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Maladaptive Schemas as a Predictor of Residential Treatment Outcomes in Females with Eating Disorders

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MALADAPTIVE SCHEMAS AS A PREDICTOR OF RESIDENTIAL TREATMENT OUTCOMES IN FEMALES WITH EATING DISORDERS

by

Jodi L. Cullum

A dissertation submitted in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Psychology

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2009
The present study aimed to examine the relationship between maladaptive schemas and treatment outcomes of adolescent and adult women with an eating disorder receiving residential treatment. Existing data were obtained from 67 females aged 11 to 47 years \(m = 18.61\) that had entered residential treatment for anorexia nervosa (AN), bulimia nervosa (BN), or eating disorder not otherwise specified (EDNOS) at a Western United States residential eating disorder treatment facility. Pre- and posttreatment data were collected by the personnel at the facility on eating disorder symptomatology, mood, and core beliefs. Three hypotheses were tested: (a) that maladaptive schemas would be positively correlated with eating disorder symptom severity, (b) that females endorsing more maladaptive schemas at admission or those with stable maladaptive schemas across their course of treatment would have less favorable posttreatment outcomes at the time of their discharge from residential treatment than females with lower scores initially or improved scores over the course of their treatment and follow-up, and (c) that females
endorsing more maladaptive schemas or with greater stability of their maladaptive schemas across treatment will spend more time in residential treatment. To address the above hypotheses a series of hierarchical linear regressions, linear mixed-effects models, and Cox proportional-hazards regressions were conducted. Results indicated that maladaptive schemas at the start of treatment were predominantly predictive of admit rather than discharge symptomatology. Different combinations of maladaptive schemas were found to have both positive and negative relationships to one’s symptoms across time. The most common maladaptive schemas found to be significantly associated with symptoms were impaired limits, impaired autonomy and performance, and overvigilance and inhibition. Lastly, a relationship existed between both impaired limits and overvigilance and inhibition and a participant’s length of stay in treatment. The results of this study suggest that maladaptive schemas provide some predictability of treatment outcomes and are important targets for psychological interventions aimed at recovery. Furthermore, the results of the study highlight the complexity associated with maladaptive schemas in females with eating disorders and the need for longitudinal research to examine common patterns and therapeutic targets based on diagnosis and status in treatment.
ACKNOWLEDGMENTS

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I am very grateful to the residential eating disorder facility for their openness to my utilization of their data. This allowed me to explore an incredibly important population that is typically difficult to access. Their support of my study was much appreciated and I commend them on their interest in furthering the field of eating disorders treatment through their ongoing work.

Throughout my studies I was provided with support and guidance by countless others. My parents, Don and Bette, have continued to support all of my educational endeavors and encouraged me to push through the most challenging of times. My Great Uncle Gerry has been a true inspiration to me. His wisdom, enthusiasm for learning, and belief in me are just a few of the gifts he has shared with me. The patience and support I received from my partner, Dr. Mark Deneau, was unparalleled. His positive attitude assisted me in a multitude of ways.

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Jodi L. Cullum
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Eating disorders are highly challenging disorders to treat due to their complexity. The ego syntonic nature of eating disorders, along with a multitude of psychological, biological, and sociological variables associated with the development and maintenance of these disorders, provides some explanation for the difficulty in successfully treating these conditions. Numerous factors have been studied in the etiology of eating disorders and as potential prognostic factors for treatment outcomes in individuals with eating disorders.

Investigations of cognitive factors, in particular, have lead to the development and testing of numerous cognitive-behavioral theories related to eating disordered behaviors (e.g., dysfunctional assumptions about weight, shape, and food; perfectionism, need for self-control; Fairburn, Shafran, & Cooper, 1999; Halmi et al., 2000; Waller, Ohanian, Meyer, & Osman, 2000). The cognitive components included in these theories have typically focused on specific eating disordered ideation such as negative body image and concerns about food and weight (e.g., Fairburn & Cooper, 1989; Fairburn et al.; Vitousek, 1996). Subsequently, a primary goal of cognitive behavioral therapy (CBT) for eating disorders has been to modify and create healthy body image perception, healthy food beliefs, and assist in reestablishing normal eating patterns. Reviews of CBT interventions for eating disorders have found this approach to be moderately effective in women with bulimia nervosa and possibly effective for women with anorexia nervosa (e.g., Anderson & Maloney, 2001; Hay, Bacaltchuk, & Stefano,
Much less is known about the impact of CBT and other treatments on eating disorders not otherwise specified. Overall, CBT is typically superior to other psychotherapeutic approaches and antidepressant treatment alone in treating eating disorders (e.g., Mitchell et al., 1990; Thackwray, Smith, Bodfish, & Meyers, 1993).

While CBT is generally an effective treatment for females with bulimia nervosa (BN) and perhaps also for anorexia nervosa (AN), evidence is mounting that a focus on food or weight cognitions alone may result in a superficial or myopic understanding of eating disorders (Cooper, 1997; Mountford, Waller, Watson, & Scragg, 2004; Redenbach & Lawler, 2003; Tozzi, Sullivan, Fear, McKenzie, & Bulik, 2003). Over the last decade, more attention has been directed at the relationship between the nature of patients’ maladaptive core beliefs or schemas and their relationship with serious eating disorder symptoms. Maladaptive schemas may be described as broad, pervasive themes or patterns that comprise memories, emotions, cognitions, and bodily sensations. Emotional temperament and childhood events interact to form one’s schemas (Young, Klosko, & Weishaar, 2003). Once maladaptive schemas have developed they are dysfunctional to a substantial degree, elaborated upon throughout ones’ life, and may be directed at oneself or relationships with others (Young et al.). By way of example, an individual with BN who is stood up on a date may experience the activation of abandonment and mistrust schemas that lead to feelings of loneliness and anger. As a result of these feelings the individual may engage in a binge to relieve the negative emotional arousal in the short-term (Waller, Kennerley, & Ohanian, 2007, p. 147).

There is increasing evidence that females with eating disorders exhibit a higher occurrence of maladaptive schemas than individuals without eating disorders (Leung,
Waller, & Thomas, 1999; Turner & Cooper, 2000; Waller et al., 2000). Furthermore, within samples of females with eating disorders, relationships appear to exist between maladaptive schemas and eating disorder symptom severity. For instance, previous research has shown that the constructs of disconnection, impaired autonomy, impaired limits, and overcontrol were positively associated with compensatory behaviors (Dingemans, Spinhoven, & Van Furth, 2006). The current evidence on the relationship between maladaptive schemas and eating disorders seems to suggest that further inquiry will benefit the current conceptualizations of eating disorders and subsequently lead to improved therapeutic approaches. As one example, CBT techniques can be employed to directly address those beliefs in individuals with eating disorders. An approach that directs greater attention to broader cognitions associated with eating disorder symptom severity in addition to more eating disorder specific beliefs could result in improved outcomes for patients (e.g., fewer residual symptoms at discharge, a reduced length of stay).

The purpose of this study was to examine the relationship between maladaptive schemas and both eating disorder symptomatology and treatment outcomes among adolescent and adult females who have attended residential treatment for eating disorders. The study examined the interplay between maladaptive schemas and eating disorder symptomatology from intake to discharge. Demonstrating a relationship between maladaptive schemas and responsiveness to treatment will help inform treatment providers regarding the need to target these deeper level cognitions.
The examination of the relationship between maladaptive schema and treatment outcomes offers a unique perspective that has only recently begun to receive attention in the literature. The study represented the next step in determining the need for modifications to the existing cognitive-behavioral models and their related treatment approaches for eating disorders. The prospective follow-up design of the study will be the first of its kind in the area of research connecting eating disorder symptomatology with maladaptive schemas. Examining core beliefs and clinical outcomes prospectively will better inform researchers and clinicians of the relationship of eating disorder behaviors and eating disorder specific beliefs with maladaptive schemas. Findings from this study will provide additional direction on the best approaches to be taken therapeutically, particularly within a CBT framework, when working with eating disordered individuals. The primary aims of the study were to:

1. Identify the maladaptive schemas in females attending residential treatment for eating disorders and the relationship of these beliefs and eating disorder symptom severity (i.e., global eating disorder pathology, frequency of disordered eating behaviors, body image). It was hypothesized that individuals endorsing more maladaptive schemas will report more behavioral, cognitive, and emotional symptoms associated with eating disorders.

2. Examine the relationship between maladaptive schemas at pretreatment and posttreatment with eating disorder symptoms. It was hypothesized that the magnitude of change in eating disorder symptom severity would be associated with the magnitude of change in the expression of maladaptive schemas.
3. Examine the relationship between maladaptive schemas and treatment duration, adjusting for eating disorder severity. It was hypothesized that individuals endorsing more maladaptive schemas would progress at a slower rate in treatment and require a longer stay in treatment than those individuals endorsing fewer or less severe maladaptive schemas.
CHAPTER II

REVIEW OF THE LITERATURE

The literature review begins with general information on eating disorders including diagnostic criteria, prevalence, consequences, and an overview of treatment effectiveness. This is followed by greater detail on the role of cognitions in the development and maintenance of eating disorders and the associated CBT approaches. The evolution of cognitive theory within the area of eating disorders is presented beginning with cognitive distortions related directly to body shape, weight, and food, followed by a discussion of core beliefs, and finally maladaptive schemas. Different perspectives on cognitions will be compared to help better expound these concepts and highlight maladaptive schemas. The literature review ends with a rationale for the study.

Background and Significance

Diagnostic Criteria for Eating Disorders

The modern diagnostic classifications for eating disorders have been evolving since 1970 when AN was the first eating disorder to receive formal diagnostic criteria (Garfinkel, 2002). The most recent diagnostic criteria for eating disorders are found within the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000). The DSM-IV-TR identifies AN, BN, and EDNOS as eating disorders. The DSM-IV-TR diagnostic criteria for AN and BN bifurcates these conditions based on self-cognitions, associated behaviors, and physiological changes.
The age of onset for eating disorders is often during adolescence and early adulthood. The onset of AN is typically between the ages of 14-18 and in late adolescence or early adulthood for BN (APA, 2000). Hudson, Hiripi, Pope, and Kessler (2007) found the mean age of onset for AN and BN using a national dataset to be 18.9 and 19.7 years, respectively. In addition, they reported that the mean duration of the disorders was 1.7 years for AN and 8.3 years for BN. Eating disorders are most common in females and the literature on eating disorders is reflective of this imbalance.

The DSM-IV-TR (APA, 2000) criteria do not take into account potential developmental differences across children, adolescents, and adults. For example, with prepubertal individuals the amenorrhea criteria may be confusing and it can be unclear when menstruation would have begun. Additionally, prepubertal individuals are less likely to verbalize body image distortions than their older counterparts (Kotler & Walsh, 2000).

Interestingly, there is a low comorbidity between body dysmorphic disorder (BDD) and eating disorders, despite their sharing of body image disturbances and preoccupation with physical flaws (Phillips, 2002). BDD and eating disorders may be distinguished by the overemphasis on specific body parts with BDD, and a focus on overall body shape and weight with eating disorders.

**Prevalence of Eating Disorders**

The prevalence of AN and BN in females is estimated to range between 0.5-3.7% and 1.1-4.2%, respectively (American Psychiatric Association Work Group on Eating Disorders, 2000). More recently, the prevalence rates for eating disorders found within
the National Comorbidity Replication Survey were published (Hudson et al., 2007).
Lifetime prevalence rates for AN and BN were found to be .6% and 2.8%, respectively. These rates were generally consistent with previous studies.

The mortality rate for those with AN is estimated at 0.56% per year, or approximately 5.6% per decade. This number is about 12 times higher than the annual death rate due to all causes of death among females ages 15-24 years in the general population (Sullivan, 1995). Even more alarming is that the long-term mortality rate for AN may approach 20% (Tamburrino & McGinnis, 2002). The crude mortality rate for individuals with BN is 0.3% (Keel & Mitchell, 1997) though this may be an underestimate.

There has been disagreement on whether eating disorders have been on the rise over the past century. Those that view eating disorders as increasing in North America cite societal pressures to maintain a slim physique as depicted in the popular media and more directly through relationships with family and friends as a major cause for the increase. As an example, an individual may observe frequent dieting and exercise behaviors in their family or peers or hear direct comments from family and peers about their appearance or the appearance of others. International studies have also found a positive association with exposure to Western media and eating disorder symptoms in African and Mexican girls (e.g., Austin & Smith, 2008; Eddy, Hennessey, & Thompson-Brenner, 2007). An alternative explanation for the increased incidence and prevalence of eating disorders may be the increase in awareness of the existence of eating disorders and the improved diagnosis of eating disorders. A study conducted by Pyle, Halvorson, Neuman, and Mitchell (1986) examined the prevalence of BN in college women.
Through self-report methods the researchers found that 8% of the women surveyed indicated that they were engaging in bulimic behaviors and met the criteria for BN. This percentage was an increase from two previous studies noted by the researchers that occurred earlier in the 1980s that found rates of 1% and then 3.2%. Hudson and colleagues (2007) also reported that there was a rise in BN in the second half of the 20th century, but added that the incidence rates may be leveling off.

Consequences of Eating Disorders

The physical consequences of AN and BN are well documented. These include alterations in biochemistry, cardiovascular complications, changes in gastrointestinal physiology, neuromuscular abnormalities, osteoporosis, dehydration, and reduced fertility (Zipfel, Lowe, & Herzog, 2003). The physical changes associated with restricting and purging behaviors may eventually lead to long-term physiological changes and even death. Those most at risk for medical complications include malnourished anorexic patients, bulimia patients with severe bingeing and purging symptomatology, and patients with a co-morbid medical condition such as diabetes. Significant weight fluctuations can also place an individual at risk for complications.

In addition to physical consequences, those with eating disorders and their families suffer a variety of other consequences. For instance, high psychological distress is common both in the patient and in the family members responsible for their care (Nielsen & Bara-Carril, 2003). Eating disorders can greatly impact the social functioning of those afflicted either through delaying social development or through impaired ability to build or maintain social relationships (Cozzi & Ostuzzi, 2007; Ruuska, Koivisto,
Issues of sexuality (e.g., lower sexual esteem) are also common along with a reduced quality of life overall (de la Rie, Noordenbos, Donker, & van Furth, 2007; Morgan, Wiederman, & Pryor, 1995; Schembri & Evans, 2008). Conflict may increase within a family and a family may experience isolation from outside relationships as a consequence (Hilleage, Beale, & McMaster, 2006; Treasure et al., 2001; Whitney & Eisler, 2005).

**Overview of Treatment for Eating Disorders**

The treatment of eating disorders is a considerable challenge to the professionals working with this population. Anorexia nervosa, in particular, has proven to be a highly intractable condition (Halmi et al., 2005). Treatments include a host of psychotherapeutic interventions (e.g., cognitive behavioral therapy (CBT), interpersonal therapy, family therapy, dialectical behavior therapy, acceptance and commitment therapy, and supportive therapy), pharmacotherapy, re-feeding, and nutritional counseling. The levels of care obtained (e.g., inpatient vs. outpatient treatment) and the need for a multidisciplinary team typically depends on the severity and duration of symptoms.

The most cost-effective means for treating eating disorders is with the use of antidepressants. Unfortunately, the relapse rate is higher with pharmocotherapy than with psychotherapy (Agras, 2001; Walsh et al., 2006). A review of the treatment literature by Wilson, Fairburn, Agras, Walsh, and Kraemer (2002) suggests that CBT is the most promising psychological treatment for BN. This approach has been shown to produce clinically significant changes in eating behaviors, purging, and abnormal attitudes about body shape and weight. Their review also found CBT to be faster acting than other
psychotherapeutic treatments such as supportive psychotherapy, interpersonal therapy, and stress management therapy. Similar conclusions were drawn by the RTI-UNC Evidence-Based Practice Center (2006) in that CBT may reduce relapse risk for adults with AN after weight restoration. This finding was promising as research conducted on treatment outcomes for females with AN has been minimal compared to that of BN (Fairburn & Harrison, 2003; Halmi et al., 2005), and thus, an empirically supported treatment for this disorder remains elusive. Clearly, additional research is needed to examine treatment outcomes for this population. Modifications to cognitive behavioral approaches that have been developed for those with BN and then transferred to this population may be warranted upon closer examination.

Although promising treatments are available for eating disorders, particularly for BN, relapse rates remain high at longer-term follow-ups and chronification is not uncommon for BN and AN (Quadflieg & Fichter, 2003; Steinhausen, 2002). This suggests that we must turn our focus to identifying those underlying variables that lead females to return to ineffective compensatory behaviors such as food restriction, bingeing, and purging. Considering ways in which we may improve cognitive-behavioral approaches appears to be a worthwhile endeavor as this approach has proven to be the most efficacious psychological treatment for BN and perhaps AN. Additionally, many eating disordered patients report a preference for psychological treatment as opposed to the use of medications such as antidepressants (Mitchell et al., 1990). Furthermore, few consistent benefits are found combining psychotropic medication with CBT over CBT alone for eating disorder treatment (Wilson et al., 2002)). It is therefore highly advisable to improve our conceptualization of the underlying psychosocial components of eating
disorders to improve our existing psychotherapeutic approaches. The following sections will examine the role of cognitions in eating disorders beginning with eating disorder specific cognitions and then an examination of core beliefs and cognitive schemas.

Cognitive Processes

Cognitive Distortions

Cognitive distortions include automatic thoughts that are moment-to-moment cognitions that are effortless and occur spontaneously in specific situations (e.g., “he doesn’t like me because I am fat”). These thoughts are often negatively distorted and linked to the moods and behavioral responses of an individual (Riso & McBride, 2007). The next level of cognitions may be referred to as our intermediate beliefs or conditional assumptions (e.g., “if I lose weight then more people will like me”). Beck is perhaps one of the best known psychological theorists to bring attention to the different levels of cognitions can have on an individual’s wellbeing (e.g., Beck, 1967, 1976). He viewed automatic thoughts as the most superficial level of our cognitions and the most accessible. Beck also insisted that the automatic thoughts and intermediate beliefs come out of more general cognitive schemas.

The development of cognitive models for individuals with eating disorders came into existence in an attempt to “drive” CBT for this population (Hughes, Hamill, van Gerko, Lockwood, & Waller, 2006). The focus of earlier cognitive models was on cognitive distortions directly related to eating disorder symptoms (e.g., fear of gaining
weight, disturbed body image; Garner & Bemis, 1982; Wonderlich, Mitchell, Swan-Kremier, Peterson, & Crow, 2004), which are the focus of most current CBT approaches.

Questionnaires have been developed to tap into the dysfunctional cognitions purported to be associated with the development and maintenance of eating disorders. Mizes (1991) developed the Mizes Anorectic Cognitions Questionnaire to identify specific cognitive distortions that may be central to the psychopathology of AN and BN. Identifying core beliefs early in treatment can assist therapists in targeting key cognitive distortions that are most relevant to a patient.

Therapeutic Interventions for Eating Disorders

CBT has received more attention by researchers than any other therapeutic approach for eating disorders. The goals of CBT for eating disorders have typically been to modify cognitive and behavioral processes that are directly related to the eating disorder (Wonderlich et al., 2004). More distal factors such as relationships or core beliefs about the self tend to be minimized in treatment. It follows that CBT tends to be a shorter-term treatment approach than other therapies that address the more distal issues and beliefs that are held by an individual with an eating disorder.

CBT is applied to BN and AN in a similar fashion. Typically, there is a psychoeducational component that addresses medical and dietary issues, approaches to cognitive restructuring, and behavioral interventions targeted at healthier food consumption (Wonderlich et al., 2004). There are some areas of divergence however, in the application of CBT to females with BN versus females with AN. For example, there is a greater focus on weight gain for AN and the timing and style of CBT interventions is
highly dependent on motivation levels in this group. Active patient participation is crucial in all activities including monitoring of behaviors, actively confronting cognitions and following through on cognitive challenges, and completing therapeutic homework.

As mentioned earlier, CBT is considered to be the most efficacious treatment for eating disorders (Berkman et al., 2006; Fassino et al., 2004). While CBT has been a promising treatment, or component of treatment, relapse rates remain high when longitudinal data is available for those who have attended a CBT-based treatment (Olmstead, Kaplan, & Rocker, 1994). Accordingly, research has begun to look at more distal cognitive factors that contribute to eating disorders. The relationships between core beliefs and self-schemas with eating disorders have been particularly noteworthy and have encouraged continual investigation.

While there is little reason to doubt that negative cognitions associated with eating, body image, and weight are related to eating disorder behaviors, researchers have opted not to remain stalled at this conceptualization in light of more recent findings. Although relapse remains a significant concern, other residual attitudinal and behavioral disturbances may remain following treatment including fear of failure, lower drive for success, obsessiveness, perfectionism, and low self-esteem (Bachner-Melman, Zohar, & Ebstein, 2006). The recognition of limitations with cognitive models examining general cognitive distortions and cognitive beliefs related to appearance and food along with promising new research focusing on core beliefs has opened the door for another look at how best to conceptualize eating disorders from a cognitive perspective. The next sections will focus on expanded views of cognitions in eating disorders.
Core Beliefs and Schemas

Core beliefs are not a recent psychological concept. However, it was only within the past 20 years that the idea of core beliefs being involved in eating disordered behavior began to gain the attention of researchers. Serious inquiry into the core beliefs of women with eating disorders began in the early 1990s (Jones, Harris, & Leung, 2005). During this time it was suggested that women with eating disorders exhibited a “general self-schemata” as they interacted with the world around them (Vitousek & Hollon, 1990). As with the majority of published eating disorder research, the study participants in schema studies have been predominantly Caucasian females. Thus, the generalizability of this research in this area is quite limited.

Core beliefs are referred to as absolute, unconditional, and dichotomous cognitions about the self and the world (Waller et al., 2000). Our core beliefs are akin to a priori truths that are implicit, taken for granted, and central to our organization of personality (Dingemans et al., 2006). These rather rigid beliefs develop as a result of our life experiences, particularly the negative interactions that are encountered with important individuals in our lives (Beck, 1967, 1976). Core beliefs fall at the deepest level of our thoughts and provide limited opportunity for improvement, particularly if left unchallenged, as would be the case with assumptions (Cooper, Todd, & Wells, 2000). Another characteristic that sets core beliefs apart from general assumptions about oneself and others is the accompaniment of strong emotions. Core beliefs have been implicated in the development of numerous psychiatric conditions including depression, anxiety, personality disorders, affective disorders, and now eating disorders.
The figure below summarizes the pathway between the different levels of cognitions.

Cognitive Distortions

- Automatic thoughts, moment to moment
- Negatively distorted, linked to moods

![Diagram showing the pathway from Cognitive Distortions to Conditional Assumptions]

Conditional Assumptions

- Beliefs or rules (i.e., if....then)

![Diagram showing the pathway from Conditional Assumptions to Core Beliefs/Schemas]

Core Beliefs/Schemas

- Deepest level of thoughts
- Absolute, unconditional, dichotomous cognitions about the self and world
- Implicit truths, central to organization of one’s personality
- Accompanied by strong emotions
- Implicated in the development of psychiatric conditions (e.g., depression, Pds, Eds)

*Figure 1. Levels of cognition.*

Young and colleagues (Young, 1994; Young et al., 2003) have proposed a more elaborate conceptualization of Beck’s concept of core beliefs that they have labeled EMS. According to Young (1994), EMS consisted of unconditional cognitive content and cognitive processes. An activated schema will maintain cognitive content through behavioral, affective, and somatic manifestations. The proposed schemas, formed at an early age, are at the root of a number of psychological conditions including personality disorders, Axis I disorders, and more mild characterological problems. Individuals that
score high on numerous maladaptive schemas may find that traditional psychotherapeutic approaches do not provide significant or long-term benefit (Leung, Waller, & Thomas, 2000). Schemas may be described as core beliefs that reflect negative global self-evaluations (Cooper, 2005). They are also generally viewed across the literature as generalized superordinate cognitions that are resistant to change with a powerful influence on thoughts, affect, and behavior (Markus, 1977; Riso & McBride, 2007).

Young and colleagues (2003) provided a more complete definition of schemas that include the following components: (a) a broad, pervasive theme or pattern; (b) comprise memories, emotions, cognitions, and bodily sensations; (c) regarding oneself and one’s relationship with others; (d) developed during childhood or adolescence; (e) elaborated through one’s lifetime; and (f) dysfunctional to a significant degree. Furthermore, maladaptive behaviors (e.g., eating disorders) may develop as a response to the schema(s) that an individual holds (e.g., beliefs about abandonment, personal defectiveness, emotional deprivation, and entitlement). Young (1994) explained that in order to effectively treat patients with chronic conditions we need to address maladaptive core beliefs about the self, others, and the world. An approach such as CBT focuses primarily on secondary cognitions (i.e., cognitive distortions) rather than the more primary cognitions (i.e., maladaptive schemas) that may continue to drive ineffective behaviors and thinking styles.

Young (Young & Brown, 1990; Young et al., 2003) has developed inventories to assess for the presence of maladaptive schemas. In his most recent instruments, the Young Schema Inventory--Long version 3 (YSQ-L3) and the Young Schema Inventory--Short Form, Version 3 (YSQ-S3), Young identifies 18 separate maladaptive schemas.
These 18 categories have been further reduced to five overarching domains using the 75-question Early Maladaptive Schema Questionnaire--Research Version, a modified version of the YSQ: disconnection and rejection, impaired autonomy and performance, impaired limits, other-directedness, and overvigilance and inhibition (Cecero, Nelson, & Gillie, 2004). The YSQ has an advantage over other eating disorder specific instruments with its assessment of multiple aspects of core beliefs. The YSQ also affords researchers and clinicians the opportunity to explore maladaptive beliefs at a much deeper level than other available measures.

*The Connection Between Maladaptive Schemas and Eating Disorders*

In the therapeutic setting, improvements in cognitive distortions surrounding weight, shape, and food have been viewed as indicating a move towards recovery in individuals with eating disorders (Bachner-Melman et al., 2006). Indeed, many researchers have found a relationship between change in eating disorder specific cognitions and eating disordered behaviors (e.g., Lowe et al., 1996). Dobmeyer and Stein (2003), in particular, found that initial maladaptive cognitions surrounding eating, body image, and weight were related to the severity of anorexic and bulimic symptoms four years later in a sample of college undergraduates followed prospectively. In light of these findings an examination of more general core beliefs or schema in individuals with eating disorders appears to be a fruitful area of research when looking for further guidance on conceptualizing women with eating disorders from a cognitive perspective.

Since the late 1990s, there has been significant growth in research examining core beliefs in eating disorders. The rationale for this evolving outlook came from the
recognition that food or weight-related cognitions are not sufficient to explain eating disorder symptomatology (Cooper, 1997). Evidence for this assertion came from a variety of sources including the following: (a) CBT that focuses on negative automatic thoughts and dysfunctional assumptions related to food and body image achieves remission and recovery rates that are no more effective than other psychological therapies (Fairburn et al., 1995), and (b) bulimic disorders association with negative emotional states and threat processing (McManus, Waller, & Chadwick, 1996). Waller and colleagues (2000) purport that we have not yet fully incorporated the cognitive and emotional underpinnings into models of eating disorders.

Research focusing on cognitions in women with eating disorders indicates that this population reports significantly more unhealthy core beliefs or maladaptive cognitive schemas than individuals without eating disorders (Leung et al., 1999; Waller et al., 2000). Multiple studies have found core beliefs to be reliably associated with the development of eating disorders, symptom maintenance, along with recovery and relapse following treatment (Dingemans et al., 2006; Gongora, Derksen, & van Der Staak, 2004; Hughes et al., 2006; Jones et al., 2005; Leung et al., 1999; Waller et al., 2000). For example, Waller and colleagues (2000) found core beliefs, measured by the Young Schema Questionnaire, to be predictive of levels of bingeing and vomiting in women with BN. Leung and Price (2007) reported that women with eating disorders had higher scores on 8 of 15 core beliefs than symptomatic dieters even when controlling for depression and low self-esteem. They surmised from this that women with clinical eating disorders are psychologically different from nonclinical women (i.e., adiagnostic women). The Eating Disorder Belief Questionnaire (EDBQ; Cooper, Cohen-Toovee,
Todd, Wells, & Tovee, 1997) was designed with the intent of assessing various beliefs associated with eating disorders. Negative self-beliefs and other underlying assumptions (e.g., weight and shape are a means to acceptance by others). The EDBQ is a unitary measure of negative self-beliefs (Jones, Leung, & Harris, 2007a). Studies that have included this measure have found a relationship between level of eating disorder symptomatology and the EDBQ (e.g., Cooper, Rose, & Turner, 2006; Cooper & Turner, 2000).

Jones and colleagues (2007a) conducted a review of the literature on dysfunctional core beliefs in eating disorders. The authors concluded that the studies they reviewed systematically showed a higher level of negative self-beliefs and beliefs about the world in women with eating disorders than in healthy controls. The authors also found within the literature that bulimic attitudes and behaviors (i.e., bingeing) were characteristic of individuals that highly endorsed emotional deprivation, social isolation, dependence/incompetence, and insufficient self-control. Restriction has been associated with dependence/incompetence, entitlement, and emotional inhibition. In general however, there is a lack of consensus of which of the core beliefs are consistently related to eating disorder symptoms.

An examination of the literature also reveals minimal attention to the prognostic value of identified cognitive schemas for individuals undergoing treatment for an eating disorder (i.e., relationship between the number or type of high scoring scales and outcomes) and the extent to which these beliefs may be modified over the course of standard cognitive-behavioral treatment protocols. Jones and colleagues (2005) also indicated that the core beliefs of those recovered from eating disorders are
underrepresented in the literature. Leung and colleagues (2000) studied the immediate outcomes of group CBT for bulimia in 20 women that had completed the Young Schema Inventory at the start of treatment. The treatment model applied was not modified to specifically address core beliefs but rather followed an existing cognitive-behavioral model (Fairburn, Cooper, & Cooper, 1986; Fairburn, Marcus, & Wilson, 1993). The authors examined the relationship between maladaptive core beliefs and treatment outcomes at the end of the 12-week intervention. At the end of the group CBT intervention it was found that women with more unhealthy defectiveness/shame, social isolation, and social undesirability core beliefs at the start of treatment failed to experience a reduction in their frequency of vomiting. Additionally, changes in bulimic attitudes were predicted by YSQ subscale scores and pretreatment pathology. Participants with a high level of unconditional functional dependence/incompetence beliefs failed to show improvements in general bulimic attitudes. The authors concluded that their outcomes confirmed previous findings and indicated a need for further investigation into the role of core beliefs in treatment efficacy.

The literature on core beliefs in eating disorders is rather telling and seems to indicate the need for additional research on the relationship between changes in core beliefs during treatment and treatment response. Authors with an interest in core beliefs and eating disorders have noted the paucity of research on core beliefs or maladaptive schemas and treatment outcomes (Jones et al., 2005; Leung et al., 1999). In particular, prospective research that examines the relationship between maladaptive schema and treatment outcomes is still in its infancy and is typically conducted with individuals obtaining less intensive or outpatient treatment (e.g., Leung et al., 2000). Many studies
have also used a cross-sectional approach preventing an analysis on the change in core beliefs over the course of treatment (e.g., Jones et al., 2000; Leung et al.). As relationships between eating disorders and core beliefs are still being established it is imperative that core beliefs be examined prospectively along with eating disorder symptoms. It seems likely that individuals with more severe and stable maladaptive core beliefs would require more time in intensive treatment (e.g., inpatient or residential care) before being deemed ready to enter a lower level of care (e.g., outpatient psychotherapy). Additionally, existing studies have been less inclusive with their samples (e.g., including those with co-morbid conditions) and failed to look at both adolescents and adults with a range of eating disorder diagnoses (e.g., BN, AN, and EDNOS; Leung et al.).

This proposed study will evaluate the relationship of maladaptive schemas at admission and maladaptive schemas at discharge with treatment outcomes in adolescent and adult women attending a residential treatment facility. Treatment outcome is a broad label and encompasses multiple outcome possibilities including premature termination of treatment, successful completion of treatment, duration of treatment, and a reduction in eating disorder symptoms. In the proposed study, the direct role of specific treatment or intervention techniques will not be examined. Rather, this study is designed to explore the nature of the relationship between eating disorder symptomatology and maladaptive core beliefs with the aim of developing a more comprehensive conceptualization of cognitions in eating disorders. As a byproduct, the results of this study will provide further direction for cognitive-behavioral oriented eating disorder interventions.
CHAPTER III

METHOD

The study examined the relationship between maladaptive schema(s) and eating disorder symptomatology and eating disorder treatment outcomes. Accordingly, the following hypotheses were proposed for evaluation: (a) maladaptive schemas will be positively correlated with eating disorder symptom severity in females with eating disorders attending residential treatment, (b) females endorsing more maladaptive schemas at admission or those with stable maladaptive schemas across their course of treatment will have a less favorable posttreatment outcome at the time of their discharge from residential treatment than females with lower scores initially or improved scores over the course of their treatment and follow-up, and (c) females endorsing more maladaptive schemas or with greater stability of their maladaptive schemas across treatment will spend a more time in residential treatment. Archival clinical data collected from 2007 to 2009 at a residential eating disorder treatment facility were used to explore the above hypotheses.

Brief Overview of Study Design and Location

The current study had two related aims. Each aim for the study focused primarily on maladaptive schemas and the impact of this variable on eating disorders symptoms. The relationship between maladaptive schemas and treatment outcomes for females in residential treatment for eating disorders and the stability of maladaptive schemas over the course of treatment was examined using a prospective research design. Participants
completed a series of psychological self-report measures at admission and again at discharge.

**Participants and Recruitment**

All eligible females admitted for treatment at a residential eating disorder facility in the western United States completed a battery of self-report clinical assessment measures at admission. As part of admitting protocol for the facility, residents were asked whether or not they would like to complete measures at multiple follow-up points as part of the treatment facility=s ongoing quality improvement initiatives and outcomes research. Issues surrounding confidentiality were explained to incoming residents and their parents or guardians, if applicable, including measures being taken to ensure that no identifying information was included in results from the quality improvement activities and outcomes research. That is, all reports, presentations, and manuscripts were to include aggregated data without identifying information that could result in unwittingly violating confidentiality of individual residents.

Admission statistics from a 1-year period leading up to the data analysis indicated that the average age of residents attending the treatment center was 18.75 years (range = 14-35 years), with the majority falling between the ages of 14 and 26 years. Additionally, the majority of individuals seeking treatment at the facility since its inception have been Caucasian. This is reflective of the typical demographics reported for females diagnosed with eating disorders (Hoek & van Hoeken, 2003). The percentages of residents with AN, BN, and EDNOS or atypical eating disorder (e.g., combination of AN and BN) specified were 42%, 25%, and 30.8%, respectively. Individuals obtaining treatment at the residential facility come from communities across North America and occasionally from
countries outside of North America, allowing for a geographically diverse sample to be obtained.

Individuals attending the treatment facility were referred by a home physician and/or psychologist to receive residential treatment for their eating disorder. Information required prior to admission included a DSM-IV diagnosis of an eating disorder, current medications, and other problems noted by the professional for the incoming resident. Incoming residents were screened for possible medical and cognitive complications by medical staff in their home community prior to being admitted for residential treatment (i.e., EKG, pregnancy test, comprehensive blood work, bone density, TB, toxicology screen, immunization records). Additional psychological diagnoses may be present (i.e., depression, anxiety, obsessive-compulsive disorder [OCD]) as diagnosed by a professional. A clinical interview and assessment was completed by the eating disorder treatment facility clinicians and physicians when the individual arrived for treatment. A treatment team composed of licensed therapists, a physician, nurse practitioners, nurses, and dieticians met in order to reach a consensus on the final diagnoses given to residents.

Individuals seeking residential treatment that are a clear danger to themselves or others were not admitted into the treatment facility. In addition, individuals with very low motivation for treatment and those at a high risk for running away from the treatment facility were not admitted. All incoming residents were eligible for research provided they maintained medical stability during their treatment. The treatment facility did not admit residents that were medically unstable and thus it is unlikely that an individual recruited for participation was physically unable to remain in treatment and complete the measures. Additionally, residents unable to engage in treatment because of significant
cognitive impairment were not knowingly admitted. Thus, through the current resident
selection protocol individuals with significant problems that may impair their ability to
stay and engage in treatment and subsequently complete self-report questionnaires were
unlikely to be admitted to the treatment facility.

Procedure

Instruments

Each of the self-report measures listed below for administration in the proposed
study have been used with an eating disorder population previously and are deemed
appropriate for this population.

*Young Schema Inventory B Short 3 (YSQ-S3).* The YSQ-S3 (Young, 2005) is a
90-item scale that assesses 18 core beliefs. Each item is rated using a 6-point Likert scale.
The core beliefs measured are as follows: abandonment: belief in the imminent end of
close relationships; mistrust/abuse: belief that others will be abusive to oneself;
emotional deprivation: belief that one’s emotional needs will not be met; functional
dependence: perception that one cannot cope without support from others; vulnerability
to harm: belief that one cannot control the threat of disaster; enmeshment: perceived
emotional over involvement with others, due to a fear of being unable to cope without
them; defectiveness/shame: perceived defects that make one unlovable; social
undesirability: perceived isolation due to a perception that one’s characteristics are
undesirable; failure to achieve: perceived inadequacy, leading to failure to meet any
desired goals; subjugation: view other’s desires as more important than one’s own;
emotional inhibition: emotional expression viewed as having aversive consequences;
self-sacrifice: belief that one should focus on other’s needs rather than one’s own;
unrelenting standards: belief that one should strive to achieve impossible levels;
entitlement: perception that one can act without considering others; insufficient self-
control: belief that one cannot control impulses and feelings, and social isolation:
viewing oneself as being different from others, and isolated in the world;
admiration/recognition seeking: excessive dependence on approval from others;
punitiveness: believe that people should be harshly punished for mistakes; and
negativity/pessimism: a pervasive lifelong focus on negative aspects of life. Higher
subscales scores are indicative of a more dysfunctional belief. The 18 subscales fall
under five broad categories referred to as schema domains:

Table 1

Maladaptive Schema Domains and Subscales

| Disconnection and rejection | Impaired autonomy and performance | Impaired limits | Other-directedness | Overvigilance and inhibition |
|-----------------------------|----------------------------------|----------------|-------------------|-----------------------------
| Abandonment/instability     | Dependence/incompetence          | Entitlement/grandiosity | Subjugation      | Negativism/pessimism         |
| Mistrust/abuse              | Vulnerability to harm or illness | Insufficient self-control/self-discipline | Self-sacrifice | Emotional Inhibition         |
| Emotional deprivation       | Enmeshment/underdeveloped self    | Approval-seeking/recognition-seeking | Unrelenting standards/hypercriticalness Punitiveness |
| Defectiveness/shame         | Failure                          |                 |                   |                             |
| Social isolation            |                                  |                 |                   |                             |
Test-retest reliability on the subscales for the YSQ ranges from .50-.82 (average $r = .76$) and internal consistency reliability ranges from .83-.96 with an average alpha of .90 (Schmidt, Joiner, Young, & Telch, 1995).

*Eating Disorder Diagnostic Scale (EDDS).* The EDDS (Stice, Telch, & Rizvi, 2000) is a 22-item self-report measure developed to access diagnostic criteria for the different eating disorder subtypes (i.e., AN, BN, and binge eating disorder). In addition to providing diagnostic information this inventory provides an overall eating disorder symptom composite for an individual by standardizing and summing items (with the exception of height and birth control). The EDDS is both a valid and reliable measure within samples of adolescent and adult females. A follow-up study examining the validity and reliability of this measure found a Cronbach’s alpha of .89 for the symptom composite (Stice, Fisher, & Martinez, 2004). This was consistent with the alpha value found in the first psychometric study (Stice et al., 2000). Additionally, the EDDS was found to be sufficiently sensitive to detecting intervention effects and show predictive validity.

*Eating Disorder Inventory B 3 (EDI-3).* The EDI-3 (Garner, 2004) consists of 91-items that are divided into 12 primary scales. Included in the 12 scales are three eating-disorder-specific scales and nine general psychological scales that are highly relevant to eating disorders: drive for thinness, bulimia, body dissatisfaction, low self-esteem, personal alienation, interoceptive deficits, emotional dysreguation, perfectionism, asceticism, and maturity fears. Six composite scores are also calculated: one that is eating-disorder specific and five that are general integrative psychological constructs (i.e., ineffectiveness, interpersonal problems, affective problems, and
overcontrol). All reliability coefficients are generally in the high ranges (i.e., from the .80s to low .90s). The Eating Disorder Risk Composite, in particular, ranged from .90-.97 across the different eating disorder diagnostic groups. Overall, the test-retest stability coefficients are very good.

*Beck Depression Inventory--II (BDI-II).* The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item measure of current depressive symptomatology in adolescents and adults. The measure focuses on the frequency of depressive symptoms including mood, suicide ideation, self-belief, guilt, and physical symptoms. A total score is provided and indicates the severity of one’s depressive symptoms. Total scores range from 0-63 with higher scores indicating more severe levels of depression. The BDI-II has demonstrated good reliability and internal consistency. Internal consistency was found to be .80 and test-retest reliability had a coefficient of .93. Overall the measure demonstrates good content, construct, and convergent validity.

*Beck Anxiety Inventory (BAI).* The BAI (Beck & Steer, 1993) is a 21-item measure of global or generalized anxiety symptomatology in adolescents and adults including the subjective, somatic, or panic-related symptoms of anxiety. This measure demonstrates good reliability and validity. Additionally, it has been shown to effectively discriminate between anxious and nonanxious diagnostic groups in a variety of clinical populations and discriminate between depression and anxiety. The BAI has high internal validity ($\alpha = .94$) and good test-retest reliability. Total scores range from 0-63 with higher scores indicating a higher level of anxiety.
Data Collection

The internal Institutional Review Board (IRB) at the eating disorder facility approved the collection of self-report clinical assessment data on current residents to assist in more systematic reviews of resident outcomes and research endeavors. The IRB at USU also approved use of data from the eating disorders treatment facility for research purposes related to this dissertation (#2229). Treatment facility residents completed all of the self-report clinical assessment/outcome measures online at the treatment facility site when they admit and again prior to their discharge. Trained treatment center staff assist residents in getting online to the secure assessment website and in answering questions. Behavioral observations are also recorded on each resident during the assessment by the staff member proctoring the assessment to assist in establishing the reliability of results. Upon completion of the clinical assessment battery residents are unable to return to the individual assessment instruments so as to enhance the security of the data and of the testing instruments.

Approximately one hour is required to complete all of the measures, some of which are not included in the current study. Although breaks are not regularly scheduled during the assessment period, residents are provided with a short break if needed. A direct care staff member trained to administer the online assessment is present at the admission and discharge assessments to assist residents, ensure that all of the measures have been completed, and record behavioral observations of residents while they complete the measures. All responses entered by current and previous residents are exported in a data management program (e.g., SPSS). Residents are assigned a
randomized ID number and no personally identifying information is included in the study data set. Table 2 presents the measures that were of interest for the current study and the time points that this data were collected.

Initial Assessment/Baseline

Incoming residents to the treatment center meet with a primary therapist for a clinical assessment the day they arrive. They also meet with medical staff and a dietician. Following the gathering of clinical, medical, and dietary information residents are oriented to the treatment facility. Residents complete the battery of clinical measures online within a week of arriving. As mentioned previously, a direct care supervisor or case manager is present during the completion of the online assessment.

Discharge Assessment

Residents preparing to be discharged from treatment complete the full clinical online assessment battery prior to leaving the treatment facility. An exception to all residents completing assessments at this time point were residents that left treatment in less than four weeks. A direct care supervisor or case manager is present during the completion of the online assessment.

Collection of Demographic and Health-related Variables

Additional variables of interest include the following: (a) age 3 of onset: age when the participant was first exhibiting eating disordered behavior; (b) motivation: the level of motivation for recovery upon admit for a participant as assessed by the treatment team on a 5-point scale; (c) Body Mass Index (BMI): measure of body fat calculated
Table 2

Summary of Assessment Measures Administered to Residents

<table>
<thead>
<tr>
<th>Admission</th>
<th>Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical interview</td>
<td>YSQ-S3</td>
</tr>
<tr>
<td>YSQ-S3</td>
<td>YSQ-S3</td>
</tr>
<tr>
<td>EDI-3</td>
<td>EDI-3</td>
</tr>
<tr>
<td>EDDS</td>
<td>EDDS</td>
</tr>
<tr>
<td>BDI-II</td>
<td>BDI-II</td>
</tr>
<tr>
<td>BAI</td>
<td>BAI</td>
</tr>
</tbody>
</table>

from height and weight; (d) eating disorder duration: length of time resident has been exhibiting clinically significant eating disorder symptoms; and (e) length of stay: days that the participant was considered to be in residential treatment.

Data Analysis

Data were stored and analyzed using SPSS and R. The database was cleaned in SPSS prior to running the planned analyses. Data were examined descriptively (e.g., correlation matrices) to inspect for possible trends or problems. Descriptive statistics were then calculated on participant characteristics and for each of the measures. What follows are results from analyses from each of the three hypotheses.

Hypothesis 1: Individuals Endorsing More Maladaptive Schemas Will Report More Behavioral, Cognitive, and Emotional Symptoms Associated with Eating Disorders

To evaluate hypothesis 1, a series of five multiple regression analyses were conducted at both admit and discharge in order to test the hypothesis that behavioral,
cognitive, and emotional symptoms associated with eating disorders were predicted by deeper level cognitions (e.g., maladaptive schemas). Outcomes included in these analyses were overall symptomatology as measured by the symptom scales of the EDDS and the EDI-3, and the individual subscales of the EDI-3 (drive for thinness, bulimia, and body dissatisfaction). The key predictor variables in these analyses were maladaptive schemas, as measured by the five subscales of the YSQ-S3. Total scores for each subscale were entered into the models. Regardless of their significance, covariates included in these analyses were: (a) age at admit (coded as adolescent, 11-17 years old) or adult (18 years and to 47), (b) duration of eating disorder in months, and (c) BMI. The covariate motivation for recovery was added in analyses where discharge outcomes were included. Covariates were kept in each model regardless of their significance as these variables have the potential to confound the relationship between the maladaptive schema variables and each outcome. Thus, leaving the covariates in each model controls for their influence. Furthermore, inclusion of covariates across all of the models provided consistency in interpreting model results.

All of the variables entered into the regression models were centered with the exception of the variable diagnosis, which was entered as a factor. Interactions for diagnosis and BMI and diagnosis and each of the YSQ subscales were tested before arriving at the final models. It was theorized that maladaptive schemas assessed at admit would not only predict initial symptom presentation but also would be predictive of symptomatology at discharge. Variance inflation factors (VIF) were evaluated in order to assess for problems associated with multicollinearity. VIF were in the normal range for each final model, suggesting the absence of multicollinearity.
Preliminary sample size calculations indicated that a sample of 32 participants would achieve 81% power to detect an $R^2$ as small as .21 attributed to the key independent variable (YSQ) with a significance level of $a \leq .05$. The relationship tested was adjusted for an additional relationship of at least $R^2 = .01$ between the key independent variable and at least four other covariates.

Hypothesis 2: The Magnitude of Change in Eating Disorder Symptom Severity Will be Associated with the Magnitude of Change in the Expression of Maladaptive Schemas

In essence, Hypothesis 2 examined the relationships between the magnitude of change in one variable (ED symptoms) as a function of change in another related variable (maladaptive schemas). Because multiple observations were made on the same participants, nonindependence of observations was obtained. Subsequently, linear mixed-effects modeling was used to account for the clustered nature of the data by allowing random intercepts and slopes for each participant. Similar to the analyses described for Hypothesis 1, a series of five linear mixed-effects models, with eating disorder symptom measures as the outcomes at both admit and at discharge were conducted. The primary predictor variables were time (admit and discharge) and maladaptive schemas as described in the analyses for Hypothesis 1. Because maladaptive schemas are measured at both admit and discharge, this variable was specified as a time-varying covariate, which allowed for a direct assessment of the research question. Additionally, an interaction between time and maladaptive schemas was specified to address the research question. Other fixed-effect covariates included age at admit, duration of eating disorder
in months, BMI, and motivation for recovery at admit. The decision to retain YSQ subscales scores in a given model was based on the significance of the $t$ statistic for that variable. Interaction terms for both YSQ and (a) time (admit and discharge), and (b) diagnosis were tested in each model for each YSQ subscale. The likelihood ratio test was conducted to determine whether an interaction term significantly improved the fit of the model.

**Hypothesis 3: Individuals Endorsing More Maladaptive Schemas Will Progress at a Slower Rate in Treatment and Require a Longer Stay in Residential Treatment Than Those Individuals Endorsing Fewer or Less Severe Maladaptive Schemas**

Hypothesis 3, was evaluated using survival analysis methodology. Specifically a Cox proportional hazards (PH) regression model was tested, with days to discharge as the time (or outcome) variable and discharge as the event of interest. This particular analysis assessed the relationship between the level of maladaptive schemas in residents at the start of treatment with their length of stay in residential treatment, adjusting for other factors such as eating disorder symptomatology, age at admit, eating disorder duration in months, motivation for recovery at admit, and BMI. Using survival analysis affords one the ability to include data from those participants where the outcome variable is either unknown or missing (i.e., not completing residential treatment before end of study, leaving residential treatment against medical/clinical advice, a lack of financial resources to sustain treatment) providing a larger sample size for the analysis as such cases are not eliminated from the analysis. Thus, participants with such conditions were classified as
censored in the analyses. Predictor variables were entered sequentially with the maladaptive schema broad categories entered last to determine what these final variables added to the prediction of survival time (i.e., time to discharge) above and beyond other covariates.

Sample size calculations indicated that a Cox PH regression of the log hazard ratio on a covariate with a standard deviation of one based on a sample of 55 observations participants would achieve 80% power at the $\alpha \leq 0.05$ significance level to detect a regression coefficient equal to or at least 0.59 or a hazard ratio of 1.80 (small to moderate). The sample size was adjusted for a possible relation between the key predictor variable of interest (maladaptive schemas) and the other covariates in the Cox regression of at least $R^2 = 0.15$. The sample size was also adjusted for an anticipated event rate of 60%, meaning that at least 60% of the sample would be discharged following successful completion of their residential treatment.
CHAPTER IV

RESULTS

The results of the statistical analyses are presented in this section. Data screening and the characteristics of the participants are reported first. This is followed by the results of the analyses that address the three hypotheses presented earlier. The database was examined for missing values and accuracy of data entry prior to conducting the planned analyses. Missing values for entire questionnaires were left blank if the resident had failed to complete an instrument. As a result of the online questionnaire design, participants were reminded if they missed an item and asked to return to the item to complete it.

Thirty-three adolescent and 34 adult women diagnosed with an eating disorder and attending residential treatment were included in the admit analyses. At discharge, data were available for 15 adolescents and 25 adults. The majority of adolescent residents had a diagnosis of AN (51.5%) followed by EDNOS (30.3%), and BN (18.2%). There was a more even distribution of diagnoses among the adults, with 38.2% diagnosed with EDNOS, 32.4% diagnosed with AN, and 29.4% diagnosed with BN. The majority of participants (91%) had at least one other DSM-IV diagnosis in addition to their eating disorder. Depression, anxiety, and OCD were the most prominent co-morbid diagnoses for the participants. All but one of the participants received some prior form of treatment for their eating disorder (e.g., outpatient, inpatient, or hospitalization). Table 3 provides a more detailed description of the participants in terms of their demographic characteristics at admit and discharge stratified by diagnostic and age groups. Table 4
Table 3

Descriptive Statistics of Adult and Adolescent Participants

<table>
<thead>
<tr>
<th></th>
<th>Adolescents</th>
<th>Adults</th>
<th>Cohen’s d effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>n</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td><strong>Anorexia Nervosa</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-EDDS total score</td>
<td>24.94 (11.64)</td>
<td>17</td>
<td>44.25 (12.19)</td>
</tr>
<tr>
<td>Post-EDDS total score</td>
<td>6.56 (6.56)</td>
<td>9</td>
<td>24.29 (16.81)</td>
</tr>
<tr>
<td>Pre-Drive for thinness</td>
<td>47.64 (9.98)</td>
<td>17</td>
<td>53.45 (9.73)</td>
</tr>
<tr>
<td>Post-Drive for thinness</td>
<td>31.55 (2.96)</td>
<td>9</td>
<td>64.57 (17.06)</td>
</tr>
<tr>
<td>Pre-Bulimia</td>
<td>44.00 (6.82)</td>
<td>17</td>
<td>34.36 (8.82)</td>
</tr>
<tr>
<td>Post-Bulimia</td>
<td>42.33 (5.27)</td>
<td>9</td>
<td>25.57 (13.40)</td>
</tr>
<tr>
<td>Pre-Body dissatisfaction</td>
<td>46.18 (2.18)</td>
<td>17</td>
<td>57.18 (11.66)</td>
</tr>
<tr>
<td>Post-body dissatisfaction</td>
<td>25.67 (6.94)</td>
<td>9</td>
<td>43.86 (7.17)</td>
</tr>
<tr>
<td>Pre-Eating disorder risk composite</td>
<td>45.29 (8.96)</td>
<td>17</td>
<td>54.82 (4.09)</td>
</tr>
<tr>
<td>Post-Eating disorder risk composite</td>
<td>32.78 (5.26)</td>
<td>9</td>
<td>38.29 (8.06)</td>
</tr>
<tr>
<td><strong>EDNOS</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pre-EDDS total score</td>
<td>38.87 (7.20)</td>
<td>8</td>
<td>47.44 (20.73)</td>
</tr>
<tr>
<td>Post-EDDS total score</td>
<td>11.00 (8.68)</td>
<td>4</td>
<td>17.78 (10.54)</td>
</tr>
<tr>
<td>Pre-Drive for thinness</td>
<td>52.20 (6.89)</td>
<td>10</td>
<td>50.08 (10.25)</td>
</tr>
<tr>
<td>Post-Drive for thinness</td>
<td>34.25 (14.77)</td>
<td>4</td>
<td>31.00 (7.40)</td>
</tr>
<tr>
<td>Pre-Bulimia</td>
<td>42.30 (7.73)</td>
<td>10</td>
<td>47.92 (11.62)</td>
</tr>
<tr>
<td>Post-Bulimia</td>
<td>20.68 (13.32)</td>
<td>4</td>
<td>38.67 (1.80)</td>
</tr>
<tr>
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<td>35.50 (15.26)</td>
<td>10</td>
<td>49.00 (10.98)</td>
</tr>
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<td>Post-Body dissatisfaction</td>
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<td>4</td>
<td>36.67 (7.84)</td>
</tr>
<tr>
<td>Pre-Eating disorder risk composite</td>
<td>48.80 (6.63)</td>
<td>10</td>
<td>48.31 (11.15)</td>
</tr>
<tr>
<td>Post-Eating disorder risk composite</td>
<td>34.00 (15.41)</td>
<td>4</td>
<td>30.67 (7.09)</td>
</tr>
<tr>
<td><strong>Bulimia Nervosa</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-EDDS total score</td>
<td>50.60 (2.30)</td>
<td>6</td>
<td>58.38 (13.11)</td>
</tr>
<tr>
<td>Post-EDDS total score</td>
<td>27.00 (28.28)</td>
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<td>33.56 (28.28)</td>
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<tr>
<td>Pre-Drive for thinness</td>
<td>51.17 (10.61)</td>
<td>6</td>
<td>49.40 (16.72)</td>
</tr>
<tr>
<td>Post-Drive for thinness</td>
<td>22.50 (2.12)</td>
<td>2</td>
<td>33.11 (14.09)</td>
</tr>
<tr>
<td>Pre-Bulimia</td>
<td>50.17 (.71)</td>
<td>6</td>
<td>53.60 (10.88)</td>
</tr>
<tr>
<td>Post-Bulimia</td>
<td>35.50 (7.52)</td>
<td>2</td>
<td>35.44 (12.12)</td>
</tr>
<tr>
<td>Pre-Body dissatisfaction</td>
<td>60.67 (6.92)</td>
<td>6</td>
<td>48.40 (10.91)</td>
</tr>
<tr>
<td>Post-Body dissatisfaction</td>
<td>29.50 (3.53)</td>
<td>2</td>
<td>41.33 (12.29)</td>
</tr>
<tr>
<td>Pre-Eating disorder risk composite</td>
<td>50.33 (8.55)</td>
<td>6</td>
<td>49.80 (14.01)</td>
</tr>
<tr>
<td>Post-Eating disorder risk composite</td>
<td>23.00 (2.83)</td>
<td>2</td>
<td>32.44 (14.42)</td>
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</table>

provides a summary of maladaptive schema scores for the participants, and Table 5 provides a summary of measures of depression and anxiety scores for the participants.
Table 4

Maladaptive Schemas at Admit and Discharge

<table>
<thead>
<tr>
<th></th>
<th>Adolescents Mean (SD)</th>
<th>n</th>
<th>Adults Mean (SD)</th>
<th>n</th>
<th>Cohen’s d effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anorexia Nervosa</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Disconnection and rejection</td>
<td>58.94 (21.32)</td>
<td>17</td>
<td>89.91 (26.72)</td>
<td>11</td>
<td>-1.66</td>
</tr>
<tr>
<td>Post-Disconnection and rejection</td>
<td>37.33 (10.57)</td>
<td>9</td>
<td>68.00 (30.72)</td>
<td>7</td>
<td>-1.34</td>
</tr>
<tr>
<td>Pre-Impaired autonomy and performance</td>
<td>46.47 (10.37)</td>
<td>17</td>
<td>73.09 (15.61)</td>
<td>11</td>
<td>-2.01</td>
</tr>
<tr>
<td>Post-Impaired autonomy and performance</td>
<td>40.33 (7.75)</td>
<td>9</td>
<td>64.57 (17.06)</td>
<td>7</td>
<td>-1.83</td>
</tr>
<tr>
<td>Pre-Impaired limits</td>
<td>25.88 (6.82)</td>
<td>17</td>
<td>34.36 (8.82)</td>
<td>11</td>
<td>-1.08</td>
</tr>
<tr>
<td>Post-Impaired limits</td>
<td>18.56 (5.27)</td>
<td>9</td>
<td>25.57 (13.40)</td>
<td>7</td>
<td>0.69</td>
</tr>
<tr>
<td>Pre-Other-directedness</td>
<td>46.18 (12.48)</td>
<td>17</td>
<td>57.18 (11.66)</td>
<td>11</td>
<td>0.91</td>
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<tr>
<td>Post-Other-directedness</td>
<td>25.67 (6.94)</td>
<td>9</td>
<td>55.71 (19.09)</td>
<td>7</td>
<td>-2.10</td>
</tr>
<tr>
<td>Post-Overvigilance and inhibition</td>
<td>60.24 (20.18)</td>
<td>17</td>
<td>87.82 (13.07)</td>
<td>11</td>
<td>-1.62</td>
</tr>
<tr>
<td><strong>EDNOS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Disconnection and rejection</td>
<td>60.50 (27.94)</td>
<td>6</td>
<td>82.85 (32.11)</td>
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<td>-0.13</td>
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<tr>
<td>Post-Disconnection and rejection</td>
<td>57.33 (33.57)</td>
<td>3</td>
<td>58.44 (25.48)</td>
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<td>-0.04</td>
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<tr>
<td>Pre-Impaired autonomy and performance</td>
<td>51.33 (19.06)</td>
<td>6</td>
<td>59.70 (21.90)</td>
<td>13</td>
<td>-0.01</td>
</tr>
<tr>
<td>Post-Impaired autonomy and performance</td>
<td>46.67 (6.81)</td>
<td>3</td>
<td>50.44 (16.97)</td>
<td>9</td>
<td>-0.29</td>
</tr>
<tr>
<td>Pre-Impaired limits</td>
<td>30.00 (8.58)</td>
<td>5</td>
<td>27.23 (15.31)</td>
<td>13</td>
<td>-0.18</td>
</tr>
<tr>
<td>Post-Impaired limits</td>
<td>20.68 (13.32)</td>
<td>3</td>
<td>23.22 (5.24)</td>
<td>9</td>
<td>-0.70</td>
</tr>
<tr>
<td>Pre-Other-directedness</td>
<td>47.17 (13.92)</td>
<td>6</td>
<td>51.31 (12.05)</td>
<td>13</td>
<td>-0.16</td>
</tr>
<tr>
<td>Post-Other-directedness</td>
<td>34.33 (13.20)</td>
<td>3</td>
<td>42.44 (9.77)</td>
<td>9</td>
<td>-0.70</td>
</tr>
<tr>
<td>Pre-Overvigilance and inhibition</td>
<td>62.00 (15.27)</td>
<td>6</td>
<td>72.00 (20.08)</td>
<td>13</td>
<td>-0.22</td>
</tr>
<tr>
<td>Post-Overvigilance and inhibition</td>
<td>58.67 (35.11)</td>
<td>3</td>
<td>50.89 (16.70)</td>
<td>9</td>
<td>0.28</td>
</tr>
<tr>
<td><strong>Bulimia Nervosa</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Pre-Disconnection and rejection</td>
<td>79.20 (24.57)</td>
<td>10</td>
<td>71.10 (20.93)</td>
<td>10</td>
<td>-0.43</td>
</tr>
<tr>
<td>Post-Disconnection and rejection</td>
<td>40.50 (10.60)</td>
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<td>61.89 (20.15)</td>
<td>9</td>
<td>-1.33</td>
</tr>
<tr>
<td>Pre-Impaired autonomy and performance</td>
<td>59.60 (14.34)</td>
<td>10</td>
<td>54.20 (16.72)</td>
<td>10</td>
<td>-0.01</td>
</tr>
<tr>
<td>Post-Impaired autonomy and performance</td>
<td>43.50 (19.09)</td>
<td>2</td>
<td>52.33 (13.61)</td>
<td>9</td>
<td>-0.53</td>
</tr>
<tr>
<td>Pre-Impaired limits</td>
<td>29.40 (7.18)</td>
<td>10</td>
<td>30.30 (7.73)</td>
<td>10</td>
<td>-0.04</td>
</tr>
<tr>
<td>Post-Impaired limits</td>
<td>30.00 (8.58)</td>
<td>2</td>
<td>28.33 (6.18)</td>
<td>9</td>
<td>0.22</td>
</tr>
<tr>
<td>Pre-Other-directedness</td>
<td>49.80 (6.51)</td>
<td>10</td>
<td>52.40 (9.09)</td>
<td>10</td>
<td>-0.44</td>
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<tr>
<td>Post-Other-directedness</td>
<td>31.00 (1.41)</td>
<td>2</td>
<td>47.33 (9.58)</td>
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<td>-2.38</td>
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<tr>
<td>Pre-Overvigilance and inhibition</td>
<td>75.80 (13.04)</td>
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<td>67.10 (14.99)</td>
<td>10</td>
<td>0.34</td>
</tr>
<tr>
<td>Post-Overvigilance and inhibition</td>
<td>41.00 (1.41)</td>
<td>2</td>
<td>54.33 (12.04)</td>
<td>9</td>
<td>-1.56</td>
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</tbody>
</table>

Results for Hypothesis 1: Maladaptive Schemas as Predictors of Eating Disorder Symptom Severity

To test the first hypothesis, a series of five multiple linear regression analyses were conducted.
Table 5

Beck Depression Inventory and Beck Anxiety Inventory Scores

<table>
<thead>
<tr>
<th></th>
<th>Adolescents</th>
<th>Adults</th>
<th>Cohen’s d effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>n</td>
<td>Mean (SD)</td>
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<tr>
<td>AN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-BDI</td>
<td>20.53 (12.21)</td>
<td>17</td>
<td>37.45 (11.81)</td>
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<tr>
<td>Post-BDI</td>
<td>3.56 (4.78)</td>
<td>9</td>
<td>10.14 (12.83)</td>
</tr>
<tr>
<td>Pre-BAI</td>
<td>15.24 (12.03)</td>
<td>17</td>
<td>28.09 (12.51)</td>
</tr>
<tr>
<td>Post-BAI</td>
<td>7.67 (6.19)</td>
<td>9</td>
<td>13.29 (16.80)</td>
</tr>
<tr>
<td>EDNOS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-BDI</td>
<td>33.10 (14.14)</td>
<td>10</td>
<td>29.62 (17.51)</td>
</tr>
<tr>
<td>Post-BDI</td>
<td>8.50 (12.26)</td>
<td>4</td>
<td>8.00 (6.67)</td>
</tr>
<tr>
<td>Pre-BAI</td>
<td>26.80 (12.38)</td>
<td>10</td>
<td>21.62 (14.59)</td>
</tr>
<tr>
<td>Post-BAI</td>
<td>8.75 (6.24)</td>
<td>4</td>
<td>10.56 (7.49)</td>
</tr>
<tr>
<td>BN</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pre-BDI</td>
<td>31.33 (10.54)</td>
<td>6</td>
<td>25.90 (14.78)</td>
</tr>
<tr>
<td>Post-BDI</td>
<td>5.50 (7.78)</td>
<td>2</td>
<td>10.00 (7.34)</td>
</tr>
<tr>
<td>Pre-BAI</td>
<td>25.50 (10.99)</td>
<td>2</td>
<td>25.50 (15.04)</td>
</tr>
<tr>
<td>Post-BAI</td>
<td>17.50 (9.19)</td>
<td>2</td>
<td>6.89 (15.71)</td>
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</table>

Results for Drive for Thinness at Admit and Discharge

The EDI-3 subscale Drive for thinness was included as the outcome variable in the first set of multiple regressions analyses. The final model for the admit time period included the three covariates and overvigilance and inhibition at admit ($R^2 = .29$, $p < .001$; see Table 6). The final model for the discharge time period did not include any of the admit YSQ subscale variables, but rather included the four covariates and diagnosis ($R^2 = .10$; $p = .146$; see Table 6).

Results for Bulimia Symptoms at Admit and Discharge

The next set of models included the EDI-3 subscale bulimia as the dependent variable. The final model for admit included the three covariates and the YSQ subscale...
Table 6

Results of Regression Analysis for Variables Predicting Drive for Thinness at Admit and Discharge

<table>
<thead>
<tr>
<th>Variable</th>
<th>Admit (N = 67)</th>
<th>Discharge (N = 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>t</td>
</tr>
<tr>
<td>Age</td>
<td>-.79</td>
<td>.31</td>
</tr>
<tr>
<td>ED duration</td>
<td>-.03</td>
<td>.94</td>
</tr>
<tr>
<td>Admit BMI</td>
<td>.33</td>
<td>.76</td>
</tr>
<tr>
<td>Admit motivation</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>BN</td>
<td>.96</td>
<td>.24</td>
</tr>
<tr>
<td>EDNOS</td>
<td>.26</td>
<td>.09</td>
</tr>
<tr>
<td>YOI</td>
<td>.31</td>
<td>5.17</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
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<td>.29</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt; .001</td>
<td>--</td>
</tr>
</tbody>
</table>

impaired limits ($R^2 = .27; p < .001; see Table 7). Similar to the final model for drive for thinness, the discharge model for bulimia did not include any of the YSQ subscale variables as predictors, however, the four covariates remained ($R^2$ value of = .01, and $p = value of .393; see Table 7).

Results for Body Dissatisfaction at Admit and Discharge

At admit the final model for body dissatisfaction included the three covariates as well as the overvigilance and inhibition YSQ subscale ($R^2 = .32; p < .001; see Table 8). The discharge model for body dissatisfaction included the four covariates, but no YSQ subscales ($R^2 = .09; p = .172; see Table 9).

Results for Eating Disorder Risk Composite at Admit and Discharge

In these analyses, the eating disorder risk composite was the last EDI-3 subscale
Table 7

*Summary of Regression Analysis for Variables Predicting Bulimia at Admit and Discharge*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Admit (N = 67)</th>
<th>Discharge (N = 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>t</td>
</tr>
<tr>
<td>Age</td>
<td>6.59</td>
<td>2.75</td>
</tr>
<tr>
<td>ED duration</td>
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<td>-2.35</td>
</tr>
<tr>
<td>Admit BMI</td>
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<td>2.84</td>
</tr>
<tr>
<td>Admit motivation</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>YIL</td>
<td>.52</td>
<td>3.79</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>.27</td>
<td>--</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt; .001</td>
<td>--</td>
</tr>
</tbody>
</table>

Table 8

*Summary of Regression Analysis for Variables Predicting Body Dissatisfaction at Admit and Discharge*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Admit (N = 67)</th>
<th>Discharge (N = 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>t</td>
</tr>
<tr>
<td>Age</td>
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<td>-.78</td>
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<tr>
<td>Admit BMI</td>
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<td>.61</td>
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<td>EDNOS VS AN</td>
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<tr>
<td>BN VS AN</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Admit motivation</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>YOI</td>
<td>.34</td>
<td>5.77</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>.32</td>
<td>--</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt; .001</td>
<td>--</td>
</tr>
</tbody>
</table>

used as an output in variable the admit and discharge regression models. The final model for admit showed that, in addition to the three covariates, impaired limits along with overvigilance and inhibition YSQ subscales were significant ($R^2 = .38; p < .001$; see
Table 9

Summary of Regression Analysis for Variables Predicting Eating Disorder Risk

Composite Score at Admit and Discharge

<table>
<thead>
<tr>
<th>Variable</th>
<th>Admit (N = 67)</th>
<th>Discharge (N = 40)</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>β</td>
<td>t</td>
</tr>
<tr>
<td>Age group</td>
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<td>1.38</td>
</tr>
<tr>
<td>ED duration</td>
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<td>-2.38</td>
</tr>
<tr>
<td>Admit BMI</td>
<td>.57</td>
<td>2.11</td>
</tr>
<tr>
<td>EDNOS VS AN</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>BN VS AN</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Admit motivation</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>YIL</td>
<td>.30</td>
<td>2.23</td>
</tr>
<tr>
<td>YOI</td>
<td>.25</td>
<td>4.74</td>
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<td>Adjusted $R^2$</td>
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<td>&lt;.001</td>
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<tr>
<td>p-value</td>
<td>&lt;.001</td>
<td>.232</td>
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</table>

Table 9). Similar to the results of the previous models using EDI-3 subscales as outcomes, the final model at discharge only included the four covariates and diagnosis ($R^2 = .06; p = .232; see Table 9$).

Results for Eating Disorder Diagnostic Scale

Total Score at Admit and Discharge

The admit model retained the three covariates along with impaired autonomy ($R^2 = .59; p < .001; see Table 10$). The discharge model included four covariates along with diagnosis, impaired autonomy, and performance ($R^2 = .60; p < .001; see Table 10$). A significant interaction between impaired autonomy and diagnosis at discharge indicated that the relationship between EDDS total score and impaired autonomy and performance varied across diagnostic groups (AN from EDNOS, and BN) For instance, those with AN show a positive association between impaired autonomy and performance.
### Table 10

**Summary of Regression Analysis for Variables Predicting EDDS Symptom Scores at Admit and Discharge**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Admit ($N = 54$)</th>
<th>Discharge ($N = 40$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$</td>
<td>$t$</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED duration</td>
<td>11.95</td>
<td>3.28</td>
</tr>
<tr>
<td>ED duration</td>
<td>.04</td>
<td>1.00</td>
</tr>
<tr>
<td>Admit BMI</td>
<td>2.66</td>
<td>5.85</td>
</tr>
<tr>
<td>Admit motivation</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>YIAP</td>
<td>.30</td>
<td>3.42</td>
</tr>
<tr>
<td>EDNOS VS AN</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>BN VS AN</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>YIAP * EDNOS</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>YIAP * BN</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>$p$-value</td>
<td>&lt; .001</td>
<td></td>
</tr>
</tbody>
</table>

With the total EDDS score, while those with EDNOS and BN demonstrated a negative relationship between impaired autonomy and performance with the discharge EDDS score (see Figure 2). In addition to the interactions for impaired autonomy and performance and diagnosis, there was also a main effect for impaired autonomy and performance indicating that higher scores on this YSQ variable at admit were associated with higher scores on the EDDS at discharge. The main effect for age group indicated that those in the adult group were reporting significantly higher EDDS scores at admit compared to the adolescent group.

Overall, the covariates were not consistently significant predictors of admit and discharge symptom severity values. However, BMI at admit were found to be significant in three of the admit models and three of the discharge models. Eating disorder duration...
Figure 2. Relationship between the EDDS and impaired autonomy and performance for AN, EDNOS, and BN.

was found to be significant in the admit models with bulimia and the Eating Disorder Risk Composite scores as the outcomes. Finally, age group was found to be significant in two of the admit models with bulimia and the EDDS total score as the outcomes.

Results for Hypothesis 2: Change in Eating Disorder Symptomatology as a Factor of Change in Maladaptive Schema Activity

To test the second hypothesis that the magnitude of change in eating disorder symptom severity was associated with the magnitude of change in the expression of maladaptive schemas, a series of linear mixed-effects models were tested for each symptomatology outcome.
Results for EDI-3 Subscale Scores Across Time

Each of the four EDI-3 symptomatology scales were included in separate linear mixed-effects models. Including drive for thinness as the outcome variable led to a final mixed-effects model that included main effects for overvigilance and inhibition, and an interaction between diagnosis and time (see Table 11). An examination of the plots depicting the interactions demonstrates that individuals with AN do not have as steep of a reduction in drive for thinness as those with EDNOS and BN (see Figure 3). Figure 4 depicts the positive relationship between drive for thinness and overvigilance and inhibition across time.

Results for EDI-3 Bulimia Across Time

The final model that included bulimia as the outcome was found to have three significant interactions (see Table 12). The first was between other-directedness and time (see Figure 5), the next between overvigilance and inhibition and time (see Figure 6), and the final interaction was between diagnosis and time (see Figure 7).

A plot of the first interaction between other-directedness and time illustrates that other-directedness had a stronger relationship to the EDI-3 bulimia score at admit than at discharge. The next interaction when plotted suggested that a stronger relationship existed between overvigilance and inhibition and the EDI-3 bulimia score at discharge than at admission. A plot of the last interaction between diagnosis and time revealed that those with BN have the steepest reduction in bulimia symptoms, while those with EDNOS have a slight reduction and those with AN have even less of a reduction.
### Table 11

*Linear Mixed-Effect Model with Drive for Thinness as the Outcome*

<table>
<thead>
<tr>
<th>Effect</th>
<th>Estimate</th>
<th>SE</th>
<th>t value</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>39.08</td>
<td>9.20</td>
<td>4.24*</td>
</tr>
<tr>
<td>Duration of ED</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.01</td>
</tr>
<tr>
<td>Age group</td>
<td>1.44</td>
<td>2.02</td>
<td>0.71</td>
</tr>
<tr>
<td>BMI at admit</td>
<td>0.31</td>
<td>0.35</td>
<td>0.90</td>
</tr>
<tr>
<td>Admit motivation</td>
<td>-1.45</td>
<td>1.02</td>
<td>-1.42</td>
</tr>
<tr>
<td>EDNOS VS AN</td>
<td>9.51</td>
<td>5.47</td>
<td>1.74</td>
</tr>
<tr>
<td>BN VS AN</td>
<td>2.54</td>
<td>4.46</td>
<td>0.57</td>
</tr>
<tr>
<td>Time</td>
<td>-9.27</td>
<td>2.68</td>
<td>3.45*</td>
</tr>
<tr>
<td>YOI</td>
<td>0.25</td>
<td>0.06</td>
<td>4.61*</td>
</tr>
<tr>
<td>EDNOS * Time</td>
<td>-9.41</td>
<td>3.09</td>
<td>-3.05*</td>
</tr>
<tr>
<td>BN * Time</td>
<td>-43.93</td>
<td>2.84</td>
<td>-1.39</td>
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</table>

<table>
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<tr>
<th>SD</th>
<th>Correlation</th>
</tr>
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<tr>
<td>YOI</td>
<td>0.27</td>
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<tr>
<td>Time</td>
<td>-0.97</td>
</tr>
<tr>
<td>Residual</td>
<td>3.68</td>
</tr>
</tbody>
</table>

*Figure 3.* Interaction between diagnosis and time on the EDI-3 Drive for Thinness.
Figure 4. Main effect for overvigilance and inhibition on Drive for Thinness scores at admit and discharge.

Results for EDI-3 Body Dissatisfaction Across Time

The final body dissatisfaction model included a main effect in the positive direction for overvigilance and inhibition (see Table 13). Thus a reduction in the overvigilance and inhibition subscale was related to a reduction in an individual’s body dissatisfaction.

Results for Eating Disorder Risk Composite Across Time

The final model in the EDI-3 series included the Eating Disorder Risk Composite scale score as the outcome variable (see Table 14). A significant main effect was found for overvigilance and and inhibition is associated with a reduction in the Eating Disorder Risk Composite (EDRC) score over time. In addition, significant interactions were found between diagnosis and time (see Figure 8), in that those with a diagnosis of AN
Table 12

Linear Mixed-Effects Model with EDI-3 Bulimia Subscale as the Outcome

<table>
<thead>
<tr>
<th>Effect</th>
<th>Estimate</th>
<th>SE</th>
<th>t value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>24.19</td>
<td>8.25</td>
<td>2.93*</td>
</tr>
<tr>
<td>Duration of ED</td>
<td>-.01</td>
<td>.02</td>
<td>-.26</td>
</tr>
<tr>
<td>Age group</td>
<td>-1.67</td>
<td>.50</td>
<td>-3.32*</td>
</tr>
<tr>
<td>BMI at admit</td>
<td>-.08</td>
<td>.15</td>
<td>-.49</td>
</tr>
<tr>
<td>Admit motivation</td>
<td>-.15</td>
<td>.35</td>
<td>-.45</td>
</tr>
<tr>
<td>EDNOS VS AN</td>
<td>21.70</td>
<td>4.87</td>
<td>4.31</td>
</tr>
<tr>
<td>BN VS AN</td>
<td>3.15</td>
<td>4.27</td>
<td>.74</td>
</tr>
<tr>
<td>Time</td>
<td>8.21</td>
<td>3.77</td>
<td>2.18*</td>
</tr>
<tr>
<td>YODR</td>
<td>0.84</td>
<td>.24</td>
<td>3.45*</td>
</tr>
<tr>
<td>YOI</td>
<td>-.23</td>
<td>.14</td>
<td>-1.72</td>
</tr>
<tr>
<td>EDNOS * Time</td>
<td>-14.16</td>
<td>2.60</td>
<td>-5.44*</td>
</tr>
<tr>
<td>BN * Time</td>
<td>-2.63</td>
<td>2.17</td>
<td>-1.22</td>
</tr>
<tr>
<td>YODR * Time</td>
<td>-.48</td>
<td>.13</td>
<td>-3.91*</td>
</tr>
<tr>
<td>YOI * Time</td>
<td>.22</td>
<td>.07</td>
<td>3.30*</td>
</tr>
</tbody>
</table>

SD Correlations

| Intercept   | .65    |
| YODR        | .47    | 1.00  |
| Time        | 2.34   | .94   | .94   |
| YOI         | .37    | -.80  | -.80  | -.95 |
| YODR * Time | .37    | -1.00 | -1.00 | -.93 | .77 |
| YOI * Time  | .17    | .90   | .90   | .99  | .98 | -.88 |
| Residual    | .30    |

experienced a slower decline in their EDRC scores over time as compared to their EDNOS and BN counterparts.

Results for EDDS Total Score Across Time

The final linear mixed-effects model analysis was conducted with the EDDS total score as the outcome. The final model included the four covariates, time, and the YSQ
Figure 5. Interaction between diagnosis and time for the EDI-3 Bulimia Scale.

Figure 6. Interaction between other-directedness and time for the EDI-3 Bulimia Scale.
Figure 7. Interaction between overvigilance and inhibition and time for EDI-3 Bulimia Scale.

Table 13

Linear Mixed-Effects Model with EDI-3 Body Dissatisfaction as the Outcome

<table>
<thead>
<tr>
<th>Effect</th>
<th>Estimate</th>
<th>SE</th>
<th>t value</th>
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</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>24.39</td>
<td>8.53</td>
<td>2.86*</td>
</tr>
<tr>
<td>Duration of ED</td>
<td>.01</td>
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<tr>
<td>Age group</td>
<td>1.51</td>
<td>2.26</td>
<td>.67</td>
</tr>
<tr>
<td>BMI at admit</td>
<td>.73</td>
<td>.39</td>
<td>1.86</td>
</tr>
<tr>
<td>Admit motivation</td>
<td>-1.62</td>
<td>1.14</td>
<td>-1.42</td>
</tr>
<tr>
<td>EDNOS VS AN</td>
<td>-6.44</td>
<td>3.61</td>
<td>-1.79</td>
</tr>
<tr>
<td>BN VS AN</td>
<td>-6.30</td>
<td>2.55</td>
<td>-2.47*</td>
</tr>
<tr>
<td>Time</td>
<td>-4.73</td>
<td>1.60</td>
<td>-2.96*</td>
</tr>
<tr>
<td>YOI</td>
<td>.34</td>
<td>.05</td>
<td>7.29*</td>
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</table>

<table>
<thead>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>14.58</td>
</tr>
<tr>
<td>YOI</td>
<td>6.24</td>
</tr>
<tr>
<td>Time</td>
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</table>
Table 14

Linear Mixed-Effects Model with EDI-3 Risk Composite Subscale as the Outcome

<table>
<thead>
<tr>
<th>Effect</th>
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<tr>
<td>Duration of ED</td>
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<td>0.02</td>
<td>-1.05</td>
</tr>
<tr>
<td>Age group</td>
<td>3.61</td>
<td>1.61</td>
<td>2.25*</td>
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<tr>
<td>BMI at admit</td>
<td>0.58</td>
<td>0.28</td>
<td>2.09*</td>
</tr>
<tr>
<td>Admit motivation</td>
<td>0.03</td>
<td>0.85</td>
<td>0.04</td>
</tr>
<tr>
<td>EDNOS VS AN</td>
<td>13.56</td>
<td>5.18</td>
<td>2.62*</td>
</tr>
<tr>
<td>BN VS AN</td>
<td>-0.75</td>
<td>4.32</td>
<td>-0.17</td>
</tr>
<tr>
<td>Time</td>
<td>-6.10</td>
<td>2.53</td>
<td>-2.41*</td>
</tr>
<tr>
<td>YDR</td>
<td>0.09</td>
<td>0.05</td>
<td>1.91*</td>
</tr>
<tr>
<td>YOI</td>
<td>0.19</td>
<td>0.07</td>
<td>2.91*</td>
</tr>
<tr>
<td>EDNOS * Time</td>
<td>-13.65</td>
<td>2.85</td>
<td>-4.80*</td>
</tr>
<tr>
<td>BN * Time</td>
<td>-3.67</td>
<td>2.53</td>
<td>-1.45</td>
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<table>
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<tr>
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<tr>
<td>YDR</td>
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</tr>
<tr>
<td>YOI</td>
<td>0.18</td>
</tr>
<tr>
<td>Time</td>
<td>12.87</td>
</tr>
<tr>
<td>Residual</td>
<td>.67</td>
</tr>
</tbody>
</table>

subscases other-directedness, impaired autonomy and performance, as well as an
interaction between impaired autonomy and performance and time (see Table 15). The
interaction between time and impaired autonomy and performance demonstrates that the
relationship between EDDS total score and Impaired Autonomy and Performance varies
significantly from admit to discharge (see Figure 9). More specifically, there is a
stronger relationship between Impaired Autonomy and Performance with EDDS scores at
discharge than at admit.
Figure 8. Interaction between diagnosis and time for the EDRC Scale.

Table 15

Linear Mixed-Effects Model with EDDS as the Outcome

<table>
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<th>Effect</th>
<th>Estimate</th>
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<th>t value</th>
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</thead>
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<tr>
<td>Intercept</td>
<td>-26.30</td>
<td>15.65</td>
<td>-1.68</td>
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<tr>
<td>Duration of ED</td>
<td>.04</td>
<td>.03</td>
<td>1.22</td>
</tr>
<tr>
<td>Age group</td>
<td>9.15</td>
<td>3.10</td>
<td>3.52*</td>
</tr>
<tr>
<td>BMI at admit</td>
<td>1.80</td>
<td>1.75</td>
<td>3.51*</td>
</tr>
<tr>
<td>Admit motivation</td>
<td>2.02</td>
<td>1.75</td>
<td>1.15</td>
</tr>
<tr>
<td>EDNOS VS AN</td>
<td>6.72</td>
<td>4.76</td>
<td>1.41</td>
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<td>BN VS AN</td>
<td>-.35</td>
<td>3.44</td>
<td>-.10</td>
</tr>
<tr>
<td>Time</td>
<td>-.471</td>
<td>6.95</td>
<td>-.68</td>
</tr>
<tr>
<td>YIAP</td>
<td>.63</td>
<td>.19</td>
<td>3.39*</td>
</tr>
<tr>
<td>YIAP * Time</td>
<td>-.35</td>
<td>.15</td>
<td>2.39*</td>
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<td>YIAP</td>
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<tr>
<td>Time</td>
<td>5.80</td>
</tr>
<tr>
<td>Residual</td>
<td>.22</td>
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</tbody>
</table>
Results for Hypothesis 3: Individuals Endorsing More Maladaptive Schemas Will Progress at a Slower Rate in Treatment and Require a Longer Stay in Residential Treatment Than Those Individuals Endorsing Fewer or Less Severe Maladaptive Schemas

To test this hypothesis, two Cox PH regression analyses were conducted, using either EDDS and EDRC total scores at admit as key predictor variables, the four previously described covariates, and the five YSQ subscales as predictors. Length of time in residential treatment was the outcome. Individuals that did not complete residential treatment due to an early discharge were considered censored for analysis purposes. Results showed that participants with AN remained in treatment the longest followed by...
those with EDNOS and then BN (see Figure 10). The following predictors were included along with the EDDS total score: BMI, age group, eating disorder duration, diagnosis, and the YSQ subscales impaired limits and overvigilance and inhibition ($R^2 = .44$; see Table 16 for a summary of these results). The following predictors were found to be significant in the final model when including the Eating Disorder Risk Composite as a variable in the model: (a) an interaction between BMI and diagnosis, (b) age group, and (c) diagnosis ($R^2 = .28$; see Table 17 for a summary of these results and Figure 11 for a depiction of these interaction terms). The YSQ domain impaired limits did not quite reach significance on its own ($p = .10$) and was removed from the model.

It is interesting to observe that BMI had virtually no impact on length of treatment for individuals with BN and had a slight relationship for AN and EDNOS in a positive direction. That is, a higher BMI at admit was associated with a slightly longer stay in treatment for those with AN and EDNOS.

![Figure 10. Time to discharge for AN, EDNOS, and BN.](image)
### Table 16

**Results for Cox Regression Analysis with EDDS as the Key Symptomatology Variable**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>Hazard ratio</th>
<th>95% C.I.</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDDS</td>
<td>.03</td>
<td>.02</td>
<td>1.03</td>
<td>.99 - 1.07</td>
<td>.150</td>
</tr>
<tr>
<td>Age group</td>
<td>.07</td>
<td>.61</td>
<td>1.07</td>
<td>.33 - 3.52</td>
<td>.91</td>
</tr>
<tr>
<td>ED duration</td>
<td>.01</td>
<td>&gt; .01</td>
<td>1.01</td>
<td>1.00 - 1.02</td>
<td>.100</td>
</tr>
<tr>
<td>BMI</td>
<td>-.22</td>
<td>.11</td>
<td>.81</td>
<td>.65 - 1.00</td>
<td>.054</td>
</tr>
<tr>
<td>EDNOS</td>
<td>1.73</td>
<td>.78</td>
<td>5.62</td>
<td>1.23 - 25.68</td>
<td>.026</td>
</tr>
<tr>
<td>BN</td>
<td>.36</td>
<td>.50</td>
<td>1.44</td>
<td>.54 - 3.80</td>
<td>.360</td>
</tr>
<tr>
<td>Impaired limits</td>
<td>.13</td>
<td>.03</td>
<td>1.13</td>
<td>1.06 - 1.21</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Overvigilance and inhibition</td>
<td>-.04</td>
<td>.01</td>
<td>.96</td>
<td>.93 - .99</td>
<td>.005</td>
</tr>
</tbody>
</table>

$R^2 = .44.$

### Table 17

**Results for Cox Regression Analysis with EDRC as the Key Symptomatology Variable**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>Hazard ratio</th>
<th>95% C.I.</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDRC</td>
<td>-.01</td>
<td>.02</td>
<td>.99</td>
<td>.95 - 1.04</td>
<td>.750</td>
</tr>
<tr>
<td>Age group</td>
<td>.42</td>
<td>.44</td>
<td>1.52</td>
<td>.64 - 3.59</td>
<td>.340</td>
</tr>
<tr>
<td>BMI</td>
<td>-.43</td>
<td>.18</td>
<td>.65</td>
<td>.46 - .93</td>
<td>.018</td>
</tr>
<tr>
<td>EDNOS</td>
<td>2.78</td>
<td>.95</td>
<td>16.15</td>
<td>2.44 - 102.81</td>
<td>.003</td>
</tr>
<tr>
<td>BN</td>
<td>1.53</td>
<td>.68</td>
<td>4.60</td>
<td>1.21 - 17.71</td>
<td>.025</td>
</tr>
<tr>
<td>BMI * EDNOS</td>
<td>.26</td>
<td>.24</td>
<td>1.30</td>
<td>.81 - 2.08</td>
<td>.280</td>
</tr>
<tr>
<td>BMI * BN</td>
<td>.46</td>
<td>.20</td>
<td>1.58</td>
<td>1.07 - 2.35</td>
<td>.022</td>
</tr>
</tbody>
</table>

$R^2 = .28.$
Figure 11. Interaction between BMI and diagnosis on time in treatment
Eating disorders continue to be viewed as having complex origins and maintenance factors that provide practitioners with a considerable challenge when attempting to treat a patient to recovery. Cognitive theory has been the dominant theory in eating disorder research and clinical practice or treatment. Cognitive theory, within the context of eating disorders has typically focused on the individual’s cognitions towards their body, food, and other surface-level cognitive distortions that are not connected to an individual’s development (e.g., all-or-nothing thinking, disqualifying the positive, emotional reasoning). However, cognitive theory within eating disorders research has continued to integrate additional theories and concepts including core beliefs and maladaptive schemas in an attempt to better explain the development and course of an eating disorder. Findings from existing studies have associated core beliefs with the severity of one’s eating disorder symptomatology and their treatment outcomes (Jones, Leung, & Harris, 2007b; Leung et al., 2000). These studies have opened the door for further research that may lead to an improved understanding of the development and subsequently the treatment of eating disorders. The design of the current study allowed for a prospective examination of the relationship between maladaptive schemas and residential treatment outcomes in adolescent and adult females with a diagnosis of AN, BN, or EDNOS through examination of existing clinical data.
Analyses were conducted to test the hypothesis that maladaptive cognitive schemas, in addition to participant characteristics, would predict behavioral, cognitive, and emotional symptoms associated with eating disorders at admit and again at discharge. The results of the present study suggested some impact of maladaptive cognitive schemas on subscales for eating disorder symptomatology. For instance, the YSQ subscale scores demonstrated greater predictability of residents’ symptomatology at the start of treatment than at discharge. This may suggest that as an individual’s maladaptive schemas are modified over the course of treatment and a different pattern may emerge between their schemas and their symptomatology that persist at the end of treatment. The EDI-3 subscale scores for Drive for Thinness, Bulimia, Body Dissatisfaction, and the overall risk composite score were predicted by YSQ variables at admit, but not at discharge. As mentioned above, changes in an individual’s schemas over the course of treatment may explain the reduction in relationships between schemas and current symptomatology.

Logical connections can be made between the YSQ domains significantly associated with eating disordered thoughts and behaviors. The YSQ domain overvigorilance and inhibition, for example, was predictive of Drive for Thinness at admit. This association appears reasonable as unrelenting standards and hypercriticalness are conceivable precursors to one’s preoccupation with their body and an intense fear of weight gain. The EDI-3 Bulimia subscale was predicted by the YSQ domain of impaired
limits. Once again, this appears to be a logical extension of the emotional and behavioral characteristics of bulimia where one will think about and engage in bouts of uncontrollable eating often in response to being upset. Those scoring higher on impaired limits are characterized by insufficient self-control or discipline, which are important precursors to engaging in bingeing behavior and inappropriate compensatory behaviors. Similarly to Drive for Thinness, when body dissatisfaction was entered into the model as the outcome variable of interest, the admit YSQ subscale score for overvigilance and inhibition was predictive of the outcome at admit, but not discharge. The characteristics that underlie overvigilance and inhibition (e.g., negativism, unrelenting standards/hypercriticalness, punitiveness) are likely important contributors to an individual’s shift to extreme discontent with their body. Finally, the EDI-3 Eating Disorder Risk Composite score was predicted by impaired limits and overvigilance and inhibition. This finding was not unexpected, considering the previous symptomatology subscales that make up the EDRC included the predictors of impaired limits and overvigilance and inhibition.

Total EDDS, however, was predicted by YSQ domains at both admit and discharge. For example, impaired autonomy and performance was significant at both admit and discharge in that individuals scoring higher on this subscale had higher scores on the EDDS. Although there was a significant correlation between the EDI-3 risk composite score, which takes into account multiple facets of an eating disorder, and the EDDS total score ($r = .58, p < .001$), the EDDS focuses more directly on symptom presentation according to the DSM-IV criteria and is more behaviorally oriented. However, it is interesting to see the characteristics found under impaired autonomy and
performance to be associated with the more diagnostically oriented EDDS than the EDI-3. Individuals with impaired autonomy and performance are characterized by a sense of dependence/incompetence, vulnerability to harm or illness, enmeshment/underdeveloped self, and failure. Examination of a significant interaction between impaired autonomy and diagnosis at discharge led to the finding that those with AN show a negative association between impaired autonomy and performance with the total EDNOS score, while those with EDNOS and BN demonstrate a positive relationship between impaired autonomy and performance with the discharge EDDS score. It is unclear why individuals with AN would have experienced a greater drop in their EDDS score if they began treatment with a higher level of impaired autonomy and performance. Perhaps those with AN that begin treatment with the characteristics that fall under this category (e.g., dependence/incompetence, failure, enmeshment/underdeveloped self) gain greater confidence in themselves through intensive treatment and are able to move towards becoming a more independent self that enhances their ability to move towards recovery.

Previous research has found that in general negative core beliefs using measures such as the YSQ predict more symptom severity and poorer outcomes in individuals obtaining outpatient treatment for an eating disorder (Cooper et al., 1997; Leung, Waller, & Thomas, 2000). It is of interest that the YSQ domain other-directedness, which focuses on approval seeking, self-sacrifice, and subjugation, was not a predictor of eating disorder symptomatology as previous studies have associated them with bingeing and purging behaviors (Jones et al., 2005; Leung et al., 2000). However, overall an overview of the literature finds much variation in those with BN with a focus on dependence/
incompetence, entitlement, and emotional inhibition in the few studies conducted with those diagnosed with AN (Jones et al., 2007b).

Relationship Between Changes in Maladaptive Schemas to Changes in Symptomatology Across Time

Linear mixed-effects models were conducted for each of the five symptomatology outcome variables to examine whether changes in the YSQ subscale scores coincided with the changes in the outcome variables across the two time points. The covariates diagnosis, age at admit, BMI, duration of eating disorder, and motivation for recovery were included in each model regardless of their significance. The first model included Drive for Thinness as the outcome variable of interest and was found to have a significant main effect for overvigilance and inhibition and an interaction between diagnosis and time. The positive directionality of the relationship between overvigilance and inhibition and Drive for Thinness indicated that one increased with the other. This relationship is fitting after considering that overvigilance and inhibition includes the characteristics of unrelenting standards/hypercriticalness, punitiveness, and emotional inhibition. A reduction in these beliefs would likely lead to a reduction in more specific self-beliefs (e.g., need to be thinner) and coping responses (e.g., restricting) that focus on improving an aspect of one’s self that may be controllable.

Several variables were found to be associated with the EDI-3 subscale bulimia, and some of those relationships were conditional on the level of another variable, as demonstrated by three significant interactions: other-directedness and time, overvigilance and inhibition and time, and diagnosis and time. Other-Directedness was more strongly
related to bulimia scores at admit and overvigilance and inhibition were more strongly related to bulimia scores at discharge. These findings indicated that early on in treatment an individual’s bulimic symptoms are more strongly associated with characteristics that may be more easily addressed in an individual with an eating disorder (e.g., approval/recognition seeking, self-sacrifice). However, characteristics that are potentially more difficult to modify in an individual with an eating disorder (e.g., negativism/pessimism, emotional inhibition, unrelenting standards/hypercriticalness, and punitiveness) may show more of a relationship to bulimic symptoms as they are addressed in intensive residential treatment. The third interaction represented an unsurprising relationship between diagnostic category and time. That is, those with bulimia demonstrated a steeper decline in bulimia symptoms than those with AN or EDNOS from admit to discharge. This is an expected find due to the prominence of these bulimic symptoms in individuals with BN and the higher values found in the BN group on the EDI-3 bulimia scale at admit.

The Body Dissatisfaction model included a significant main effect for overvigilance and inhibition, indicating that a reduction in the overvigilance and inhibition subscale was related to a reduction in an individual’s body dissatisfaction. Similar to the model including Drive for Thinness, such a relationship was a logical one, fitting with prior research examining the relationship between maladaptive schemas and eating disorder symptomatology (e.g., Jones et al., 2005; Leung et al., 2000).

The Eating Disorder Risk Composite Score was significantly associated with overvigilance and inhibition as a function of time, meaning that a decline in one’s risk composite score was observed over time as this particular YSQ scale decreased over
time. The diagnosis and time interaction indicated that those with AN had a slower
decline on their Eating Disorder Risk Composite score over time as compared with
EDNOS or BN. As individuals with AN typically remained in treatment longer than their
EDNOS and BN counterparts, according to facility records, this was an expected finding.

The EDDS total score was significantly associated with the four covariates, a
main effect for overvigilance and inhibition, and an interaction between impaired
autonomy and performance and time. The interaction between impaired autonomy and
performance and time suggested that a significantly stronger relationship between this
YSQ variable and one’s score on the EDDS measure at discharge as compared to admit.
This finding suggests that characteristics associated with impaired autonomy and
performance may be more modifiable during treatment and relate more closely with
one’s reduced symptomatology at discharge. A bivariate correlation suggested a positive
association between overvigilance and inhibition at discharge and length of stay in
residential treatment \( r = .548, p = <.001 \). As overvigilance and inhibition seems to be
intuitively associated with eating disorder symptomatology, and prior findings have
substantiated this connection (Jones et al., 2005; Leung et al., 2000), the reduction in
eating disorder symptoms being accompanied by a lessening of maladaptive schema
severity is a reasonable finding.

Relationship Between Maladaptive Core Beliefs
and Time in Residential Treatment

Study findings suggested that residents with AN typically remained in treatment
longest followed by residents with EDNOS and BN. This finding has been validated by
previous studies that have examined time to remission (e.g., Clausen, 2008) and prior records from the residential treatment facility. This general examination led to the testing of the final hypothesis, that maladaptive core beliefs would predict length of stay in treatment in addition to general resident characteristics. Results revealed that when EDDS, other covariates, and YSQ subscales were included in the analysis that BMI, impaired limits, and overvigilance and inhibition were predictive of length of stay. Impaired limits was positively related, while overvigilance and inhibition was negatively related to length of stay in treatment, though this latter effect was not strong. It is unclear why increased overvigilance and inhibition was found to be associated with a slight reduction in treatment time. This could indicate that the subcharacteristic of unrelenting standards motivated an individual to push towards recovery rather than continue to support unhealthy behaviors to achieve a particular image. Items from the subscale of unrelenting standards and hypercriticalness include “I try to do my best; I can’t settle for ‘good enough,’” “I must meet all of my responsibilities,” and “I can’t let myself off the hook easily or make excuses for my mistakes.” Thus, certain aspects of one’s maladaptive schemas may be redirected in a positive way, but this would not indicate that the schema itself should be ignored and left unaddressed therapeutically. It seems advisable to ensure that maladaptive schemas even when directed at positive goals (e.g., pushing oneself to obtain recovery so as to be responsible or not fail) still be addressed as an individual could easily slip back into more ineffective behaviors that are activated by their maladaptive schema of overvigilance and inhibition.

The Eating Disorder Risk Composite model included main effects for age group, diagnosis, and BMI along with an interaction between BMI and diagnosis. The YSQ
domain of impaired limits did not quite meet statistical significance. The interaction between BMI and diagnosis suggested that BMI is not a reliable indicator of time in treatment. Similarly to the EDDS model impaired limits was found to be positively related to length of stay in treatment providing further evidence that impaired limits is an important domain to assess for and address in individuals with eating disorders.

An additional observation of interest was that survival model including the EDDS demonstrated the YSQ variables to be stronger predictors of time in treatment over one’s admit levels of symptomatology. This provides further evidence for the importance of examining and addressing the deeper level core beliefs that may help drive an individual’s eating disorder. It is possible that the EDRC model did not include a significant YSQ domain due to more overlap between this composite scores and maladaptive schemas than the model including the EDDS, a more eating disorder specific measure.

The inclusion of deeper level cognitions in the conceptualization of an individual with an eating disorder does not imply that lower level cognitions be overlooked. Rather the results of the current study should be viewed as additional pieces of the biopsychosocial puzzle of an eating disorder. As indicated in Figure 1, when focusing on cognitions alone, there are a series of cognitive levels to target in treatment. Early on in treatment an emphasis may focus more on what can be considered surface level cognitions (e.g., “if I am thin, I will be more well-liked”). As treatment progresses, deeper level cognitions may be addressed to reduce beliefs that may activate the lower level cognitions again in the future leading to ineffective responses (e.g., overemphasis on weight followed by restriction or purging). Addressing cognitions at a deeper level
may lead to improved long-term outcomes for females with eating disorders and, subsequently, reduce the likelihood of a relapse.

Summary of Findings

Collectively, the results of the three sets of analyses addressing the research hypotheses indicate that maladaptive schemas do have a role in the severity of one’s eating disorder symptomatology and the change in symptoms across time. Impaired limits, impaired autonomy and performance, and overvigilance and inhibition were the three most common predictors of eating disorder symptomatology and had a seemingly logical connection to the eating disordered beliefs and behaviors. These connections suggest that maladaptive schemas were in place prior to the development of an eating disorder and provided a foundation for these maladaptive coping behaviors. Subtle differences were found across the diagnostics groups as well. Previous research has also emphasized the impact of maladaptive schemas on eating disorders, but focused on the individual schemas making up the larger schema domains (e.g., Jones et al., 2007a, 2007b). There remains much variation in the most prominent schemas overall across the diagnostic groups, however. Waller and colleagues (2007) have suggested that little difference may exist between the different diagnostic groups on the schemas with which they present. They suggest that important differences across the diagnostic groups may lie in their schema processes (e.g., primary avoidance of negative affect for those with a more restrictive eating pathology and secondary avoidance of negative affect for those with a bulimic eating pathology). It follows that these coping mechanisms may be
another potential target for treatment upon arriving at and addressing the maladaptive schemas exhibited by an individual.

These findings, though preliminary, lend support to the need for a more elaborate cognitive model to be developed to better explain the mechanisms associated with the development, maintenance, and recovery from an eating disorder. An elaborated model may consider providing cognitions that are more developmentally based and long-standing, which then lead into more readily observable cognitions that connect directly with eating disordered beliefs and behaviors. It follows that an improved understanding of the factors leading to and maintaining an eating disorder will open the door for more effective treatments and even preventive measures.

An unexpected finding during the analysis of data was the stronger association between YSQ domains and the EDDS total symptom score than the YSQ domains and the Eating Disorder Risk Composite score from the EDI-3. The EDDS was developed with the goal of capturing the key diagnostic criteria associated with an eating disorder; that is, the specific eating disordered beliefs and behaviors. The EDI-3 risk composite scores, on the other hand, go beyond the basic eating disorder diagnostic criteria to include more specific beliefs about one’s body and weight potentially leading to greater variability in values. As the EDDS is a more concise diagnostic instrument, it appears to serve well when paired with an instrument like the EDDS, where finer disordered beliefs may not be needed to assess for impact on key symptoms.
The present study has a number of limitations. The analyses conducted are limited by their scope due to the number of participants included. The sample size did not allow for the inclusion of the 18 maladaptive schemas in the analyses as this would increase the risk of Type I error. Instead the analyses included the five overarching schema domains: disconnection and rejection; impaired autonomy and performance; impaired limits; other-directedness; and overvigilance and inhibition. Previous studies in this area have attended to the lower level categories that combine to create the five overarching maladaptive schema domains. The decision to use the five domains was again dictated primarily by the sample size of the current study. It is viewed as desirable to use the lower level subscales to obtain more detail on the schemas most associated with eating disorder symptoms and treatment outcomes in future studies.

Additionally, the analyses were disaggregated only on diagnostic group and age group. It is important to note however, that differences among the diagnostic groups in the actual presentation of schemas may not be as important as their subsequent response to the maladaptive schemas. Furthermore, distinguishing different schema patterns based on diagnostic group may not be the best approach in light of the frequent overlap or movement between symptoms for the difference diagnostics groups (Milos, Spindler, Schnyder, & Fairburn, 2005).

Longitudinal studies of the long-term impact of residential treatment on the association between maladaptive schemas and eating disorder symptomatology would shed further light on the persistence of this relationship following treatment. However,
such follow-up data were not available due to an absence of participant data at later time points. Future studies should focus on increasing participation in follow-ups to increase the likelihood of obtaining representative data at multiple time periods.

The completion of self-report measures by the population of interest may be problematic if those completing the instruments are experiencing mild cognitive impairment as a result of their eating disorder. Additionally, individuals coming into a treatment center for the first time may exaggerate or downplay their psychosocial and physical symptoms in an effort to obtain more attention or to convince others that their symptoms are not severe enough for intensive treatment.

The analyses conducted did not take into account many other variables that could impact the treatment outcomes in females with eating disorders. Certainly other factors, including level of family involvement, financial resources, and comorbid conditions could impact the outcomes and subsequently the magnitude of the maladaptive schemas on eating disorder treatment outcomes. These additional variables can also vary in importance within the adolescent and adult groups.

The generalizability of this study is limited as a result of the culturally homogeneous sample. This appears to be a common problem in the literature and suggests that greater efforts be made to learn more about the course of eating disorders in females from diverse cultural backgrounds. With increased awareness of females from various cultural backgrounds developing eating disorders, more attention will need to be turned to how variables such as maladaptive schemas impact the development and maintenance of eating disorders and recovery from eating disorders in these populations.
Conclusion and Recommendations

The findings from the current study support previous research that has positively associated eating disorder symptomatology with maladaptive schemas. The prospective design of the current study, however, builds on these earlier studies and suggests that an individual’s maladaptive schemas may play different roles at different time points during their treatment. Additionally, the prospective design demonstrated that maladaptive schema domains impact the length of time an individual spends in treatment beyond other covariates and initial eating disorder symptomatology. Additionally, while most studies choose to exam one or two diagnostic groups, mainly AN and BN, the current study included those with EDNOS as this is not an uncommon diagnosis for incoming residents. The inclusion of the EDNOS group allowed a more complete picture of the type of clients commonly seen in eating disorder treatment facilities.

The combination of findings and limitations of the current study suggest that additional research is required to further illuminate the relationships between maladaptive schema domains and the course of eating disorders. It is strongly recommended that a longitudinal design be used to provide further clarity on the magnitude of the effect of maladaptive schemas on eating disorder development and treatment outcomes. Another suggestion for future studies is to include the full 18 YSQ maladaptive schemas subscales rather than the five overarching domains as this would provide increased understanding of the specific beliefs that relate to eating disorder symptomatology and treatment outcomes. In addition to examining the schemas of individuals with eating disorders, an examination of their subsequent coping strategies to
test the theory of differing reactions to maladaptive schemas across eating disorder
diagnostic groups would be highly beneficial to applied settings. Perhaps another
interesting addition to current schema research in eating disorders is to also follow
noneating disordered behaviors that an individual may turn to following treatment if
maladaptive schemas remained unaddressed in treatment (e.g., alcohol abuse, self-harm,
retail therapy).

As studies continue to shed light on the role of maladaptive schemas in eating
disorder development and treatment outcomes more effective interventions may be
developed that target these beliefs specifically. Thus, there is much clinical significance
associated with research demonstrating a relationship between the maladaptive schemas
and the development, maintenance, and recovery from eating disorders. Although
reductions in maladaptive schemas were found over time in the current study it is unclear
if addressing these beliefs more directly would lead to more effective treatment outcomes
and reduced relapse rates. Additionally, it is not clear what constitutes clinically
significant change on maladaptive schemas. Longitudinal and treatment-based studies
focusing on maladaptive schemas will be key in better addressing these questions and
furthering research and clinical practice for eating disorders.
REFERENCES


APPENDICES
Appendix A:

YSQ-S3
Instructions: Listed below are statements that people might use to describe themselves. Please read each statement, then rate it based on how accurately it fits you over the past year. When you are not sure, base your answer on what you emotionally feel, not on what you think to be true. A few of the items ask about your relationships with your parents or romantic partners. If any of these people have died, please answer these items based on your relationships when they were alive. If you do not currently have a partner but have had partners in the past, please answer the item based on your most recent significant romantic partner.

Choose the highest score from 1 to 6 on the rating scale below that best describes you, then write your answer on the line before each statement.

**RATING SCALE**

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<tr>
<th>1 = Completely untrue of me</th>
<th>4 = Moderately true of me</th>
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<td>2 = Mostly untrue of me</td>
<td>5 = Mostly true of me</td>
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<tr>
<td>3 = Slightly more true than untrue</td>
<td>6 = Describes me perfectly</td>
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1. _____ I haven’t had someone to nurture me, share him/herself with me, or care deeply about everything that happens to me.

2. _____ I find myself clinging to people I’m close to because I’m afraid they’ll leave me.

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

4. _____ I don’t fit in.

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

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

7. _____ I do not feel capable of getting by on my own in everyday life.

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

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

10. _____ I think that if I do what I want, I’m only asking for trouble.

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

12. _____ I am too self-conscious to show positive feelings to others (e.g., affection, showing I care).
13. _____ I must be the best at most of what I do; I can’t accept second best.

14. _____ I have a lot of trouble accepting “no” for an answer when I want something from other people.

15. _____ I can’t seem to discipline myself to complete most routine or boring tasks.

16. _____ Having money and knowing important people make me feel worthwhile.
17. _____ Even when things seem to be going well, I feel that it is only temporary.

18. _____ If I make a mistake, I deserve to be punished

19. _____ I don’t have people to give me warmth, holding, and affection.

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

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

22. _____ I’m fundamentally different from other people.

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

24. _____ I’m incompetent when it comes to achievement.

25. _____ I think of myself as a dependent person when it comes to everyday functioning.

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

27. _____ My parent(s) and I tend to be over-involved in each other’s lives and problems.

28. _____ I feel as if I have no choice but to give in to other people’s wishes, or else they will retaliate, get angry, or reject me in some way.

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

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

31. _____ I try to do my best; I can’t settle for “good enough.”

32. _____ I’m special and shouldn’t have to accept many of the restrictions or limitations placed on other people.

33. _____ If I can’t reach a goal, I become easily frustrated and give up.
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34. _____ Accomplishments are most valuable to me if other people notice them.

35. _____ If something good happens, I worry that something bad is likely to follow.

36. _____ If I don't try my hardest, I should expect to lose out.

37. _____ I haven’t felt that I am special to someone.

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

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

40. _____ I don’t belong; I’m a loner.

41. _____ I’m unworthy of the love, attention, and respect of others.

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

43. _____ I lack common sense.

44. _____ I worry about being physically attacked by people.

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

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

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

48. _____ I find it hard to be free-spirited and spontaneous around other people.

49. _____ I must meet all my responsibilities.

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

51. _____ I have a very difficult time sacrificing immediate gratification or pleasure to achieve a long-range goal.

52. _____ Unless I get a lot of attention from others, I feel less important.

53. _____ You can’t be too careful; something will almost always go wrong.
54. _____ If I don’t do the job right, I should suffer the consequences.

55. _____ I have not had someone who really listens to me, understands me, or is tuned into my true needs and feelings.

56. _____ When someone I care for seems to be pulling away or withdrawing from me, I feel desperate.

57. _____ I am quite suspicious of other people’s motives.

58. _____ I feel alienated or cut off from other people.

59. _____ I feel that I’m not lovable.

60. _____ I’m not as talented as most people are at their work.

61. _____ My judgment cannot be counted on in everyday situations.

62. _____ I worry that I’ll lose all my money and become destitute or very poor.

63. _____ I often feel as if my parent(s) are living through me— that I don’t have a life of my own.

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

65. _____ I’ve always been the one who listens to everyone else’s problems.

66. _____ I control myself so much that many people think I am unemotional or unfeeling.

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

68. _____ I feel that I shouldn’t have to follow the normal rules or conventions that other people do.

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

70. _____ If I make remarks at a meeting, or am introduced in a social situation, it’s important for me to get recognition and admiration.

71. _____ No matter how hard I work, I worry that I could be wiped out financially and lose almost everything.
72. _____ It doesn’t matter why I make a mistake. When I do something wrong, I should pay the consequences.

73. _____ I haven’t had a strong or wise person to give me sound advice or direction when I’m not sure what to do.

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

75. _____ I’m usually on the lookout for people’s ulterior or hidden motives.

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

77. _____ I am too unacceptable in very basic ways to reveal myself to other people or to let them get to know me well.

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

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

80. _____ I worry that I’m developing a serious illness, even though nothing serious has been diagnosed by a doctor.

81. _____ I often feel I do not have a separate identity from my parent(s) or partner.

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

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

84. _____ People see me as uptight emotionally.

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

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

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

88. _____ Lots of praise and compliments make me feel like a worthwhile person.

89. _____ I worry that a wrong decision could lead to disaster.

90. _____ I’m a bad person who deserves to be punished.
Appendix B:

AH Online Assessment Behavior Observations
AH Online Assessment Behavior Observations

Assessment Date:________________      Start Time:________ am/pm  End time: ________am/pm
Assessment time point (circle):  AdmissionDischarge

Resident ID:______________________Proctor:________________________________________

Comments/observations (check):
Level of cooperation:
very cooperative__ generally cooperative__ uncooperative at times__ uncooperative throughout assessment__

Activity level:
seemed lethargic__ unremarkable__ appeared fidgety/restless at times__ overly active/difficulty attending__

Attention:
unusually absorbed__ attentive to tasks__ distracted often__ consistently distracted/inattentive__

Responding:
very slow and hesitant__ slow and careful__ prompt but careful__ too quick at times__ impulsive and careless__

Confidence:
appeared confident__ appeared at ease__ appeared tense/worried at times__ appeared overtly anxious__

Other observations:
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

Appendix C:

Consent Form
CONSENT FORM

Background information

Avalon Hills is committed to providing the highest level of care. In order to monitor our quality of care more fully, it is important to obtain consistent feedback from our residents and past residents on their current psychological and physical status. The information you provide upon admission will help inform the clinicians working with you about your specific needs. All residents are invited to complete the questionnaires again at discharge and following their residential stay as part of Avalon Hills ongoing outcome study. We ask that you read this form and ask any questions you may have before completing the questionnaires.

With your permission we would like to use the questionnaire data in research endeavors conducted by Avalon Hills. The data will also be added to a national database on eating disorders research.

Procedures

Questionnaires will be completed shortly after admission for treatment, just prior to your discharge, and following residential treatment at three, six, and twelve months and annually thereafter. All of the questionnaires are completed online through our secure website. A staff member will be present as you complete the questionnaires upon admission to Avalon Hills and again prior to discharge. You will also be able to ask for assistance through e-mail or via phone from the Performance and Quality Improvement Coordinator when you complete the questionnaires at home using a computer.

You will be given a randomly selected ID number in order to maintain anonymity. Also, we will aggregate the questionnaires’ responses for all participants in order to further mask the identity of participants.

Risks of completing the questionnaires

There are no significant foreseeable risks in completing the questionnaires. There is a possible risk of fatigue or discomfort associated with answering personal questions. You may refuse to participate or discontinue completing the questionnaires at any time with no consequences to your current or future care or services at Avalon Hills.

The time required to complete the questionnaires will require approximately one hour and will be completed upon admission, prior to discharge, and again at three months, six months, twelve months, and annually following treatment at Avalon Hills.
**Benefits of completing the questionnaires**

Participation in this research may result in increased self-awareness and insight. The information you provide is also beneficial to clinicians as they will receive detailed information about your eating disorder and related issues early-on in treatment. Additionally, your responses to post-treatment questionnaires may benefit others who may receive treatment for eating disorders.

**Compensation**

You will not receive any reimbursement for completing the measures.

**Confidentiality**

Responses on questionnaires completed upon admission will be available for therapists to review. This information will help your primary therapist and treatment team develop your treatment plan. Data collected at discharge and thereafter will be anonymously aggregated for research purposes and will require your consent.

All data used for research purposes will be aggregated and identifying information removed. You will be randomly assigned an ID number that will be used in our research database. Your name and any other identifying information will not appear in our database. Data collected at Avalon Hills for research purposes will also be added to a National database and may be presented at conferences or in publications. Your anonymity will be retained in all research activities.

Our electronic database is password protected and available only to those directly involved in the outcomes research and the clinical director. Databases in which identifying information is removed may be saved on external drives that will be locked up in cabinets on Avalon Hills premises. Our internal internet server has additional firewalls and protection to prevent others from outside of our organization from gaining access to raw data.

**Voluntary nature of the study**

Your decision whether or not to allow your information to be used for research purposes will not affect your current or future treatment at Avalon Hills. You are free to end your participation in Avalon Hills research at any time without affecting your care.

**Contacts and questions**

If you have any questions or concerns regarding how your questionnaire data may be used for research purposes let a staff member know or contact the Clinical Director, Dr. Jennifer Tolman (435-245-4537). If you would like to talk to someone other than the data collector(s), you may contact a member of the internal Institutional Review Board for Research with Human Subjects at Avalon Hills (435-245-4537).

*You will be given a copy of this information to keep for your records.*

**Statement of Consent:**
I have read the above information □. I have asked questions and have received answers □. I consent to participate in the treatment outcome study at Avalon Hills □.

Resident name: _____________________________________ Date: ________________

Resident Signature: __________________________________________________________

Parent/guardian name: _______________________________ Date: ________________

Signature of parent or guardian: _____________________________________________

Proctor/Witness: ______________________________________ Date: ________________

Signature of Proctor/Witness: ________________________________________________
Appendix D:

Facility Research Permission Letter
Avalon Hills
146 E 100 N
Logan, UT 84321

December 15, 2008

Utah State University Institutional Review Board
9530 Old Main Hill
Logan, UT 84322-9530

Please note that Ms. Jodi Cullum, USU Graduate Student, has the permission of Avalon Hills to conduct research at our facilities for her study, “Maladaptive Schemas as a Predictor of Residential Treatment Outcomes in Females with Eating Disorders”. Ms. Cullum will be using an existing data set that includes general patient demographics and resident responses on self-report measures. Ms. Cullum’s on-site research activities will be finished by April 2009.

If there are any questions, please contact my office.

Signed,

Whitney Nelson
Project Manager
CURRICULUM VITAE

JODI L. CULLUM

PERSONAL INFORMATION

EDUCATION

Current
Doctor of Philosophy, Experimental and Applied Psychological Science
Dissertation Title: Maladaptive Schemas as a Predictor of Residential Treatment Outcomes in Females with Eating Disorders
(tentative defense--March 2009)
Utah State University, Logan, Utah

2001
Master of Science, Health Psychology
Thesis Title: Retreat Program Evaluation: The Primary Support Person Perspective
University of Bath, England

1999
Bachelor of Arts, First Class Honours in Psychology
Thesis Title: Emotional Experiences of Elite Athletes
University of Calgary, Calgary, Canada

SCHOLARSHIPS AND AWARDS

2007
Doctoral Studies Grant, Government of Canada

2007
College of Education and Human Services Scholarship, Utah State University

2007
Third Place, Poster Presentation at the USU Graduate Research Symposium

2006
College of Education and Human Services Scholarship, Utah State University

2005
School of Graduate Studies Honor Roll, Utah State University

1996-1999
Dean’s List for Faculty of Social Sciences, University of Calgary

1998
Undergraduate Merit Award, University of Calgary

1997
Louise McKinney Scholarship

1995
Alexander Rutherford Scholarship
PUBLISHED ARTICLES


PROFESSIONAL PRESENTATIONS


ASSISTANTSHIPS

National Center for Engineering Technology Education
Graduate Research Assistant Logan, Utah May 2007 - April 2009
- Internal program evaluator
- Key role in the development of a year-long evaluation plan
- Developed survey and interview materials
- Creation of and management of quantitative and qualitative databases
- Data analysis
- Report writing

Avalon Hills Residential Eating Disorders Program
Graduate Assistant Logan, Utah May 2006 - April 2009
- Lead role in developing outcomes research and related research programs
- Member of the Performance and Quality Improvement committee
- Creation of and management of research database
- Data analysis
- Developed general and relapse prevention didactic materials
- Eight months of psychotherapeutic activities
Utah State University Center for Epidemiologic Studies  
Research Assistant, Logan, Utah, May 2005 - August 2006
- Conducted structured phone interviews with informants for study participants
- Assessed for cognitive decline, problems of daily living, medical history, and behavioral disturbances
- Data entry and peer editing of interviews
- Assisted in clinical ratings of study participants

Utah State University  
Logan, UT, August 2004 - August 2005
Clinic Assistant
- Provided assistance to students obtaining testing materials
- Assisted in development and analysis of a clinic needs assessment
- Prepared orientation presentation for new students
- Maintained clinic database

USU Department of Psychology  
Logan, Utah, September 2003 - May 2004
Teaching Assistant
- Assisted students enrolled in a work study program through the psychology department
- Graded student papers

USU Department of Psychology  
Logan, Utah, September 2003 - August 2004
Research Assistant
- Involved in the phone interviewing of college women in a study assessing the impact of media on eating disorders; DSM-IV diagnostic interviews
- Assisted in IRB proposal write-up
- Preparation of articles for a meta-analysis

ADDITIONAL RESEARCH EXPERIENCE

Utah State University  
Logan, Utah, Fall 2004
Research Assistant
- Assisted in the modification of questionnaires and participant materials
- Responded to individuals interested in becoming participants in a dieting study involving food intake monitoring with a computer program
- Ran participants through baseline procedures (i.e., physiological measurements, self-report questionnaires)
- Assisted in workshops for participants learning the new software
- Created database and assisted in data analysis
Alberta Children’s Hospital  Calgary, Alberta  April 2002 - July 2003
Research Assistant
- Involved in the recruitment of participants for a study examining the impact of a secure chat site for adolescents with cerebral palsy and spina bifida
- Responsible for conducting pre- and post-intervention interviews

Tom Baker Cancer Centre  Calgary, Alberta  October 2001 - August 2003
Research Assistant
- Responsible for a review of the psychosocial oncology literature, collection of articles, organization of references, write up of an annotated bibliography
- Database creation and management, data analysis, write-up of articles for submission
- Patient screening and assessment of physical and psychosocial functioning
- Involved in follow-up data collection using structured and semi-structured interview formats with retreat participants and caregivers as part of a program evaluation
- Recruitment, interviewing, and tracking of patients with prostate cancer and their partners for involvement in a partner support group
- Member of team involved in the mass screening of patients for psychosocial needs assessment and for awareness of and attitudes to psychosocial resources
- Coordination of mass mail out into community for a comparison study with cancer patients
- Member of a program evaluation team for the Tapestry Retreat Outreach Program

Calgary Chronic Pain Centre  Calgary, Alberta  October 2001 - September 2002
Research Assistant/Program Evaluator
- Involved in data collection using a structured interview format with clients and family members as part of a government program evaluation
- Data management of interview material
- Qualitative analysis of open-ended interview questions

Alberta Children’s Hospital  Calgary, Alberta  October 2001 - February 2002
Research Assistant
- Responsible for data management of a study examining the use of a mineral supplement for individuals with bipolar disorder

Tom Baker Cancer Centre  Calgary, Alberta  April - September 2001
Master’s Placement
- Conducted independent qualitative research for the Tapestry Retreat Program
- Assisted other researchers with similar studies

National Sport Centre  Calgary, Alberta  September 1999 - January 2000
Research Assistant
- Responsible for data entry, graphical representation of data, and analysis of data pertaining to over-training in athletes
University of Calgary
Psychology Department
Calgary, Alberta September 1996 - April 1997
Research Assistant
• Recruited participants, arranged appointments for research sessions, and supervised computer-based sessions with participants involved in a depression study
• Data analysis
• Conducted phone interviews on the publics’ knowledge of psychological services

University of Calgary
Psychology Department
Calgary, Alberta July - November 1997
Research Assistant
• Recruited participants, arranged appointments for research sessions, ran research sessions with groups of participants
• Assisted in the development of a self-efficacy questionnaire

ACTIVITIES

Campus Representative, American Psychological Association of Graduate Students, 2005-2006

RECENT CONFERENCES AND WORKSHOPS ATTENDED


National Center for Engineering and Technology Education annual workshop, Minneapolis, MN, 2008

National Center for Engineering and Technology Education annual workshop, Bloomington, IL, 2007

Utah State University Graduate Student Research Symposium, Logan, UT, 2007

Society of Behavioral Medicine, San Francisco, CA, 2005
PROFESSIONAL & ACADEMIC MEMBERSHIPS

Academy for Eating Disorders
American Psychological Association
  - Division of Health Psychology
  - Graduate Students Division (APAGS)
American Society of Engineering Education
Canadian Psychological Association
Society of Behavioral Medicine