An Empirical Investigation of Eating Disorders and Difficulties Regulating Emotion: Do

Difficulties Vary Based on Symptom Profiles?

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Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor of Philosophy in the Department of
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<u>ABSTRACT</u>

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Abstract

Eating disorders pose a serious threat to the physical and mental health of those who suffer from them. Given the impact of these disorders and difficulty treating them, it is important to understand the nature of them and factors involved in their development and maintenance. The empirical investigation of eating disorders is made difficult by the extreme heterogeneity seen within current DSM-IV diagnostic categories. Research on emotion regulation in eating disorders is rising, yet scant in terms of identifying specific difficulties and points of intervention. The proposed study focused on the construct of emotion regulation and its relation to the eating disorders by: (1) empirically identifying groups of eating disorder participants based on symptoms and (2) examining specific difficulties in emotion regulation capacities in each of the identified groups of eating disorder participants and (3) identifying whether difficulties in emotion regulation contribute to eating disorder symptom severity. A clinical sample of individuals with eating disorders was classified into subgroups based on symptom frequency using latent profile analysis. The most parsimonious and best fitting model was a four-profile solution which resulted in four distinct subgroups. Profile 1 consisted of individuals who endorsed moderate restriction and occasional binge eating and vomiting, all at a subclinical level. Profiles 2, 3, and 4 all met criteria for bulimia nervosa and consisted of individuals who engaged in restriction, binge eating, and purging

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though in varying degrees. When these groups were compared to a sample of college

aged healthy control participants using multivariate analysis of variance, results indicate

that individuals in profile 1, which comprised 71% of the sample, experience greater

difficulty with emotion regulation in the areas of awareness, nonacceptance, and

perceived access to strategies to help them feel better. Results of three hierarchical

regression analyses showed that difficulties in emotion regulation did not significantly

contribute to symptom severity as anticipated.

Dedication

This thesis is dedicated in loving memory of Woodrow E. Hoch.

Contents

Acknowledgements

1. Introduction

1.1 Overview and Aims

Eating disorders pose a serious threat to the physical and mental health of those who suffer from them. The prevalence of eating disorder behavior has increased greatly in the past fifty years and continues to rise (Polivy and Herman, 2002). Relative to other disorders, eating disorders have one of the highest rates of inpatient hospitalizations and the highest mortality rate of any psychological disorder (Newman et al, 1996; Stice, Presnell, & Bearman, 2001). Given the seriousness of the impact of these disorders, the difficulty treating them, and the rising number of individuals who suffer from them, it has become increasingly important to understand the nature of these disorders and the factors involved in their development and maintenance. Though several lines of research have been conducted in attempts to better understand the etiology, maintenance, and related variables in eating disorders, this study will focus primarily on the construct of emotion regulation and its relation to the eating disorders.

The role of aberrant processes in emotion regulation has gained increased attention in its relation to the maintenance and putative etiology of several forms of psychopathology. Researchers have examined the clinical significance of emotion regulation in problematic behaviors such as aggression (Bushman, Baumeister, & Philips, 2001; Mullin & Hinshaw 2007) and self injury (Briere & Gil, 1998; Gratz, 2003; Gratz, 2007), as well as clinical disorders such as substance abuse (Hayes et al, 1996; Sher

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and Grekin, 2007), mood disorders (Campbell-Sills & Barlow, 2007; Mennin, Heimberg,

Turk, & Fresco, 2002), borderline personality disorder (Linehan, 1993; Linehan, Bohus, &

Lynch, 2007) and more recently, eating disorders (Overton et al, 2005; Safer et al, 2001;

Sim and Zeman, 2006; Whiteside et al, 2007). This study will examine this relationship

between emotion regulation and eating disorder symptoms empirically, investigate

specific difficulties regulating emotions experienced by individuals with eating

disorders, and determine the extent to which these difficulties vary between groups of

individuals with eating disorders.

1.2 Background and Significance

1.2.1 Eating Disorder Classification

In investigating differences between individuals or groups of individuals with

eating disorders, one of the largest challenges becomes deciding how to classify them.

There is currently a considerable amount of debate regarding the extant diagnostic

classification system of eating disorders as established by the Diagnostic and Statistical

Manual of Mental Disorders (DSM-IV-TR) (American Psychiatric Association, 2000).

Several lines of research have begun to not only argue with the current nosology and the

limitations it poses (Wilfle, Bishop, Wilson, & Agras, 2007; Wonderlich, Joiner, Keel,

Williamson, & Crosby, 2007), but also to empirically explore new means of examining

how to best go about classifying eating disorders (Bulik, Sullivan, & Kendler, 2000;

Eddy, et al, 2009; Keel, et al, 2004; Mitchell et al, 2007; Sloan, Mizes, & Epstein, 2005;

Wade, Crosby & Martin, 2006). This section will discuss the current DSM-IV-TR criteria, criticism of its utility, and ways in which researchers aim to address these problems.

1.2.1.1 Current Eating Disorder Classification

According to the DSM-IV-TR, eating disorders can broadly be divided into three categories: anorexia nervosa (AN), bulimia nervosa (BN), and eating disorder not otherwise specified (EDNOS) under which binge eating disorder (BED) is subsumed. The DSM-IV-TR states that anorexia nervosa is classified as a refusal to maintain a body weight greater than 85% of normal weight for age and height, prominent fear of weight gain or becoming fat, denial of the seriousness of current low body weight, overvaluation of weight and/or shape, and in females, amenorrhea for three months or longer. There are two subtypes of AN, the restricting type in which weight loss is achieved primarily through dieting, fasting, or excessive exercise, and the binge-purge subtype in which the individual engages in purging behaviors such as vomiting, laxative use and diuretics, in order to compensate for caloric intake.

Bulimia nervosa is characterized by recurrent episodes of binge eating (eating a larger amount of food than most people would consume in a given situation, in a discrete period of time) which are accompanied by a sense of loss of control or inability to stop once the episode has begun, and followed by inappropriate behaviors in attempt to compensate for caloric intake. There are two subtypes of BN, the purging type in which the person engages in purging behaviors such as vomiting, laxative use, or

diuretics, and the non-purging type in which the person compensates by fasting or excessive exercise (American Psychiatric Association, 2000).

Eating disorder not otherwise specified is a category for individuals who do not meet the full criteria for AN or BN, who may have significant eating pathology but present at the sub-threshold level. Binge eating disorder (BED), a disorder which is prominent in the literature though not yet independent in the current DMS-IV-TR, is currently included in this "catch-all" category of EDNOS. BED is characterized by episodes of binge eating which are similar to, if not the same as binges described in persons with BN, though the criteria for BED state the binge episodes must be associated with three of the following: eating much more rapidly than normal, eating until uncomfortably full, eating large amounts of food when not feeling hungry, eating alone because of embarrassment about quantity of food eaten, and feeling disgusted with oneself, depressed, or very guilty after overeating. As opposed to individuals with BN, those with BED do not engage in regular compensatory behaviors (American Psychiatric Association, 2000).

1.2.1.2 Redefining Eating Disorder Groups

Over the past decade, researchers have begun to shed light on the problems posed by approaching the categorization of eating disorders as laid out by the DSM-IV-TR criteria. One of the main arguments against the validity of the DSM-IV-TR criteria is that these categories were based largely on expert consensus rather than empirical

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evidence (Wilfle, Bishop, Wilson, & Agras, 2007; Wonderlich, Joiner, Keel, Williamson, & Crosby, 2007). One major criticism of approaching the study of eating disorders by using the current categorical approach is that the most common eating disorder diagnosis seen in outpatient settings appears to be EDNOS (Fairburn & Bohn, 2005; Wade, Crosby & Martin, 2006), which indicates that the majority of individuals presenting with an eating disorder do not fit neatly into any one of the three main diagnostic categories. Furthermore, not only is there considerable overlap in symptoms among the established diagnostic categories, there is also a high rate of crossover from one disorder to another over time (Garfinkel, Lin, Goering, Spegg, Goldbloom, Kennedy, et al., 1995; Keel & Mitchell, 1997; Keel, Fichter, Quadfleig, Bulik, Baxter et al., 2004). These studies reveal that the classification of eating disorders is no easy task but one that must gain some sort of empirical consensus in the field if empirically based research is to continue to improve upon itself, inform the community, and better inform approaches to treatment.

Recently researchers have begun to approach this issue using statistical classification such as latent class analysis (LCA) or latent profile analysis (LPA) as a means of identifying groups of individuals based on their pattern of endorsement of symptoms rather than relying on diagnostic category. LCA is used for categorical variables, whereas LPA offers the advantage of analyzing continuous variables. To date, there have been 5 studies using LCA (Bulik et al, 2000; Duncan et al, 2007; Keel et al, 2004; Striegel-Moore et al, 2005; Sullivan et al, 1998) and 3 using LPA (Eddy, et al, 2009;

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Mitchell et al, 2007; Wade et al, 2006) in order to classify eating disorder groups based on symptom profiles. Each of these studies yielded different numbers of eating disorder groups with different symptom profiles. A few studies have found groups fitting the criteria for AN (Bulik, et al, 2000; Keel, et al, 2004). Several studies found groups resembling BN (Bulik et al, 2000; Duncan et al, 2007; Keel et al, 2004; Striegel-Moore et al, 2005; Sullivan et al, 1998). While some researchers have found empirical support for all three main classes of eating disorder (AN, BN, and BED) when looking at symptom profiles (Bulik, Sullivan, & Kendler, 2000) they, along with others, have found the picture to be incomplete as evidenced by numerous cases who fit the weight *or* psychological criteria, but not both concurrently, or who fall into other categories altogether (i.e. identifying significant differences between those who use multiple methods of purging vs. vomiting alone) (Keel, et al, 2004; Wade, et al, 2006). Rather than utilizing the current DSM-IV-TR diagnostic classification system, this study will utilize these newer methods of statistical classification, specifically latent profile analysis, in order to examine the problem of emotion regulation in its relation to eating disorder symptoms and symptom profiles.

1.2.2 Defining Emotion and Emotion Regulation

1.2.2.1 Features of Emotion

In order to examine the role that emotion regulation plays in eating disorder symptomology it is key that the constructs of emotion and emotion regulation be clearly

defined. According to Gross (1998a), emotions can be seen as short-lived, flexible

response tendencies that are elicited upon an individual's evaluation of a situation, and

involve fluctuations in the physiological, experiential, and behavioral systems, which

can be modulated and thereby influence the final shape of the emotional response. In

other words a person encounters a situation, which can be internal (thoughts) or external

(interaction or observation), they evaluate the situation, and have responses to the

situation (i.e. change in heart rate, the awareness of feeling an emotion, and behavioral

urges) based on that evaluation. Given that the term emotion has several different

meanings in the field and public discourse, the terms affect and emotion are often used

to discuss the same construct. In order to differentiate emotion from other related

constructs Gross uses the term affect as a broad, superordinate category to encompass

state-based affect (emotions and moods), as well as affective traits and temperament (see

Gross, 1998a; Gross and Thompson, 2007 for more detailed description). Citing the

Diagnostic and Statistical Manual IV (APA, 1994), Gross (1998a) highlights that "mood is

the 'pervasive and sustained emotional climate,' and emotions are 'fluctuating changes

in the weather.'"

Gross and Thompson together (2007) propose a modal model of emotion which

states that emotion is a "person-situation transaction that compels attention, has

particular meaning to an individual, and gives rise to a coordinated yet flexible

multisystem response to the ongoing person situation transaction." These components

exist in a feedback loop whereby one's attention to and appraisal of a situation may lead

to a particular response which then changes the nature of the situation altogether and

starts the process all over again (Gross & Thompson, 2007). Combining their views on

emotion, as well as that of other key researchers in the field, they provide a clear

framework from which to explore the construct of emotion regulation.

1.2.2.2 Defining Emotion Regulation

Emotion regulation had its beginnings as a distinct construct in the

developmental psychology literature (Campos, Campos, & Barrett 1989; Gaensbauer,

1982) and has more recently become a focus of the psychopathology and treatment

literature as well, as evidenced by the fivefold increase in the literature on emotion

regulation seen in the last 20 years (Gross, 2007). Yet, what is meant by emotion

regulation varies across discipline and researcher. Due to the rise in prominence and

lack of a unified understanding of emotion regulation, it becomes imperative that one

define what is meant by emotion regulation when discussing its implications to a

particular body of literature. In discussing emotion regulation in its relation to eating

disorder symptoms, this study will utilize the conceptualizations of emotion regulation

posed by Gross (1998a, Gross and Thompson, 2007), Thompson (1994; Gross and

Thompson, 2007), and Gratz & Roemer (2004).

The term emotion regulation has several meanings in the literature. The phrase

can be taken to mean regulation *by* emotions, or regulation *of* emotions; that emotions

can be both *regulating* and *regulated* (Cole et al, 1994; Gross & Thompson, 2007). In both

Gross's and Thompson's work, it is the latter that is examined: which factors contribute

to the regulation of one's emotions, and the processes that are involved. Other research

has conceptualized emotion regulation as the *controlling* of one's emotions or

minimizing negative emotions (Garner & Spears, 2000; Gratz & Roemer, 2004; Kopp,

1989; Zeman & Garber, 1996). According to Gross and Thompson (2007; Gross 1998a;

Thompson, 1994), this too is problematic, as they see the construct as much more broad

and involving modulation of the full range of emotions and not solely referring to the

minimization of negative emotions.

 Thompson (1994) states that emotion regulation is comprised of internal and

external processes which are responsible for "monitoring, evaluating, and modifying

emotional reactions, especially their intensive and temporal features," in order to

accomplish one's goals. According to Thompson, emotion regulation can involve either

the enhancement or the inhibition of emotional experiences and it involves the

regulation of both the emotional experience and its expression.

 When describing the processes that take place during emotion regulation,

Thompson (1994) includes the ability to shift attention flexibly, the ability to construe

alternate interpretations or meanings of events as they occur, the ability to accurately

interpret and attend to internal cues such as autonomic changes, the ability to seek out

coping resources and enlist help from the environment, the ability to create an

environment which is suited to one's own needs and emotional well-being, and finally

the ability to select alternate behavioral responses that are effective in terms of one's

goals, beliefs, and cultural norms. Present in this definition is Gross's focus on

evaluation of the situation, physiological changes, and flexibility in responding.

Gross also offers a definition of emotion regulation which breaks the concept

down into more specific factors and ways in which emotions are regulated. According

to Gross (1998a), emotion regulation refers to the "process by which individuals

influence which emotions they have, when they have them, and how they experience

and express these emotions." Gross asserts that in this process, both positive and

negative emotions are regulated by decreasing, maintaining, or enhancing them, and

that emotion regulation as a construct itself is not inherently good or bad. He also

speaks to the debate about the level of consciousness required in emotion regulation by

stating that it exists on more of a continuum "from conscious, effortful, and controlled

regulation to unconscious, effortless and automatic regulation" with certain situations

calling for more or less conscious awareness of regulation than others (Gross, 1998a;

Gross & Thompson, 2007).

According to Gross (1998a), emotion regulation can be examined not only by

which factors are involved, but also by certain time points in emotion generative

process. He highlights five specific emotion regulation processes: situation selection,

situation modification, attentional deployment, cognitive change, and response

modulation (Gross, 1998a,b). He states that emotions can be regulated before the

generation of emotion, which he calls antecedent-focused emotion regulation, as well as

after the emotion has occurred, which he calls response-focused emotion regulation. In

this model of emotion regulation, antecedent-focused emotion regulation refers to

regulation that is achieved by selecting situations which will enhance, dampen or

prevent the occurrence of certain emotions, by changing the circumstances of a given

situation in order to change the impact of the emotions it may elicit, by shifting attention

to other aspects of the situation, and by altering cognitive interpretations of situations in

order to alter their emotional impact in some way. Response-focused emotion

regulation refers to altering one's response to an emotion once it is present, which can

refer to physiological and experiential strategies such as deep breathing to slow down

heart rate (Gross & Thompson, 2007). However, it is most commonly used to discuss

behavioral responses such as overt behaviors such as purposely altering one's facial

expression, which can alter the experience of the emotion as well as physiological

arousal (Gross, 1998a,b; Gross et al, 2006; Gross & Levenson, 1993). Other forms of

behavioral response modulation include the use of alcohol, cigarettes, drugs, and food to

manage emotions after they arise (Gross and Thompson, 2007).

In order to maintain clarity in terminology, Gross also differentiates emotion

regulation from similar constructs. Using the broad term of affect regulation as a

superordinate category to include various forms of influencing our valenced reactions,

emotion regulation can be seen as one of four overlapping constructs (coping, emotion regulation, mood regulation, and defenses) (Gross, 1998a; Gross and Thompson, 2007). In doing so he distinguishes emotion regulation by stating that unlike other constructs, emotion regulation is neither inherently beneficial or maladaptive, is more specific to discrete emotions rather than moods, involves more than minimizing the effects of stress or diminishing negative emotions, and *can* include conscious processes (unlike defenses) (see Gross 1998a for more detailed review). Though Gross and Thompson highlight that emotion regulation is broad and also includes the modulation of positive affect as well as negative, the most pressing needs for regulation are often in response to intense negative emotions (Feldman Barrett et al, 2001). The bulk of the psychopathology literature focuses on difficulties with negative affect, likely because regulation of negative affect is more prominent in the majority of disorders.

Gross and Thompson provide highly compatible definitions of emotion and emotion regulation, and each lends itself well to examining the difficulties experienced by individuals with eating disorders. Gross focuses on the notion that emotion regulation can happen at various points in the emotion generative process and states that one can regulate one's emotional experience before it arises (situation selection, situation modification, attentional deployment, and cognitive change), or after it has occurred (response modulation). Thompson on the other hand focuses on the processes involved in regulating one's emotions such as the ability to manage attention processes,

construe alternate meanings, interpret internal cues, seek coping resources, manage

one's environment so that dysregulation does not occur, and finally, the ability to select

adaptive behavioral responses.

Citing Gross and Munoz (1995), Gratz and Roemer (2004) emphasize that

emotion *dysregulation* may be a central unifying feature of several disorders and problem

behaviors. This again highlights the notion that many problem behaviors seen across

various disorders serve an emotion regulatory function. After reviewing the literature

on emotion regulation they have identified key factors from various areas of research

which they incorporate into a more multidimensional model of emotion regulation.

According to Gratz and Roemer (2004), (effective) emotion regulation can be

viewed as including the following "a) awareness and understanding of emotions, b)

acceptance of emotions, c) ability to control impulsive behaviors and behave in

accordance with desired goals when experiencing negative emotions, d) ability to use

situationally appropriate emotion regulation strategies flexibly, to modulate emotional

responses as desired in order to meet individual goals and situational demands."

According to this model, deficits in one or more of these areas would signify difficulties

in emotion regulation (Gratz & Roemer, 2004).

Rather than offering a process model of emotion regulation such as those

presented by Gross and Thompson, Gratz and Roemer identify specific difficulties

experienced by an individual that interrupt their ability to effectively regulate their

emotions. Where Gross and Thompson identify mechanisms, Gratz and Roemer

establish specific vulnerabilities. In determining the relationship of these models to one

another, it could be stated that difficulty in one or more of the areas laid out in Gratz

and Roemer's model would lead to diminished capacity to effectively navigate the

emotion regulation processes defined by Gross and Thompson. This study will examine

these diminished capacities in emotion regulation as they relate to eating disorders.

1.2.3 Affective Vulnerabilities in Eating Disorders

There is considerable evidence that patients with eating disorders have difficulty

in most, if not all of these areas of regulating emotion. In providing a framework from

which to view eating disorders from an emotion regulation standpoint, it is necessary to

first understand the emotional experiences associated with eating disorders

1.2.3.1 Negative Affect, Mood Disorders, and Anxiety

The examination of affect in eating disorders is longstanding. Individuals with

eating disorders often experience high levels of negative affect that are perceived as

difficult to tolerate (Cohen & Petrie, 2005; Leon et al, 1995; Lyubomirsky et al, 2001). In

each of the eating disorders, there is a high rate of comorbity of mood disorders and

anxiety disorders (American Psychiatric Association, 2000; Godart et al, 2006; Steiner &

Lock, 1998; Herzog et al, 1992). Campbell-Sills and Barlow (2007) highlight the shift in

focus of research on mood disorders to include emotion regulation. They suggest that

one's individual emotion regulation capacities may lead to resilience or vulnerability to

mood disorders and anxiety. More specifically, the presence of anxiety or mood disorders may influence the abilities to regulate emotions at any of the time points in the emotion generative process; it may color which situations are selected, what is attended to in a situation, how the situation is appraised and behavioral urges that follow. In reviewing the literature Cambell-Sills and Barlow (2007) also highlight that many "clinical features of anxiety and mood disorders (avoidance, rumination, rationalization) may be construed as maladaptive attempts to regulate emotions." It has been estimated that approximately 63% of patients with eating disorders also meet criteria for a lifetime mood disorder, particularly those with mixed anorexic and bulimic symptoms (Herzog et al, 1992; Steiner & Lock, 1998). Patients with AN also tend to show more symptoms of Obsessive Compulsive Disorder (American Psychiatric Association, 2000; Godart et al, 2006). Individuals who binge eat have also been found to suffer from more depressive symptoms than the general population (Yacono Freeman & Gil, 2004; Godart et al, 2006). Given the relationship between mood disorders and emotion regulation difficulties (Campbell-Sills & Barlow, 2007; Mennin, Heimberg, Turk, & Fresco, 2002), it would stand to reason that the high rate of mood disorders seen in individuals with eating disorders would pose increased threat to their capacity for effective emotion regulation.

1.2.3.2 Personality Factors

Personality and temperament also play an important role in determining an individual's emotion regulation capacities (John & Gross, 2007: Rothbart & Sheese 2007).

Though negative affect, mood disorders, and anxiety are prominent in the majority of

patients with eating disorders regardless of their diagnostic classification, several key

differences emerge between the extant diagnostic categories when examining affective

traits, personality traits, and temperament. Temperament influences one's emotional

reactivity and shapes the relationship between emotion and attentional processes

(Rothbart & Sheese, 2007). Thus a person's temperament plays an important role in

which aspects of a situation are attended to in the regulatory process. Individuals who

primarily engage in caloric restriction have been found to display characteristics such as

being rigid, rule-governed, constricted, inhibited in their emotional expression, and

over-controlled in their behaviors, whereas individuals with bulimic features tend to be

more impulsive, affectively unstable, chaotic, and under-controlled (Vitousek & Manke,

1994; Thompson-Brenner & Westen, 2005). Lilenfeld and colleagues (2000) also

reviewed the literature on personality and temperament styles in eating disorder

patients and found that patients with bulimic features tend to be more impulsive,

reactive to stress, affectively dysregulated and engage in a higher rate of novelty seeking

whereas those who are more restrictive are described as obsessional, harm-avoidant,

socially isolated and neurotic. Westen and Harnden-Fischer (2001) have also proposed

that among patients with eating disorders, further division of general personality styles

enables researchers to classify them in three ways: "emotionally dysregulated/under-

controlled", which is characterized by emotional dysregulation and impulsivity,

"constricted/over-controlled", which is characterized by inhibition and emotional

avoidance, and "high-functioning/perfectionistic", which is characterized by

perfectionism and negative affect. These categorizations were later replicated by

Thompson-Brenner and Westen (2005) using reports of clinicians in the community who

were asked to describe personality profiles of eating disorder patients with whom they

have worked. Though these later results were based on clinician report, they help to

confirm the assertion that eating disorder patients may be a more phenotypically

heterogeneous group than presently shown in the DSM-IV-TR criteria. If this is the case,

examining patients with eating disorders from the viewpoint of their constellation of

symptoms, rather than simple diagnostic classification of their behavioral criteria may

prove a more effective means of going about treating them.

1.2.3.3 Related Problems of Dysregulation

Patients with eating disorders often also experience high rates of other

maladaptive behaviors and psychological disorders in which emotion regulation or

dysregulation rather, is a factor. These behaviors can be viewed as maladaptive

attempts at response modulation as defined by Gross (1998a; Gross and Thomson, 2007)

or the inability to select adaptive behavioral responses as seen in Thompson's model

(1994). Individuals with eating disorders often report high levels of dissociation, self-

injurious behaviors, and comorbid personality disorders, all of which have been

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conceptualized as involving deficits in emotion regulation in the literature (Chapman, Gratz, & Brown, 2006; Swirsky & Mitchell, 1996).

Eating disorder patients score higher on measures of dissociation than do normal controls (Shumaker et al, 1994). There is substantial evidence that dissociation plays a role in binge eating and the bulimic binge-purge cycle (Schumaker et al, 1994; Everill & Waller, 1995; Swirsky & Mitchell, 1996). Patients with bulimic features tend to report an increase in dissociative symptoms surrounding binge episodes, endorsing statements such as feeling "in a daze" (Lyubomirsky et al, 2001). Lyubomirsky et al. (2001) also found that in bulimic women 86% reported dissociated feelings accompanying a binge, and in the non-bulimic (sub-threshold) women 59% reported that they also experienced a dissociated stated during the act of a binge episode. This indicates that for individuals who binge, it is likely that in the presence of distress, other regulatory strategies are not as readily available and dissociation may serve as a means to regulate negative affect or experiences by avoiding or escaping.

Self injurious behaviors are thought to help those who engage in them regulate intolerable emotions and internal states (Chapman, Gratz, & Brown, 2006; Claes, Vendereycken, & Vertommen, 2003; Favaro & Santonastaso 1998; 2000). Self injurious behavior may serve to regulate emotional experiences by taking the focus away from emotional pain, concretizing diffuse emotional pain, providing a sense of control, or possibly to terminate the surreal nature of sensations present in dissociation. A review

of studies in this area revealed that 80-94% of individuals who engage in self-injurious

behavior report feeling better and more relieved after the act (Chapman, Gratz, &

Brown, 2006).

Patients with eating disorders tend to exhibit high rates of self injurious

behaviors. Some researchers have even considered eating disorder behaviors (starving,

excessive exercise, vomiting, and laxative abuse) to be specific forms of self-injury

(Favaro & Santonastaso 1998; 2000). Rates of self-injury in patients with eating disorders

have been estimated to range between approximately 30-50% (Claes, Vendereycken, &

Vertommen, 2003). The rate of eating disorders among patients who self-injure is

estimated to be between 61-100% (Favazza & Rosenthal, 1993; Sachsee, 1989; cited in

Paul et al 2002). Though there is some discrepancy in the research as to whether self-

injury is more closely associated with bulimia nervosa or anorexia nervosa, there has

been considerable evidence to show that both engage in higher rates of self-injurious

behavior than healthy controls (Paul et al, 2002; Claes, Vendereycken, & Vertommen,

2003). Claes and colleagues (2003) also found that in bulimic patients, those who engage

in self-injurious behaviors were found to have greater difficulty with anger, and greater

propensity for self criticism and self-punitive urges than those who do not injure

themselves.

Self-injurious behavior and dissociation are also prominent features of Borderline

Personality Disorder (BPD) (American Psychiatric Association, 2000), a disorder in

which emotion dysregulation is a central feature (Linehan, 1993). There is a high rate of

comorbidity between eating disorders and personality disorders, and a particularly high

level of co-occurrence of BPD and bulimia nervosa (Westen & Harnden-Fisher, 2001;

Williamson et al, 2001; Thompson-Brenner & Westen, 2003). Though there is some

evidence to show that anorexia nervosa is typically related to personality disorders in

the anxious and fearful cluster (Obsessive Compulsive Personality Disorder, Avoidant

Personality Disorder) other work has found anorexic patients also have more comorbid

Schizoid and Schizoptypal Personality Disorders, though these later findings have not

been replicated (Westen & Harnden-Fischer, 2001; Williamson et al, 2001). However,

determining the exact relationship between personality disorders and restrictive

anorexia nervosa has been difficult, and has not been as extensively studied as it has

been in patients with bulimic features.

Estimates of personality disorders in patients with bulimia nervosa range from

60-77%, with BPD being the most common and occurring at a rate of approximately 50%

of bulimic patients (Williamson et al, 2001; Thompson Brenner & Westen, 2005). Also

prevalent among bulimic individuals are personality features which may not have been

present to such an extent that they warrant the diagnosis of a personality disorder, but

remain clinically relevant nonetheless. In the sample investigated by Thompson-

Brenner and Westen (2005), 90% of patients were found to have difficulty with self-

esteem, depression and controlling their aggression, 80% experienced difficulties in

relationships, and feelings of shame and guilt, 70% expressed fear of abandonment and rejection, and 40% struggled with impulsivity, difficulty with authority, devaluation of others, and marked emotional difficulties.

After examining the nature of emotionality in patients with eating disorders, the high levels of negative affect they experience, the personality variables associated with eating pathology, the co-occurring behaviors mentioned, and evidence that some of these co-occurring behaviors such as dissociation, and self-injury that have been implicated as a means of dealing with negative affect and emotional experiences, it is natural that the field has begun to look at eating disorders from a more functional perspective with regard to symptoms. As a result of this trajectory, there is a growing body of literature that asserts that eating disorders provide a means of regulating one's emotions. Like many maladaptive behaviors which serve to regulate emotions, eating disorder behaviors are employed in the absence of other strategies in the emotion generative process. Inability to shift attention away from or reframe eating disorder thoughts (fear of weight gain, judgments about shape or weight) gives rise to negative emotions, and lack of effective behavioral responses leads to a state of emotion dyregulation. The inability to adaptively regulate emotions is considered by some to play an essential role in the development and maintenance of eating disorders (Overton et al, 2005).

1.2.4 Emotion Regulation and Eating Disorders

The pattern of negative affect being ameliorated after engaging in eating disorder behavior has been shown in several lines of research (Lyubomirsky et al, 2001; Overton et al, 2005; Sim & Zeman, 2006). There is evidence that engaging in exercise relieves anxiety in eating disorder patients (Shroff et al, 2006). Reduction of negative emotions surrounding the binge-purge cycle suggest this may also be the case for binge eating and bulimic behaviors (Paxton & Diggens, 1996; Jeppson et al, 2003; Corstorphine et al, 2006). It is believed that eating disorder behaviors serve as a means of regulating immediate affective states rather than more long lasting emotional experiences such as mood (Overton et al, 2005). Though it is relatively agreed upon that binge eating serves as a means of regulating anger, anxiety, tension, and guilt, it can also serve to manage any number of emotional experiences which are experienced as difficult to tolerate in the moment, and reduce awareness of mental states through a process of cognitive narrowing or emotional blocking (Jeppson et al, 2003; Corstorphine et al, 2006).

Later work has expanded on this to examine purging episodes after binge eating. Though binge eating may temporarily reduce negative affect, if it were that simple, why would patients engage in purging behaviors following a binge? While binge eating does seem to result in a decrease in negative affect, during or immediately after engaging in a binge episode, there seems to also be a subsequent increase in negative affect which likely contributes to subsequent purging behavior (Kenardy et al, 1996). For binge eaters

who don't engage in compensatory behaviors, the pattern may be one described in the "trade-off" hypothesis. According to this theory, emotions felt before the onset of a binge tend to be intense, negative, and somewhat diffuse, after the binge episode emotions tend to be more concrete (as seen in the pattern of emotional concretizing mentioned regarding self-injurious behavior) and are thought to be experienced as more tolerable than pre-binge emotions (Kenardy et al, 1996; Williamson et al, 2001). In patients who do engage in subsequent purging behavior, this behavior is thought to relieve physical discomfort and fear of weight gain as well as reduce shame (Corstorphine et al, 2006; Williamson et al, 2001).

Though the role of emotion regulation in eating disorders has been studied more extensively in patients who exhibit bingeing and purging behaviors, there has been some promising work examining emotion regulation across the entire spectrum of eating disorder behavior. A study by A. Harrison, Sullivan, Tchanturia &Treasure (2010) found that emotion regulation difficulties were found across the entire spectrum of eating disorder behavior in a clinical sample. There is evidence that the relation between eating disorder symptoms and emotional functioning may be different for patients who display more restrictive features versus bulimic ones (Overton et al, 2005). Overton and colleagues (2005) hypothesize that patients with anorexia nervosa may respond to uncomfortable emotional states by over-controlling or over-regulating their emotions which may result in their suppression. Patients with bulimia nervosa on the

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other hand tend to become overwhelmed by intense emotions and as a result may

under-regulate and display insufficient self-control in response to them (Overton et al,

2005). From this viewpoint, both restrictive and binge/purge behaviors are the result of

the inability to enlist other regulation strategies. Like many maladaptive means of

regulating emotions, eating disorder behaviors tend to work to regulate affect in the

short term, and as a result other more adaptive strategies are not employed.

It is clear that those who suffer from eating disorders often experience a great

deal of emotional unrest (high levels of negative affect, depression, anxiety), display a

great number of other behaviors thought to regulate difficult emotions (dissociation,

self-injury, substance use), and that eating disorder behaviors (restricting, binge eating,

various means of purging, excessive exercise) themselves may serve to regulate

emotions. However, to simply state that eating disorders are a means of emotion

regulation, would imply that it is sufficient to stop there. To identify that an individual

experiences emotional difficulty in certain situations, displays an inability to shift

attention or reappraise aspects of a situation, or possesses an absence of faculties

necessary to engage in more adaptive behaviors, is critically important and has been a

major area of focus in most cognitive behavioral treatments (Hayes et al, 1996).

However, without an understanding of *why* and *how* these difficulties present

themselves the picture of emotion regulation as is applies to clinical disorders, is

incomplete. It is therefore imperative to investigate which difficulties in regulating

emotions are most prevalent, and in the case of this particular study, which of these difficulties is most predominant among groups of individuals with eating disorders.

1.2.5 Difficulties in Emotion Regulation Scale and Eating Disorders

Gratz and Roemer used their multidimensional model of emotion regulation to offer a possible explanation of where individuals experience specific difficulty regulating their emotions. They created a measure of these difficulties, making it possible to empirically investigate and pinpoint differences in these difficulties among groups of individuals. The Difficulties in Emotion Regulation Scale (DERS) was developed and in its validation, six factors emerged (for more detailed description see Gratz & Romer, 2004). These six factors (Awareness, Clarity, Nonacceptance, Impulsiveness, Goals, and Strategies) assess six specific areas of emotion regulation difficulty which, in addition to providing a picture of distinct, yet related areas of deficit, add up to a total score of overall difficulties in emotion regulation. To date, very few studies have examined these specific areas of deficit among individuals with eating disorders. Whiteside et al (2007) found that total DERS scores accounted for a significant amount of variance in binge eating scores above and beyond other factors such as caloric restriction, and over-valuation of weight and shape. These results confirm a relationship between binge eating and the specific emotion regulation deficits that comprise Gratz and Roemer's model. Further research on patients with restrictive and purgative features is needed. The following sections will discuss the six areas of difficulty outlined

by Gratz and Roemer (2004), and examine each of these specific areas as they relate to eating disorders.

1.2.5.1 Awareness

Effective emotion regulation requires the ability to observe and attend to emotions as they arise (Gratz & Roemer, 2004; Thompson & Calkins, 1996). Lack of awareness of inner thoughts and feelings has been discussed in the literature using two terms: interoceptive awareness and alexithymia. Interoceptive awareness is defined as the ability to identify one's internal states including emotions as well as hunger and satiety cues (Sim & Zeman, 2004). Alexythymia has been characterized as difficulty identifying feelings and distinguishing emotions from physical sensations, difficulty communicating emotional states to others, and difficulty describing the emotions of others (Bydlowski et al, 2005; Kessler et al, 2006).

Bruch (1962; 1969) was among the first to notice this inability to clearly identify internal states in eating disorder patients and stressed the importance of this deficit as a risk factor for disordered eating behavior. Since that time researchers have examined this deficit and found support for Bruch's early theory (Bourke et al, 1992; Markey & Vander Wal, 2007; Schmidt et al, 1993). Estimates of alexithymia range from 23%-77% for anorexia nervosa, and 51%-83% for bulimia nervosa (Quinton & Wagner, 2005). Poor interoceptive awareness may be one of the strongest predictors of disordered eating among adolescent girls (Sim & Zeman, 2006). A longitudinal study by Leon and

colleagues (1995) found that poor interoceptive awareness was predictive of continued eating disorder behavior over time and that it explained the greatest amount of variance in eating disorder symptoms over a 3 year follow up.

Sim and Zeman (2004) found that not only do girls with bulimia nervosa have difficulties with interoceptive awareness, they also exhibit several other key deficits in this area as well. Findings show that patients with bulimic features have more difficulty identifying emotional states and distinguishing them from bodily sensations, report greater reluctance expressing emotion, and take significantly longer to respond and label their emotions. Subsequent research in this area has found that patients with eating disorders experience emotion processing deficits above and beyond deficits that may be explained by the co-occurrence of anxiety and depression (Bydlowski et al, 2005).

The extent to which these emotion processing deficits is fully understood in patients with eating disorders has yet to be determined. Though Bydlowski and colleagues found that these deficits occur independent of anxiety and depression, their other findings face discrepant evidence. Bydlowski et al, (2005) found that patients with eating disorders are impaired in their ability to identify their own emotions as well as those of others. However, Kessler and colleagues (2006) found that though patients with eating disorders display higher rates of alexithymia, they found no differences in facial emotion recognition of others compared to controls. These findings highlight the necessity of further research in this area in order to explore differences in emotional

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awareness both within and between groups of individuals with eating disorders.

Regardless of whether awareness of *others'* emotions is a factor, it is clearly established

that patients with eating disorders exhibit difficulties in emotion awareness.

1.2.5.2 Clarity

In addition to being aware of one's emotions, equally important is the capacity to

clearly *identify* emotions as they come and go. Emotional clarity can be defined as the

ability to understand and discriminate between different emotions and to have a sense

of knowing how to label those emotions as they arise. Saarni (1999) asserts that the key

to optimal emotional functioning is to be aware of and identify distinct emotions.

Though awareness of emotions and clarity of emotions are often discussed together

(Bydlowski et al, 2005; Feldman Barrett et al, 2001; Sim & Zeman, 2004; Dizen, et al,

2005), and conceptualized as the same construct, Gratz and Roemer (2004) separate these

strategies into two distinct areas. Some people may know that they are feeling *something*,

yet be unable to define which emotion or emotions, they are feeling (Gohm & Clore,

2000). Difficulty making sense of one's feelings versus being able to identify and

differentiate them from one another, are vital aspects of emotion regulation. Several

researchers have stressed the importance of clarity or emotion differentiation in the role

of emotional functioning (Schwartz & Clore 1996; Salovey et al, 1995). The inability to

discern specific emotions may negatively impact one's regulatory capacities such as

appraisal (Feldman Barrett et al, 2001) as well as the ability to identify one's needs in a situation (Dizen et al, 2005).

To date, there are few studies examining the specific construct of emotion clarity in the eating disorder literature. This is likely due to the overlap of clarity and awareness in past investigations. Sim and Zeman (2004) examined awareness of emotional state, interoceptive awareness, application of labels to describe emotions, the capacity to discriminate different emotions, and the effect of emotional intensity on these capacities in a group of adolescent girls with bulimia nervosa compared to adolescent girls with depression, and healthy controls. They hypothesized that the girls in the bulimic group would have greater difficulty than the two other groups in all these areas.

Sim and Zeman (2004) also found that girls in the bulimic group tended to use non-specific emotion words (such as bad or strange), and endorse a greater number of emotion labels when provided a list of possible emotions felt (suggestive of difficulty with emotion differentiation or lack of emotional clarity), than depressed patients or healthy control subjects These findings to confirm Leon and colleagues' (1995) assertion that eating disorder behaviors are employed in response to emotional states which are difficult to identify. Given that diffuse, unidentified emotional experiences are often more aversive and difficult to tolerate, as discussed in the binge-purge cycle and self injury literature, it will be important to further explore the construct of clarity as it applies to eating disorder behaviors.

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1.2.5.3 Nonacceptance

Acceptance of one's emotional experiences is also crucial to the ability to regulate them, whereas nonacceptance of emotions has been found to increase emotion dysregulation (Gratz & Roemer, 2004; Kashdan et al, 2006). Nonacceptance has been discussed in the literature on emotional suppression (Gross, 1998b) and experiential avoidance (Hayes, 1994; Hayes et al, 1999). Early work in this area discovered that inhibiting or concealing one's emotions (suppression) in an experimental setting actually results a paradoxical increase in physiological arousal (Gross & Levenson, 1993; 1997). Research on nonacceptance shows that it can lead to several adverse outcomes in addition to posing a difficulty in one's ability to regulate effectively in a given situation.

According to Gross (1998a,b), suppression is a response-focused emotion regulation strategy (engaged in after an emotion has been generated) which is defined as a conscious attempt to inhibit the ongoing stream of emotional experience. In addition to increasing physiological arousal, suppression has been found to dampen positive emotional experiences, lead to difficulty remembering social information and strain interpersonal connections during interaction (Butler & Gross, 2004; Gross and Levenson 1993; 1997). Gross and John (2003), also found that suppression is also strongly related to psychological distress in general and impairment in social situations.

Kashdan and colleagues (2006) have stated that suppression may be one particular form of the broader construct of experiential avoidance. According to Hayes

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(1994; Hayes et al, 1996), experiential avoidance is "the phenomenon that occurs when a person is unwilling to remain in contact with particular private experiences (e.g. bodily sensations, emotions, thoughts, memories, behavioral predispositions) and takes steps to alter the form or frequency of these events and the contexts that occasion them." These events are often negatively evaluated and unwanted which leads to attempts to control or avoid them (Hayes, 1994; Hayes et al, 1999). Similar to the relationship between suppression and arousal, Hayes (1996) suggests that a rebound effect may take place where avoided experiences return in the context in which they were suppressed or a mood may return if a thought comes to mind that was present during the mood's suppression. Experiential avoidance is thought to be a key contributor to various forms of psychopathology (Hayes et al 1996; 1999; Kashdun et al 2006).

1.2.5.4 Impulsiveness

Several definitions of emotion regulation have also cited the ability to inhibit impulsive behaviors and behave appropriately in the context of a situation, as essential to the process (Gratz & Roemer, 2004; Gross 1998a; Linehan, 1993). Impulsivity can be conceptualized as the inability to remain in control of one's behaviors in the presence of emotional experience, and failure to calculate consequences of behavior. Impulsivity is a personality trait which is present in several psychological disorders including BPD and eating disorders (Bornovalova et al, 2005; Bulik et al, 2004; Critchfield et al, 2004; Fernandez-Aranda 2006; Linehan, 1993). Given the high rate of comorbidity of these

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disorders, such findings are not surprising. Higher rates of impulsive behaviors such as

self-injury and stealing are also common in those who suffer from eating disorders

(Fernandez-Aranda, 2006).

As previously mentioned impulsivity was found to be a factor in patients with

bulimic or binge-purge features (Vitousek & Manke; 1994). Not seen nearly as often in

patients with anorexia nervosa, impulsivity may be a key feature that differentiates

those who primarily restrict from those who engage in bingeing or compensatory

behaviors (Polivy & Herman, 2002). Following on Vitousek and Manke's (1994) review

of personality variables in eating disorders, Cassin and von Ranson (2005), review a

decade of empirical literature from 1994 onward and conducted a meta-analysis

providing a more recent examination of personality and eating pathology. They found

that among the few key differences between the personality profiles of those who

restrict versus those who binge and purge, were that the patients with bulimic features

were higher in impulsivity, sensation seeking, and novelty seeking (Cassin & von

Ranson, 2005).

Corstorphine and colleagues (2007) assert that eating disorders are themselves

disorders of impulse control which are characterized by "irresistible urges to commit

[an] act, mounting tension when the individual attempts to resist the behavior, and relief

following the commission of the act" and state that they emerge in response to emotion.

This would indeed support the norion that engaging in impulsive behaviors does serve

to regulate emotions, though perhaps maladaptively, and may speak to an inability to regulate otherwise. Particularly problematic are patients with both an eating disorder and one or more other disorders in which impulsivity is a key factor, as these patients tend to have a poor prognosis and require more intensive treatment (Fichter et al, 1994, Lacey & Read, 1993). A more recent study examining bulimic patients with and without coexisting impulse control disorders (substance use, BPD, gambling) confirmed these findings. Results showed that bulimic patients who had the lifetime occurrence of another impulse control disorder exhibited more extreme difficulty and psychopathology (Fernandez-Aranda et al, 2006).

1.2.5.5. Goals and Strategies

The last two factors of Gratz and Roemer's model: Goals and Strategies, have not been studied as extensively in the emotion regulation or eating disorder literature. The Goals subscale assesses whether an individual is able to engage in goal directed behavior in the presence of negative emotion. The inability to concentrate or focus attention in an emotionally arousing situation is thought to reduce the chances of being able to effectively regulate emotions. Reviewing the literature on emotion regulation, Gratz and Roemer (2004) originally adhered to the notion that an inability to inhibit inappropriate behaviors (impulsivity) is related to the ability to engage in goal directed behavior. However, in the factor analysis performed, items for these two constructs loaded into two distinct factors (Gratz & Roemern 2004). These results imply there is a

difference between the ability to inhibit undesired behaviors and actually being able to engage in desired behaviors. In examining this factor in patients with BPD, Gratz and colleagues (2006) found that patients with BPD were intolerant of distress in the pursuit of goal directed behavior (measured by their termination scores on the PASAT-C), however in the face of this distress they did not experience greater difficulty engaging in goal directed behavior (measured by their performance). Further research in this area is needed to better understand the relation between negative arousal and goal directedness. Though based upon the extant literature, it seems logical to hypothesize that individuals with bulimic features would have difficulty in this area as well.

The Strategies subscale assesses whether an individual believes there is nothing that can be done once upset or whether they see themselves as having access to strategies that will be effective in helping them feel better. Whiteside and colleagues (2007) are the first to examine this factor in eating disorders. They found that perceived access to alternate, effective strategies predicted unique variance in binge eating episodes. These results indicate that those who binge-eat do not possess alternate strategies for regulating negative affect. Continued study is needed to determine whether those who binge eat actually have fewer alternate strategies or whether they attempt to employ other strategies but are unsuccessful (Whiteside et al, 2007), as is examination of this factor in those who are restrictive or for those who engage in compensatory behaviors.

1.3 Aims and Hypotheses

Though there is a clear established relationship between eating disorders and emotion regulation difficulties, the purpose of this study is to empirically examine difficulties regulating emotions experienced by individuals with eating disorders and to identify differences based on symptom profiles. Specifically, this study has three aims. The first is to classify eating disorder groups empirically, using symptom classes or profiles, rather than compare groups which are selected based on DSM-IV diagnosis. Next, this study will examine whether individuals who exhibit certain eating disorder symptoms more frequently than others will display certain specific emotion regulation difficulties or profiles in emotion regulation deficit. For example, does someone who engages primarily in caloric restriction have patterns of difficulty regulating their emotions that are different than the difficulties experienced by someone who engages in binge eating and/or purging behaviors? By addressing these questions, and determining where these differences lie, it is the hope of this study that these findings will serve to better inform treatment of eating disorders by addressing in a more specific way: how to help individuals with eating disorders better regulate their emotions specific to their own deficits and needs. Finally, the third aim of this study is to replicate the findings of Whiteside and colleagues, that DERS scores are uniquely predictive of eating disorder symptomology, above and beyond caloric restriction or concern for weight and shape, in

a clinical sample, as this paints a very strong picture of the role of emotion regulation in the function of eating disorder behaviors.

It is hypothesized that:

1. Four groups or classes of eating-disorder participants will emerge based on their symptom profiles. Since caloric restriction is often a factor in eating disorders, regardless of other presenting symptoms, it is anticipated that symptoms of restriction will be present, to some extent, in each group. The four anticipated groups are:

a. Latent Profile 1 Primary Restriction: those who primarily engage in significant caloric restriction and do not report significant binge eating or purging behaviors.

b. Latent Profile 2 Primary Binge and Purge: those who may engage in caloric restriction and who also engage in significant levels of both binge eating *and* purging.

c. Latent Profile 3 Primary Purge: those who may engage in caloric restriction and who also engage in purging but do not engage in significant binge eating.

d. <u>Latent Profile 4 Primary Binge</u>: those who may engage in caloric restriction and whose symptoms involve significant binge eating and who do not engage in significant purging behaviors.

2. Eating disorder subgroups or profiles will display different difficulties in their ability to regulate emotions as measured by the DERS.

   a. All participants with an eating disorder in this study will score higher on the Non-acceptance subscale of the DERS than the healthy control participants.

   b. Participants who primarily score high in caloric restriction will have lower scores on the Goals scale of the DERS (meaning they are able to stay on task when upset) while participants who binge and/or purge will have higher scores on this subscale (meaning they are unable to stay on task when upset) than healthy control participants.

   c. Participants who primarily score high in caloric restriction will have lower scores on the Impulse scale of the DERS (meaning they are not highly impulsive) whereas participants who binge and/or purge will score higher on this subscale, (meaning they are more

apt to engage in impulsive behaviors) than the healthy control
subjects.

   d. Participants who primarily engage in restriction will score lower
       on the Awareness subscale of the DERS (meaning they are often
       unaware of their present emotional state or that they are
       experiencing an emotion) than the healthy control participants.

   e. All eating disorder groups will score higher on the Strategies
       subscale of the DERS (meaning that they do not believe they have
       access to other strategies to help them feel better) than the healthy
       control participants.

   f. All eating disorder groups will score higher on the Clarity
       subscale of the DERS (meaning that even if they are aware they
       are feeling something they are not certain as to *what*) than the
       healthy control participants.

3. DERS scores will predict a unique amount of variance in binge eating,
   vomiting, and laxative use in eating disorder participants, above and
   beyond variance accounted for by caloric restriction and concern for
   weight and shape for those who engage in those behaviors.

2. Method

2.1 Participants and Procedures

This study used data collected from two sources at a private university in the Southeastern United States. Data from a group of healthy control participants was collected by using the undergraduate research participation pool at the university. Data from a clinical sample of participants was collected at an eating disorder treatment program in the university's medical center. A description of the participants and procedures for each of the samples follows.

Data was collected from a clinical sample comprised of 117 patients seeking treatment for an eating disorder. The clinical sample was 96.5% female, with an average BMI of 21.9 which ranged from 14.20 to 47.40, and the mean age was 25.12 (see Table 1 for more specific detail). After obtaining consent, patients were asked to fill out a series of questionnaires about their eating disorder symptoms and emotional experiences upon their admission to the program. This outpatient program specializes in treatment of all eating disorders. Thus, it was anticipated that this sample would include patients with a broad range of symptoms. The questionnaires were taken at baseline, before beginning treatment.

Data from a sample of 200 undergraduates participating in the undergraduate

research participation program at the university was collected for this study to serve as a

group of healthy control participants. The control sample was 50.8% female, with an

average BMI of 22.54 which ranged from 17.6 to 36.00, and the mean age was 19.03 (see

Table 1 for more specific details). Students were presented with a consent form, three

questionnaire measures and some demographic questions, and gave their consent and

responses using an online survey format. After collection was complete, data from the

healthy control group was screened for clinically significant eating disorder behavior

using the Eating Disorder Diagnostic Scale (Stice et al, 2000), a diagnostic questionnaire

used to determine the presence of an eating disorder. Each participant's responses to the

EDDS were scored and after screening the 200 participants, 119 did not meet criteria for

clinically significant eating disorder symptoms and were included in the data analysis.

2.2 Measures

Eating Disorder Diagnostic Scale (EDDS; Stice et al, 2000). The EDDS is a 22 item

self report measure that assesses symptoms of anorexia nervosa, bulimia nervosa, and

binge eating disorder. The EDDS specifically targets diagnostic items that pertain to each

of the eating disorder diagnoses. The EDDS is a well accepted and widely used measure

and has been found to display excellent internal consistency and test-retest reliability

(Stice, Telch & Rizvi, 2000; Stice & Ragan, 2002; Stice, Fisher & Martinez, 2004).

Eating Disorder Examination Questionnaire (EDE-Q; Belgin & Fairburn, 1992; Fairburn and Belgin, 1994). The 38 item EDE-Q is a self report measure based on the Eating Disorder Examination interview. The EDE-Q assesses feelings and behaviors related to eating and body image over the previous 28 days. The EDE-Q is scored using a combination of both categorical (is the symptom present/not present) and continuous (frequency/severity of symptoms) ratings. There are four subscales (Restraint, Weight Concern, Shape Concern, and Eating Concern) that when combined yield a Global score. The EDE-Q is a widely used and well accepted measure and has repeatedly shown excellent discriminant and convergent validity, test-retest reliability, and internal consistency (Fairburn, Cooper, Doll & Davies, 2005; Sysko, Walsh & Fairburn, 2005). For this study only the continuous diagnostic items relating to frequency (number of days in the past 28 days) of binge eating, self-induced vomiting, and laxative use were included, as was the total score for the Restraint scale, which measures behavioral indicators of caloric restriction.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a 36 item self report measure used to assess difficulties regulating one's emotions. The DERS has six subscales: 1) Non-acceptance: Non-acceptance of Emotional Responses, 2) Goals: Difficulty Engaging in Goal-Directed Behavior, 3) Impulse: Impulse Control Difficulties, 4) Awareness: Awareness of Emotions, 5) Strategies: Limited Access to Emotion Regulation Strategies, and 6) Clarity: Lack of Emotional Clarity. Each subscale

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contains items which are scored on a 5-point Likert scale and yield a subscale score. Together these subscales also yield a Global score. The DERS has high internal consistency, construct validity, and test-retest reliability (Gratz & Roemer, 2004; Whiteside et al, 2007).

2.3 Data Analysis

Data was analyzed using both IBM SPSS version 19 and Mplus version 3.0 (Muthén & Muthén, 2006). Missing data was handled in two ways. Participants who gave answers on the EDE-Q that were outside of the parameter for an item were excluded from the analyses. An example of this would be a patient reporting that they had purged 36 of the past 28 days. The dataset contained 4 such cases and the resulting number of patients in clinical sample was 113. Missing data in the DERS were handled by using multiple imputation.

2.3.1 Latent Profile Analysis

In order to identify eating disorder subgroups or latent profiles, the data from the clinical sample were analyzed using Latent Profile Analysis (LPA) in Mplus version 3.0 (Muthén & Muthén, 2006). LPA is a data analytic procedure that is used to identify relatively homogeneous and unobserved (latent) groups or classes of individuals with similar response patterns to a set of indicators. The primary objective of LPA is to find the smallest number of latent classes that can describe the associations among a set of

observed continuous variables. This is accomplished by adding classes in a stepwise

fashion until the model fits the data adequately (Lanza et al., 2003).

2.3.1.1 LPA Indices of Model Fit

Roesch, Villodas, and Villodas (2010) provide a more detailed review of

suggested practices for identifying and selecting the best-fitting model using LPA.

Specifically, it is recommended that researchers examine multiple indicators of model fit

in order to select the consensus, best-fitting model. Typically, in exploratory studies,

models with increasing numbers of classes/profiles are fit sequentially and their fit

indices compared. The Akaike Information Critreria (AIC; Akaike, 1974), Bayesian

Information Criterion (BIC; Schwarz, 1978), and sample size-adjusted BIC (Sclove, 1987)

are also useful for model selection. Each of these information criteria is based on the log

likelihood function for individual models and, thus, do not compare models statistically,

but can be compared across models in order to determine the best fitting model. All

three statistical indicators penalize models for estimating excessive parameters and both

versions of the BIC further penalize models by sample size. In addition, Entropy

provides an index of how well classes/profiles can be distinguished based on posterior

probabilities assigned to individuals for each class/profile. These posterior probabilities

are a function of each individual's response pattern, the number of latent

classes/profiles, and the proportion of individuals estimated to be in each class/profile.

Entropy values range from zero to one, with values greater than .80 considered

noteworthy. Roesch et al. (2010) suggest consulting as many fit indices as possible when selecting the best-fitting model, and recommend primarily the sample size-adjusted BIC and Entropy in particular if/when indices provide discrepant information.

2.3.1.2 LPA Model Parameters

Roesch et al. (2010) suggest that the examination of statistical fit indices is important in model selection, only if the selected models can be meaningfully interpreted. In this way, interpretation of model parameters is an important, and often overlooked, step in the model selection process. The LPA model includes two important parameters, Conditional Response Means (CRMs) and Latent Profile Probabilities (LPPs). CRMs are estimated for each indicator of the latent variable for each class and represent an estimation of the mean value of a particular indicator given membership in a particular class/profile. CRMs are analogous to factor loadings in factor analysis as they indicate to what degree an indicator represents the latent variable it is specified to represent. Thus, CRMs can be examined within and between classes in order to substantively differentiate between the classes identified by the solutions. In addition to CRMs, LPPs indicate the probability that each case will be assigned to each profile of the resulting solution. Thus, LPPs indicate the prevalence of each profile among the sample such that a profile with an LPP of .75 indicates that any one case would have a 75% chance of being assigned to that profile.

The LPAs were performed in the present study to identify latent profiles of eating disorder patients based on their responses to three particular diagnostic items and one subscale from the EDE-Q. Specifically, items representing the number of days an individual experienced a binge episode, the number of days that each individual purged by vomiting, and the number of days each individual purged by using laxatives, and their total score on the Restraint subscale were used as indicators of profile membership.

2.3.2 MANOVA and Regression Analyses

In order to investigate the differences in emotion regulation difficulties between the eating disorder subgroups, the resulting latent profile solutions were then merged with a control sample of individuals with no clinical eating disorder diagnoses and were compared using Multivariate Analyses of Variance (MANOVA's) to examine mean differences in DERS subscale scores.

Finally, three two-step Hierarchical Linear Regression analyses were conducted to examine the incremental validity of the DERS total score for the prediction of binge eating, vomiting, and laxative use above and beyond restriction, concern for weight, and concern for shape from the EDEQ. Both the MANOVA and Regression analyses were conducted using IBM SPSS release version 19.

3. Results

3.1 Latent Profile Analysis

LPA was used to examine one-, two-, three-, four-, and five-profile solutions for individuals' reports of eating disorder behavior indicators from the EDE-Q (AIC, sample size-adjusted BIC, and Entropy can be found in Table 2). Although the AIC and sample size-adjusted BIC both decreased for the 3-profile solutions in comparison to the 2-class solution indicating improved fit, the Entropy decreased slightly. However, the value remained well above the minimum value of .80 for noteworthy fit. Similarly, the AIC and sample size-adjusted BIC indicated that the 4-profile solution was an improvement over the 3-profile solution, while maintaining a minimal decrease in the Entropy value. The 5-profile solution also resulted in an improvement in model fit as indicated by decreases in the AIC and sample size-adjusted BIC values and increases in the Entropy values. However, when considering the 6-class solution in comparison to the 5-class solution, the AIC and sample size-adjusted BIC values increased indicating poorer model fit, despite the increase in the Entropy value. Given the increases in sample size-adjusted BIC and AIC values, it was determined that the 6-profile solution did not provide an improvement in model fit over the 5-class solution.

However, Roesch et al. (2010) suggested that model interpretability an equally important criterion in the model selection process and warned against the interpretation of "spurious" profiles, or those consisting of less than 5% of the sample. Given the small

sample utilized in the present study, the salience of this concern is magnified. The 5-profile solution produced two profiles that consisted of less than 3% of the sample, which increases the likelihood that these profiles are statistical artifacts and weakens the likely stability of the solution. Thus, the 4-profile solution was selected as the most parsimonious and best-fitting model with regard to statistical fit and model interpretability. Although the 4-profile solution includes one profile that consists of slightly less than 5% of the sample, this solution *can* be meaningfully interpreted, but should be interpreted with some caution.

Demographic information broken down by profile can be found in Table 1. LPPs and CRMs for each profile can be found in Tables 3 and 4 (see Figure 1 for graphical presentation of CRMs). Profile 1 consisted of 81 individuals (71.7%), profile 2 consisted of 19 individuals (16.8%), profile 3 consisted of 5 individuals (4.4%), and profile 4 consisted of 8 individuals (7.1%). In order to interpret the criteria that were used to discriminate between each class, the CRMs were examined as well as the overall means for each indicator in the overall sample.

Individuals in profile 1 were characterized by a very low mean number of days of laxative use or vomiting in the last 28 days (.11, 1.40, respectively) relative to the means for the total sample (1.58 and 5.96, respectively). Moreover, individuals assigned to this profile had fewer days of binge eating in the last 28 days (5.18) and a lower total Restraint score (17.26) than the overall sample means for those items (7.11 and 18.36,

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respectively). Given the relatively lower scores on each of the indicators among individuals in this profile, it was identified as the "Subthreshold/EDNOS" profile.

Individuals in profile 2 were characterized by the highest numbers of days of binge eating and days vomited in the last 28 days, relative to the other profiles that were identified. Although their mean score on the Restriction subscale was not as high as some of the other profiles, it was higher than the mean for the overall sample. However, their mean score for laxative use was very low (.14) relative to the sample mean. Given the pattern of high level of binge eating with vomiting as only method of purging represented in this profile, it was identified as the "BN: High Binge and Vomiting" profile.

Individuals in profile 3 were characterized by CRMs that were above the overall sample mean for number of days of binge eating (9.20) and days vomited (9.80) in the last 28 days, but were particularly distinguished from other profiles by their CRMs for laxative use (23.60) and the restriction subscale (25.80). In fact, relative to the other profiles, they had the highest CRMs for each of these two items. Given this presentation of multiple methods of purging, with laxative use being the predominant identifier, individuals in this profile were identified as the "BN/Multi-purge: High Laxative Use" profile.

Finally, individuals in profile 4 were characterized by CRMs that were above the overall sample mean for number of days of binge eating (11.74), days vomited (14.34),

and days of laxative use (6.08) in the last 28 days, and their CRM for the restriction

subscale (25.02) was very high relative to the overall sample mean. Given this pattern of

multiple methods of purging, with vomiting being the predominant identifier, these

individuals in this profile were identified as primarily "BN/Multi-purge: High

Vomiting" profile. It is also noteworthy that both of the groups in which individuals

engaged in multiple methods of purging (profiles 3 and 4) had similar CRMs on the

Restraint subscale which were considerably higher than the sample mean and CRMs of

the other profiles.

3.2 MANOVA

A between-subjects multivariate analysis of variance (MANOVA) was performed

to examine mean differences between eating disorder profiles (5 levels: Control Sample,

Subthreshold/EDNOS, BN: High Binge and Vomiting, BN/Multi-purge: High Laxative

Use, and BN/Multi-purge: High Vomiting) on six dependent variables: the

Nonacceptance, Goals, Impulsiveness, Awareness, Strategies, and Clarity scales of the

DERS. Using an alpha level of .001 to evaluate homogeneity assumptions, Box's M test of

homogeneity of covariance was significant ($p < .001$) and Levene's homogeneity of

variance test was statistically significant for Nonacceptance, Impulsiveness, and

Strategies scales ($p's < .001$). However, Tabachnick and Fidel (2007) warn of the increased

sensitivities of these tests to sample sizes. Thus, the following results were interpreted

and the Pillae's Trace omnibus test and Games-Howell post-hoc test were selected to

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correct for the violation of these assumptions. In consideration of the number of tests

being conducted, a Bonferroni alpha adjustment was used to control the error rates

(Weinfurt, 1995). Thus, the analyses were conducted using a family-wise error rate of $p =$

.008. Using Pillae's Trace criterion as the omnibus test statistic, the combined dependent

variables resulted in a significant main effects for Eating Disorder profiles, $F(6, 896) =$

3.740, $p < .001$, partial $\eta^2 = .091$. The effect size was moderate indicating that

approximately 9% of the variance in the resulting linear composite was accounted for by

Eating Disorder profile.

      To probe the statistically significant multivariate effects, univariate ANOVAs

were conducted on each individual dependent variable (group means and F-values for

each analysis are displayed in Table 5 and a graphical presentation of group mean

differences for each analysis can be found in Figure 1). Main effects were found in each

analysis with one exception being the Clarity scale. More specifically, post-hoc analyses

revealed that individuals in the Subthreshold/EDNOS group had significantly higher

mean levels of Nonacceptance relative to the control group ($p = .002$). Despite having

significant F-values, no significant mean differences were found between the eating

disorder groups at the adjusted alpha level for the Goals and Impulsiveness scales.

However for the Impulsiveness scale, the Subthreshold/EDNOS group had a higher

mean than the Control group that approached significance ($p = .01$). For the Awareness

scale, only the Subthreshold/EDNOS group had a significantly lower mean than the

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Control group. The Subthreshold/EDNOS group also had a significantly higher mean for the Strategies scale relative to the Control group (ps < .001). Profile 2, the BN: High Binge and Vomiting Profile, had a lower mean for the Awareness scale and a higher mean for the Strategies scale than the Control group and these approached significance (ps = .01 and .03, respectively).

3.3 Hierarchical Linear Regression

Zero-order correlations among each of the variables included in the hierarchical linear regression analyses can be found in Table 10. All variables included in the analysis with the exception of the DERS total score were transformed because their distributions significantly deviated from normality. Three hierarchical linear regression analyses were conducted with indicators of binging, vomiting, and laxative use as criterion variables and the EDEQ Restraint, Weight Concern, Shape Concern as predictor variables entered on step one and the DERS Total score entered as a predictor variable on step 2 (see Table 11 for F values and effect sizes for each analysis). For number binges, the first step was statistically significant and accounted for approximately 18% of the variance in number of binges. Only Shape Concern significantly predicted number of binges and it had a strong and positive association, indicating that increased Shape Concern was associated with more binges. The overall model for step two did not contribute a statistically significant increase in explained variance. As can be seen in Table 11, the overall model for number of times vomited was not significant. For number of laxative uses, the

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overall model was significant at step one and had a moderate to large effect size accounting for approximately 14% of the variance in Laxative Use. Only the Restriction scale was significantly associated with number of laxative uses and it had a positive and moderate association indicating that increased Restriction was associated with more laxative use. The overall model for step two did not contribute a statistically significant increase in explained variance.

3.4 Supplementary Analyses

Given the gender disparity between the clinical (96.5% female) and healthy control sample (50.6% female) subsequent analyses were conducted to examine the extent to which these results could have been explained by differences in emotion regulation between men and women. A Multivariate Analysis of Variance (MANOVA) was conducted to test for gender differences between men and women on DERS subscales and total score. No significant differences were found for any of the subscales or total score. Using Pillae's Trace criterion as the omnibus test statistic, the combined dependent variables did not result in a significant main effect for sample, $F(6, 111) =$ 1.931, $p = .08$. However, analyses were repeated using only the women in the sample in order to ensure that the two samples were as well matched as possible.

The LPA was rerun excluding the 4 men in the clinical sample. The LPA including only women also resulted in a best fitting 4-profile solution, and the four profiles that emerged were almost identical to the original LPA and thus were given the

same descriptor names (Profile 1: Subthreshold/EDNOS, Profile 2: BN: High Binge and Vomiting, Profile 3: BN/Multi-purge: High Laxative Use, and Profile 4: BN/Multi-purge: High Vomiting). See Tables 6 and 7 for profile fit indexes and LPPs for the secondary LPA including only women.

Additionally, a MANOVA was conducted to test for significance between the means of each of the indicators in the latent profiles that emerged in the second LPA. Finally, two MANOVAs using only the women from each sample were run comparing the clinical and healthy control samples on DERS scores. The first compared the total clinical and healthy control samples. The second compared the healthy control sample to each of the new latent profiles. The following sections discuss these new analyses and their results.

3.4.1 MANOVA Testing Differences Between LPA Profiles

In order test for significant differences between the means for each profile on each of the indicator items, a MANOVA was conducted examining how much these groups actually differ on their eating disorder symptoms of interest. Rerunning the LPA including only women yielded only slight differences from the means in the original LPA (CRMs for the second LPA, as well as the significance of the observed means for each indicator are found in Table 8). Given the small number of individuals in profiles 2, 3, and 4 significant differences between the profiles were difficult to detect. For the number of binges there were no significant differences between any of the profiles.

However, diagnostically, profile 1 does not meet the clinical criteria of twice weekly for

significant binge eating whereas profiles 2,3, and 4 do. For vomiting, only profiles 1 and

2 are significantly though profiles 2 and 4 also have means that would qualify as

diagnostically relevant. For laxative use, only profile 3 meets *diagnostic* criteria while

profiles 3 and 4 are significantly different from 1 and 2. The pattern of significance for

Restraint or caloric restriction shows that only profile 4 is significantly different from the

others. However a potentially more reasonable way to approach the profiles in terms of

their relevant differences or level of severity of Restraint would be to look to the extant

literature examining norms for Restraint in a non-clinical sample. Researchers have

suggested that a cutoff composite mean score for Restraint suggesting severity would be

anything above 4.0 (or raw score of 20) (Mond, Hay, Rogers, & Owen, 2006; Luce,

Crowther, and Pole, 2008). Using this approach, profiles 1 and 2 would not be

considered to endorse a severe amount of caloric restriction as measured by the

Restraint scale, while profiles 3 and 4 would be considered severe in this category.

3.4.2 MANOVAs Comparing Emotion Regulation

A between-subjects multivariate analysis of variance (MANOVA) was performed

to examine mean differences between the clinical and control samples including only

women on seven dependent variables: the Nonacceptance, Goals, Impulsiveness,

Awareness, Strategies, and Clarity scales as well as the Total score for the DERS. Given

the number of tests being conducted, a Bonferroni alpha adjustment was used to control

the error rates (Weinfurt, 1995). Thus, the analyses were conducted using a family-wise error rate of p = .008. . Using an alpha level of .001 to evaluate homogeneity assumptions, Levene's homogeneity of variance test was statistically significant for Nonacceptance, Impulsiveness, and Strategies, and Clarity scales as well as the total score ($p's$ < .001). Using the same criterion as in the first MANOVA, the results for the analyses including only women were interpreted and the Pillae's Trace omnibus test and Games-Howell post-hoc test were selected to correct for the violation of these assumptions. Using Pillae's Trace criterion as the omnibus test statistic, the combined dependent variables resulted in a significant main effect for sample, $F(6, 162) = 8.882$, $p <$ .001, partial $\eta^2 = .248$. The effect size was strong indicating that approximately 25% of the variance in the resulting linear composite was accounted for by sample.

To probe the statistically significant multivariate effects, univariate ANOVAs were conducted on each individual dependent variable (group means and F-values for each analysis are displayed in Table 8). Main effects were found for Nonacceptance, Impulsiveness, Awareness, and Strategies. More specifically, the clinical sample had higher means for Nonacceptance, Impulsiveness, and Strategies and a lower mean for Awareness relative to the control sample.

A second between-subjects multivariate analysis of variance (MANOVA) was performed to examine mean differences between the healthy controls and eating disorder profiles when including only women (5 levels: Control Sample,

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Subthreshold/EDNOS, BN: High Binge and Vomiting, BN/Multi-purge: High Laxative

Use, and BN/Multi-purge: High Vomiting) on seven dependent variables: the

Nonacceptance, Goals, Impulsiveness, Awareness, Strategies, and Clarity scales as well

as the Total score of the DERS. Using an alpha level of .001 to evaluate homogeneity

assumptions, Levene's homogeneity of variance test was statistically significant for

Impulsiveness and Strategies scales as well as the total score ($p's$ < .001). These results

were interpreted and the Pillae's Trace omnibus test and Games-Howell post-hoc test

were selected to correct for the violation of assumptions. A Bonferroni alpha adjustment

was used to control the error rates (Weinfurt, 1995) and the analyses were conducted

using a family-wise error rate of p = .008. Using Pillae's Trace criterion as the omnibus

test statistic, the combined dependent variables resulted in a significant main effects for

Eating Disorder profile, $F(24\ 648) = 2.560$, $p < .001$, partial $\eta^2 = .087$. The effect size was

moderate indicating that approximately 9% of the variance in the resulting linear

composite was accounted for by Eating Disorder profile.

To probe the statistically significant multivariate effects, univariate ANOVAs

were conducted on each individual dependent variable (group means and F-values for

each analysis are displayed in Table 9). Main effects were found for the Nonacceptance,

Impulsiveness, Awareness, and Strategies scales. More specifically, post-hoc analyses

revealed that individuals in the Profile 1 had significantly higher means scores for the

Impulsiveness ($p = .001$) and Strategies ($p = .003$) scales and a significantly lower mean

for the Awareness ($p < .001$) scale relative to the control group. However, despite having

significant F-values, no significant mean differences were found between the eating

disorder groups at the adjusted alpha level for the Nonacceptance scale. However for

the Nonacceptance scale, individuals in Profile 1 had a higher mean than the Control

group that approached significance ($p = .025$). Similarly, for the Awareness scale,

individuals in Profile 2 had a lower mean than the Control group that approached

significance ($p = .018$).

4. Discussion

This study was designed to examine differences in emotion regulation difficulties between subgroups of individuals with eating disorders who were classified into groups using empirical methods, and to investigate the direct contribution of emotion regulation to eating disorder symptoms. This section will discuss the findings of each of the hypotheses followed by a general discussion of results, secondary analyses, implications, limitations, and future directions.

4.1 Empirical Classification of Eating Disorder Groups

This study is one of a very few number of studies to attempt to classify individuals with eating disorders empirically using latent profile analysis. The use of methods such as LCA and LPA provide an opportunity to classify individual patients and compare them based on their responses to specific symptom endorsement, rather than simply attempting to fit them into one of the extant diagnostic categories. The advantage of using LPA for this type of classification is that it allows for the analysis of continuous variables such as symptom frequency, whereas LCA is constrained to categorical items. Thus, for this study, LPA was chosen because it allows a broader symptom profile to emerge and provides information which is potentially more rich and descriptive. In the present study, four indicator variables (binge eating, vomiting,

laxative use, and caloric restriction as measured by the Restraint scale of the EDE-Q) led

to a five-profile solution being the best fitting model, meaning that based on individuals

responses to these four criteria, there were five significantly distinct groups of

individuals. Given the small size of the overall sample, two of those profiles contained

an insufficient number of individuals to be interpretable and the more parsimonious

four-profile solution was chosen. The studies using LCA and LPA previously mentioned

have found best fit solutions ranging from 3 to 6 classes or profiles, which suggests that

the number of profiles identified in this study is within the range that appears in the

current literature.

The first main hypothesis that latent profile analysis would result in a four

profile solution comprised of profiles characterized primary restriction, binge eating and

purging, primary purging, and primary binge eating was not confirmed. In general,

studies using LPA and LCA tend not to make *specific* hypotheses about number or

makeup of classes or profiles that will emerge. However, this study chose to do so due

to the specific hypotheses about differences in emotion regulation between groups

suffering from different eating disorder symptoms (i.e. those who restrict vs. those who

binge/purge). In the previous studies that have employed these methods, each has used

a different set of indicator variables with which to classify participants such as different

measures of eating disorder symptomology, lifetime history of symptoms, medical and

physical health indicators, BMI, and psychological factors such as depression. Some

have defined "purging" as vomiting alone, while others have distinguished between multiple methods of purging. Based on the previous studies that did identify profiles resembling AN, BN, and BED, and purging in the absence of binge eating, it was anticipated that in this study, the profiles that emerged would resemble these four groups. There are several possible explanations for why these groups did not emerge in this sample.

No profile emerged which captured individuals who primarily engage in significant restriction in the absence of other behaviors such as binge eating or purging. This could be due to the low prevalence of individuals with restrictive anorexia nervosa. The absence of significant pure restriction in this sample could also be explained by the fact that this data was obtained at an outpatient eating disorder treatment facility. Though it is possible to treat anorexia nervosa in an outpatient setting, it is not uncommon for patients with anorexia nervosa to not seek treatment until they are incredibly ill and often not until hospitalization or inpatient treatment is needed. Thus it is *possible* that they are also underrepresented in an outpatient setting or underrepresented in this sample. Another possibility is that perhaps individuals initially seeking treatment for an eating disorder may be ambivalent about reporting the full extent of their symptoms. Underreporting may have led to underrepresentation of a more predominant group of primary restrictors.

The anticipated primary purging and primary binge eating profiles also did not emerge. This is not to say that the clinical sample did not contain any individuals for whom these symptoms are their primary concern. LPA works to identify groups of individuals based on mean scores and results in the CRM value for each profile. Thus it is possible that there were a few individuals in this sample who struggle with purging or binge eating as their primary difficulty, but perhaps either there were not enough of these individuals to fall into their own subgroup or that when considering their scores on all the indicators, the analyses placed them into another group based on their comparison to the mean.

Though the classes did not fall out exactly as anticipated, some commonalities with the current literature and other recent LPA and LCA studies do emerge. For instance profile 1, who appeared to be in the EDNOS range in terms of their symptom endorsement, was comprised of the majority of individuals in the clinical sample. This is consistent with previous findings (Fairburn & Bohn, 2005; Wade, Crosby & Martin, 2006) that the majority of patients with eating disorders carry the diagnosis of EDNOS because they are experiencing clinically significant symptoms which may be subthreshold for an actual diagnosis of anorexia nervosa or bulimia nervosa. Though individuals in this profile scored higher on the Restraint subscale than any of the other symptoms, their mean for Restraint was lower than those of the other subgroups and the overall sample mean and lower than the suggested cutoff in the literature ((Mond, Hay, Rogers, &

Owen, 2006; Luce, Crowther, and Pole, 2008). Therefore it is more prudent to identify this group as subthreshold or EDNOS.

Also interesting is that each of the other profiles (2,3, and 4) all meet diagnostic criteria for bulimia nervosa but with differing presentations. This finding resembles the results of Sullivan et al (1998), which found varying degrees and representations of bulimic behaviors in a sample of women with a lifetime diagnosis of bulimia nervosa, as well as those of Striegel-Moore et al (2005) who found three different classes based on differing severity of binge eating and purging symptoms in a sample of women with bulimia nervosa. Profile 2 appears to be comprised of individuals who engage in caloric restriction but whose scores for the Restraint subscale are just under that of the sample mean, and whose scores for binge eating and purging are well above the sample mean and the means of the other profiles. Profile 3, who endorse multiple methods of purging, is comprised of individuals who have significant scores for both binge eating and vomiting which would meet criteria for bulimia nervosa but who are particularly differentiated by their extremely high frequency scores on laxative use and high score on the Restraint subscale. Individuals is profile 4, who also report multiple methods of purging, endorsed higher levels of binge eating and vomiting than those in profile 3 but not as high as those for profile 2, and who also report a moderate amount of laxative use and also have a significantly high score on the Restaint scale. Both profiles 3 and 4 exhibited multiple purging methods combined with very high scores on the Restraint

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scale which points to a greater level of severity. The profiles found in this study serve to confirm the assertion that the picture of eating disorders present in clinical samples is diverse and quite heterogeneous.

4.2 Differences in Emotion Regulation Between Groups

In the secondary MANOVA comparing women from the overall total eating disorder and healthy control samples, the eating disorder sample reported significantly more difficulty on each of the DERS subscales with the exception of Clarity highlighting that individuals with eating disorders have greater difficulties with emotion regulation than the general population. The second main hypothesis of this study, that individuals in each of the eating disorder profiles will display different difficulties in their ability to regulate emotions as measured by the DERS, was confirmed to a great extent. The specific profiles not falling out as anticipated, led to an inability to examine emotion regulation difficulties for pure restriction, primary binge eating, or primary purging. The differences in emotion regulation difficulties in the profiles that did emerge were significant in several key areas and trended toward significance in other hypothesized areas as well.

The hypothesis that individuals with eating disorders would score significantly higher on the Non-acceptance scale of the DERS was not fully confirmed but was largely so. The only latent profile found to significantly differ from the control group on this subscale was profile 1, the Subthreshold/EDNOS profile. Profile 1 made up 71.7% of the

clinical sample meaning that the majority of patients in the clinical sample differed from

the control sample, and have greater difficulty accepting their emotions. Additionally, in

looking at the actual mean numbers of each of the eating disorder profiles on the Non-

acceptance subscale, they all yield a similar mean number or greater than the mean of

profile 1 and thus all scored higher on non-acceptance than the healthy controls. The

other three classes are not significantly different however, and this is likely due to

sample size in each of the other profiles. Even though their means are similar to or

higher than profile 1, with so few individuals being compared to the control group,

significant differences are difficult to detect. The secondary analyses also resulted in a

similar pattern however, after excluding the men from the analysis resulting smaller

sample sizes, profile 1 was not significantly different though approached significance.

The hypothesis that participants who engage in some form of binge eating

and/or purging behavior will have higher scores on the Goals subscale of the DERS was

not substantiated. This subscale assesses whether individuals have a difficult time

engaging in goal directed behavior in the face of negative emotion. Profiles 2, 3, and 4 all

exhibited binge eating and purging behaviors, and their scores were in fact higher than

the mean score of the control group on the Goals subscale. Individuals in profiles 3 and 4

who engaged in multiple methods of purging, actually had the highest scores for the

Goals subscale. However, no significant differences were detected. This lack of

significance could mean that in this sample, eating disorder patients who binge and

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purge do not struggle with the ability to stay on task while upset any more than the control group of average college students. However, as in the case of Non-acceptance, this might be a limitation based on the small number of individuals in these profiles. If the differences between the control sample and profiles 3 and 4 had been significant, it would implicate a relationship between greater eating disorder severity with multiple methods of purging and more difficulty engaging in goal directed behavior in the face of negative emotion. It is noteworthy that in the MANOVA comparing the women in the overall total samples, the Goals subscale approached significance meaning that when comparing the entire sample, the eating disorder sample had a more difficult time engaging in Goal directed behavior than did the healthy controls. However with so few individuals it is difficult to detect significant differences or determine where those differences might emerge within the different profiles in the clinical sample.

The hypothesis that participants who engage in binge eating and/or purging behaviors will score higher on the Impulse subscale of the DERS was not confirmed. In the first MANOVA, though profile 1 approached being significantly different from the control group, they were not significant after the Bonferroni correction. Individuals in profiles 2, 3, and 4, who all engaged in binge eating and purging behaviors, each had even higher mean scores for the Impulse subscale than those in profile 1. A similar pattern appeared in the secondary analysis with profile 1 being significantly different but not 2, 3, and 4 though their means were higher. Given the established relationship

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between impulsivity and binge/purge behaviors in the empirical literature it is likely that the lack of significant differences being detected in this study could be explained by the small sample size in each of those groups.

The lack of group of pure restrictors in this sample makes it difficult to determine whether the hypothesis that participants who engage primarily in restriction would score lower on the Awareness subscale of the DERS than healthy controls. There was a significant difference in awareness between the mean scores of control sample and profile 1 in both the primary and secondary analyses. Individuals in profile 1 endorsed restriction more so than any of the other indicators, meaning that it was their primary symptom. However, they endorsed it at a level that was lower than the other profiles. Thus even though Profile 1 scored higher on the Restraint scale than any of the other diagnostic items, this score was lower than the sample mean and it is therefore difficult to categorize this group as "primary restrictors" rather than subthreshold/EDNOS. Consequently, it is difficult to ascertain from the results whether this hypothesis was confirmed. Also not anticipated is that individuals in profile 2 approached significance in the primary analysis with regard to differing from the control sample on awareness, but the difference was not significant after the Bonferroni correction. This suggests that perhaps lack of awareness of emotional states is not limited to restriction alone. However, taken together, these findings do indicate that individuals with eating disorders struggle with awareness of their emotions more than the general population.

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This notion is also supported by the overall secondary MANOVA which yielded

significant differences between the total samples on the Awareness scale.

The hypothesis that individuals with eating disorders will score higher on the

Strategies subscale of the DERS was largely confirmed as well. Profile 1 had a

significantly higher mean score for this subscale than the healthy control sample,

meaning that 71.7% of the sample had a more difficult time believing they had access to

ways and strategies to help them regulate their negative emotions than those in the

control sample. Though each of the other subgroups had higher mean scores for this

scale, no other significant differences were found for any of the other profiles, though

profile 2 did approach significance. The secondary analyses also showed profile 1 being

significantly higher and profile 2 approaching significance. Profile 4 had the highest

mean score for this subscale, meaning that out of the entire sample they have the most

difficulty coming up with alternate strategies to regulate their emotions. However, likely

due to the small number of individuals in this profile, no significant differences were

detected.

Finally the hypothesis that individuals with eating disorders will score lower on

the Clarity subscale of the DERS than the healthy control sample was also not

substantiated in either set of analyses. Though, as previously mentioned, there is

research to support the notion that individuals with eating disorders have greater

difficulty differentiating their emotions, this study did not find any differences between

the clinical sample and the healthy control sample. Merwin and colleagues (2009), in an attempt to disentangle clarity from other components of interoceptive awareness, found that clarity did not significantly predict variance in eating disorder behaviors. However, they found that non-acceptance of emotions predicted restricting. It is possible that the literature relating poor interoceptive awareness and alexithymia to eating disorders has been driven by the emotional awareness and non-acceptance components of these constructs. Perhaps clarity is not a major factor differentiating individuals with eating disorders or contributing to eating disorder behaviors. Further research which continues to differentiate these constructs and examine them individually is necessary.

4.3 Contribution of DERS Scores to Eating Disorder Symptoms

This study failed to confirm the hypothesis that DERS scores account for a significant amount of variance in binge eating, vomiting, and laxative use above and beyond that accounted for by restriction, and weight and shape concerns. For vomiting, none of the predictor variables accounted for much of the variance at all. There was significance in the model for binge eating and laxative use at step 1 but DERS scores did not contribute any significant variance in any of the eating disorder behaviors above and beyond Step 1. The findings of Whiteside and colleagues that difficulties regulating emotions would account for significant variance in eating disorder symptoms were not replicated in this clinical sample. This could be due to the use of a different measure of eating pathology (Whiteside and colleagues used the EDDS while the present study

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used the EDE-Q) or possibly that Whiteside and colleagues surveyed an undergraduate

sample while this study examined a clinical sample seeking treatment.

Additionally, this lack of significance could speak to a lack of consensus about

the direction of the relationship between eating disorder symptoms and emotion

regulation. Sim and Zeman (2006) found that BMI and negative affect predicted body

dissatisfaction while body dissatisfaction and lack of emotional awareness predicted

disordered eating. As discussed previously, lack of emotional awareness greatly

diminishes the ability to regulate emotions and is one of the constructs highlighted in

the DERS. With a larger sample size it may have been possible to examine the specific

contribution of each DERS subscale to the variance accounted for in binge eating and

purging behaviors. Additionally, considering the results of Sim and Zeman's (2006)

study, it is possible that difficulties regulating negative emotions *do* contribute to eating

disorder behaviors, and do so primarily in the context of negative emotions surrounding

the typical concerns of those with eating disorders (eating, weight gain, changes in body

shape).

4.4 General Discussion and Limitations

The results of this study confirm that individuals with eating disorders

experience greater difficulties regulating their emotions than the healthy control sample,

particularly with regard to nonacceptance, awareness, and access to strategies. As laid

out in the literature review of this study, the ability to notice one is having an emotion,

to accept it rather than push it away, and to believe that one has the capacity to effectively handle that emotion, are crucial to emotional health and wellbeing. This study confirms that individuals with eating disorders do experience greater difficulty in this area than individuals in the general population. Unfortunately, what can not be determined based on these findings is how exactly individuals with eating disorders differ from one another in these difficulties.

The profiles that emerged in this clinical sample were either in the EDNOS range or closely resembled BN. No groups emerged that would enable a comparison with a group of restrictors or primary binge eaters. Further research to examine how individuals suffering from specific eating disorder symptoms differ from one another in difficulties regulating emotion is needed. There is a great deal of evidence in the literature that these difficulties may be different for those who struggle with binge eating and/or purging than those who primarily restrict. Additionally, in examining the pattern of results of this study, individuals who engage in multiple methods of purging may experience even greater difficulty than those who engage in vomiting alone. Continued study in this area is needed in order to provide empirical evidence of these differences. Being able to pinpoint the differences in these areas of deficit in emotion regulation will serve to inform the literature as well as treatment approaches.

Methods such as LCA and LPA could prove to be extremely beneficial in attempting to identify better means with which examine the classification of eating

disorders empirically. However, as evidenced in this study and discussed in the literature review, each study that has employed these methods has found differing numbers of classes/profiles with various symptoms and combinations, and this is because each of these studies has included different indicator variables (symptoms used for classification). Though taken together they do serve to confirm that eating disorders are more heterogeneous than the categories in the DSM-IV-TR, at present we are still met with a lack of consensus on how to best classify eating disorders, if at all. An agreement on which indicators are most important and which measures provide the best information will be crucial if there are to be studies such as this one that then take these profiles and use them to attempt to identify clinically meaningful comparisons.

One of the major limitations of this study is sample size. Though, as evidenced by a valid 4 profile solution, it is possible to conduct a latent profile analysis on sample this small, conducting any further comparison analyses based on the resulting profiles becomes difficult when one or more of the profiles contains a small number of individuals. Previous studies have obtained sample sizes ranging from 234 participants (Striegel-Moore, et al., 2005) to over 3500 participants (Duncan, et al., 2007) with the majority of studies have a sample size of well over 500 participants. A larger clinical sample may have resulted in more significant differences between groups on the emotion regulation subscales.

The use of self report measures alone is also another limitation of this study. Though consistent with the prevalence of EDNOS in the literature, 71% of the individuals with eating disorders reported subclinical levels of symptom frequency at the time they presented for treatment. It is possible that underreporting occurred or that ambivalence about treatment and denial of the severity of their experiences, particularly for those who primarily restrict, may have been a factor in the responses given to the questionnaire items. Though the EDE-Q is a widely used measure which is often used in research, and clinically as a marker of symptom severity, the interview may be more beneficial in obtaining more accurate clinical information. A clinical interview by an experienced clinician in which rapport was built and a relationship begun may have resulted in higher levels of reported symptom frequency which may have resulted in different profiles emerging.

Finally, the lack of another clinical comparison group can also be seen as a limitation of this study. As discussed in previous sections, difficulty regulating emotions is common across a wide range of psychological disorders and is not unique to eating disorders. The results of this study show that individuals with eating disorders have greater difficulty regulating their emotions in comparison to a sample of control participants. The inclusion of other clinical samples would allow the exploration of whether individuals with eating disorders have more difficulty than other clinical groups and if so in what areas.

Figures
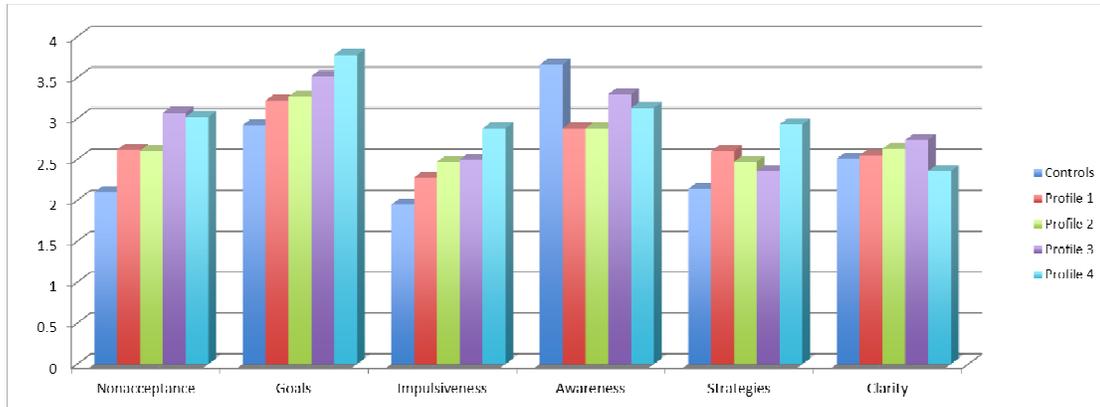
Figure 1

Graphical Representation of Mean Differences in DERS Scores Among Eating Disorder

Groups

Tables

Table 1

Demographic Information for Overall Samples and Each Profile

	Female		Age		BMI	
	%	Mean (SD)	Mode (Min, Max)	Mean (SD)	Mode (Min, Max)	
Clinical Sample	96.5	25.12 (9.24)	21.00 (13.00, 63.00)	21.90 (6.76)	19.50 (14.20, 47.40)	
Controls	50.8	19.03 (.86)	19.00 (18.00. 21.00)	22.54 (3.23)	22.30 (17.60, 36.00)	
Profile 1	95.1	26.10 (10.08)	21.50 (16.00, 63.00)	22.18 (7.48)	19.30 (14.20, 47.40)	
Profile 2	100	21.00 (4.06)	21.00 (13.00, 33.00)	20.62 (3.31)	19.45 (16.80, 27.00)	
Profile 3	100	23.80 (6.91)	27.00 (15.00, 31.00)	20.48 (3.93)	21.50 (14.50, 24.70)	
Profile 4	100	26.00 (8.88)	22.50 (17.00, 41.00)	23.29 (7.71)	20.50 (15.40, 36.30)	

Table 2

Model Fit Indexes for the 2-, 3-, 4-, and 5-Profile Solution for Original LPA Including

Both Men and Women

Fit Index	2-Class	3-Class	4-Class	5-Class	6-Class
AIC	2919.578	2847.474	2785.024	2709.881	2730.865
BIC	2913.947	2839.678	2775.062	2697.753	2716.572
Entropy	1.000	.959	.972	.980	.988

Note: AIC = Akaike Information Criterion, BIC = sample size-adjusted Bayesian
Information Criterion

Table 3

Latent Profile Probabilities for Each Profile Given Assigned Profile

for Original LPA Including Both Men and Women

Assigned Profiles	Profile 1	Profile 2	Profile 3	Profile 4
Profile 1	.994	.006	.000	.000
Profile 2	.054	.937	.000	.009
Profile 3	.000	.000	1.000	.000
Profile 4	.008	.004	.000	.988

Table 4

Conditional Response Means for the 4-Profile Solution For Original LPA Including

Both Men and Women

EDE-Q Items	Sample Mean (n = 113)	Profile 1 (n = 81) CRM(se)	Profile 2 (n = 19) CRM(se)	Profile 3 (n = 5) CRM(se)	Profile 4 (n = 8) CRM(se)
Number of Binges	7.11 (8.03)	5.18 (.79)	13.07 (2.28)	9.20 (4.71)	11.74 (1.72)
Number of times vomited	5.96 (9.07)	1.40 (.42)	21.52 (1.30)	9.80 (5.46)	11.34 (3.13)
Number of times used laxatives	1.58 (5.12)	.11 (.06)	0.14 (.16)	23.60 (1.76)	6.08 (.84)
Restraint scale	18.36 (7.88)	17.25 (.87)	18.33 (1.92)	25.80 (1.84)	25.02 (1.31)

Table 5

Mean Differences in DERS Scores Among Controls and Eating Disorder Profiles

Including Both Men and Women

	Nonacceptance	Goals	Impulsiveness	Awareness	Strategies	Clarity
ED Profile	$F(4,226)=20.73$ partial $\eta 2=.10$**	$F(4,226)=9.87$ partial $\eta 2=.07$*	$F(4,226)=12.90$ partial $\eta 2=.10$**	$F(4,226)=33.35$ partial $\eta 2=.18$**	$F(4,226)=23.24$ partial $\eta 2=.16$**	$F(4,226)=1.76$ partial $\eta 2=.03$
Controls	2.10_a	2.92_a	1.95_a	3.66_a	2.14_a	2.51
Profile 1	2.62_b	3.22_a	$2.28_{a\dagger}$	2.88_b	2.60_b	2.55
Profile 2	2.61_{ab}	3.27_a	2.47_a	$2.88_{ab\dagger}$	$2.47_{ab\dagger}$	2.63
Profile 3	3.07_{ab}	3.52_a	2.50_a	3.30_{ab}	2.36_{ab}	2.74
Profile 4	3.02_{ab}	3.78_a	2.88_a	3.13_{ab}	2.93_{ab}	2.36

Note: Means with different subscripts were significantly different from one another.
*$p<.008,$**$p<.001$
† indicates means that approached being significantly different from the mean of the control group.

Table 6

Model Fit Indexes for the 2-, 3-, and 4-Profile Solutions for Secondary LPA Including
Only Women

Fit Index	2-Profile	3-Profile	4-Profile	5-Profile
AIC	2827.033	2755.153	2695.925	2622.900
BIC	2820.942	2746.719	2685.149	2609.781
Entropy	1.00	.961	.973	.981

Note: AIC = Akaike Information Criterion, BIC = sample size-adjusted Bayesian
Information Criterion.

Table 7

Latent Profile Probabilities for Each Profile Given Assigned Profile for Secondary

LPA Including Only Women

Assigned Profiles	Profile 1	Profile 2	Profile 3	Profile 4
Profile 1	.994	.006	.000	.000
Profile 2	.051	.941	.000	.009
Profile 3	.000	.000	1.000	.000
Profile 4	.011	.004	.000	.985

Table 8

Mean Differences in DERS Scores Between Overall Clinical and Control Samples

Including Only Women

	Non-acceptance	Goals	Impulsive-ness	Awareness	Strategies	Clarity	Total
<u>Sample</u>	$F(1,167)=$ 11.73 partial η2=.07*	$F(1,167)=$ 6.58 partial η2=.04†	$F(1,167)=$ 17.88 partial η2=.10**	$F(1,167)=$ 25.55 partial η2=.13**	$F(1,167)=$ 17.69 partial η2=.10**	$F(1,167)$ =.839 partial η2=.01	$F(1,167)=$ 6.05 partial η2=.04†
Control	2.13	2.94	1.85	3.63	2.18	2.50	2.54
Clinical	2.64	3.27	2.36	2.91	2.71	2.59	2.75

*p<.008,**p<.001
† indicates means that approached being significantly different from the mean of the control group.

Table 9

Mean Differences in DERS Scores Among Controls and Eating Disorder Profiles

Including Only Women.

	Non-acceptance	Goals	Impulsive-ness	Awareness	Strategies	Clarity	Total
Profile	$F_{(4,164)}=$ 3.61 partial η2=.08*	$F_{(4, 164)}=$ 2.66 partial η2=.06	$F_{(4, 164)}=$ 5.96 partial η2=.13**	$F_{(4, 164)}=$ 6.73 partial η2=.14**	$F_{(4, 164)}=$ 5.99 partial η2=.13**	$F_{(4, 164)}=$ 1,27 partial η2=.03	$F_{(4, 164)}=$ 3,20 partial η2=.07
Control	2.13_a	2.94_a	1.85_a	3.63_a	2.18_a	2.50_a	2.54_a
Profile 1	$2.58_{a†}$	3.21_a	2.27_b	2.88_b	2.63_b	2.60_a	2.69_a
Profile 2	2.61_a	3.27_a	2.47_{ab}	$2.88_{ab†}$	$2.79_{ab†}$	2.47_a	2.75_a
Profile 3	3.07_a	3.52_a	2.50_{ab}	3.30_{ab}	2.70_{ab}	2.38_a	2.91_a
Profile 4	3.02_a	3.78_a	2.88_{ab}	3.13_{ab}	3.33_{ab}	2.93_a	3.18_a

Note: Means with different subscripts were significantly different from one another
*$p<.008$,**$p<.001$
† indicates means that approached being significantly different from the mean of the control group.

Table 10

Correlations Between EDE-Q Scales and Eating Disorder Behaviors

	EDEQ Restraint	EDEQ Weight Concern	EDEQ Shape Concern	DERS Total	Days of Binge Eating	Days of Purging	Days of Laxative Use
EDEQ Restraint	1.000	-	-	-	-	-	-
EDEQ Weight Concern	.649**	1.000	-	-	-	-	-
EDEQ Shape Concern	.577**	.816**	1.000	-	-	-	-
DERS Total	.237*	.304**	.338**	1.000	-	-	-
Days of Binge Eating	..257*	.219	.378*	.121	1.000	-	-
Days of Purges	.069	.-141	-.135	.058	.461**	1.000	-
Days of Laxative Use	.258	-.066	-.148	.080	.325	.705*	1.000

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

Table 11

Hierarchical Linear Regression Analyses for Bingeing, Vomiting, and Laxative Use

	Binging	Vomiting	Laxative Use
Step 1	$F(3,105)=4.168^{**}$, $R^2=.11$, β (95% CI)	$F(3,105)=1.338$, $R^2=.04$, β (95% CI)	$F(3,105)=5.764$, $R^2=.14$, β (95% CI)
Restraint	-.108 (-1.48,.06)	.136(-.05,.18)	.328(.03,.17)**
Weight Concern	-.048(-.17,.12)	.167(-.88,.25)	.246(-.03,.17)
Shape Concern	.411(.05,.42)*	-.131(-.30,.13)	-.248(-.23,.03)
Step 2	$\Delta F(1,104)=.166$, $\Delta R^2=.00$, β (95% CI)	$\Delta F(1,104)=.957$, $\Delta R^2=.01$, β (95% CI)	$\Delta F(1,104)=.795$, $\Delta R^2=.01$, β (95% CI)
DERS Total	.040(-.13,.20)	.100(-.10,.28)	.086(-.06,.16)

Note: OR=Odds Ratio, CI=Confidence Interval. * $p<.05$; ** $p<.01$.

Appendix A

Instructions

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

ON HOW MANY DAYS OUT OF THE PAST 28 DAYS…..	No Days	1-5 Days	6-12 Days	13-15 Days	16-22 Days	23-27 Days	Every Day
1. …Have you been consciously trying to restrict the amount of food you eat to influence shape or weight?	0	1	2	3	4	5	6
2. …Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?	0	1	2	3	4	5	6
3. …Have you <u>attempted</u> to avoid eating any foods which you like in order to influence your shape or weight?	0	1	2	3	4	5	6
4. …Have you <u>attempted</u> to follow definite rules regarding your eating in order to influence your shape or weight; for example, a calorie limit, a set amount of food, or rules about what or when you should eat?	0	1	2	3	4	5	6
5. …Has thinking about food or its calories content interfered significantly with your ability to concentrate on things you are interested it; for example, read, watch TV, or follow a conversation?	0	1	2	3	4	5	6
6. …Have you had a definite fear that you might not be able to	0	1	2	3	4	5	6

either resist eating or stop eating?							
7. …Have you experienced a sense of loss of control over eating?	0	1	2	3	4	5	6
8. …Have you had any episodes of binge-eating?	0	1	2	3	4	5	6

ON HOW MANY DAYS OUT OF THE PAST 28 DAYS…..	No Days	1-5 Days	6-12 Days	13-15 Days	16-22 Days	23-27 Days	Every Day
9. …Have you eaten in secret? (Do not count binges.)	0	1	2	3	4	5	6
10. …Have you had a definite desire for your stomach to be flat?	0	1	2	3	4	5	6
11. …Have you had a definite desire for your stomach to be empty?	0	1	2	3	4	5	6
12. …Has thinking about shape or weight interfered with your ability to concentrate on things you are interested in: for example, read, watch TV, or follow a conversation?	0	1	2	3	4	5	6
13. …Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
14. …Have you felt fat?	0	1	2	3	4	5	6
15. …Have you had a strong desire to lose weight?	0	1	2	3	4	5	6
OVER THE PAST FOUR WEEKS (28 DAYS)…….							

16. …On what proportion of times that you have eaten have you felt guilty because of your shape or weight? (Do not count binges.)	0. None of the times 1. A few of the times 2. Less than half the times 3. Half the times 4. More than half the times 5. Most of the time 6. Every time
17. … Have there been times when you have eaten what other people would regard as an unusually large amount of food? (Please circle)	0 ---- NO 1 ---- YES
18.… How many such episodes have you had over the past 4 weeks?	_____
19.… During how many of these episodes of overeating did you have a sense of having lost control?	_____
OVER THE PAST FOUR WEEKS (28 DAYS)…….	
20 ….Have you had other episodes of eating in which you have had a sense of having lost control but have not eaten an usually large amount of food? (Please circle)	0 ---- NO 1 ---- YES
21….How many such episodes have you had over the past four weeks?	_____
22….Over the past four weeks have you made yourself sick (vomit) as a means of controlling your shape or weight, or to counteract the effects of eating? (Please circle)	0 ---- NO 1 ---- YES
23….On how many days out of the last 28 have you done this?	_____
24 ….Have you taken laxatives as a means of controlling your shape or weight or to counteract the effects of eating?	0 ---- NO 1 ---- YES
25.On how many days out of the last 28 have you done this?	_____
26….Have you taken diuretics (water tablets) as a means of controlling your shape or weight or to counteract the effects of eating? (Please circle)	0 ---- NO 1 ---- YES
27.On how many days out of the last 28 have you done this?	_____
28….Have you vigorously exercised as a means of controlling your weight, altering your shape or amount of fat, or burning off calories? (Please circle)	0 ---- NO 1 ---- YES
29.On how many days out of the last 28 have you done this?	_____
OVER THE PAST 4 WEEKS (28 DAYS)……….	

	NOT AT ALL		SLIGHTLY		MODERATELY		MARKEDLY

	NOT AT ALL		SLIGHTLY		MODERATELY		MARKEDLY
30....Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
31....Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
32....How much would it distress you if you had to weigh yourself once a week for the next four weeks?	0	1	2	3	4	5	6
33....How dissatisfied have you felt about your weight?	0	1	2	3	4	5	6
34....How dissatisfied have you felt about your shape?	0	1	2	3	4	5	6
35...How thin have you wanted to be?	0	1	2	3	4	5	6
36....How concerned have you been about other people seeing you eat? (Only circle 4, 5, or 6 if you have avoided some occasions).	0	1	2	3	4	5	6
	NOT AT ALL		SLIGHTLY		MODERATELY		MARKEDLY
37....How uncomfortable have you felt seeing your body: for example, in the mirror, in the shop window reflections, while undressing or taking a bath or shower? (Only circle 4, 5, or 6 if you have avoided some occasions).	0	1	2	3	4	5	6
38....How uncomfortable have you felt about others seeing your body; for example, in communal changing rooms, when swimming or wearing tight clothes? (Only circle 4, 5, or 6 if you have avoided some	0	1	2	3	4	5	6

occasions).							
Have the past four weeks been representative of the past year? (Please circle)						YES	NO
If no, how has the past year differed from the past four weeks?							

EATING SCREEN

Please carefully complete all questions

Over the <u>past 3 months…</u>	Not at all		Slightly		Moderately		Extremely
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 many **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 upset about your uncontrolled 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 many **times per week** on average over the past **3 months** have you used laxatives or 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 **times per week** on average over the past **3 months** have you engaged in excessive exercise specifically to counteract the effects of overeating episodes?
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

19. How much do you weigh? If uncertain, please give your best estimate. _____ lbs.

20. How tall are you? _Please specify in inches (5 ft.= 60 in.)_____ in.

21. Over the past **3 months**, how many menstrual periods have you missed? 0 1 2 3 n/a

22. Have you been taking birth control pills during the past **3 months**?. . . . . .YES   NO

SCORING:
Please refer to Stice, E., Fisher, M., & Martinez, E. (2004) for scoring procedures.

DERS

INSTRUCTIONS: 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   sometimes   about half the time   most of the time   almost always
(0-10%)   (11-35%)   (36-65%)   (66-90%)   (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'll 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 with 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 that there is nothing I can do to make myself feel

better.

_____ 29) When I'm upset, I become irritated with 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 behaviors.

_____ 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.

DERS Scoring/Subscales

NONACCEPTANCE – 6 items
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.
21) When I'm upset, I feel ashamed with myself for feeling that way.
23) When I'm upset, I feel like I am weak.
25) When I'm upset, I feel guilty for feeling that way.
29) When I'm upset, I become irritated with myself for feeling that way.

GOALS – 5 items
13) When I'm upset, I have difficulty getting work done.
18) When I'm upset, I have difficulty focusing on other things.
20) When I'm upset, I can still get things done. (r)
26) When I'm upset, I have difficulty concentrating.
33) When I'm upset, I have difficulty thinking about anything else.

IMPULSE – 6 items
3) I experience my emotions as overwhelming and out of control.
14) When I'm upset, I become out of control.
19) When I'm upset, I feel out of control.
24) When I'm upset, I feel like I can remain in control of my behaviors. (r)
27) When I'm upset, I have difficulty controlling my behaviors.
32) When I'm upset, I lose control over my behaviors.

AWARENESS – 6 items
2) I pay attention to how I feel.
6) I am attentive to my feelings.
8) I care about what I am feeling.
10) When I'm upset, I acknowledge my emotions.
17) When I'm upset, I believe that my feelings are valid and important.
34) When I'm upset, I take time to figure out what I'm really feeling.

STRATEGIES – 8 items
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'll end up feeling very depressed.
22) When I'm upset, I know that I can find a way to eventually feel better. (r)
28) When I'm upset, I believe that there is nothing I can do to make myself feel better.
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.
35) When I'm upset, it takes me a long time to feel better.
36) When I'm upset, my emotions feel overwhelming.

CLARITY – 5 items

1) I am clear about my feelings. (r)
4) I have no idea how I am feeling.
5) I am having difficulty making sense out of my feelings.
7) I know exactly how I am feeling. (r)
9) I am confused about how I feel.

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Biography

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