation Scale – strategies	C1 (Well Regulated)	13.26 (3.51)	12.51	14.01
	C2 (Confused about Feelings)	18.19 (5.01)	16.71	19.66
	C3 (Emotionally Reactive)	25.10 (4.50)	23.79	26.41
	C4 (Unregulated and Unsoothed)	30.32 (4.63)	28.52	32.12
Difficulties with Emotion Regulation Scale – clarity	C1 (Well Regulated)	9.60 (3.18)	8.92	10.28
	C2 (Confused about Feelings)	11.29 (3.16)	10.36	12.22
	C3 (Emotionally Reactive)	14.66 (3.41)	13.67	15.65
	C4 (Unregulated and Unsoothed)	17.21 (4.08)	15.63	18.79
Self-compassion Scale	C1 (Well Regulated)	3.29 (0.57)	3.17	3.41
	C2 (Confused about Feelings)	2.82 (0.55)	2.65	2.98
	C3 (Emotionally Reactive)	2.37 (0.47)	2.23	2.50
	C4 (Unregulated and Unsoothed)	2.07 (0.50)	1.88	2.27

Relating clusters to disordered eating groups. After determining the clusters, exploratory descriptive analyses of the clusters were conducted to identify match with the eating pathology groupings. A chi-square analysis was completed wherein we compared the match between the Eating Disorder Diagnostic Scale disordered eating groups and the four clusters. The assumptions to this analysis were met, as measurements were independent of each other and all expected frequencies were greater than 5. There was a significant association between cluster type and eating disorder diagnosis, $\chi^2 = 34.51$, $p < 0.001$. These results are shown in table 13.

Table 13.

Cluster analysis: distribution of disordered eating groups within each cluster

		Cluster 1 (Well Regulated)	Cluster 2 (Confused about Feelings)	Cluster 3 (Emotionally Reactive)	Cluster 4 (Unregulated and Unsoothed)
Control group	Observed value	52	18	13	7
	Expected value	37.0	20.2	20.7	12.1
Dieting group	Observed value	8	7	3	4
	Expected value	9.1	4.9	5.1	2.9
Binging group	Observed value	17	18	18	6
	Expected value	24.3	13.3	13.6	7.9
Binge/purging group	Observed value	9	4	14	11
	Expected value	15.6	8.5	8.7	5.1

Note: Bolded groups denote the majority membership in the respective cluster.

The chi-squared test output does not readily provide an evaluation of the significance of the distribution of each disordered eating group in each of the clusters. For this, an internet search led to two documents posted by the University of Missouri (Stockburger, 2015) and the University of Regina (Ginrich, 2015) which described ways of interpreting these percentages. According to both documents, a chi-squared test that has reached statistical significance overall is interpretable. Within the contingency table, the association between the two variables is provided with two values: the expected value (calculated based on the minimal significance of the association between variables, e.g., how many control participants should be found in Cluster 1) and the observed value (which is the actual incidence of cases pertaining to one variable within the other variable; e.g., how many healthy controls are in Cluster 1). Table cells where expected values are less than the observed values indicate a markedly strong association between the two variables in question and warrant further interpretation.

Based on these instructions, *control* participants appear to be mostly distributed in cluster 1, indicating that individuals who appear to have a normative relationship with eating and an adequate body image are able to process emotions appropriately and access self-soothing strategies as needed. *Dieting* participants are distributed mostly in cluster 2, with a smaller proportion in cluster 4. This distribution suggests that participants in the dieting group generally experience positive emotions and are able to self-soothe, but struggle to identify and interpret some emotional states. Of interest, one fifth of them still expressed intense emotional dysregulation.

Participants in the *binging* group seem to be relatively uniformly distributed across clusters 2, and 3, suggesting that one third of them indicate some difficulties understanding their

emotions, while the one third indicates significant struggles controlling emotions and engaging in self-compassion. Lastly, participants in the *binge/purging* group are distributed mostly in clusters 3 and 4, suggesting that they endorse significant difficulties identifying and controlling emotions as well as accessing self-compassion strategies.

Validation of the clusters. In order to obtain an external criterion validation of the clusters, five variables that were independent of the initial clustering analyses were used, as per the indications of Aldenderfer and Blashfield (1984) and Schinka and Velicer (2003, p. 179). These five variables were intentionally not included in the initial cluster analysis, which was meant to cluster participants based solely on their reported emotion intensity, emotion dysregulation, and self-compassion skills. Additionally, Aldenderfer and Blashfield, as well as Schinka and Velicer note that the independent validation variables should not be included in the initial analysis. Choosing these variables originated from their customary use in eating disorders research wherein strong associations have been found between disordered eating and depressive symptomatology, self-esteem, body satisfaction, and body mass index (Furnham, Badmin & Sneade, 2002; Foster, Wadden, Swain, Stunkard, Platte, & Vogt, 1998; Spoor, Stice, Bekker, Van Strien, Croon, & Van Heck, 2006; Ojserkis, Sysko, Goldfein, & Devlin, 2014). These analyses would help clarify whether the groups differ in terms of these variables and whether any of the clusters are healthier or more impaired than others. At the same time, these variables were not included in the initial cluster analysis, as the clustering was intended to be formulated based solely on measures of perceived emotion intensity, emotion regulation, and self-compassion.

The five variables were depressive symptomatology (BDI), self-esteem (RES), body satisfaction (BESAA total), and body mass index (BMI). Significant differences were found

between the four clusters and additional variables, with the exception of BMI, as noted in table 14.

Table 14.

Validation of the clusters: differences in depressive symptoms, self-esteem, body satisfaction, and body mass index across clusters.

Source	SS	F	p
RES total	560.15	14.102	<0.001
BDI total (Welch's test)	n/a	77.516	<0.001
BESAA total	12770.86	14.764	<0.001
BMI	114.026	1.264	0.288

Note: Validation analysis of the clusters. The clusters were compared in an analysis of variance across variables customarily used in research of emotion regulation and disordered eating. None of these variables were initially included in the variables used for determining the clusters. df = 3, df error = 205.

Post hoc analyses revealed that clusters 1 and 2 indicated significantly higher levels of self-esteem and body satisfaction than clusters 3 and 4. The four clusters ranked on a continuum of depressive symptomatology, where the Well Regulated (Cluster 1) scored lowest, followed by the Confused about Feelings (Cluster 2), then by Emotionally Reactive (Cluster 3) and lastly, Unregulated and Unsoothed (Cluster 4) had the highest scores. Of note, Cluster 3 indicated symptoms falling in the moderate range of the depressive symptomatology, while Cluster 4 fell in the severe range – for more details, see table 15.

Table 15.

Descriptive analysis of the four clusters across depressive symptoms, self-esteem, and body satisfaction.

Source	Cluster 1 Well Regulated	Cluster 2 Confused about Feelings	Cluster 3 Emotionally Reactive	Cluster 4 Unregulated and Unsoothed
RES	M = 19.04	M = 17.38	M = 15.47	M = 15.07
	SD = 4.12	SD = 3.11	SD = 3.31	SD = 3.35
BDI	M = 7.75	M = 12.29	M = 23.66	M = 30.42
	SD = 5.64	SD = 8.15	SD = 8.51	SD = 9.77
BESAA	M = 49.72	M = 45.08	M = 33.81	M = 30.04
	SD = 17.23	SD = 18.39	SD = 14.1	SD = 18.56

Note: RES = Rosenberg Self-esteem Scale, BDI = Beck Depression Inventory, BESAA = Body Esteem Scale for Adolescents and Adults.

The significance of these analyses provides sufficient external validation to the clusters described above (Schinka & Velicer, 2003) considering that these clusters were associated with differences within variables that have already been found to differ along emotion regulation dimensions.

Analyses of the Narratives

Participants completed narratives as described in the Methods section. As per instructions, they were requested to describe a negative event, as well as their emotions in response to this event, and their coping strategies. All participants filled the online survey field allotted for the answer. Narratives were read and screened for fit with the task requirements of a discrete negative event. The Complexity of Emotion Regulation Scale (CERS; Pascual-Leone, Gillespie, Orr, & Harrington, 2015) was employed for coding the emotion regulation quality in these narratives. The scale requires that the event coded be a discrete instance, as opposed to repetitive events, or events that progress over a lengthy period of time. Additionally, the narratives were coded for crystallized and ostensibly stabilized emotion regulation skills employed during adulthood, as opposed to childhood, when the person is still developing stress coping strategies and may require intervention from adults in doing so. As such, narratives of long standing events (e.g., parental divorce), general attitude (e.g., body dissatisfaction), or childhood events (e.g., pet dying when client was 9 years old) were deemed uncodable in the Complexity of Emotion Regulation Scale (CERS). The writer of this study as well as another graduate student rated the narratives independently. The additional rater had been initially involved in the creation of the CERS and was well familiarized with the coding criteria. An interrater reliability analysis using Cronbach's coefficient determined that the inter-rater

consistency was high, $\alpha = 0.86$. Of the 209 participants included in the analysis, 46 (22%) provided uncodable narratives on the CERS, based on the criteria above while 163 (78%) offered narratives of codable, discrete stressors. The narratives were also scored for indicators of non-eating disorder vs. eating-disorder (e.g., engagement in dieting in response to stress, or voicing body dissatisfaction). The distribution of these narratives was 31 (14.8%) indicating disordered eating and 178 (85.2%) including no eating disorder tendencies.

Considering that the CERS is a new measure, which has not yet been validated empirically, this study provided the opportunity to explore elements of validity that this measure provides, by correlating it to the other measures for emotion processing included in this study. As such, a correlation matrix was generated, including the subscale and total scores of the following measures: the Complexity of Emotion Regulation Scale, Emotion Intensity Scale, Affective Control Scale, Difficulties with Emotion Regulation Scale, and Self-compassion Scale. The results are exhibited in Table 16. Summarizing the findings, the Complexity of Emotion Regulation Scale correlated positively with the total scores of the Difficulties with Emotion Regulation Scale and Self-compassion Scale. Additional significant correlations with subscale scores included the DERS – acceptance of emotions, DERS – Impulsivity, and DERS – access to adaptive strategies.

Table 16.

Narrative analysis: correlations of the Complexity of Emotion Regulation Scale with measures of emotion processing.

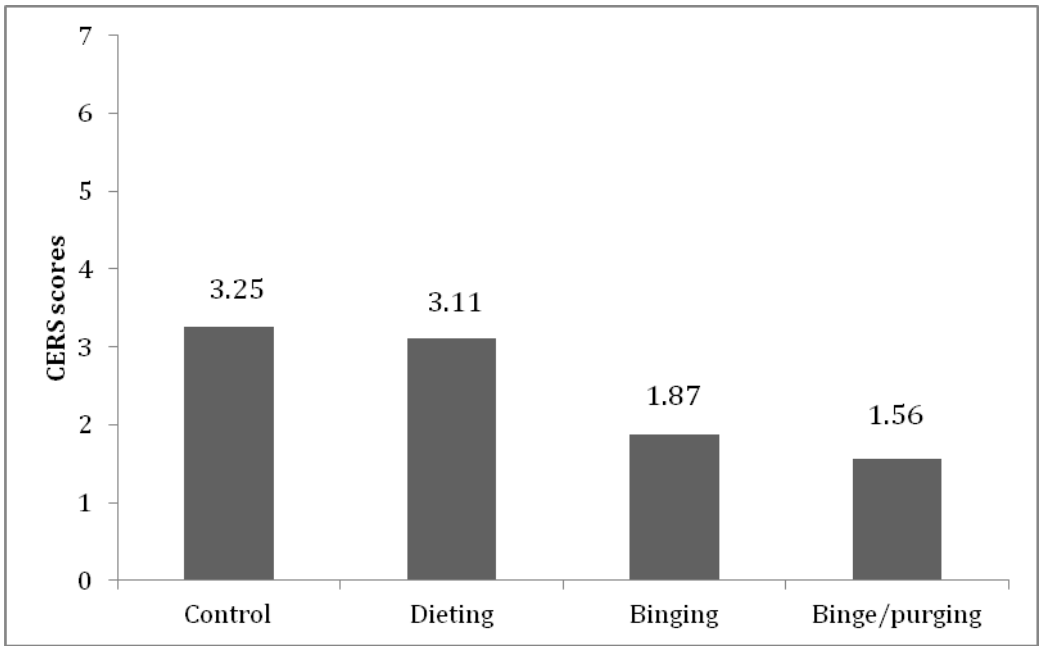
Measure	Complexity of Emotion Regulation Scale (CERS)
Emotion Intensity Scale (EIS) – total score	-0.053
Affective Control Scale (ACS) – total score	-0.152
Difficulties with Emotion Regulation Scale (DERS) – total score	-0.225**
DERS – Acceptance of emotions	-0.192*
DERS – Impulsivity	-0.203**
DERS – Access to strategies	-0.259**
Self-compassion Scale (SCS) – total score	0.256**

Note. The variables and measures are as follows: Emotion intensity measures (Emotion Intensity Scale, Affective Control Scale); emotion regulation (Difficulties with Emotion Regulation Scale); self-compassion (Self-Compassion Scale). *$p < 0.05$; **$p < .001$

Using the Complexity of Emotion Regulation Scale as a continuous scale. The CERS can be considered either as a scale or as a categorical measure. In considering the measure's scores as a continuous scale, -1 is the lowest score – corresponding to maladaptive behaviour, and 6 is the highest score – corresponding to the most complex and adaptive emotion regulation behaviours. For the purposes of quantitative analyses, the scoring of CERS was modified to range from 0 to 7 instead, in order to eliminate negative scores. In this format, the CERS was subjected to a univariate ANOVA to determine whether the four study groups different in their complexity of emotion regulation abilities (Figure 3).

Figure 3.

Narrative analysis: Univariate analysis results for the distribution of CERS scores across the four experimental groups.



Note: Non-significant differences were identified between control and dieting groups, as well as between binge and binge/purge groups. Significant differences were identified between control and binge groups, control and binge/purge groups, and dieting and binge/purge groups.

Analyses revealed that the four groups different on this dimension, $F(3, 159) = 7.731$, $p < 0.001$. Planned comparisons revealed that participants in the control group reported significantly higher CERS scores than did participants in the binge and binge/purge groups did. Participants in the dieting group scored significantly higher than did the binge/purge group. No significant difference was recorded between the control and dieting groups or binge and binge/purge groups.

Using the Complexity of Emotion Regulation Scale as a categorical measure. A chi squared analysis was attempted to clarify the relationship between the different levels of emotion regulation and eating disorder behaviours. As per Pascual-Leone, Orr, Gillespie, and Harrington (2015), an appropriate and economical clustering of the scale scores would be as follows: maladaptive coping (score of 0, e.g., use of drugs, or alcohol, physical or verbal aggression), limited action (scores of 1 and 2, e.g., no mention of emotional reaction or of action towards coping), general strategies to soothe (scores of 3 and 4, e.g., short term soothing such as distraction via TV, friends, working out, sleeping), or complex strategies to soothe (scores of 5, 6, 7, e.g., specific reflection, meaning making, and transformation of emotion). Specific examples of maladaptive coping would be: "When my boyfriend and I broke up, I felt lonely, inadequate and angry with myself. My eating disorder made me behave differently, and I blamed it for driving my boyfriend away. I was impulsive, emotional and quick to anger when I was struggling with my ED. I immediately started questioning my appearance when we split because I had gained a few pounds. I felt like the only thing that would make me feel better was if I could fit in my skinny jeans again and I became preoccupied with that goal. I started drinking a lot to escape and was very reckless. I constantly felt the need to seek out situations that would give me a rush/thrill. I was promiscuous. I was selfish and did not consider other

people's feelings because I had been hurt. The one thing that brought me joy and pleasure in life was no longer mine. Everything I had hoped and believed was destroyed because my eating disorder. My eating disorder never let me be happy or satisfied with my life. I constantly punished myself with binge purge episodes every time I felt upset/frustrated/anxious". A narrative illustrating limited coping includes: "When I broke up with my first love I was extremely depressed. I felt as though he had changed dramatically and I couldn't believe anything he once said to me. He was hostile, rude, and not the person I once fell in love with. I began questioning my own self-worth and wondering if I was good enough for anybody. If anybody could ever love me the way I love others. Sometimes I still feel this way. I feel as though I give so much to others and I really don't get anything back in return. I feel as though I put in the most effort into all my relationships, whether romantic or platonic". A general soothing illustration would include: "I had a fight with my sister. Sometimes I feel like she behaves superior to me and that she doesn't pay attention to how I feel and my thoughts, we are really close so when we got into a fight over a disagreement on types of food that are healthy I was really upset after over the names and things she said to me. I cried for a long time and my mom came to comfort me. I felt like I wasn't getting enough importance in her life like how my younger sister gets and I kept thinking about all the incidents that made me feel inferior. I went to sleep and the next day when I went to University I felt better as I wasn't home and away from my sister and family. I spent time with friends and focused on other things and when I came back home my sister apologized to me and everything went back to normal. I feel that when I'm upset it usually last 1-2 days and then going out and a change of atmosphere helps me bounce right back. When I'm on my period my emotions become heightened and I feel more emotional and more upset at certain situations then I would normally be". Lastly, complex self-soothing

would be illustrated by the following: “When I was informed that I failed a class, I felt extremely disappointed in myself. I felt as though I should have performed better and tried harder. I felt that if I should have studied more, then maybe I would have had better results on my tests. Although I was upset, I realized that I can't be good at everything and being upset over it wouldn't change what happened. I talked to my family about it and my mom reassured me that it was not the end of the world. I feel as though I coped very well with the negative event. I just reminded myself that we all make mistakes. I learned from my mistakes and that will only make me stronger in the future”.

The distribution of CERS responses in this scoring format is detailed in Table 17.

Table 17.

Distribution of CERS categories within the sample of participants

Type of CERS category	Number of participants	Percentage
Maladaptive coping	26	12.4%
Limited action	62	29.7%
General self-soothing	27	12.9%
Complex self-soothing	48	23%

A chi squared analysis was conducted to explore the relationship between CERS emotion regulation and eating disorder groups. There was a significant association between emotion regulation and eating disorder diagnosis, $\chi^2 = 21.069$, $p < 0.01$. Furthermore, the distribution of CERS across eating disorder groups indicates that use of maladaptive behaviours increases with severity of symptoms, where control participants rarely engage in unhelpful coping, followed by participants in the dieting group, binging group, and lastly binge/purging group. No significant differences were registered in terms of limited emotion regulation action across groups, indicating that approximately one third of all participant endorse that they would take limited action to feel better. In reviewing the general, distraction-based self-soothing strategies, participants in the control and binging group endorse these behaviours more frequently than participants in the dieting and binge/purging group. Lastly, participants in the control and dieting group indicated a higher reliance on meaning-making behaviours, while participants in the binging and binge/purging group appeared to engage rarely in such transformative coping (see table 18).

Table 18.

Narrative analysis: distribution of emotion regulation skills as measured by CERS across disordered eating groups

	Maladaptive	Limited action	General soothing	Complex soothing
Control	6.6%	34.2%	**21.1%**	**38.2%**
Restrict	11.1%	33.3%	11.1%	**44.4%**
Binge	**25.6%**	43.6%	**15.4%**	15.4%
Binge/Purge	**30.0%**	43.3%	10.0%	16.7%

Note: The table includes the percentage of participants in each disordered eating group that endorsed a specific type of emotion regulation as defined by the CERS

To control for systematic error or hidden confounding variables, chi squared analyses were conducted to explore the incidence of uncodable events as well as the incidence of disordered eating accounts within the sample population. The chi squared analysis of uncodable narratives was rendered non-significant, $\chi^2 = 7.25$, p=0.064 suggesting that the groups did not differ in their expression of uncodable events. In contrast, the analysis of narratives including an eating disorder account was significant, $\chi^2 = 17.279$, $p < 0.05$. At a closer examination, participants in the dieting group provided 18.2% of these accounts, while participants in the binging group provided 23.7%, and participants in the purging group, 26.3%, suggesting that the CERS was adequate in capturing coping by engagement in eating pathology behaviours for the pathological groups compared to controls.

CHAPTER FOUR

Discussion

The first part of the discussion will include summaries and interpretations of the major findings in this study with regards to differences in emotion regulation processing between healthy controls and disordered eating participants. The following subsection will offer interpretation of the differences in emotion regulation within the three groups of participants with "at risk" eating behaviours. Then, clinical implications will offer potential directions for treatment formulation. Concluding, limitations of this study are reviewed and directions for further research are offered.

Review of the Rationale for the Current Study

The relationship between eating disorders and emotion regulation has become a strong area of research in the past two decades. Both clinical and sub-clinical participants have

provided reports indicating that they struggle with understanding and tolerating negative emotions. These studies suggest that disordered eating behaviours serve as coping strategies for down-regulating distress (Stice et al., 1996; Brockmeyer et al., 2012; Lingswiler et al., 1987; Lehman & Rodin, 1988; Crosby et al., 2009). Furthermore, self-compassion was found to function as protective factor against negative emotions and to decrease the probability of disordered eating behaviours such as obligatory exercising or binging (Magnus et al., 2010; Kelly et al., 2014; Breines et al., 2014). These findings give rise to the current study's questions whether in the case of persons with disordered eating, emotions may be perceived as intolerably intense and/or that there is a marked paucity of appropriate range of adaptive and self-compassionate coping strategies. Clarifying the relationship between specific patterns of disordered eating and emotion processing holds some implications for the treatment of eating disorders.

The findings of the study generally supported hypotheses and fit with previous research, highlighting a significant relationship between emotion regulation deficits and disordered eating in general, as well as specific associations between each type of risky eating behaviour and features of emotion dysregulation. Considering the use of sub-clinical participants in the current design, these results could not be generalized to the clinical population. However, they provided a foundation for the replication of this research with clinical participants.

Discussion of the First Hypothesis: Deficits in Emotion Processing Mediate the Relationship between Emotion Intensity and Risky Eating Behaviours

The first hypothesis highlighted a significant association between disordered eating and emotional processing deficits. Specifically, participants who engaged in managed eating behaviours reported high levels of emotion intensity and significant struggles in regulating

emotions. They also indicated that they feared their emotions and possess limited levels of self-compassion. These findings indicated that participants at risk for disordered eating struggle to tolerate and down-regulate their emotional experience, and may engage in judgmental self-talk.

Of note, the initial correlational analyses using the Eating Disorder Diagnostic Scale (EDDS) composite score did not yield any significant results. This finding was surprising, considering that the measure had been validated for use with subclinical samples including university students (Stice et al., 2004) and our sample was obtained from a similar participant pool. A reasonable explanation for the non-significant results might be our sample did not meet the measure's threshold levels, in other words, our participants were not endorsing sufficient problematic behaviours. Krabbenborg, Danner, Larse, van der Veer, van Elburg, and colleagues (2011) suggested that a cutoff score of 16.5 to successfully discriminates clinical participants from controls and no cutoff was provided for subclinical levels of risky eating. In the current study, the EDDS composite score had a mode of 3.63. These data suggested that most of our sample exhibited sub-clinical eating behaviours and the EDDS composite score was not a sufficiently sensitive measure for them. However, replacing the EDDS composite score with the SCOFF total score yielded significant results. The SCOFF was likely a more suitable measure for our sub-clinical sample as the scale was initially designed to be used as a disordered eating screener in the general population (Morgan et al., 1999) such that medical professionals would detect patients "at risk" for pathology and refer them for more specialized testing. The subsequent analyses consolidated the justification of this assumption, as significant differences were found between healthy controls and participants who were in the "at risk" groups.

In the current study, higher levels of emotion regulation deficits predicted engagement in risky eating behaviours, providing further support to existing research. Emotion regulation deficit measurements were obtained from total scores of the following scales: Difficulties with Emotion Regulation Scale, Affective Control Scale, Emotion Intensity Scale and Self-compassion Scale. Participants with emotion regulation deficits endorsed general difficulties regulating emotions, fear towards their emotional experience in general, limited self-compassionate attitudes, and deemed the intensity of their emotional experience as high. Prior research has similarly shown that poor emotion regulation skills have been strongly associated with eating pathology in general (Wildes et al., 2010; Svaldi et al., 2012), as well as with each of the diagnostic entities (Anestis et al., 2007; Whiteside et al., 2007; Alpers & Tuschen-Caffier, 2001; Racine & Wildes, Svaldi et al., 2012; Brockmeyer et al., 2014).

The current study's finding that disordered eating is associated with low levels of self-compassionate soothing also echoes previous research, as Lehman and Rodin (1989) found that higher levels of disordered eating correlated with significantly lower levels of self-soothing, especially pleasurable behaviours that did not involve consumption of food. In the context of their impoverished coping, participants in our study may be using their disordered eating behaviours as a means to reduce their distress.

The current study found a positive association between perceived emotion intensity and disordered eating. Similarly, Crowther and colleagues (2001) and Freeman and Gil (2004) found that sub-clinical participants rated their daily stressors as more intense and frequent than the healthy counterparts, such that binging was reported to occur in response to particularly stressful days. Using participant ratings obtained on handheld devises for the ongoing assessment of emotional experience and eating behaviours over a 48-hour period, Crosby and colleagues

(2009) found that binging and purging occurred on days when their participants indicated increasing or steadily high negative emotions. Participants who engage in compulsive exercising also endorsed that this behaviour was significantly associated with the perception of intense emotion (Penal-Lledo et al., 2002). At the same time, experimental designs failed to identify changes in physiology that would substantiate the ratings of high arousal. The current study underscores the relationship between *perceived* emotional intensity and managed eating behaviours. While studies where participants' physiological markers were monitored did not register significant changes in heart rate, blood pressure, or cortisol levels (Cattanach et al., 1988), the current study finds support for the concept that regardless of their level of physiological arousal, participants with disordered eating seem to interpret their emotional experience as intense or unbearable.

The fact that emotion regulation deficits mediated the relationship between emotion intensity and disordered eating might clarify the lack of physiological arousal found by previous studies. In interpreting these results, a related theory about the emotion intensity and regulation determinants of depressive symptomatology must be taken into consideration (Berking & Whitley, 2005). This theory posited that depressive symptoms develop and are maintained by deficits in emotion regulation. It further described that due to the deficient development of coping skills, emotions are not regulated, but rather experienced as persistent and intolerable. This experience feeds back into further distress as the person feels his or her emotions are intense and out of control. While Berking and Whitley (2004) discussed the interplay of emotion regulation and the perception of emotional intensity as determinants for depression, our study generalizes their theoretical frame to risky eating behaviours, indicating that disordered eating may be one type of several manifestations of deeper, underlying emotion processing deficits.

Furthermore, this theory also supports the concept that the perception of high emotional intensity is a subjective phenomenon corresponding to the person's limited ability to engage adaptive and effective emotion regulation strategies, rather than to a physiologically and objectively measurable systemic reactivity to emotional arousal.

Discussion of the Second Hypothesis: Different Types of Managed Eating Behaviour Are Associated with Specific Emotion Processing Deficits

The second hypothesis predicted that each disordered eating type will be associated with specific emotion regulation deficits. The paucity of studies examining the relationship between subtypes of disordered eating and emotion processing difficulties did not provide enough grounding to formulate detailed predictions for each risky eating group. As such, analyses for this hypothesis were largely exploratory. The data was subjected to a (1) multivariate analysis of variance as well as (2) a discriminant analysis. An additional (3) cluster analysis was also employed, wherein participants were grouped based on their endorsement of emotion regulation skills and these groupings were compared to the disordered eating groups. The following discussion will be structured based on the findings for each of these analyses and the respective fit of these findings in the existing research.

Discussion of the multivariate analysis results. Analyses included the subscale scores of the Emotion Intensity Scale (EIS positive emotions and negative emotions), Affective Control Scale (ACS – Anger, Fear, Sadness, and Positive emotions), Difficulties with Emotion Regulation Scale (DERS – Awareness, Clarity, Non-acceptance, Impulsivity, Access to strategies, and Goal-orientation), and Self-Compassion Scale. Data subjected to the MANOVA indicated that disordered eating behaviour clusters were ordered on a continuum of emotion dysregulation, where healthy controls were at the low end of the continuum, followed by dieting

participants, then binging participants, and lastly, participants who both binged and purged. These findings suggest a relationship between the severity continuum of problematic eating and a continuum of emotion processing deficits. As such, the results of the second hypothesis converged with findings of the first hypothesis.

The multivariate analysis shed further light on the specific differences between managed eating behaviour groups: dieting, binging, and binge/purge. These groups were initially compared to healthy controls. A second analysis explored the configuration of emotion regulation deficits when comparing dieting to binging participants and binging to binge/purging participants.

Comparing risky eating groups to healthy controls. In the initial analysis of the managed eating groups to healthy controls, dieting participants endorsed trends of distress about emotions towards anger and anxiety as well as a diminished ability to engage in goal directed behaviours as measured in self-reports by the Affective Control Scale (Anger and Anxiety subscales) and the Difficulties with Emotion Regulation Scale (the Difficulties Orienting Towards a Goal subscale). These findings did not support the dieting hypothesis, as differences between dieters and healthy controls did not reach clinical significance, indicating that participants in the dieting group are only slightly more impaired than non-dieters. Elevations that may characterize restricted eaters were likely undetected because dieting participants were not engaging in severe restriction, but were rather engaging in moderate or occasional dieting. On the other hand, the trends detected by this analysis regarding fear of distressing emotions fits with previous literature findings that food restriction is associated with avoidance of anger and sadness, and that excessive exercising was used to cope with state-dependent anger (Fox, 2009; Waller et al., 2003).

In comparison to healthy controls, participants in the *binging* group endorsed difficulties controlling impulses, as measured by the Difficulties with Emotion Regulation Scale – impulsivity subscale. These data identified additional specific emotion regulation difficulties such as perceived intensity of negative emotions, fear of sadness and anxiety, difficulties engaging in goal directed behaviour, lack of emotional clarity, and limited self-compassion, measured by Emotion Intensity Scale, Affective Control Scale (fear and sadness subscales), Difficulties with Emotion Regulation Scale (goal, and clarity subscale) and Self-Compassion Scale. There is strong empirical support for the association between binging, intense negative emotion and lack of clarity about one's emotions (Whiteside et al., 2007; Fox & Harrison, 2008; Koo-Loeb et al., 2000) as well as binging and impulsivity (Lavender et al., 2014; Racine & Wildes, 2013). Similarly, our finding that binging participants endorsed limited strategies for self-compassion echoes the findings of Lehman and Rodin (1988) about the reliance on food-related coping over other types of coping in bulimic patients and the findings about the negative association between self-compassion and severity of binge episodes (Webb & Forman, 2013). The current study also identified that participants in the binging group endorsed more difficulties engaging in goal-directed behaviours compared to healthy controls, a deficit which has been significantly associated with binge/purge cycles in both Anorexia Nervosa and Bulimia Nervosa but not with binge cycles in Binge Eating Disorder (Brockmeyer et al., 2014). When examining the data about the binge/purging group, it was identified that the binge/purge group scored higher (albeit not significantly) on the goal orientation dimension. Considering that in our study, the three managed eating groups registered on a continuum of emotion regulation difficulties, it may be speculated that the difficulties orienting to a goal was one of the variables manifested in the continuum, such that dieters endorsed non-significant trends of this deficit, while binging and

binge/purging participants endorsed significant and increasing levels of difficulty orienting towards a goal.

Lastly, compared to healthy controls*, binging/purging* participants endorsed all types of emotion regulation difficulties that were measured by self-report: Emotion Intensity Scale, Affective Control Scale, Difficulties with Emotion Regulation Scale, and Self-compassion Scale. The results of our study suggest that, of all "at risk" groups, they were the most distressed by their emotions, which they perceived as very intense and uncontrollable. They also seemed to engage in very limited self-compassionate thinking and instead reported tendencies to act impulsively. This finding fits with other studies that identified binge/purging participants as having the most severe presentation, lowest quality of life, most relenting symptoms, and highest rate of relapse (Nunes-Navarro, Jimenez-Murcia, Alvarez-Moya, Villarejo, Diaz, et al., 2011; De Jong, Oldershaw, Sternheim, Samarawickrema, Kenyon, et al., 2013).

Comparing disordered eating groups to each other. Considering the finding that participants fell on a continuum of severity from dieting (at the low severity end) to binging to binging/purging (at the more severe end), multivariate analyses were also employed to examine the cumulative progression of emotion dysregulation across managed eating groups, specifically comparing dieting to binging and binging to binge/purging. Compared to dieters, *participants who binge* endorsed more pronounced regulatory deficits, namely fewer self-compassionate behaviours (measured by the Self Compasion Scale), less clarity of emotional experience (measured by the Difficulties with Emotion Regulation Scale – clarity subscale), and fear of sadness (Affective Control Scale – Sadness subscale). These findings agree with previous research, as Whiteside and colleagues (2007) connected the presence of binging episodes to a

lack of emotional clarity, while Lehman and Rodin (1988) similarly highlighted the paucity of non-food related self-soothing behaviours in participants with bulimia.

Summarizing this finding on emotional difficulties for participants who *binge/purge* as they compared to participants who binge, the data indicated that participants in the binge/purge group reported significantly stronger difficulties accepting their emotional experiences (as measured by Affective Control Scale positive emotions and sadness, Difficulties with Emotion Regulation Scale – acceptance subscale) as well as higher levels of impulsivity (measured by Difficulties with Emotion Regulation Scale – impulsivity) and low levels of access to emotion regulation strategies (assessed by Difficulties with Emotion Regulation Scale – strategies), as compared to their binging counterparts. In other words, binge/purging participants lacked appropriate skills in emotion regulatory and impulse control, and experienced their emotion as generally intolerable and frightening, regardless of the emotion valence. Partial support is offered for our second hypothesis in the association found between binge/purging behaviours and not accepting ones emotions, impulsivity, and lack of adaptive coping strategies. These findings are similar as with previous studies, wherein purging is conceptualized as an avoidant coping strategy, used as a quick escape from unbearable emotions, offering temporary relief from negative affect (Jeppson et al., 2003; Alpers & Tuschen-Caffier, 2001; Svaldi et al., 2012). Curiously, binging/purging participants indicated discomfort experiencing positive emotions. These results may indicate that this risky eating group struggles with understanding and regulating both positive and negative emotions, alike. So, they reported reacting with fear to unregulated emotion in general, which further heightened emotional arousal, leading to further distress. Not accepting one's emerging experience may link with the limited impulse control endorsed by binging/purging participants. It follows that, in the context of intolerable emotional

distress, these persons may be seeking to urgently eliminate emotions and engage in avoidant coping, including binging and purging. Of course, the correlational nature of the current study does not clarify the direction of this relationship, as an inverse relationship may be true, where impulsive action towards avoiding emotional experiences may prevent the participants from examining and accepting their emotion. Nonetheless, these findings are similar to previous studies which highlighted that purging is associated with the lack of premeditation as well as an urgency to "eliminate" emotional distress (Claes et al., 2005; Fischer, Settles, Collings, Gunn, & Smith, 2012).

Lastly, as noted above, the progression from healthy eating to dieting approached clinical significance, at a significance level of 0.06. While these results may not be interpretable to a great extent, it is worth noting that dieters endorsed a trend toward fear of emotions as well as difficulties orienting behaviours towards specific goals. The data does not allow speculation as to whether whether dieting may associated with some emotional deficits which the current sample did not capture, or whether dieting does not correlate with risky eating in a clinically meaningful way. Further studies employing severely restricting as well as dieting participants are warranted.

Discussion of the discriminant analysis results. This analysis was employed as a complement to the multivariate analyses exploring whether features of emotion regulation deficits could be employed to distinguish the four groups: healthy controls, dieting, binging, and binge/purging behaviours. The emotion regulation dimensions included in the analyses were the subscales for the Emotion Intensity Scale, Affective Control Scale, Difficulties with Emotion Regulation Scale and Self-compassion Scale. Results indicated only one significant function, grouping dieting and control participants in one category, ostensibly of lower eating symptom

severity vs. binging and binge/purging participants in another category of higher symptom severity. Binging and binge/purge participants endorsed high levels of impulsivity (assessed by the Difficulties with Emotion Regulation Scale – impulsivity subscale) and fear of sadness (measured by the Affective Control Scale – sadness subscale) as well as low levels of self-compassion (as assessed by the Self-compassion Scale). There were no further significant discriminant functions, therefore our data were unable to identify specific peaks in emotion regulation deficits associated with specific risky eating behaviours. The limited results yielded by this analysis could be a reflection of the subclinical nature of the sample, where differences between "at risk" groups and healthy controls were not large enough to be discerned through these analyses.

Nonetheless, the limited results of this analysis fall in line with the multivariate analysis already discussed: dieting participants were very similar to healthy controls in terms of their emotion regulation skills, and this sample did not capture severely restricting participants. Nonetheless, these study findings have limited validity for restricted eaters.

Dieting has been conceptualized as a precursor for further risky eating patterns and merits cautious interpretation of these analyses. Half of teenage girls engage in dieting in conjunction with compensatory behaviours such as use of laxatives and diuretics (Neumark-Sztainer, 2005) and up to one quarter of dieters progress to clinical levels of eating pathology (Shisslak et al., 1995). As such, it is reasonable to assume that, while some of the participants in the current study may eventually stop dieting altogether (Heatherton, Striepe, Mahamedi, Keel & Field, 1997), a large proportion of dieters in this sample is still at risk of developing further eating difficulties. The fact that the multivariate analysis indicated a non-significant trend of difficulties in emotion processing and regulation (i.e., particularly for anger and anxiety),

suggests that even small levels of disordered eating and engagement in compensatory exercising may eventually become problematic. Therefore, the exploration of the emotion regulation difficulties accompanying dieting behaviours could shed light into the precursors of severe disordered eating.

According to the discriminant function, binging and purging/binging participants shared similarities in terms of self-compassion, impulsivity, and fear of other emerging emotion. These results are in line with previous research that participants who engage in binging/purging are also similar with binging participants in terms of their lack of premeditation, impaired ability to make reappraisals, their novelty seeking, avoidance of emotional experiences, and emotional eating (Vervaet, et al., 2004; Ramacciotti et al., 2005; Claes et al., 2005; Brockmeyer et al., 2014). The combination of emotion processing variables suggested that individuals who binge or binge/purge have a limited tolerance to sadness, which they find frightening and unsettling. They also experience limited mindfulness of their emotions, and self kindness –elements that have been used to define self-compassion (Neff, 2003). In the absence of adaptive and self-supportive skills, it can be hypothesized that participants impulsively seek a means to escape when they get distressed, engaging in risky eating behaviours. Diminished attitudes of self-kindness may explain the use of purging as a punishment for the overeating (Garner et al., 1982) or as a fast, albeit unpleasant means to repair the increased food intake (Corstorphine et al., 2006).

Discussion of the cluster analysis results. The previous discriminate analyses provided a top-down perspective, wherein risky eating patterns were compared in terms of differences in their emotion regulation skills. An additional view was provided by way of cluster analysis, which explored this relationship in a bottom-up fashion. In the cluster analysis, participants were

first grouped based on emotional regulation characteristics, and these clusters were matched with the risky eating groups. This analysis sought to determine whether each managed eating grouping overlapped with multiple emotion processing clusters, or fit with a specific one.

Our analyses revealed that participants could be differentiated in four clusters based on their experience and regulation of emotions. The four clusters registered along a continuum of what seemed to be overall emotional distress (see Table 9), with cluster 1 (Well Regulated) at the adaptive end, followed by clusters 2 (Confused about Feelings), then 3 (Emotionally Reactive), and ending with cluster 4 (Dysregulated and Unsoothed) at the highly distressed end. In examining these clusters, there were significant differences between all four on the dimensions of emotion regulation measured by Emotion Intensity Scale, Affective Control Scale, Difficulties with Emotion Regulation Scale, and Self-Compassion Scale. Furthermore, planned contrasts yielded significant results, indicating an inverse relationship between the use of adaptive, self-compassionate coping on one hand, and emotional distress and/or use of maladaptive coping on the other hand. Specifically, cluster 1 (Well Regulated) appeared to be able to soothe well and experienced low levels of negative emotions and emotion dysregulation. Cluster 2 (Confused about Feelings) was characterized by elevations in emotional non-clarity as well as diminished self-compassion. Cluster 3 (Emotionally Reactive) indicated greater emotional distress than cluster 2, in particular fear emotions such as sadness, impulsivity as well as markedly diminished self-compassion. Lastly, the fourth cluster (Dysregulated and Unsoothed) indicated engagement in minimal self-compassion and endorsed high degrees of emotion dysregulation, and perceived emotion intensity regardless of valence.

Our expectation regarding the match between each managed eating groups and several emotion processing clusters was clarified: no single disordered eating group was associated

exclusively with one emotion regulation cluster. At the same time, it was observed that certain clusters had a higher percentage of match with specific risky behaviour groups. As noted in the results section, in interpreting the distribution of disordered eating participants within each cluster, interpretation was provided only for the cells where the observed incidence was higher than the expected incidence.

The *healthy controls* group was found mostly with cluster 1 (Well Regulated – 60.5%), denoting, as expected, that most healthy controls engage in adaptive emotion regulation and experience a significant amount of positive emotions and self-compassion. The *dieting* group was represented mostly in cluster 2 (Confused about Feelings – 14.9%), followed by cluster 4 (Unregulated and Unsoothed – 14.3%). These results suggested that dieting participants reported struggling with diminished emotional clarify and awareness, which has been found to be associated with individuals engaging in restrictive eating (Racine & Wildes, 2013; Gilboa-Schechtman et al., 2006). Of interest, dieting participants were found in the fourth cluster (Dysregulated and Unsoothed), which indicates that this proportion of dieters exhibit significant emotional distress. This finding provides further support to the study of dieting as a potential precursor of more severe disordered eating as well as a psychological entity worthy of clinical attention.

The *binging* group was found most preponderant in clusters 2 (Confused about Feelings – 38.3%) and 3 (Emotionally Reactive – 37.5). Consistently with MANOVA findings in our study, one third of binging participants described some adaptive coping, yet indicated they struggle to identify and understand emotions. At the same time, another third of participants also indicated that they lack appropriate self-compassionate skills and in fact, become markedly distressed by their affective experience, and react impulsively. This finding is convergent with

previous research that (over)eating is brought about by feelings of sadness (Leehr et al., 2015), and is associated with impulsivity (Claes et al., 2005).

Lastly, the *binge/purging* group was associated with clusters 3 (Emotionally Reactive – 29.2%) and 4 (Dysregulated and Unsoothed – 39.3%) which echoes previous findings in the literature that binge/purging individuals describe very high levels of emotional distress, are highly impulsive, and find limited satisfaction in engaging in self-soothing behaviours (Nunes-Navarro et al., 2011; DeJong et al., 2013; Claes et al. 2015). Altogether, the results of the cluster analysis provided confirmation for previous analyses in this study, while also highlighting the difficulty in pinpointing singular elements of emotion dysregulation for each risky eating pattern.

Discussion of the Narrative Analysis

Participants provided narratives of a stressful event, wherein they described the nature of the event, emotional reactions experienced, and coping strategies they employed in an attempt to diminish their distress. The narrative was coded using the Complexity of Emotion Regulation Scale (CERS), which can be used either as a continuous or as a categorical scale (Pascual-Leone, et al., 2015). Analyses were conducted on both forms of scoring and yielded significant results. Data resulting from the use of CERS as a continuous scale, provided additional support to findings related to the two research hypotheses already tested. Of interest, using the CERS as a categorical measure offered a new system for defining qualitatively different types of emotion regulation. Analyses of the relationship between these new types of emotion regulation and the types of risky eating pattern yielded compelling and novel data. The following will include a summary and interpretation of these two sets of analyses as well as a discussion about the elements of fit with previous research.

The Complexity of Emotion Regulation Scale (CERS) as a Continuous Measure.

The "complexity of emotion regulation" refers to a repertoire of emotion coping strategies, ranging from general "one size fits all" to specific "idiosyncratic" behaviours. This range progresses from maladaptive coping, to limited action, to distraction-based soothing, and finally to meaning-making strategies. The complexity of emotion regulation refers not only to the variety of these strategies, but also to the person's ability to "nest" them in combinations including fast-acting coping, such as distraction, and introspective strategies such as meaning-making (Pascual-Leone, et al., 2015).

The findings of analyses suggested that participants landed on a continuum of emotion regulation, with higher scores on the complexity of emotion regulation skills associated with less disordered eating, while lower scores – indicative of greater emotional impairment were associated with higher degree of disordered eating. These results generally fit with the findings of the first hypothesis, which identified the same direction of association between managed eating and emotion processing. Data also mirrored the results of the discriminant analysis, wherein dieting and control groups differed significantly from binging and binge/purging groups. Specifically, dieting and control groups endorsed well developed skills for down-regulating and managing emotions. In contrast, binging and binge/purging participants endorsed markedly lower levels of adaptive and complex emotion regulation skills. While these results serve to strengthen the findings of the current study, they also provide the first empirical validation of the newly developed CERS, by showing that the measure is sensitive enough to detect differences in emotion regulation skills within a sub-clinical population.

The Complexity of Emotion Regulation Scale (CERS) as a Categorical Measure.

The use of the Complexity of Emotion Regulation Scale as a categorical measure provided new

data regarding the type and depth of emotion regulation employed by our participants. These data were a welcomed addition to the pen-and-paper data, as they answered the questions: "What types of emotion regulation strategies do participants in each managed eating group report engaging in?" and "How complex is their emotion regulation, considering, for example, that distraction-based coping is a more superficial level than looking for positive meaning?" Our results indicate, as expected and supported by previous literature, that increased disordered eating was associated with increased engagement in maladaptive coping. Examples of maladaptive coping provided by our participants included not only eating-specific behaviours, but also impulsive shopping, self-harm, extreme avoidance behaviours, and violence - behaviours usually highly correlated with impulsivity and eating pathology (for a review of literature on impulsivity and eating disorders, see Waxman, 2009).

Surprisingly, approximately one third of all participants gave narrative accounts suggesting that they did not intentionally engage in any distress coping behaviours. This means that one third of all individuals, regardless of the presence or type of disordered eating they reported, apparently limit their actions to expressing distress, without actively seeking a solution to resolve the problem or decrease the negative affect. This finding suggests that such limited reaction to distress may be a generalized initial reaction to negative events and for approximately one third of the sample, accounts of that distress reaction do not seem to entail any additional behaviours that could be read as intended for appropriate emotion regulation.

Furthermore, when participants wrote open-ended responses to the question "what did you do to make yourself feel better?", their narratives offered a window into observations about what they experienced as being a deliberate effort, if not an effective effort, in diminishing their distress. Engagement in superficial, fast acting, distraction-based self-soothing was employed

more frequently by control and binging participants, compared to dieting and purge/binging participants. This is an interesting finding as it points to the fact that distraction-based emotion regulation (e.g., going out with friends) is sufficient to diminish distress for binging participants, as well as for healthy control. The narratives do not provide sufficient detail to discriminate between social contacts as a means to avoid the distress (i.e. change of scenery) or as a source of pleasure, however, it is a fair assumption to make that seeking out friends is likely associated with positive feelings and therefore, is a pleasurable distraction. This finding comes counter to the study by Lehman and Rodin (1989) who found that binging participants endorsed fewer non-food related strategies for coping with distress than dieting and control counterparts, and that ordinarily pleasurable activities do not procure them the same pleasure as they do to healthy or restricting participants. At a closer look, Lehman and Rodin appeared to use participants who binged *and* purged, therefore their findings may be rendered less clear and in fact, may relate closer to the present study findings that binge/purge participants did not engage in distracting behaviours to cope with stress.

In reviewing complex emotion regulation use, control and dieting participants were found to engage in meaning-making coping, such as seeking advice, downward comparisons ("Others have it worse than me"), looking on the bright side ("I failed this exam but I can try again next semester"), or drawing strength ("This taught me a lot about myself in relationships so I can deal with similar situations better"). This finding runs in line with earlier study findings that dieters were very similar to healthy controls in terms of their managed eating patterns as well as deployment of emotion regulation strategies. Specifically, while dieters endorsed trends of distress, they also used appropriate coping resources such as self-compassion and adaptive strategies at rates comparable to control participants. As such, based on narrative accounts rated

on the CERS, it appears that controls and dieters exhibited hope, self-kindness, and thoughtfulness as strategies to regulate emotion (more complex strategies), while more severe participants such as the ones in the binging and binge/purge groups did not make use of the same meaning-making strategies.

Of note, purging participants did not score high on any of the adaptive coping strategies measured by the CERS. This suggests that when faced with distress, they reported engaging either in limited action or in maladaptive coping such as binging, purging, or other harmful behaviours. Considering earlier findings in the present study that the purging group endorsed extremely low self-compassion, as well as high impulsivity and emotion intolerance, it becomes evident that individuals in the binging/purging group experience the most intense levels of distress.

Clinical Implications of This Study

Process variables describe symptom severity. The findings of the current study indicate that the disordered eating severity continuum can be predicted by a continuum of emotion regulation difficulties. This finding bears importance for understanding the role of emotion regulation in managed eating, and for formulating treatment configurations for clinicians. To date, research in the field of eating disorders has focused on identifying specific eating pathology *symptoms* to define each disorder group. For example, the current format of the diagnostic manuals (DSM IV – TR and the new DSM – V) contains detailed descriptions of specific symptoms such as dieting, exercising, binging, compensatory behaviours, etc. While these sets of guidelines are useful for helping clinicians recognize and label the pattern of pathological behaviours, they do not provide any information regarding the origins or the potential processes that lead to these symptoms. This fact seems to be echoed in the limited

effectiveness of treatments that are focused solely on the management of eating symptoms such as weight restoration for anorexia nervosa, wherein weight restored women still expressed problematic emotional experiences as frequently as their clinical counterparts (Brockmeyer et al., 2012).

In contrast, the findings of this study support the use of emotion regulation as a *process dimension* that discriminates between "at risk" participants and healthy eaters, as well as distinguishing among specific patterns of managed eating. Emotion regulation emerges as an underlying element common to all disordered eating groups. In this context, eating pathology may be one of the various psychopathology categories associated with the persistent struggle to understand, tolerate, and regulate emotions (Aldao et al, 2010). The fact that emotion regulation was found to act as a mediator between perceived emotion intensity and disordered eating provides further information regarding the interplay between these variables and their influence on managed eating, wherein the initial emotions resulting from a stressor are compounded by the lack of adaptive coping, leading to increasing distress, perception of emotions as intolerably intense, and subsequent engagement in maladaptive behaviours. The findings inform the need to assess and intervene with the development of more adaptive emotion regulation skills, emotion tolerance and self-compassion.

Emotion regulation deficits inform our understanding of managed eating. This study identified significant differences in emotion regulation within the disordered eating groups. It is noted that specific emotion regulation features did not define one managed eating group over others singularly and definitively, but statistically significant associations between disordered eating groups and clusters of emotion regulation deficits were identified. These results can be directly interpreted in terms of clinical implications. To that end, while non-

significant trends are not directly interpretable, they may offer additional context for entertaining specific clinical implications with respect to the managed eating groups. For example, it may be useful to tentatively consider that participants who were *dieting* participants also endorsed certain non-significant trends in their distress about their emotional reactivity, as well as a non-significant trend of diminished ability to engage in goal directed behaviour.

In explaining the relationship between emotion processing and disordered eating for the *binging and binge/purging* groups, two theories of affect regulation have already been previously formulated. These theories posit that engagement in binging is driven by the need to manage distress. In one of these theories, Heatherton and Baumeister (1991) propose that binging is essentially an "*escape*" from distress. The theory posits that persons who binge possess: (a) high self-standards, and belief that their reference group holds similar high expectations of them; (b) a strong desire to be perceived favourably by others; (c) a high levels of self-awareness and negative attributions secondary to their perceived failure to meet these high standards. These three traits combine, leading to the experience of severe self-criticism and subsequent negative emotions (Heatherton & Baumeister, 1991). Eating provides an escape from the distress by narrowing the individual's attention to a low level of cognitive involvement and low levels of meaning. Awareness limited to the sensations pertaining to the act of eating is a central characteristic of this distraction strategy. The painful self-awareness is not fully interrupted (i.e., as in clinically significant forms of dissociation), but rather it is avoided and staved off from awareness by focusing on the physical experience of eating (Heatherton & Baumeister, 1991).

A second affect-regulation theory was formulated by Polivy and Herman (1988, 1993, 2002), who noted that binging may provide a "comfort" from negative emotions (i.e., the "*comfort theory*"). Binging reduces distress by offering the individual a pleasurable experience.

While the escape theory underscores that the distraction from distress functions as a negative reinforcer, the comfort theory suggests that engaging in binging for the pleasure of the food's taste functions as a positive reinforcer. Resorting to food is conceptualized as a means to self-soothe, in the context of a limited range of non-food-related coping strategies.

These affect regulation theories are complementary and may be helpful in understanding the different functions of disordered eating for binging and binge/purge participants in the current study. In particular, *binging* participants indicated difficulties in identifying their emotions (in particular sadness) and tolerating them. They also indicated difficulties engaging in kind, compassionate thinking towards themselves at time of stress. Of note, the analysis of personal narratives indicated that binging participants may have struggled with meaning-making and complex emotion regulation, but they also reported engagement in some short-term distraction techniques, such as seeking social company – activity which is usually considered pleasurable. The context in which they offered these descriptions indicates that they use such behaviours to cope with distress. However, given their endorsement of limited emotional awareness and tolerance, they may not be able to explore and identify the emotion adequately in order to connect it to a specific adaptive behaviour (e.g., identifying that they are disappointed about a grade and problem solving how to study better next time). As such, these participants may likely engage only in time-limited, distraction-based coping, which includes eating as an ostensibly pleasurable activity. The significant relationship between the use of reported short-term distractions and identified binging behaviours indicates that eating in times of distress may indeed be associated with pleasure, as was posited in the comfort affect regulation theory (Polivy & Herman, 2002).

In contrast, the reported difficulties in emotional processing that related to participants with *binge/purging* behaviours drew similarities to the escape theory (Heatherton & Baumesiter, 1991). In the current study, these behaviours were associated with a scarcity of adaptive coping strategies, lack of emotional clarity, and distress about having intense emotional experiences in general (including positive affect), all coupled with reported impulsivity. In the event of a negative emotion, binge/purging participants indicated that they experience emotions that they are unable to identify, understand, or tolerate. These participants, understandably, also feel an urgency to act to control the distress, but they do not seem to have access to a wide variety of strategies for doing this. The correlational nature of the current study does not allow one to elaborate with any confidence on the direction of the relationship between urgency, scarcity of coping strategies, and lack of emotional clarity and tolerance. Nonetheless, the mediation analysis does suggest that a lack of adaptive coping is a constraint on participants' ability to tolerate emotion and together, these emotion processing difficulties are associated with risky eating behaviours.

A particular interpretation can be formulated about the relationship of limited self-compassion and binging/purging behaviours. Reflecting further on the effects binging has on affect, prior studies found that individuals may impulsively engage without premeditation in a binging episode, which further worsens their affect (Alpers & Tuschen Caffier, 2001). The current study has identified that binging participants endorse limited self-kindness, and one could speculate that this deficit may lead the person to consider engaging in compensatory behaviours, such as purging, despite their unpleasant and painful nature. Other studies have highlighted the use of purging by participants as a means of managing their feelings of shame and guilt following a binge by "repairing the mistake" of the increased food intake (Alpers & Tuschen

Caffier, 2001, Wildes et al., 2010). As such, impulsively using binge-purge cycles as a means to manage emotional distress in the context of diminished self-compassion seems to bear some similarities to the escape theory (Heatherton & Baumeister, 1991).

Self-compassion is a key for negotiating problematic eating behaviours. The current study revealed an inverse relationship between emotion regulation deficits and self-compassion. Participants in the control and dieting group – ostensibly the less impaired groups in terms of "at risk" eating behaviours – scored high on ratings of self-compassion and low on emotion dysregulation, whereas participants in binging and purging groups showed the opposite pattern in their scores (i.e., high emotion dysregulation and low self-compassion). Neff's (2003) definition of self-compassion includes (a) mindfulness of ones own thoughts and feelings, (b) acceptance of one's experiences as being part of the larger human experience, and (c) a caring, non-judgmental, and kind attitude towards one's shortcomings. Self-compassion counters isolating self-judgments by placing one's experience in the context of common human experience. Limited self-compassion in the context of eating disorders is associated with decreased kindness towards the self and increased self-criticism. In this context of hostility directed towards the self, the impulsivity and emotional intolerance found in the binging and binge/purging groups create the conditions for repeated engagement in painful and maladaptive coping, coupled with the experience of shame, and isolation from social networks. Previous research has identified that self-compassion protects the individual against internalizing unattainable societal ideals regarding weight and shape, guilt related to eating, binging, and obligatory exercising (Wasylkiw et al., 2012; Ferreira et al., 2013; Magnus et al., 2010; Webb et al., 2013).

Furthermore, the inclusion of self-compassion training in the treatment of eating disorders decreases shame, increases the sense of belonging and community with others, teaches

mindfulness and tolerance of emotions, and produces lasting decreases in eating pathology (Kelly, Carter, & Borairi, 2014). In regards to the emotion processing deficits associated with eating pathology, such systematic interventions geared towards the development of self-compassion had a strong positive effect decreasing shame, self-loathing, and difficulties generating positive affiliative emotions (Goss & Allan, 2014). Of particular interest is the last of these three difficulties, as the purging/binging group in our study endorsed the lowest levels of limited tendencies to engage in pleasurable distraction behaviours and expressed strong distress about the disruptiveness of even their positive emotions.

Implications for assessment and treatment of disordered eating behaviour patterns. It is acknowledged that the current study focused on individual differences in a subclinical population presenting with eating disorder tendencies. However, the significant and consistent findings regarding the relationship between types of risky eating behaviours and specific emotion processing deficits encourages the formulation of tentative assessment and treatment considerations for this population. Further exploration of emotion regulation skills associated with clinical presentations of eating pathology may consolidate these suggestions.

In terms of assessment considerations, Shisslak and colleagues (1995) pointed out that 25% of chronic dieters progress to full eating disorders, therefore it is likely useful for clinicians to develop markers that distinguish risky eating behaviours from occasional weight-loss behaviours. As such, an informative line of assessment would include questions about client's client's reliance on food-related and non-food related behaviours for mood regulation, and general ability to tolerate and manage distress.

In terms of treatment, tentative considerations may be offered for each disordered eating group. As noted above, most dieting participants may only engage in this behaviour occasionally,

yet a group of dieting participants indicated significant emotional dysregulation, As such, potential treatment modalities would include a component of skill development for emotion tolerance and acceptance, while also teaching them to identify ego-syntonic values and connect them with specific goals geared towards diminishing or coping with stressors and trouble-shooting their initial difficulty.

Binging participants may benefit from interventions geared towards the development of emotion awareness and acceptance skills with a focus on normalizing and exploring the functions of emotions. Focusing on bodily correlates of emotional experiences may be a starting point for developing an emotional awareness (Gendlin, 1996), which would then be followed up with a more structured focus on developing self compassionate skills (Neff, 2003). Considering their use of short-term distraction self soothing, such clients may benefit from increasing their range of such coping skills while also focusing on complex emotion regulation, such as processing their distressing experiences as a potential of growth and meaning.

Lastly, binge-purge participants indicated the highest levels of emotion dysregulation, including impulsivity and a preponderant reliance on maladaptive or limited action coping skills. The avoidant, escapist function of maladaptive behaviours is similar to other pathological presentations such as substance abuse and self harm, which seem to respond well to distress tolerance and emotion regulation interventions specific to Dialectical Behaviour Therapy. In applying these techniques to disordered eating, a focus would include increased awareness and acceptance of emotional experiences, and techniques for curtailing impulsive and self-harming behaviours (Linehan, 2014). Studies that have explored the effectiveness of DBT treatment for binging/purging symptoms found significant improvements in symptomatology, coupled with

low drop out rates, and enduring changes at 6-month follow-ups (Safer, Telch, & Agras, 2001; Fischer & Peterson, 2015).

Limitations of the Present Study

There are several limitations to the present research. One of the clearest limitations is the sample characteristics: the exclusion of males from the participant sample, and the use of sub-clinical participants. The exclusionary use of females for this study was prompted by two reasons. First, previous research has identified significant differences in symptomatology between males and females in terms of food intake patterns, binge characteristics, body dissatisfaction characteristics, and use of compulsive exercising (McDonald & Thompson, 1992; Rolls, Fedoroff, & Guthrie, 1991). This suggested that including a mixed gender sample may pose difficulties in capturing gender-specific characteristics. In conjunction with this factor, it was unlikely that this study would obtain a sufficiently large number of males for statistical power requirements, considering the female majority in the psychology participant pool.

A second limitation of the sample characteristic is the use of sub-clinical participants self-selected from a university population. Although the study design was meant to include only sub-clinical participants, a small proportion of individuals reported in the demographic questionnaire that they had a formal diagnosis of an eating disorder. Their number was insufficient to meet statistical power requirements, therefore this study did could not benefit from exploring the characteristics of a more clinically symptomatic group. As such, the generalizability of these study findings to the clinical population is unknown and cannot be assumed.

The use of pen-and-paper measures as well as open-ended narratives present had certain advantages, but also posed limitation to this study. As it was noted in the literature review,

experimental studies have been unable to consistently draw an association between eating pathology and emotion dysregulation. Levine and Marcus (1997) suggested that participants modify their usual behaviours in the context of a laboratory experiment and suggested a more ecologically valid setup. The design of the study allowed participants to complete these measures in the comfort of their own home, with the intent of minimizing behavioural inhibition that may be associated with laboratory conditions (Levine & Marcus, 1997). Participants were allowed to take breaks as needed and no time limits were imposed. It is arguable that this design may have avoided the 'fake good' bias, considering that participants were able to remain anonymous to the researcher and peers. At the same time, the reliance on self-report measures remains susceptible to subjective interpretations of emotional experience, while the reliability of the narratives may be diminished by retrospective bias in their recall.

The literature review shows that most studies to date have focused on comparing diagnostic categories, without addressing the overlap of symptoms between diagnostic entities (e.g., binging/purging cycles present both in anorexia and bulimia; binging-only behaviours shared between bulimia and binge eating disorder). The current study attempted to capture specific risky eating groups while eschewing the diagnostic categories. As such, the scoring of the Eating Disorder Diagnostic Scale was redesigned to identify patterns of dieting/exercising, binging, and binging/purging. Particular efforts were taken to deviate as little as possible from the original scoring. As such, the scoring syntax was built using the example provided by Stice and colleagues (2004) and used similar minimum cutoff scores for identifying subclinical clusters of behaviours, such as binging, purging, or dieting. Despite these efforts, these modifications have affected the validity and reliability properties of the measure. Further

validation of the new syntax would be required in order to consolidate the findings of this study as well as the potential use of the new behavioural clusters for research purposes.

Lastly, the current sample did not capture a sufficient number of participants who severely restricted food intake while exercising compulsively. Considering the very low proportion of such persons even within the anorexia nervosa clinical and sub-clinical population, it was unlikely that our sample would capture enough such participants for a meaningful analysis. At the same time, dieting appears to be quantitatively, not qualitatively different from more pathological behaviours involving food (Lowe, et al., 1996; Franko & Omori, 1999; Tylka & Subich, 1999; Dancyger & Garfinkel, 1995; Stice, et al., 1998). Furthermore, the fact that a large proportion of dieters progress to full blown clinical configurations of eating pathology (Shisslak et al., 1997) warrants the inclusion of a dieting group in our study. As such, the dieting and restricting participants were clustered in the same group, characterized by risky behaviours, such as skipping meals and exercising for weight control, but who potentially maintained a relatively healthy weight and eating patterns. This modification does not allow one to assume the findings of the dieting group will generalize to severely restricting individuals who did not participate. A study exploring these emotion regulation deficits in a sample of severely restricting participants would complete the clinical picture intended by the current study.

Directions for Further Research

Considering the fact that males were not included in the current study, further research would be required to identify the relationship between the study variables in a male-only population. Previous studies have underscored gender differences in eating pathology manifestations (McDonald & Thompson, 1992) as well as the use of emotion regulation skills (McRae, Ochsner, Mauss, Gabrielli & Gross, 2008; Gardener, Carr, MacGregor, & Felmingham,

2013). The need for a male-only study is particularly salient considering the limited effectiveness of current eating disorder treatments which are not specifically formulated for males. Studies have found that men are less likely to seek treatment and recover for a variety of reasons, one of which may be the gender-specificity of treatment modalities for eating disorders (Weltzin, Wiensel, Franczyk, Burnett, Klitz, & Bean, 2005). As such, further exploration of the relationship between eating behaviours and emotion regulation in males would benefit for further development of eating disorders treatments, particularly given the known gender-differences in emotion regulation styles.

An additional direction for future research should address the current design, which employed a subclinical sample. The current findings underscore a relationship between disordered eating tendencies and emotion processing in a sub-clinical sample. As noted above, there are numerous studies supporting the notion that sub-clinical presentations of disordered eating are less severe configurations of clinical syndromes (Lowe, et al., 1996; Stice, et al., 1998). Nonetheless, in order to clarify and generalize the association of emotion regulation deficits with clinical eating pathology, a future study would explore differences in emotion processing among persons who diet, severely restrict, binge, and binge/purge. The inclusion of a dieting group in addition to healthy controls would allow for an evaluation of the symptom continuum identified in this study.

Lastly, the current study offered support to a relationship between disordered eating and emotion processing deficits based on correlational measures. Therefore, our findings cannot provide causal evidence for the relationship between negative event, emotional reaction, and risky eating behaviours. This study, as well as other previous research in the field has employed measurements, which explore trait rather than state-dependent tendencies, thereby losing

information about state-determined changes in experience. A study design targeting this issue would include non-intrusive and quick assessments of emotion intensity and valence conducted prior to, during, and post mood induction. Additionally, trait-dependent measures as well as an in-depth interview would be employed at the end of the testing session. The interview would allow the researcher to explore the experience of eating and distinguish between its use as avoidance or soothing strategies, corresponding to the escape or comfort model, respectively. This design is not free of methodological vulnerabilities, but it would capitalize on the wealth of information extracted in interviews and would potentially further our understanding of the validity of the affect regulation models that are believed to underpin eating pathology.

Conclusions

The current study employed a correlational design to explore the relationship between perceived emotion intensity, self-compassion, emotion regulation, and disordered eating behaviours. Findings showed that deficits in tolerating, and regulating emotions predicted risky eating behaviours in general, and that different clusters of disordered eating landed on a continuum corresponding to emotion processing difficulties. Our findings also seem to draw similarities with two affect regulation models, as binging participants endorsed various behaviours of pleasurable self-soothing, wherein binging may be one example. On the other hand, binging/purging participants indicated emotional intolerance, impulsivity, and inability to engage in pleasant activities, suggesting that binge/purge cycles may be one of the maladaptive behaviours employed as an escape from emotions perceived as intolerable and unending. Aside from retrospective narrative accounts, the ordered sequence of the onset of stressors to engagement in managed eating patterns was not captured by the current design. As such, further research is needed to provide more of this detail to build causal models that explain pathology.

Nonetheless, the associations between disordered eating and emotion processing bears clinical importance for understanding the mechanisms underlying risky eating behaviours.

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Appendix A

The SCOFF screener

1. Do you make yourself sick because you feel uncomfortably full?	YES	NO
2. Do you worry you have lost control over how much you eat?	YES	NO
3. Have you recently lost more than 15 lbs in a 3-month period?	YES	NO
4. Do you believe yourself to be fat when others say you are too thin?	YES	NO
5. Would you say that food dominates your life?	YES	NO

Adapted from Morgan, Reid, & Lacey (1999).

Appendix B

Eating Disorder Diagnostic Scale

Please carefully complete all questions

Over the past 3 months	Not at all		Slightly		Modera tely		Extrem ely
1. Have you felt fat?	0	1	2	3	4	5	6
2. Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
3. Has your weight influenced how you think about (judge) yourself as a person	0	1	2	3	4	5	6
4. Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6

5. During the past 6 months have there been times when you felt you have eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances?

YES NO

6. During the times when you ate an unusually large amount of food, did you experience a loss of control (feel you couldn't' stop eating or control what or how much you were eating)?

YES NO

7. How many DAYS per week on average over the past 6 MONTHS have you eaten an unusually large amount of food and experienced a loss of control?

0 1 2 3 4 5 6 7

8. How may TIMES per week on average over the past 3 MONTHS have you eaten an unusually large amount of food and experienced a loss of control?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

During these episodes of overeating and loss of control did you…

9. Eat much more rapidly than normal?

YES NO

10. Eat until you felt uncomfortably full?

YES NO

11. Eat large amounts of food when you didn't feel physically hungry?

YES NO

12. Eat alone because you were embarrassed by how much you were eating?
    YES NO
13. Feel disgusted with yourself, depressed, or very guilty after overeating?
    YES NO
14. Feel very upset about your uncontrollable overeating or resulting weight gain?
    YES NO
15. How many times per week on average over the past 3 months have you made yourself vomit to prevent weight gain or counteract the effects of eating?
    0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
16. How may times per week on average over the past 3 months have you used laxatives of diuretics to prevent weight gain or counteract the effects of eating?
    0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
17. How many times per week on average over the past 3 months have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating?
    0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
18. How many tims per week on average over the past 3 months have you engaged in excessive exercise specifically to counteract the effects of an overeating episode?
    0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
19. How much do you weight? If uncertain, please give your best estimate. _____lb
20. How tall are you?____ft _____in.
21. Over the past 3 months, how many menstrual periods have you missed?
    1 2 3 4 N/A
22. Have you been taking birth control pills during the past 3 months?
    YES NO

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Appendix C

Emotional Intensity Scale

Imagine yourself in the following situations and then choose the answer that best described how you usually feel.

1. Someone compliments me. I feel:
    1. It has little effect on me.
    2. Mildly pleased.
    3. Pleased.
    4. Very pleased.
    5. Ecstatic – on top of the world.

2. I think about awful things that might happen. I feel:
    1. It has little effect on me.
    2. A little worried.
    3. Worried.
    4. Very worried.
    5. So extremely worried that I can almost think of nothing else.

3. I am happy. I feel:
    1. It has little effect on me.
    2. Mildly happy.
    3. Happy.
    4. Extremely happy.
    5. Euphoric – so happy I could burst.

4. I see a child suffer. I feel:
    1. It has little effect on me.
    2. A little upset.
    3. Upset.
    4. Very upset.
    5. So extremely upset I feel sick to my stomach.

5. Someone I am very attracted to asks me out for coffee. I feel:
    1. Ecstatic – on top of the world.
    2. Very thrilled.
    3. Thrilled.
    4. Mildly thrilled.
    5. It has little effect on me.

6. Something frustrates me. I feel:
    1. It has little effect on me.
    2. A little frustrated.
    3. Frustrated.
    4. Very frustrated.

5. So extremely tense and frustrated that my muscles knot up.

7. I achieve a personal best in my favourite sport. I feel:
    1. It has little effect on me.
    2. Mildly pleased.
    3. Happy.
    4. Extremely happy.
    5. Ecstatic – on top of the world.

8. I say or do something that I should not have done. I feel:
    1. It has little effect on me.
    2. A twinge of guilt.
    3. Guilty.
    4. Very guilty.
    5. Extremely guilty.

9. I am at the part with a favourite child. I feel:
    1. It has little effect on me.
    2. Slightly playful.
    3. Playful.
    4. Very playful.
    5. So playful I feel like running around the part.

10. Someone criticizes me. I feel:
    1. It has little effect on me.
    2. I am a bit taken aback.
    3. Upset.
    4. Very upset.
    5. So extremely upset I could cry.

11. I receive positive feedback from a favourite professor. I feel:
    1. Thrilled – so happy I could burst.
    2. Very happy.
    3. Happy.
    4. Mildly pleased.
    5. It has little effect on me.

12. People do things to annoy me. I feel:
    1. It has little effect on me.
    2. A little bothered.
    3. Annoyed.
    4. Very annoyed.
    5. So extremely annoyed I feel like hitting them.

13. I hear a speech by a leader whose ideas I respect. I feel:

1. It has little effect on me.
2. Slightly impressed.
3. Impressed.
4. Very impressed.
5. Inspired – so impressed I have a new sense of purpose.

14. I have an embarrassing experience. I feel:
    1. It has little effect on me.
    2. A little ill at ease.
    3. Embarrassed.
    4. Very embarrassed.
    5. So embarrassed I want to die.

15. Someone I know is rude to me. I feel:
    1. So incredibly hurt I could cry.
    2. Very hurt.
    3. Hurt.
    4. A little hurt.
    5. It has little effect on me.

16. I am at a fun party. I feel:
    1. It has little effect on me.
    2. A little lighthearted.
    3. Lively.
    4. Very lively.
    5. So lively that I almost feel like a new person.

17. Something wonderful happens to me. I feel:
    1. Extremely joyful – exuberant.
    2. Extremely glad.
    3. Glad.
    4. A little glad.
    5. It has little effect on me.

18. I see a sad movie. I feel:
    1. So extremely sad that I feel like weeping.
    2. Very sad.
    3. Sad.
    4. A little sad.
    5. It has little effect on me.

19. I have accomplished something valuable. I feel:
    1. It has little effect on me.
    2. A little satisfied.
    3. Satisfied.

4. Very satisfied.
5. So satisfied it's as if my entire life was worthwhile.

20. Something angers me. I feel:
    1. It has little effect on me.
    2. A little angry.
    3. Angry
    4. Very angry.
    5. So angry I could explode.

21. A person with whom I am involved prepares me a candlelight dinner. I feel:
    1. It has little effect on me.
    2. Slightly romantic.
    3. Romantic.
    4. Very romantic.
    5. So passionate nothing else matters.

22. I have hurt someone's feelings. I feel:
    1. It has little effect on me.
    2. A little sorry.
    3. Sorry.
    4. Very sorry.
    5. So extremely sorry that I will do anything to make it up to them.

23. I am late for work or school and I find myself in a traffic jam. I feel:
    1. In a rage.
    2. Very angry.
    3. Angry.
    4. Slightly angry.
    5. It has little effect on me.

24. I am involved in a situation in which I must do well, such as an important exam or job interview. I feel:
    1. It has little effect on me.
    2. Slightly anxious.
    3. Anxious.
    4. Very anxious.
    5. So extremely anxious I can think of nothing else.

25. My boss gives me an unexpected pat on the back and says: "nice work". I feel:
    1. Exuberant – my day is perfect.
    2. Very gratified.
    3. Gratified.
    4. Slightly gratified.
    5. It has little effect on me.

26. I am involved in a romantic relationship. I feel:
    1. So consumed with passion I can think of nothing else.
    2. Very passionate.
    3. Passionate.
    4. Mildly passionate.
    5. It has little effect on me.

27. I attend the funeral of a casual acquaintance. I feel:
    1. It has little effect on me.
    2. Mildly sad.
    3. Sad.
    4. Very sad.
    5. So extremely sad I cannot control my tears.

28. I am in an argument. I feel:
    1. It has little effect on me.
    2. Mildly angry.
    3. Angry.
    4. Very angry.
    5. So incredibly angry I find it difficult to remain composed.

29. Payments on my bills are overdue. I feel:
    1. In such a panic I can think of nothing else.
    2. Very worried.
    3. Worried.
    4. Mildly worried.
    5. It has little effect on me.

30. Someone surprises me with a gift. I feel:
    1. It has little effect on me.
    2. A little grateful.
    3. Grateful.
    4. Very grateful.
    5. So grateful I want to run out and buy them a gift in return.

Appendix D

Affective Control Scale

Please rate the extent of your agreement with each of the statements below by circling the appropriate number below each statement.

1	2	3	4	5	6	7
Very strongly disagree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Very strongly agree

1. I am concerned that I will say things I'll regret when I get angry.
   1 2 3 4 5 6 7
2. I can get too carried away when I am really happy.
   1 2 3 4 5 6 7
3. Depression could really take me over, so it is important to fight off sad feelings.
   1 2 3 4 5 6 7
4. If I get depressed, I am quite sure I'll bounce right back.
   1 2 3 4 5 6 7
5. I get so rattled when I am nervous that I cannot think clearly.
   1 2 3 4 5 6 7
6. Being filled with joy sounds great, but I am concerned that I could lose control over my actions if I get too excited.
   1 2 3 4 5 6 7
7. It scares me when I feel "shaky" (trembling).
   1 2 3 4 5 6 7
8. I am afraid that I will hurt someone if I get really furious.
   1 2 3 4 5 6 7
9. I feel comfortable that I can control my level of anxiety.
   1 2 3 4 5 6 7
10. Having an orgasm is scary for me because I am afraid of losing control.
    1 2 3 4 5 6 7
11. If people were to find out how angry I sometimes feel, the consequences might be pretty bad.
    1 2 3 4 5 6 7
12. When I feel good, I let myself go and enjoy it to the fullest.
    1 2 3 4 5 6 7
13. I am afraid that I could go into a depression that would wipe me out.
    1 2 3 4 5 6 7
14. When I feel really happy, I go overboard, so I don't like getting overly ecstatic.
    1 2 3 4 5 6 7
15. When I get nervous, I think that I am going to go crazy.
    1 2 3 4 5 6 7
16. I feel very comfortable in expressing angry feelings.
    1 2 3 4 5 6 7

17. I am able to prevent myself from becoming overly anxious.
    1 2 3 4 5 6 7
18. No matter how happy I become, I keep my feet firmly on the ground.
    1 2 3 4 5 6 7
19. I am afraid that I might try to hurt myself if I get too depressed.
    1 2 3 4 5 6 7
20. It scares me when I am nervous.
    1 2 3 4 5 6 7
21. Being nervous isn't pleasant, but I can handle it.
    1 2 3 4 5 6 7
22. I love feeling excited – it is a great feeling.
    1 2 3 4 5 6 7
23. I worry about losing self control when I am on cloud nine.
    1 2 3 4 5 6 7
24. There is nothing I can do to stop anxiety once it has started.
    1 2 3 4 5 6 7
25. When I start feeling "down", I think I might let the sadness go too far.
    1 2 3 4 5 6 7
26. Once I get nervous, I think that my anxiety might get out of hand.
    1 2 3 4 5 6 7
27. Being depressed is not so bad because I know it will soon pass.
    1 2 3 4 5 6 7
28. I would be embarrassed to death if I lost my temper in from of other people.
    1 2 3 4 5 6 7
29. When I get "the blues", I worry that they will pull me down too far.
    1 2 3 4 5 6 7
30. When I get angry, I don't particularly worry about losing my temper.
    1 2 3 4 5 6 7
31. When I am happy or not, my self-control stays about the same.
    1 2 3 4 5 6 7
32. When I get really excited about something, I worry that my enthusiasm will get out of hand.
    1 2 3 4 5 6 7
33. When I get nervous, I feel as if I'm going to scream.
    1 2 3 4 5 6 7
34. I get nervous about being angry because I am afraid I will go too far, and I'll regret it later.
    1 2 3 4 5 6 7
35. I am afraid that I will babble or talk funny when I am nervous.
    1 2 3 4 5 6 7
36. Getting really ecstatic about something is a problem for me because sometimes being too happy clouds my judgment.
    1 2 3 4 5 6 7
37. Depression is scary for me – I am afraid that I could get depressed and never recover.
    1 2 3 4 5 6 7
38. I don't really mind feeling nervous; I know it's just a passing thing.
    1 2 3 4 5 6 7

39. I am afraid that letting myself feel really angry about something could lead me into an unending rage.
    1 2 3 4 5 6 7
40. When I get nervous, I am afraid that I will act foolish.
    1 2 3 4 5 6 7
41. I am afraid that I'll do something dumb if I get carried away with happiness.
    1 2 3 4 5 6 7
42. I think my judgment suffers when I get *really* happy.
    1 2 3 4 5 6 7

Appendix E

Difficulties in Emotion Regulation Scale (DERS)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item**.**

1	2	3	4	5
almost never (0-10%)	sometimes (11-35%)	about half the time (36-65%)	most of the time (66-90%)	almost always (91-100%)

_____ 1) I am clear about my feelings.

_____ 2) I pay attention to how I feel.

_____ 3) I experience my emotions as overwhelming and out of control.

_____ 4) I have no idea how I am feeling.

_____ 5) I have difficulty making sense out of my feelings.

_____ 6) I am attentive to my feelings.

_____ 7) I know exactly how I am feeling.

_____ 8) I care about what I am feeling.

_____ 9) I am confused about how I feel.

_____ 10) When I'm upset, I acknowledge my emotions.

_____ 11) When I'm upset, I become angry with myself for feeling that way.

_____ 12) When I'm upset, I become embarrassed for feeling that way.

_____ 13) When I'm upset, I have difficulty getting work done.

_____ 14) When I'm upset, I become out of control.

_____ 15) When I'm upset, I believe that I will remain that way for a long time.

_____ 16) When I'm upset, I believe that I will end up feeling very depressed.

_____ 17) When I'm upset, I believe that my feelings are valid and important.

_____ 18) When I'm upset, I have difficulty focusing on other things.

_____ 19) When I'm upset, I feel out of control.

_____ 20) When I'm upset, I can still get things done.

_____ 21) When I'm upset, I feel ashamed at myself for feeling that way.

_____ 22) When I'm upset, I know that I can find a way to eventually feel better.

_____ 23) When I'm upset, I feel like I am weak.

_____ 24) When I'm upset, I feel like I can remain in control of my behaviors.

_____ 25) When I'm upset, I feel guilty for feeling that way.

_____ 26) When I'm upset, I have difficulty concentrating.

_____ 27) When I'm upset, I have difficulty controlling my behaviors.

_____ 28) When I'm upset, I believe there is nothing I can do to make myself feel better.

_____ 29) When I'm upset, I become irritated at myself for feeling that way.

_____ 30) When I'm upset, I start to feel very bad about myself.

_____ 31) When I'm upset, I believe that wallowing in it is all I can do.

_____ 32) When I'm upset, I lose control over my behavior.

_____ 33) When I'm upset, I have difficulty thinking about anything else.

_____ 34) When I'm upset I take time to figure out what I'm really feeling.

_____ 35) When I'm upset, it takes me a long time to feel better.

_____ 36) When I'm upset, my emotions feel overwhelming.

Appendix F

SELF-COMPASSION SCALE – Short Form

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never				**Almost always**
1	**2**	**3**	**4**	**5**

_____1. When I fail at something important to me I become consumed by feelings of inadequacy.
_____2. I try to be understanding and patient towards those aspects of my personality I don't like.
_____3. When something painful happens I try to take a balanced view of the situation.
_____4. When I'm feeling down, I tend to feel like most other people are probably happier than I am.
_____5. I try to see my failings as part of the human condition.
_____6. When I'm going through a very hard time, I give myself the caring and tenderness I need.
_____7. When something upsets me I try to keep my emotions in balance.
_____8. When I fail at something that's important to me, I tend to feel alone in my failure
_____9. When I'm feeling down I tend to obsess and fixate on everything that's wrong.
_____10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
_____11. I'm disapproving and judgmental about my own flaws and inadequacies.
_____12. I'm intolerant and impatient towards those aspects of my personality I don't like.

Appendix G

The Rosenberg Self-Esteem Scale

Instructions: Below is a list of statements dealing with your general feelings about yourself. If you strongly agree, mark SA. If you agree with the statement, mark A. If you disagree, mark D. If you strongly disagree, mark SD.

1. On the whole, I am satisfied with myself.		SA	A	D	SD
2. At times, I think I am no good at all.	SA	A	D	SD	
3. I feel that I have a number of good qualities.	SA	A	D	SD	
4. I am able to do things as well as most other people	SA	A	D	SD	
5. I feel I do not have much to be proud of.	SA	A	D	SD	
6. I certainly feel pretty useless at times.	SA	A	D	SD	
7. I feel that I'm a person of worth, at least on an equal plane with others.	SA	A	D	SD	
8. I wish I could have more respect for myself	SA	A	D	SD	
9. All in all, I am inclined to feel that I am a failure.	SA	A	D	SD	
10. I take a positive attitude toward myself.	SA	A	D	SD	

Appendix H

Beck Depression Inventory - II

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite)

1. Sadness
   0 I do not feel sad.
   1 I feel sad much of the time
   2 I am sad all the time.
   3 I am so sad and unhappy that I can't stand it.

2. Pessimism
   0 I am not discouraged about my future.
   1 I feel more discouraged about my future than I used to be.
   2 I do not expect things to work out for me.
   3 I feel the future is hopeless and will only get worse.

3. Past Failure
   0 I do not feel like a failure.
   1 I have failed more than I should have.
   2 As I look back, I see a lot of failures.
   3 I feel I am a total failure as a person.

4. Loss of Pleasure
   0 I get as much pleasure as I ever did from the things I enjoy.
   1 I don't enjoy things the way I used to.
   2 I get very little pleasure from the things I used to enjoy.
   3 I can’t get any pleasure from the things I used to enjoy.

5. Guilty Feelings
   0 I don't feel particularly guilty
   1 I feel guilty over many things I have done or should have done.
   2 I feel quite guilty most of the time.
   3 I feel guilty all of the time.

6. Punishment Feelings
   0 I don't feel I am being punished.
   1 I feel I may be punished.
   2 I expect to be punished.
   3 I feel I am being punished.

7. Self-Dislike
   0 I feel the same about myself as ever.
   1 I have lost confidence in myself.
   2 I am disappointed in myself.
   3 I dislike myself.

8. Self-Criticalness
   0 I don't criticize or blame myself more than usual.
   1 I am more critical of myself than I used to be.
   2 I criticize myself for all of my faults.
   3 I blame myself for everything bad that happens.

9. Suicide Thoughts or Wishes
   0 I don't have any thoughts of killing myself.
   1 I have thoughts of killing myself, but I would not carry them out.
   2 I would like to kill myself.
   3 I would kill myself if I had the chance.

10. Crying
   0 I don't cry any more than I used to.
   1 I cry more than I used to.
   2 I cry over every little thing.
   3 I feel like crying, but I can't.

11. Agitation
   0 I am no more restless or wound up than usual.
   1 I am more restless or wound up than usual.
   2 I am so restless or agitated that it's hard to stay still.
   3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest
   0 I have not lost interest in other people or activities.
   1 I am less interested in other people or things than before.
   2 I have lost most of my interest in other people or things.
   3 It's hard to get interested in anything.

13. Indecisiveness
   0 I make decisions about as well as ever.
   1 I find it more difficult to make decision than usual.
   2 I have much greater difficulty in making decisions than I used to.
   3 I have trouble making any decisions.

14. Worthlessness
   0 I do not feel I am worthless.
   1 I don't consider myself as worthwhile and useful as I used to.
   2 I feel more worthless as compared to other people
   3 I feel utterly worthless.

15. Loss of Energy
   0 I have as much energy as ever.
   1 I have less energy than I used to have.
   2 I don't have enough energy to do very much.
   3 I don't have enough energy to do anything.

16. Changes in Sleeping Pattern
   0 I have not experienced any changes in my sleeping pattern.
   1a I sleep somewhat more than usual.
   1b I sleep somewhat less than usual.
   2a I sleep a lot more than usual.
   2b I sleep a lot less than usual.

3a I sleep most of the day.
3b I wake up 1-2 hours early and can't get back to sleep.

17. Irritability
0 I am no more irritable than usual.
1 I am more irritable than usual.
2 I am much more irritable than usual.
3 I am irritable all the time.

18. Changes in Appetite
0 I have not experienced any change in my appetite
1a My appetite is somewhat less than usual.
1b My appetite is somewhat greater than usual.
2a My appetite is much less than before.
2b My appetite is much greater than usual.
3a I have no appetite at all.
3b I crave food all the time.

19. Concentration Difficulty
0 I can concentrate as well as ever.
1 I can't concentrate as well as usual.
2 It's hard to keep my mind on anything for very long.
3 I find I can't concentrate on anything.

20. Tiredness or Fatigue
0 I am no more tired or fatigued than usual.
1 I get more tired or fatigued more easily than usual.
2 I am too tired or fatigued to do a lot of things I used to do.
3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex
0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost all interest in sex.

Appendix I
Demographic Information

Age: _____

Height (ft and in) _____ *Weight (lbs)*_____

Education:

Number of years of education _____

Occupation: _____

Race:

____ Caucasian

____ African American

____ Hispanic

____ Middle Eastern

____ Asian

Other:_____

Previous exposure to therapy:

_____ None _____ Yes

_____Length of treatment

Previous diagnoses of mental disorder

_____Depression/Bipolar

_____Anxiety/Panic attacks

_____Eating Disorders (Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder, Eating Disorder Not Otherwise Specified)

_____Other (please specify)_____

Appendix J

Complexity of Emotion Regulation Scale (CERS); Reprinted from Pascual-Leone et al. (2015/online).

Category (-1 to 6)	Action Tendency	Level of Functioning	Need	Meaning	Examples
(0) No Response	No deliberate action to interrupt or act on situation	Arousal is moderate to high, possibly interfering with functioning	No mention of any need	No acknowledgment or reference to negative feelings	"I would do nothing./ I don't know, I would let it pass./ There isn't anything I could do"
(1) No action to Soothe (despite any general intention)	No deliberate action to interrupt or act on situation, rumination	Arousal is moderate to high, possibly interfering with functioning	Mention of a need to feel differently	Negative feeling(s) acknowledged	"I would remain calm, feel the pain, and do nothing. / It isn't my house on fire, so I won't get upset./ Grit my teeth until it goes away"
(2) General Distraction: Unrelated Interruption	Implementation of a behavior to interrupt, distract, avoid, or suppress negative feeling	Arousal is moderate to high, possibly interfering with functioning	No mention of need they have for healthy functioning	Negative feeling(s) and a need to reduce emotion arousal both acknowledged	"I would count backward from 100./ Run away, avoid. / Distract by reading, working. / Watch TV, play loud music"
(3) General Distraction: Comforting Sensory Experience	Implementation of a behavior to create a new sensory-motor experience to reduce negative feelings	Arousal is moderate to high, possibly interfering with functioning	No mention of need they have for healthy functioning	Negative feeling(s) and a need to reduce emotion arousal both acknowledged	"I would sit at home and eat ice cream or my favorite food. / Take a shower / Splash cold water on my face. / Go for a 5km run. / Smell flowers/ listen to soft calming music / relaxation meditation"
(4) Specific Meaning: Generation	Presence of self-directed reappraisal for caring, tenderness, soothing, or nurturing	If arousal present, it is regulated	Mention of need they have for healthy functioning	Detailed reflection or general reappraisal of personal meaning related to painful experience	"I would look on the bright side." "Call my best friend and catch up." "Remind myself that it isn't a life or death situation"
(5) Specific Meaning: Transformation	Presence of self-directed reappraisal and related goal-directed action for caring, tenderness, soothing, or nurturing	If arousal present, it is regulated	Attention to unmet need through positive self-evaluation and experiential problem solving	Detailed reflection, imagery, or associated memories that elaborate difficult experience. Elaborated reappraisals that lead to problem solving though new meaning.	"I would remember that time when Mom held me close when I was upset/ Imagine my partner offering encouragement. He understands me and would know what to say./ Count my losses, then count my blessings, and make some brave choices"
(6) Combined Regulation Strategies	Presence of general and specific meaning-making strategies	If arousal present, it is regulated	Attention to unmet need is adaptive and healthy	Acknowledgment of need for different strategies or to organize strategies	"I would go for a run to get out of the house. Then maybe call my best friend later to talk it out./ I would go home and take a long bath. Then I would sit down and probably write in my journal".
(-1) Maladaptive Emotion Regulation	Attempts are self-destructive or reckless	Arousal moderate to high, often interfering with functioning	Need may or may not be mentioned	Action is self-destructive, reckless, or hateful meaning	"I would cut myself to feel better./ Go to the bar and find someone to sleep with / I would send him hate-mail."

Vita Auctoris

Andreea Cristina Andreescu was born in Bucharest, Romania in 1980. She graduated from the Mihai Viteazul High School in 1998 and attended the University of Psychology from 1998 till 2002 in Bucharest, Romania. She graduated from McMaster University with a Honors Bachelor of Arts in Psychology in 2006. From there, she attended graduate studies at the University of Windsor, where she obtained a Master of Arts in Clinical Psychology in 2008 and a Doctor of Philosophy in Clinical Psychology in 2015. She is currently working as a clinical psychologist in Charlotte, North Carolina.