

Self-concealment, Psychological Flexibility, and Severity of Eating Disorders

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ABSTRACT

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The primary aim of this study was to investigate the relationship between psychological flexibility, self-concealment, and eating disorder severity. This study also sought to explore the relationship between these variables in a clinical sample. Existing literature has demonstrated that diminished psychological flexibility is likely to play a key role in eating pathology. Additionally, self-concealment has been found to be a common and treatment-interfering aspect of the clinical presentation of eating-disordered individuals. Preliminary evidence has been found linking these variables to severity of eating-disorder pathology. However, this relationship needs further clarification to understand fully the implications for treatment and relapse prevention, for these often treatment-resistant disorders.

Participants were 182 respondents to an online survey including demographic information, the Eating Disorder Examination Questionnaire (EDE-Q), the Acceptance and Action Questionnaire (AAQ-16), and the Self-Concealment Scale (SCS). Data were collected via Qualtrics software and analyzed in SPSS using Hayes PROCESS models.

Findings included the following. Among a sample of eating-disordered individuals, the less (more diminished) psychological flexibility they reported, the more severe the reported eating-disorder symptoms; in other words, an inverse relationship was found. Additionally, the greater self-concealment participants reported, the more severe were their reported eating-disorder symptoms. These findings held up for overall severity of reported symptoms and also for subscale severity for eating restraint, eating concern, weight concern, and shape concern. Additionally, a moderated mediation model found that greater self-concealment, diminished

psychological flexibility, and no treatment were all significantly related to increases in eating-disorder severity. This model also found a significant interaction between psychological flexibility and eating-disorder severity moderated by treatment condition. That is, the extent to which someone self-conceals helps to explain the relationship between psychological flexibility and severity. Furthermore, whether a patient has been in treatment significantly relates to the relationship between psychological flexibility and severity.

Implications of these findings are discussed, including a focus on emotion-regulation models of eating disorders and the rationale for adopting a transdiagnostic understanding of eating pathology. Recommendations are proposed for clinical practice, including expanding the utilization of therapies such as Acceptance and Commitment Therapy (ACT) and Dialectical Behavioral Therapy (DBT) for eating disorders, which specifically target psychological flexibility and self-concealment in the hope of preventing future relapse.

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DEDICATION

I dedicate my dissertation to my great uncle, Henry Grunebaum. He was and will always be the patriarch of a proud lineage of psychotherapists. I will never forget when I declared my psychology major in college and Henry grabbed me in an almost suffocating bear hug and proclaimed, “Another psychologist joins the ranks!” I wasn’t there yet, Henry, but I am now.

Chapter I

INTRODUCTION AND LITERATURE REVIEW

Eating disorders, including anorexia nervosa and bulimia nervosa, have the highest fatality rate of any mental illness (Arcelus, Mitchell, Wales, & Nielson, 2011). Every 62 minutes, someone dies as a direct result of an eating disorder, either due to the medical complications of the eating disorder or suicide (Hudson, Hiripi, Pope, & Kessler, 2007). At least 30 million people suffer from an eating disorder in their lifetime, and these disorders are associated with high levels of medical and psychiatric comorbidity and severe functional impairment (Dotson, Masuda, & Cohen, 2011; Guarda, 2007; Olmsted, Kaplan, & Rocket, 2005). Additionally, these disorders are difficult and expensive to treat, and relapse is common (Basile, 2004; Walsh, 2008). Due to the challenge of operationalizing a proper definition of relapse, rates tend to differ greatly, but rates ranging from 22% to 51% have been found across outcome studies of anorexia and bulimia nervosa (Keel, Dorer, Franko, Jackson, & Herzog, 2005). The course of eating disorders also varies widely. For some individuals, an eating disorder might occur only within a discrete period of time and resolve with a stable and permanent state of recovery, with or without treatment (Eshkevari, Reiger, Longo, Haggard, & Treasure, 2014). For others, symptoms and diagnoses may come and go for many years and sometimes chronically throughout the lifetime. Due to the persistent difficulty experienced by clinicians in treating these disorders, more research is needed to identify key correlates of severity. In turn, negative outcomes can be reduced and sustained recovery can become an attainable goal of treatment.

Many factors are hypothesized to contribute to the maintenance and severity of eating disorders (Masuda, Boone, & Timko, 2011). Several researchers are moving towards a model of identifying eating disorders as problems of emotion regulation in which the individual attempts to control or eliminate negatively evaluated internal states (Fairburn, Cooper, & Shafran, 2003; Malicki, Ostaszewski, & Dudek, 2014). This model posits that the behavioral facets of eating disorders (starvation, bingeing, purging, and more) can be thought of as effective strategies of remediating unwanted internal experiences. However, while these behavioral patterns may lead to relief in the short term, they likely increase the frequency or intensity of these negative emotional experiences in the long term, thus intensifying the need for escape and perpetuating a dysfunctional and perhaps even deadly cycle of maladaptive behavior. Factors related to this emotion regulation model that warrant greater investigation in the literature include psychological flexibility, or the capacity to engage in strategies or behaviors that serve valued ends, despite discomfort and self-concealment or the characterological tendency to withhold personal information (Masuda et al., 2011; Masuda & Latzman, 2012). The investigation of these two factors may help elucidate more about the mechanisms that prevent eating-disordered individuals from adopting healthy coping strategies and staying well. While behavioral tendencies vary across eating disorder diagnoses, individuals often fluctuate between diagnostic categories over the course of illness (Milos, Spindler, Schnyder, & Fairburn, 2005).

The primary aim of this study was to investigate the relationship among three core constructs (one behavioral and two dispositional traits/tendencies): severity of eating-disordered behavior, psychological flexibility, and self-concealment. Extant research suggests that these factors necessitate greater consideration in the eating disorder literature (Hill, Masuda, Melcher, & Morgan, 2015; Masuda et al. 2011). Diagnostic information was obtained and differences

across Anorexia Nervosa and Bulimia Nervosa diagnoses were examined. However, due to the tendency of individuals to fluctuate across diagnostic criteria and categories, diagnosis was not considered of primary importance to the outcomes.

Severity of Eating Disorders

Similar to other mental illnesses, eating disorders are often characterized on a spectrum ranging from subclinical levels of behaviors and cognitions related to disordered eating and avoidance of weight gain (such as dieting, excessive exercise, and body image disturbance) to the most severe clinical symptoms, including chronic starvation and high-frequency bingeing and purging (Lamarre & Rice, 2016). Research has repeatedly demonstrated that eating problems across this spectrum are continuing to permeate society in an increasingly weight-conscious population (Eshkevari et al., 2014). The *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V)* characterizes eating disorders in four primary classifications: anorexia nervosa (AN), bulimia nervosa, binge eating disorder (BED), and feeding or eating disorders not elsewhere classified (FED-NEC) (American Psychiatric Association, 2013). AN is defined by refusal to maintain minimally normal body weight, intense fear of weight gain, and significant disturbance in the perception of body shape and size. BN is defined by repeated episodes of binge eating (eating abnormally large quantities of food accompanied by a sense of loss of control), followed by inappropriate compensatory behaviors such as self-induced vomiting, excessive exercise, or misuse of laxatives, diuretics, or other methods of eliminating the food consumed. BED is defined by binge episodes without inappropriate compensatory behaviors of BN, but still accompanied by the feeling of having lost control over eating. FED-NEC includes a range of subclinical eating disorders and other disorders related to food consumption that do not meet criteria for AN, BN, or BED (American Psychiatric Association, 2013).

While clear behavioral differences exist between these diagnostic categories, research has found high diagnostic flux within eating disorders, especially between AN and BN (Milos et al., 2005). This finding suggests that common causal and preserving biological and physiological processes may be at play across eating disorder diagnoses. In Milos et al.'s study, 192 women with a current eating disorder were assessed three times over a 30-month period. Results of this research indicated that although the overarching diagnosis of "eating disorder" was relatively stable, diagnostic stability was low, with just a third of participants retaining their original diagnosis. Remission was also low across all three diagnoses, indicating that remission was not responsible for this result. This study and others support the consideration of a transdiagnostic understanding of eating disorders (Ben-Tovim et al., 2001; Fairburn et al., 2003; Milos, Baur, Muehlebach, & Spindler, 2013). While diagnostic data were collected in the present study, a transdiagnostic view was utilized in terms of general eating disorder severity and its relationship to other variables of interest, psychological flexibility, and self-concealment. Because AN and BN currently encompass the majority of eating disorder diagnoses and individuals' diagnoses often fluctuate between these two diagnoses over the course of an illness, the present study examined only individuals on the AN and BN spectrum of eating disorders. It is important to note that while much research has offered support for a transdiagnostic model of eating disorders, other notable researchers including those who have authored the eating disorders section of the DSM-V, do not utilize the transdiagnostic model and believe in valuable clinical distinctions between diagnostic categories (Dahlgren & Wisting, 2016; Fairburn, 2011).

Existing research has examined a wide variety of factors contributing to severity of eating disorders and subsequent outcomes including chronicity. Higher degrees of eating disorder severity have been found to be associated with comorbidities such as anxiety, depression, body

dysmorphia, and substance abuse disorders (Haynos, Roberto, Attia, 2015; Scott, Hanstock, & Thornton, 2014; Tchanturia et al., 2011). Other research examining correlates of eating disorder symptoms has found that lack of cognitive flexibility, negative self-talk, decreased self-efficacy, decreased self-esteem, negative body image, neuroticism, impulsivity, and perfectionism are also risk factors associated with eating disorder development and severity (Elfhag & Morey, 2008; Haynos et al., 2015; Peck & Lightsey, 2008). Recently, there has been increased interest in the role of emotion regulation as it relates to the severity of eating disorders (Ruscitti, Rufino, Goodwin, & Wagner, 2016; Svaldi, Griepenstroh, Tuschen-Caffier, & Ehring, 2012). A transdiagnostic cognitive behavioral model of eating disorders posits that the negative self-evaluation found in eating-disordered individuals can develop into a pervasive globalized negative view of the self, or “core low self-esteem,” involving negative autonomous self-judgments that can create a sense of hopelessness about the possibility for recovery (Fairburn et al., 2003). Additionally, this model suggests that there is a tendency for individuals with eating disorders to engage in dysfunctional mood modulatory behaviors in order to modify how they feel rather than allowing for changes in mood and adopting healthy coping strategies (Fairburn et al., 2003). In other words, individuals with eating disorders develop behaviors of starvation and bingeing and purging (and others) in order to control and avoid emotional experiences they consider unpleasant or intolerable. Thus, a person with a diminished capacity to tolerate strong emotions is at higher risk for developing an eating disorder in the first place and then at greater risk for increased severity once patterns of disordered eating have been established (Fairburn et al., 2003). The transdiagnostic model is consistent with another model focusing specifically on the construct of psychological flexibility.

Psychological Flexibility

A newer construct and an extension from Fairburn's transdiagnostic model, psychological flexibility has been widely studied in recent years as a contemporary theory of psychological health (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). The concept of psychological flexibility is derived from an acceptance- and mindfulness-based Cognitive Behavioral Therapy (CBT) known as Acceptance and Commitment Therapy (ACT) (Hayes et al., 2012). In ACT literature, diminished psychological flexibility is theorized to be at the core of psychopathology and suffering. Psychological flexibility is characterized by (a) experiencing the present moment as it is without judgment and avoidance; and (b) persisting or changing behavior when doing so serves valued ends (Hayes et al., 2006). Diminished psychological flexibility, on the other hand, is characterized by experiential avoidance, cognitive fusion, and a lack of value-committed action. Experiential avoidance, a key factor, refers to the unwillingness to experience negative private events (thoughts, feelings, bodily sensations) and concurrent avoidance of those experiences (Hayes et al., 1996). This avoidance of negative experience in turn leads to dysfunctional and rigid behavior patterns. Research has indicated that experiential avoidance provides short-term relief, but subsequently amounts to higher levels of distress and pathology in the long term (Hayes et al., 1996). Experiential avoidance and a lack of value-committed action are key components of diminished psychological flexibility, which has been found to contribute greatly to the development and perpetuation of numerous psychopathologies, including depression, anxiety, substance abuse, OCD, panic disorders, and suicidality (Andrew & Dullin, 2007; Hayes, Follette, & Linehan, 2004; Hayes et al., 2006).

Extant literature also suggests that diminished psychological flexibility is likely to play a meaningful part in eating-related problems (Heffner & Eifert, 2004; Masuda & Price, 2012).

Specifically, processes related to experiential avoidance—binging, compensatory behaviors (purging, laxative use, exercise), fasting, restriction, self-injury, and others (Claes, Mitchell, & Vandereycken, 2012; Fairburn et al., 2003)—are pervasive in eating disorders. Psychological flexibility has been found to be negatively correlated with cognitions related to disordered eating (Masuda, Price, Anderson, & Wendell, 2010). Some research has supported a linkage between diminished psychological flexibility and anorexia nervosa (AN). Individuals diagnosed with AN tend to have co-occurring traits of avoidant personality disorder, exhibit a general tendency to suppress negative emotional experiences, and engage in high levels of harm avoidance (Geller, Cockell, & Goldner, 2000; Klump et al., 2000; Phillipou, Gurvich, Castle, & Rossell, 2015). Individuals with Bulimia Nervosa (BN) have also been found to engage in experiential avoidance strategies inherent to diminished psychological flexibility. In a community sample of individuals with BN, participants who reported greater negative emotions also reported reduced willingness to experience those negative emotions when compared with control subjects (Pells, 2006). Additionally, the loss of control and subsequent emotional numbness that characterizes eating experiences in BN have been suggested as a potential facet of experiential avoidance (Hill et al., 2015; Tanofsky-Kraff et al., 2007). Research has also shown that psychological flexibility is negatively correlated with elevated scores of eating disorder severity and that those with eating disorder diagnoses have reported higher experiential avoidance when compared with a control sample (Rawal, Park, & Williams, 2010). Furthermore, in a cross-sectional study of college students with disordered-eating symptomatology, an inverse relationship was found between psychological flexibility and disordered eating (Masuda et al., 2011). That study utilized the Acceptance and Action Questionnaire (AAQ), an established measure of psychological

flexibility, and the Eating Attitudes Test (EAT-26) to assess eating pathology (Hayes et al., 2004).

In addition, the Masuda et al. (2011) study looked at another potential factor relating to severity of eating disorders—self-concealment—which was assessed using the Self-Concealment Scale (SCS), a validated measure of self-concealment (Cramer & Barry, 1999). It was found that self-concealment was positively associated with disordered-eating symptoms and negatively associated with psychological flexibility. In other words, the more individuals concealed, the greater his or her eating pathology and the lower his or her psychological flexibility. In the same study and utilizing the same measures, Masuda et al. (2011) furthered their investigation by exploring whether psychological flexibility mediated the association between self-concealment and disordered-eating symptoms among non-clinical college students. The initial findings were confirmed (i.e., psychological flexibility was found to be negatively associated with disordered-eating symptoms and self-concealment was found to be positively associated with disordered-eating symptoms), but additionally, psychological flexibility *was* found to mediate the association between self-concealment and disordered eating after controlling for gender, ethnicity, and body mass index (BMI).

The studies conducted by Masuda et al. (2011, 2012), as well as much of the research conducted subsequently on psychological flexibility and eating disorders, are limited by the use of college samples. However, the findings do point to a relationship between severity of eating disorder and psychological flexibility. If, in fact, psychological flexibility proves to play a significant role in the severity of eating disorders, treatment implications may stem from these findings. For example, treatments targeting a reduction in experiential avoidance and simultaneously focusing on increasing alternative coping skills such as acceptance and

mindfulness might be particularly useful (Hill et al., 2015). Acceptance and Commitment Therapy (ACT) as well as Dialectical Behavioral Therapy both target these mechanisms and utilize mindfulness and acceptance-based techniques. Preliminary evidence applying these types of therapies in an eating-disordered population has shown them to be effective in reducing patients' eating disorder behaviors (Baer, Fischer, & Huss, 2005; Telch, Agras, & Linehan, 2001). More research could help solidify the clinical implications of the role of psychological flexibility in eating disorders as well as unpack any potential relationships with other factors, including the one posited by Masuda (2011, 2012)—that is, self-concealment.

Self-concealment

Psychologists and other scholars have long affirmed that secret keeping can cause psychological distress and impairment (Larson, Chastain, Hoyt, & Ayzenberg, 2015). Self-concealment is often defined as a general and stable behavioral tendency to actively conceal from others personal information that one perceives as distressing or potentially embarrassing (Larson & Chastain, 1990). According to Larson et al., self-concealment contains various processes, including having a negatively appraised secret, keeping that secret to oneself, and avoiding self-disclosure even when it might prove beneficial. In the current model of self-concealment, it is described as a complex trait-like construct where high levels of motivation for privacy energize a range of goal-directed behaviors (e.g., keeping secrets, behavioral avoidance, lying) and dysfunctional strategies for the regulation of emotions, which serve to conceal negative or distressing personal information (Tamir, Mitchell, & Gross, 2008). In this model, factors such as traumas, insecure attachments, and dispositional social-evaluative concerns are considered antecedents to self-concealment (Larson & Chastain, 1990). These mechanisms are viewed as impacting mental health via a central conflict between urges to both conceal and

reveal and the subsequent breakdown of self-regulatory resources (Baumeister, Vohs, & Tice, 2007). Self-concealment has been found to contribute to wide-ranging psychological distress, including positive associations with anxiety, depression, low self-esteem, social anxiety, maladaptive mood regulation, and others (Kelly & Yip, 2006; Rawal et al., 2010; Vandereycken & Van Humbeeck, 2008).

Recent interest in the construct of self-concealment (as opposed to the constructs of secrecy or non-disclosure) has emerged in the context of eating disorders. It has been found that self-concealment is positively associated with general disordered-eating symptoms (including dieting, bulimia/food preoccupation, and oral control) and cognitions of disordered eating (Masuda et al., 2011). In a more recent study, Masuda and Latzman (2012) found that self-concealment was uniquely related to dieting behavior.

Researchers as well as theorists have examined the relationship between secrecy-related constructs and disordered eating. Prior to the term *self-concealment* being utilized, the implications and correlates of tendencies toward disclosure or non-disclosure of personal information, either relating to eating disorder material or not, have been documented in the eating disorder literature. For example, one study noted that eating-disordered individuals reported more secrecy about eating-related thoughts and behaviors than individuals without eating problems (Smart & Wegner, 1999). Additionally, individuals struggling with eating disorders have been found to be unreliable informants of their personal experiences (Brown, Russell, & Thornton, 1999). Another study reported that women with higher levels of disordered-eating symptoms were less willing to self-disclose certain personal details, including information about relationships, disordered-eating symptoms, and daily activities than women with fewer disordered-eating symptoms (Evans & Wertheim, 2002). This finding suggests the

possibility of a trait-based attribute in individuals with disordered eating that reflects unwillingness to share personal information. An additional study conducted by Swan and Andrews (2003) found that self-concealment was reported by 42% of a clinical sample of eating-disordered women. Swan and Andrews also found that self-concealment was associated with higher levels of eating-disordered behaviors and higher levels of shame, a negatively valenced emotion that is especially difficult to tolerate in the context of dysfunctional emotion regulation. To assess self-concealment, the authors asked the following question, “Is there anything about yourself or your behaviors around eating that you have not disclosed to professionals involved in your care?” If participants responded, “yes” to both questions, space was left for details of what the issue was and why the participant felt unable to disclose. To assess shame, the Experience of Shame Scale (ESS) was utilized. Limitations with this research included the single-item, open-ended nature of the disclosure question, a 60% response rate for the eating disorder sample, and the use of an all-female sample. This study did provide a conceptual basis for a linkage between the severity of eating disorders and the unwillingness to share personal details of the disorder with others. However, it did not explore whether this desire not to disclose might be trait-like as opposed to contextual.

Another study found that self-disclosure was inversely related to eating disorder symptoms and related factors, including BMI, body dissatisfaction, dieting, and perceived social pressure to be thin (Basile, 2004), suggesting that higher severity might be associated with unwillingness to self-disclose. Additionally, and perhaps more compellingly, Basile (2004) found that women who diet more and express more body concerns are more reluctant to disclose their feelings and thoughts with others *in general*, not just as related to eating and weight. This finding adds substance to the possibility that individuals with eating disorder pathology possess a

dispositional tendency towards concealing personal information. Other research has found a positive relationship between chronic thought suppression and both global and specific eating disorder symptoms, suggesting that chronic efforts to suppress unpleasant or unwanted thoughts may be a common avoidance strategy utilized among eating-disordered individuals (Lavender & Anderson, 2011).

While these findings are useful, this literature remains nascent. The ways in which self-concealment relates to severity of disordered eating symptoms needs clarification, which in turn might better inform the clinical picture of eating disorder prevention and treatment. Similar to the model of psychological flexibility, theorists have conceptualized self-concealment within a framework of emotion regulation, i.e., that self-concealment can be viewed as another maladaptive avoidance-based coping strategy. In fact, self-concealment can potentially be understood as a moderating factor when it comes to the relationship between psychological flexibility and eating disorders. In other words, perhaps individuals with diminished psychological flexibility are worse off if they also self-conceal than if they more freely disclose. Masuda et al. (2011) appeared to be the first research team to examine the relationship between psychological flexibility and self-concealment in the context of eating disorder severity. They posited a mediation hypothesis stating that self-concealment is a precursor to psychological flexibility, which in turn affects the severity of eating disorders.

The Present Study: Statement of the Problem

It has clearly been established in the literature that diminished psychological flexibility is related to increased severity in eating disorders. It has also been suggested that the tendency toward self-concealment might be related to increased severity in eating disorders. As noted earlier, Masuda et al. (2011, 2012) examined the relationships between psychological flexibility,

self-concealment, and severity of eating disorder symptoms in non-clinical college samples of individuals with disordered eating. However, they did not examine competing hypotheses regarding the nature of these relationships, nor did they examine these variables with a clinical population. In one study, Masuda and Latzman (2012) tested the hypotheses that self-concealment and psychological flexibility have direct effects, i.e., “main effects,” on the severity of eating disorders, although they also considered whether these effects might be moderated by gender; they found that, with one exception, they were not. In an earlier study, Masuda, Boone and Timko (2011) offered a different “specification” of the relationships between psychological flexibility, self-concealment, and the severity of eating disorders. That is, they tested whether the relationship between self-concealment and the severity of eating disorders was mediated by psychological inflexibility.

While the “main effects” and “mediation” specifications are reasonable, the relationships among psychological flexibility, self-concealment, and severity of eating disorders might be better explained by a third alternative which Masuda et al. did not consider. Perhaps the relationship between psychological flexibility and the severity of eating disorders is moderated by self-concealment. Consistent with the literature cited above, the present study posited that eating-disordered individuals who manifest greater psychological flexibility will be less severely eating disordered. However, the degree to which this inverse relationship obtains might well differ by, or depend upon, an individual’s predisposition to conceal behaviors of which they are ashamed. Thus, a psychologically inflexible individual with an eating disorder might be expected to be worse off if that same individual also has a tendency to self-conceal. In the parlance of moderation hypothesis testing, the anticipated negative relationship between psychological flexibility and the severity of eating-disordered behavior is predicted to be mitigated, i.e.,

“buffered,” by the tendency to self-conceal. Individuals who have a predisposition toward self-concealment will tend not to benefit, or will benefit less, from any level of psychological flexibility that they possess because it is offset by the predisposition to self-conceal. As a consequence, the hypothesized relationship between psychological flexibility and the severity of eating-disordered behavior will be even less negative. This moderation hypothesis deserves to be tested as it makes different theoretical claims than have been previously advanced. Additionally, because the majority of studies, including those conducted by Masuda et al., have used non-clinical college subjects, it is important to test these hypotheses with a clinical sample in order to truly further our understanding of these phenomena in an eating-disordered population.

An additional research focus would be to investigate differences in the relationship between self-concealment, psychological flexibility, and severity of eating disorders between individuals with AN and BN. Therefore, this study examined three variables that have been established as having some type of relationship to eating disorders in the literature. However, distinct from previous research, this study examined the nature of the relationship among these variables through an untested moderation hypothesis in a more clinically severe population, (i.e., participants who self-report formal diagnoses) with an additional attempt to parse out differences across diagnostic categories.

Hypotheses

H1: It is hypothesized that among a sample of eating-disordered individuals, those with diminished psychological flexibility will be more severely eating disordered.

H2: It is hypothesized that eating-disordered individuals who exhibit a tendency to self-conceal will report higher levels of eating-disordered behavior.

H3: It is further hypothesized that psychological flexibility and self-concealment will combine to jointly affect the severity of eating disorders. More specifically, it is hypothesized that the negative relationship between psychological flexibility and the severity of eating-disordered behavior will be mitigated by the predisposition to self-conceal. That is, the relationship between psychological flexibility and severely disordered eating behavior will be less negative among individuals who self-conceal than among their more disclosing counterparts.

Chapter II

METHOD

Participants

A total of 301 individuals were initially recruited for this study. After excluding participants who did not meet inclusion criteria (see below), a total of 241 participants, all individuals with a reported current or lifetime history of Anorexia Nervosa (AN) or Bulimia Nervosa (BN), completed the survey. However, after excluding participants with missing data (i.e., who did not complete the survey), the final sample size was reduced to $N = 182$ (exceeding the number suggested by power analysis of $N = 140$).

Subjects taking the survey were provided with a brief description of research participation via a consent form. They were then asked two exclusionary questions at the outset of the online survey in order to qualify for participation: “Are you 18 years of age or older?” and “Do you currently have or have you ever had Anorexia Nervosa or Bulimia Nervosa?” If subjects answered no to either of these questions, they were not permitted to complete the rest of the survey. As Table 1 indicates, of the 182 participants in the final sample, 175 identified as female, 4 as male, 2 as transgender, and 1 as other. The vast majority (83%) of participants identified as White (non-Hispanic), 4% identified as Hispanic/Latino, 3.3% as Asian/Pacific Islander, and 6.6% as other or mixed race. As for relational status: 31% of participants reported being married, 5% divorced, 1.6% separated, and 57% single. Regarding diagnostic status, participants were asked “What was your diagnosis? a. AN, b. BN, c. Both at different times, and d. No formal diagnosis.” Eighty-six participants identified with the diagnosis Anorexia Nervosa

(AN), while 21 identified with Bulimia Nervosa (BN); 39 reported receiving both diagnoses at some point in time (AN/BN), and 35 participants indicated they had never received a formal diagnostic label. A total of 135 participants reported having received some form of treatment, while 44 participants reported no treatment.

Table 1

Participant Demographics (N = 182)

	n/mean	%/SD
Gender		
Female	175	96.2
Male	4	2.2
Transgender	2	1.1
Other	1	0.5
Race/ Ethnicity		
White	151	83.0
Black	2	1.1
Hispanic	7	3.8
Native American	1	0.5
Asian	6	3.3
Other	12	6.6
Age	27.57	8.11
Marital Status		
Married	58	31.9
Divorced	9	4.9
Separated	3	1.6
Single	104	57.1
Treatment		
Yes	135	75.4
No	44	24.6
Diagnosis		
AN	86	47.3
BN	21	11.5
Both	39	21.4
No formal dx	35	19.2

Measures

Severity of Eating Disorder Behavior

The Eating Disorder Examination Questionnaire (EDE-Q). The Eating Disorder Examination Questionnaire (EDE-Q) (Fairburn & Beglin, 1994) was used to assess severity of eating disorder symptoms. The EDE-Q is a 36-item questionnaire version of the Eating Disorder Examination Interview. The EDE-Q provides the following: four subscale scores relating to restraint, eating concern, shape concern, and weight concerns; a global score; and diagnostic information such as frequency of binge episodes. The restraint subscale examines a primary symptom in eating disorders, restricting intake of food and exerting control over what and how much food is consumed. The subscale has five items (e.g., Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight?). The eating concern subscale has five items and examines the level of preoccupation with food eating or calories as well as preoccupation with others' perceptions of one's eating behavior (e.g., How often have you been engaging in behaviors such as eating in secret?). The weight concern subscale has five items and looks at preoccupation with weight or the number on the scale (e.g., On how many of the past 28 days have you had a strong desire to lose weight?). Finally, the shape concern subscale has eight items and looks at preoccupation with body shape or size (e.g., Have you had a definite desire to have a totally flat stomach?). Each item is rated on a scale from 0-6 (0 rated as "not at all," 1-3 rated as "slightly," 4-5 rated as "moderately," and 6 rated as "markedly"). Additionally, there are frequency items for which respondents provide an overall frequency for the past month; higher scores indicate greater psychopathology. The EDE-Q has been shown to be a reliable and valid measure in both clinical and non-clinical populations (Mond, Hay,

Rodgers, Owen, & Beumont, 2004). The EDE-Q has strong psychometric properties with test-retest reliability for all subscales demonstrating high levels of significance (Luce & Crowther, 1999) and highly accurate discriminate validity (Aardoom, Dingemans, Slof Op't Landt, & Van Furth, 2012). The internal consistency for the EDE-Q global score has been reported as $\alpha = .95$ and the internal consistency for each of the subscales of the EDE-Q has been reported as $\alpha = .81$ for restraint, $\alpha = .94$ for shape concern, $\alpha = .92$ for weight concern, and $\alpha = .87$ for eating concern. Additionally, the EDE-Q global score has been found to have highly accurate discriminate validity of .96, indicating a 96% likelihood that the EDE-Q global score could discriminate between individuals with an ED and those without (Aardoom et al., 2012).

Psychological Flexibility

The Acceptance and Action Questionnaire 16-item (AAQ-16). The Acceptance and Action Questionnaire (AAQ-16) was used to measure psychological flexibility in this survey. The AAQ is a 16-item measure designed to assess willingness to accept undesirable thoughts and feelings (e.g., “It is okay to feel depressed or anxious”), while acting in a way that is congruent with one’s values and goals (e.g., “I am able to take action on a problem even if I am uncertain of the right thing to do”). The measure utilizes a 7-point Likert scale, ranging from 1 (never true) to 7 (always true). Total scores range from 16 to 112, with higher scores indicating greater psychological flexibility. The AAQ-16 has previously been utilized with samples experiencing disordered-eating symptoms. Research has found that the AAQ has good psychometric properties, including internal consistency found to be between $\alpha = .72$ and $\alpha = .79$ and retest reliability found to be .80 (Masuda et al., 2011).

Self-concealment

The Self-Concealment Scale (SCS). The Self-Concealment Scale (SCS) (Larson & Chastain, 1990) is a self-report measure designed to assess a person's tendency to conceal personal information that is distressing or negatively evaluated (e.g., "There are lots of things about me that I keep to myself"). The SCS contains 10 items and employs a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) for each item. The total score is derived from the sum of responses to all 10 items, with greater values indicating greater self-concealment. The SCS has previously been utilized with samples experiencing disordered-eating symptoms. Internal consistency for the SCS has been found to be $\alpha = .86$ in samples of both males and females and retest reliability was found to be $r = .74$ (Cramer & Barry, 1999).

Table 2

Measures

Measure	Variable/Subscales	Citation
Eating Disorder Questionnaire (EDE-Q)	Severity of Eating Disorder Global Score Restraint Eating Concern Shape Concern Weight Concern	Fairburn & Beglin, 1994
Self-Concealment Scale (SCS)	Self-concealment	Larson & Chastain, 1990
Acceptance and Action Questionnaire (AAQ)	Psychological Flexibility	Hayes et al., 2004

Procedure

Data were collected through online survey format. The online survey was created using Qualtrics software. Subjects were recruited through a variety of methods. An email with a link to the survey was created (Appendix B) and distributed to 27 private clinicians throughout New York and Connecticut who identify eating disorders as a specialty. These clinicians were selected due to affiliations with eating disorder organizations including the Eating Disorders Coalition (EDC), the Academy for Eating Disorders (AED) and the National Eating Disorders Association (NEDA) that listed them as specialty providers. Clinicians were asked to distribute the survey voluntarily to appropriate patients. A link to the study was also posted on research pages of websites for eating disorder organizations, including the EDC and the AED. Additionally, subjects were recruited by posting links to online eating disorder forums, including those on Facebook and Reddit. Links were also posted to the Craigslist volunteers' page.

Data were kept confidential. Participants' names were not requested and therefore cannot be linked with their responses. Interested participants were offered to submit their email address for a lottery to win an Amazon gift card. However, no participants opted into this lottery. Survey participants were provided with a study email address to contact if they had any questions, which was ed.tc.study@gmail.com. No participants chose to reach out in this way. However, participants did reach out via Facebook and Reddit. A few asked questions via Facebook and Reddit, but participants mostly used comments to simply convey that they had completed the study. Interacting with participants via online forums about study questions as well as thanking them for participating seemed to reinforce participation and encourage others to participate.

Data Analysis

Preliminary Analyses

Prior to conducting the various tests of the hypotheses, univariate frequency distributions and descriptive statistics were computed (see Table 3 in Chapter III). Variables that exhibited evidence of non-normality and/or outliers were recoded or transformed as necessary (see Results). Internal consistency reliabilities for all multi-item measures were computed. Bivariate correlations between all of the dependent variables (eating disorder measures), psychological flexibility, and self-concealment were also computed (see Table 4 in Chapter III). Prior to estimating the regression models outlined below, tests of the assumptions for each regression model were conducted. Specifically, tests of linearity, homoscedasticity, the normality of the regression residuals, the absence of multicollinearity, and the absence of multivariate outliers were conducted and evaluated.

Preliminary analyses included various t-tests to examine significant differences in eating disorder severity, self-concealment, and psychological flexibility by treatment vs. no treatment as well as a one-way ANOVA to test for differences by diagnostic groups (see Table 6 in Chapter III). Relationships between these primary variables were also explored by running zero-order correlations.

Primary Analyses

Primary analyses included testing original hypotheses H1-H3 predicted as a result of the initial review of literature. For the primary analyses, a moderation model was run in PROCESS (Hayes, 2013) which tested Hypothesis 1: main effects of psychological flexibility on eating disorder severity; Hypothesis 2: main effects of self-concealment of eating disorder severity; and Hypothesis 3: the interaction effect of psychological flexibility with self-concealment on eating

disorder severity. The hypothesized moderation model predicts that the size or nature of the relationship between the predictor variable (psychological flexibility) and the outcome variable (eating disorder severity) changes as a function of the moderator variable (self-concealment).

Hayes' (2013) PROCESS model tests the interaction effect and also probes and plots this interaction as opposed to using simple linear regression. PROCESS provides many of the capabilities offered by existing programs and tools while expanding the number and complexity of models for mediation, moderation, and the combination of the two, all in a single easy-to-use command tool for SPSS using a path analysis framework, as described by Edwards and Lambert (2007). PROCESS generates direct and indirect effects in mediation and moderated mediation models. Additionally, PROCESS offers various tools for probing two- and three-way interactions and can construct bias-corrected and percentile-based bootstrap confidence intervals for conditional and unconditional indirect-effects mediation models (Hayes, 2012). Thus, PROCESS enhances the options beyond the simple linear regression models offered in the basic SPSS package.

Supplemental Analyses

A moderation model in PROCESS was then tested with the four subscales of the EDE-Q utilized as more specific measures of symptom severity instead of the global severity score examined in the hypothesized moderation model. These four subscales are: Eating Restraint, Eating Concern, Weight Concern, and Shape Concern. Eating Restraint refers to a primary symptom in eating disorders, restricting intake of food, and exerting control over what and how much food is consumed. Eating concern is a measure of the level of preoccupation with food eating or calories as well as preoccupation with others' perceptions of one's eating behavior (i.e., engaging in behaviors such as eating in secret). The weight concern subscale relates to the

respondent's level of preoccupation with weight or the number on the scale. Shape concern refers to the respondent's level of preoccupation and attention directed towards body shape or size and behaviors related to body shape (i.e., avoidance of body exposure). Each of these four subscales was tested as the dependent or outcome variable in a moderation model, with psychological flexibility as the predictor and self-concealment as the proposed moderator.

In order to continue exploring moderation models with other variables collected in the data set, other moderators were tested, including treatment vs. no treatment groups. Growing literature suggests the use of the treatment condition as a moderator in analyses of eating disorder severity to understand the role of treatment (particularly the role of ACT treatment as described in Introduction and Discussion sections) in patients' ability to recover from eating disorders (Nakai et al., 2017; Juarascio et al., 2013 Tchanturia et al., 2011). Additionally, participants with a diagnosis of AN vs. everyone else in the sample (i.e., a pure AN group vs. a non-pure AN group) were tested as a moderator. This analysis of an AN group vs. a non-AN group was utilized to further the transdiagnostic understanding of eating disorders that has been posited by numerous research teams (Ben-Tovim et al., 2001; Fairburn et al., 2003; Milos et al., 2013). Findings showing no differences by diagnostic groups could serve to add evidence to the mounting data suggesting a transdiagnostic spectrum of eating disorder symptoms and behaviors.

Post-hoc Research Questions and Analyses

While the researcher was initially interested in answering the question of "to what extent" is psychological flexibility related to eating disorder severity utilizing self-concealment as a moderator, due to findings reported later in Results, it was also of interest to investigate the question of "in what way" is psychological flexibility related to severity by looking at self-concealment instead as a mediator (Baron & Kenny, 1986). Following Masuda et al. (2011), a

mediation model was also tested to explore the ability to replicate research previously conducted in a college undergraduate sample by Masuda et al. in a clinical sample with the current data set. This mediation model was also examined using PROCESS.

Once it was observed that this mediation model was replicated (see Results), consideration was given to other ways in which the relationship between the original variables—psychological flexibility, self-concealment, and eating disorder severity—might be understood. Lately, research scientists have come to appreciate that analyses focusing only on potential mediation or moderation might be incomplete. Although the added value of combining mediation and moderation analysis was described in early publications on mediation analysis, it has only been within the last decade that publications have more widely explained the procedure and rationale (Hayes, 2012). Often called *moderated mediation* or *conditional process modeling* (Fairchild & MacKinnon, 2009; Preacher, Rucker, & Hayes, 2007), the goal of combining mediation and moderation into one analysis is to empirically quantify and test hypotheses about the nature of the mechanisms by which an independent variable, X , exerts influence on a dependent variable, Y . This can be accomplished by piecing together parameter estimates from a mediation analysis with parameter estimates from a moderation analysis and combining these estimates in ways that quantify and, at least in part, can explain various paths of influence from X to Y . Mediation and moderation analysis can be combined through what Hayes and Preacher (in press) called a conditional process model. Such a model allows the direct or indirect effect of an independent variable X on a dependent variable Y through one or more mediators to be moderated. When there is evidence of the moderation of the effect of X on a moderator variable, M , estimation of and inference about the conditional indirect effect of X can give the researcher

insight into the nature of the effect of X on Y through the mediator depending on the moderator. In other words, the mediation is being moderated.

Thus, in order to further investigate variables of interest following the literature through more inclusive analyses, a moderated mediation model was tested utilizing self-concealment as a mediator variable and treatment condition (i.e., participants who received treatment vs. those who have not have received treatment) as a moderator variable. This analysis aimed to answer the following post-hoc research question:

P-H R1: Does the relationship between psychological flexibility and eating disorder severity depend on treatment and also is that relationship (at least partially) explained by self-concealment?

Chapter III

RESULTS

Preliminary Analyses

Prior to conducting the various tests of the hypotheses, univariate frequency distributions and descriptive statistics were examined. For each of the three primary variables, univariate analyses were run to examine missing data, normality, linearity, multicollinearity, as well as skewness, kurtosis, and the presence of outliers. Multivariate normality was also assessed by examining the distributions of the residuals as well as multivariate outliers. These tests were conducted according to guidelines outlined by Tanachnick and Fidell (2013) and Field (2013).

Normality for the distributions for each of the variables was assessed by examining their histograms as well as skewness and kurtosis statistics. Histograms supported a normal distribution for each of the variables. Descriptive statistics (see Table 3) suggested that the distributions were neither skewed nor kurtotic. Univariate outliers were also assessed by inspecting histograms, stem-and-leaf graphs, box plots, and normal probability plots. No outliers were present in the final sample for the AAQ and EDE variables. Three outliers below 1.70 (lower than -3 standard deviations below the mean for SCS) were found for SCS; however, they were kept in the final sample since other statistics were adequate. Multicollinearity was assessed by inspecting correlations among the three variables. Correlations were significant and ranged from .34 to .40 (see Table 4). Since these correlations were not strong, multicollinearity was also ruled out.

Table 3

Descriptive Statistics (N = 182)

Variable	M	SD	Skewness (SE)	Kurtosis (SE)
AAQ	84.91	12.75	-0.14 (.18)	-0.59 (.36)
EDE-Q	4.96	1.39	-1.00 (.18)	0.91 (.36)
SCS	39.00	7.78	-0.98 (.18)	0.64 (.36)

Table 4

AAQ, EDE-Q, and SCS Correlations (N = 182)

Variable	AAQ	EDE	SCS
AAQ	1.00	.34**	.39**
EDE-Q		1.00	.40**
SCS			1.00

** $p < .01$.

Multivariate assumptions including linearity, homoscedasticity, outliers, and normality were also tested by running residuals analyses, including a scatterplot of the residuals, Mahalanobis distance, Cook's D, and Durbin-Watson tests of autocorrelation. These tests were all considered within normal limits. Scatterplots of the residuals showed that there was an even distribution of residuals across the predicted EDE scores. Multivariate linearity for Durbin-Watson scores ranged between 1.50 and 2.50, suggesting that there was no autocorrelation of errors across the sample. Cook's D values were all less than 1.00. None of the values for Mahalanobis distance were significant.

T-tests were also conducted to test for differences in eating disorder severity, self-concealment, and psychological flexibility by treatment vs. no treatment groups. There were no significant differences (see Table 5). As Table 6 indicates, a one-way ANOVA conducted to test for differences by diagnostic groups (AN, BN, both AN and BN, and no formal diagnosis) for the three primary dependent variables indicated no significant differences.

Table 5

Mean Differences in AAQ, EDE-Q, and SCS by Treatment Group

Variable	Tx (n = 135)	No Tx (n = 44)	<i>T</i>	<i>P</i>
AAQ	85.95 (7.34)	81.80 (14.16)	1.88	.06
EDE-Q	4.94 (1.39)	5.05 (1.42)	-.43	.67
SCS	39.17 (7.34)	38.77 (8.92)	.30	.77

* $p < .05$

Table 6

One-Way ANOVA

Variable	AN	BN	AN & BN	No Dx	<i>F</i>	<i>P</i>
AAQ	85.01 (11.96)	84.80 (12.10)	88.21 (13.35)	81.74 (13.96)	1.63	.183
EDE-Q	4.77 (1.33)	5.14 (1.22)	5.13 (1.71)	4.95 (1.39)	.98	.402
SCS	38.71 (8.39)	36.57 (8.19)	40.69 (7.00)	40.51 (7.00)	2.09	1.03

Note. $N(\text{AN}) = 86$, $N(\text{BN}) = 21$, $N(\text{AN\&BN}) = 39$, $N(\text{No Dx}) = 35$, $p > .05$

Primary Analyses (H1, H2, and H3)

Data analyses included testing the three initial hypotheses, supplemental analyses, and a variety of post-hoc hypotheses. The hypotheses were all tested using a moderation model in PROCESS (Hayes, 2013) (see Table 7). The variables utilized included eating disorder severity, assessed via the EDE-Q; psychological flexibility, assessed via the AAQ; and self-concealment, assessed via the SCS.

The first hypothesis, H1, stated: It is hypothesized that among a sample of eating-disordered individuals, those with diminished psychological flexibility will be more severely eating disordered. As Table 7 indicates, results showed that the hypothesis was supported and there was a significant negative main effect of psychological flexibility on eating disorder severity. The less psychological flexibility participants reported, the more severe were their reported eating-disorder symptoms.

The second hypothesis presented, H2, stated: It is hypothesized that eating-disordered individuals who exhibit a tendency to self-conceal will report higher levels of eating-disordered severity. As Table 7 indicates, this hypothesis was supported; that is, there was a significant positive main effect of self-concealment on eating-disorder severity. In other words, the greater self-concealment participants reported, the more severe were their reported eating-disorder symptoms.

The third hypothesis presented, H3, stated: It is further hypothesized that psychological flexibility and self-concealment will synergistically combine to affect the severity of eating disorders. More specifically, it is hypothesized that the negative relationship between psychological flexibility and the severity of eating-disordered behavior will be mitigated (moderated) by the predisposition to self-conceal. That is, the relationship between psychological

flexibility and severely disordered eating behavior will be less negative among individuals who self-conceal than among their more disclosing counterparts. This hypothesis was also tested in the moderation model in PROCESS (Hayes, 2013). As Table 7 indicates, results showed that the hypothesized interaction effect was not found to be significant. However, the model itself was significant $F(3, 178) = 15.65, p < .01$ and accounted for 20.87% of the variance in eating-disorder severity.

Table 7 below presents findings from H1, H2, and H3, including the significant main effects of psychological flexibility, self-concealment, and non-significant interaction effect on disordered eating.

Table 7

Effects of Self-concealment, Psychological Flexibility, and Their Interaction on Eating-Disorder Severity (N = 182)

Variable	95% CI	Unstandardized β	t	P
AAQ	[0.17, 0.01]	.09	2.21	.03*
SCS	[0.03, 0.34]	.18	2.32	.03*
AAQ x SCS	[-0.004, .0003]	-.00	-1.64	.10

* $p < .05$

Supplemental Analyses

Moderation Models With Subscales

Additional hypotheses were tested utilizing the original moderation model but expanding upon the original outcome variable. Instead of simply looking at the global EDE-Q score for eating-disorder severity, each of four subscales of the EDE-Q—Eating Restraint, Eating Concern, Weight Concern, and Shape Concern—was tested as a dependent variable.

The first subscale examined was eating restraint. Restraint is a term utilized in this context to refer to a primary symptom in eating disorders, restricting intake of food and exerting control over what and how much food is consumed. The original hypotheses (H1, H2, and H3) were reframed to assess the relationship of primary variables (psychological flexibility and self-concealment) on subscale 1 (Eating Restraint) instead of overall eating-disorder severity.

H1R (restraint): Among a sample of eating-disordered individuals, those with greater psychological flexibility will exhibit a lower degree of eating restraint. H2R: Additionally, those with greater self-concealment will exhibit a higher degree of eating restraint. H3R: Finally, self-concealment will moderate the effect of self-concealment on eating restraint.

Table 8 below presents the results of testing the moderation model with the eating disorder restraint subscale. While the model was significant, $F(3, 178) = 15.28, p < .01$, and accounted for 20.48% of the variance in eating disorder—restraint, there were no significant main effects nor was there a significant interaction effect.

Table 8

Effects of Self-concealment, Psychological Flexibility, and Their Interaction on Eating Disorder—Restraint (N = 182)

Variable	95% CI	Unstandardized β	t	P
AAQ	[-0.026, 0.160]	.07	1.43	.16
SCS	[-0.022, 0.351]	.16	1.74	.08
AAQ x SCS	[-0.003, 0.001]	-.00	-.97	.10

* $p < .05$

The eating concerns subscale of the EDE-Q was also tested as a dependent variable in the original moderation model, as indicated by Table 9. Eating concern is a measure of the level of preoccupation with food eating or calories as well as preoccupation with others' perceptions of one's eating behavior (i.e., engaging in behaviors such as eating in secret). The model was significant, $F(3, 174) = 16.62, p < .01$, and accounted for 22.30% of the variance in eating disorder—eating concerns. A significant negative main effect was found for psychological flexibility on eating concerns. In other words, the less psychological flexibility study participants reported, the more severe were their reported eating concern symptoms on the eating concern subscale of the EDE-Q. Additionally, there was a negative significant main effect of self-concealment on eating concerns. In other words, the greater self-concealment subjects reported, the more severe were their reported eating concern symptoms on the eating concern subscale of the EDE-Q. The interaction effect between psychological flexibility and self-concealment on eating concerns was not significant.

Table 9

Effects of Self-concealment, Psychological Flexibility, and Their Interaction on Eating Disorder—Eating Concerns (N = 182)

Variable	95% CI	Unstandardized β	t	P
AAQ	[0.026, 0.192]	.11	2.60	.01*
SCS	[0.027, 0.360]	.19	2.30	.03**
AAQ x SCS	[-0.004, 0.001]	-.00	-1.78	.09

* $p < .05$

Subscale 3, Weight Concerns, was also looked at as a dependent variable. The weight concern subscale relates to the respondent's level of preoccupation with weight or the number on the scale. When subscale 3, Weight Concerns, was the dependent variable, the model was also significant, $F(3, 174) = 14.32, p < .01$, and accounted for 19.80% of the variance, as Table 10 indicates. However, there were no significant main or interaction effects.

Table 10

Effects of Self-concealment, Psychological Flexibility, and Their Interaction on Eating Disorder—Weight Concern (N = 182)

Variable	LLCI	Unstandardized β	t	P
AAQ	[-0.002, 0.164]	.08	1.92	.06
SCS	[-0.025, 0.308]	.14	1.68	.10
AAQ x SCS	[-0.003, 0.001]	-.00	-1.16	.25

* $p < .05$

The final model tested for the main effect of psychological flexibility, self-concealment, and their interaction utilized the fourth subscale of the EDE-Q, Shape Concerns, as Table 11 indicates. Shape concern refers to level of preoccupation and attention directed towards body shape or size and behaviors related to body shape (i.e., avoidance of body exposure). The model was significant, $F(3, 176) = 16.68, p < .01$, and accounted for 22.13% of the variance in eating disorder—shape concerns. A significant negative main effect was found for psychological flexibility on shape concerns. In other words, the less psychological flexibility participants studied reported, the more severe were their reported eating concern symptoms on the shape concern subscale of the EDE-Q.

Table 11

Effects of Self-concealment, Psychological Flexibility, and Their Interaction on Eating Disorder—Shape Concern (N = 182)

Variable	95% CI	Unstandardized β	t	P
AAQ	[0.003, 0.162]	.08	2.05	.04*
SCS	[-0.005, 0.341]	.15	1.92	.06
AAQ x SCS	[-0.003, 0.001]	-.00	-1.30	.20

* $p < .05$

While all the models were significant and some significant main effects were found, the interaction effects were not significant.

Alternative Moderation Models

The moderation model was also tested separately in those who have and have not received treatment. These models were not significant for either group.

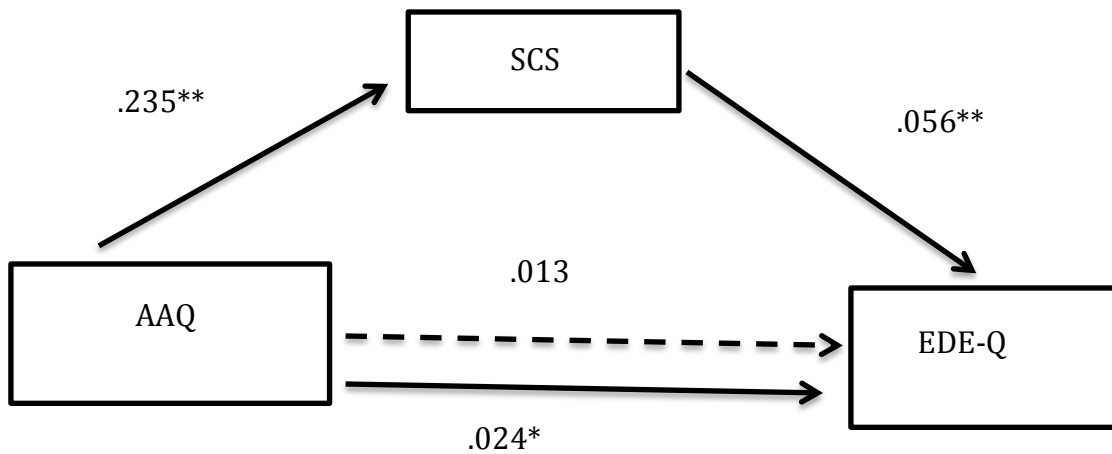
Finally, the moderation model was tested separately in those with a pure diagnosis of Anorexia Nervosa (AN) vs. all other participants, or a non-pure AN group. No significant main effects were found and the interaction effect was not significant for either group.

Post-hoc Analyses

Mediation Model

As an alternative to the original moderation model, a mediation model posited by Masuda et al. (2011) was tested with these variables. Masuda et al. conducted similar research utilizing the same variables with a mediation model with a college sample, but never attempted to corroborate their results with a clinical sample. In this model, the indirect effect of psychological flexibility on eating-disorder severity mediated by self-concealment was tested. In other words,

does self-concealment help explain the relationship between psychological flexibility and eating-disorder severity? This hypothesis was tested using a mediation model in PROCESS (Hayes, 2013). The model itself was significant, $F(3, 180) = 31.44, p < .01$, and accounted for 14.87% of the variance in eating-disorder severity. There were also significant main effects found for self-concealment for SCS on EDE-Q ($b = .06, t(180) = 4.30, p < .01$) and AAQ on EDE-Q ($b = .03, t(180) = 3.00, p < .05$). In other words, the earlier findings that participants who were more concealing experienced more severity and participants who were more psychologically flexible experienced less severity were both repeated in this mediation model. Additionally, the indirect effect of AAQ (psychological flexibility) on EDE-Q (eating-disorder severity) was bootstrapped with 5,000 bias-corrected samples and was also significant ($b = .01, LLCI = .0069, ULCI = .0217$). This means that when psychological flexibility changes one unit, eating-disorder severity changes significantly by .01 due to an increase in self-concealment. This change is significantly different from zero. Figure 1 below is a graphical representation of the mediation model.



Note. Dashed line = indirect effect. Solid lines = direct effects.

Figure 1. Mediation model

Moderated Mediation Model

Finally, a moderated mediation model was tested. This model tested the indirect effect of self-concealment and whether psychological flexibility and eating-disorder severity depend on the treatment condition of subjects (treatment vs. no treatment groups). Hayes' PROCESS model 5 was used to test this effect. The model itself was significant, $F(4, 174) = 32.10, p < .01$, and accounted for 15.35% of the variance in eating-disorder severity. Significant main effects were found for self-concealment on eating-disorder severity ($b = .06, t(174) = 4.17, p < .01$); psychological flexibility on eating-disorder severity ($b = .07, t(174) = -3.11, p < .05$); as well as treatment condition on eating-disorder severity ($b = .309, t(174) = 2.29, p < .05$). In other words, greater self-concealment, diminished psychological flexibility, and no treatment were all related to increases in eating-disorder severity.

The interaction effect of psychological flexibility and the treatment condition was also significant ($b = -.03, t(174) = -2.15, p < .05$). This interaction effect was probed in PROCESS and supported a significant conditional direct effect of psychological flexibility on eating-disorder severity, depending on treatment condition (treatment = 1, no treatment = 2). Specifically, for individuals who received treatment, there was a significant main effect of psychological flexibility on eating-disorder severity ($b = .04, t(174) = 3.75, p < .01$); however, for individuals who have not received treatment, this effect was no longer significant ($b = .00, t(174) = 0.04, p = .97$). The interaction effect was also plotted and slopes were created for each treatment condition. The figure below shows that for the treatment condition, as psychological flexibility score increases (or psychological flexibility itself decreases because it is reverse-scored), eating-disorder severity significantly increases; however, for the no treatment condition, the slope is not significant, meaning that the relationship between psychological flexibility and

eating-disorder severity is constant for those without a treatment history. In other words, a significant interaction was found between psychological flexibility and eating-disorder severity moderated by treatment condition.

Figure 2 below is a graphical representation of the slopes for treatment versus non-treatment conditions.

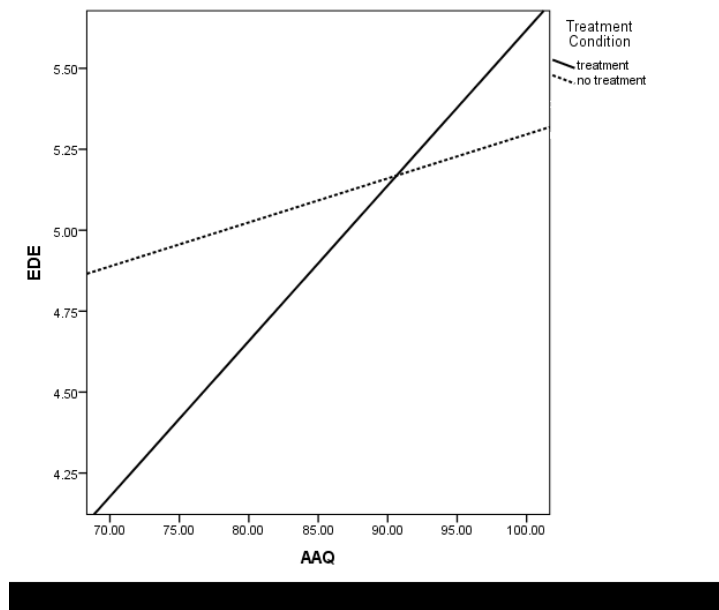
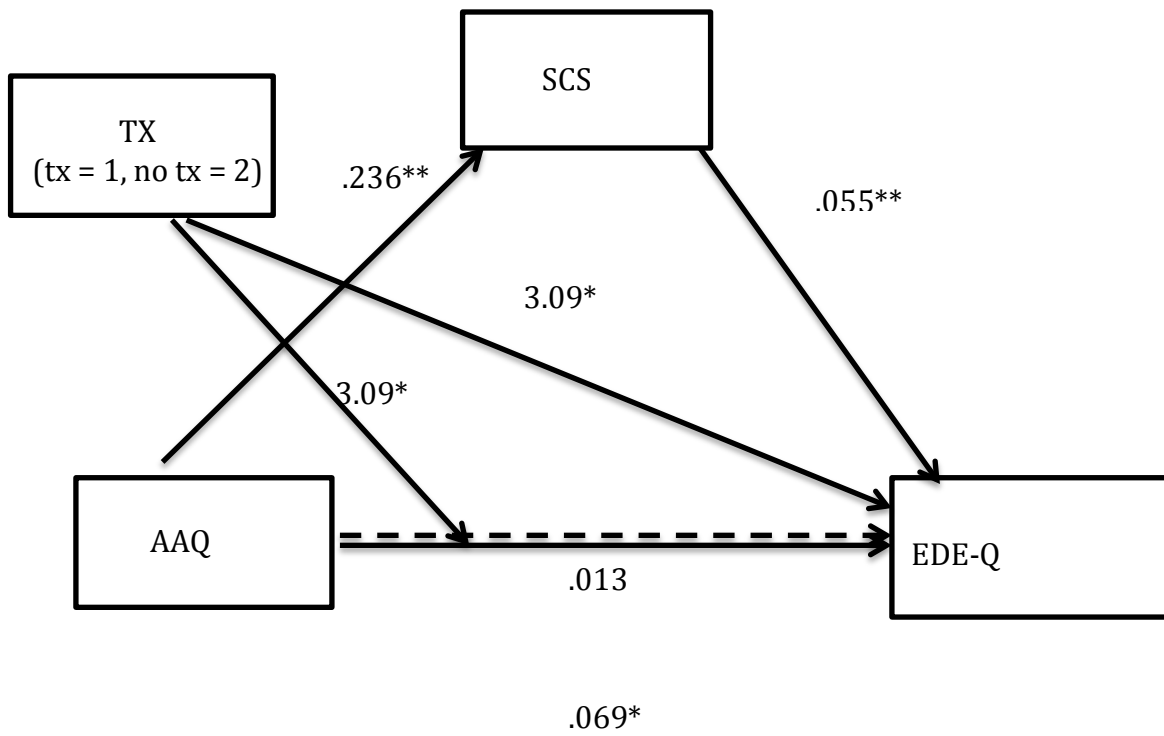


Figure 2. Slopes treatment vs. no treatment

Figure 3 below is the graphical representation of the moderated mediation model.



Note. Dashed line = indirect effect. Solid lines = direct effects. TX = treatment.

Figure 3. Moderated mediation model

Chapter IV

DISCUSSION

The primary aim of this study was to investigate the relationship between psychological flexibility, self-concealment, and eating-disorder severity in a clinical sample. Existing literature supports linkages between these variables and suggests that a greater understanding of the phenomena may have important implications in terms of eating disorder recovery and relapse prevention (Hill et al., 2015; Masuda et al., 2011).

The most important findings were as follows. Among a sample of eating-disordered individuals, the less (more diminished) psychological flexibility reported, the more severe were reported eating-disorder symptoms; in other words, an inverse relationship was found. Additionally, the greater self-concealment participants reported, the more severe were their reported eating-disorder symptoms. These findings held up for overall severity of reported symptoms and also for subscale severity for eating restraint, eating concern, weight concern, and shape concern. Additionally, a moderated mediation model found that greater self-concealment, diminished psychological flexibility, and no treatment were all significantly related to increases in eating-disorder severity. This model also found a significant interaction between psychological flexibility and eating-disorder severity moderated by treatment condition. In other words, the extent to which someone self-conceals helps to explain the relationship between psychological flexibility and eating severity. Furthermore, whether a patient has been in treatment significantly affects the relationship between psychological flexibility and severity. In terms of important null findings, a non-significant interaction effect was found for a moderation

model tested with overall severity and with all four subscales. Another non-significant interaction effect was found for a mediation model, which tested the indirect effect of psychological flexibility on eating-disorder severity mediated by self-concealment.

This discussion section first presents findings within the context of all hypotheses and research questions in the study. Also discussed are this study's findings as related to existing literature on eating disorders within the context of self-concealment and psychological flexibility. Next are the limitations of the study given its scope and structure. Finally, the implications for clinical practice and suggestions for future research are examined.

Hypotheses and Findings

Study findings are presented and examined in relation to the primary hypotheses, H1, H2, and H3, followed by results of supplemental research questions and, finally, results of post-hoc analyses.

Findings Associated With Primary Hypotheses

Hypothesis 1. It is hypothesized that among a sample of eating-disordered individuals, those with diminished psychological flexibility will be more severely eating disordered. Among the sample of eating-disordered individuals studied, the more diminished psychological flexibility they reported, the more severe were their reported eating-disorder symptoms; in other words, an inverse relationship was found and this hypothesis was supported. This finding adds to the literature suggesting that diminished psychological flexibility is related to eating-disorder pathology (Masuda et al., 2010; Masuda & Wendell, 2010; Rawal et al., 2010). Furthermore, diminished psychological flexibility has been posited as a factor that plays a role in the maintenance of eating disorders and is consistent with emotion regulation models of eating disorders (Heffner & Eifert, 2004; Lavender & Anderson, 2010).

Hypothesis 2. It is hypothesized that eating-disordered individuals who exhibit a tendency to self-conceal will report higher levels of eating-disordered behavior. Among the sample of eating-disordered individuals studied, participants who reported greater self-concealment reported more severe eating-disordered symptoms. Hypothesis 2 was supported by the present study. This finding expands on the existing literature on self-concealment and disordered eating. It has previously been suggested but not fully established that the tendency toward self-concealment is related to increased symptom severity in eating disorders. The findings of the present study provide empirical evidence to support this suggestion.

Evidence suggesting that individuals with eating disorders conceal the existence or extent of their disorder at higher levels than individuals with other types of pathology has been reported in both quantitative and qualitative research (Pettersson, Rosenvinge, & Ytterhus, 2008; Vandereycken & Van Humbeeck, 2008). It has also been noted in the literature that perhaps self-concealment is a maladaptive avoidance-based coping strategy common to eating-disordered individuals. In other words, individuals with eating disorders may try to conceal potentially embarrassing or shameful personal information and painful emotions as a means of avoiding or down-regulating negative affect (Farber, Berano, & Capobianco, 2004). However, attempts at avoidance may paradoxically intensify negative affect and bolster the maladaptive coping pattern. Therefore, engaging in self-concealment may in fact enhance the desire to engage in disordered-eating behaviors as a way of coping with the challenge of suppressing affect (Lavender & Anderson, 2010); thus, eating-disorder severity is heightened in individuals who self-conceal. Additionally, the findings of the present study may help to elucidate the underpinnings of resistance to treatment and high relapse rates. It has been noted in the literature that individuals with eating disorders view their eating disorder as more ego-syntonic than

individuals with other disorders including depression, anxiety, and substance use (Roncero et al., 2013). In fact, many eating-disordered individuals reported that they view their eating disorder as inseparable from their identity as people (Nordenbos, 2012). Therefore, self-concealment can be understood as both a maladaptive coping strategy to help avoid unpleasant emotions and also a strategy to protect a highly valued aspect of identity that individuals with eating disorders are fearful of losing. If, as the present study indicates, self-concealment—a mechanism of emotional avoidance and identity protection—is significantly related to severity of symptoms, this association may in part explain why eating disorders have historically been so difficult to treat.

Understanding both self-concealment and psychological flexibility as important aspects of the way in which eating disorders are functionally maintained may reveal an opportunity to target these maladaptive coping strategies with acceptance and mindfulness-based therapies, as discussed later in this section.

Hypothesis 3. It is further hypothesized that psychological flexibility and self-concealment will synergistically combine to affect the severity of eating disorders. More specifically, it is hypothesized that the negative relationship between psychological flexibility and the severity of eating-disordered behavior will be moderated by the predisposition to self-conceal. In other words, Hypothesis 3 posited that the relationship between psychological flexibility and severely disordered-eating behavior would be less negative among individuals who self-conceal than among their more disclosing counterparts. This moderation model was found not to be significant; therefore, this hypothesis was not confirmed by the present study. Given other significant findings in the present study, it is possible that the relationship between these variables is better explained through a different statistical model such as the moderated mediation model that was ultimately found to be significant. The moderation

hypothesis was perhaps more simplistic and did not address the entire relationship between the variables. Earlier studies such as those conducted by Masuda et al. in 2010 and 2011 led to the development of this hypothesis. These studies utilized similar methodology in terms of online survey research, but also utilized a college sample without clinical levels of eating pathology. However, because Masuda et al. did not examine this particular research question, this was the rationale for exploring it in this study. In other words, Hypothesis 3 was proposed as an alternative to the analysis conducted in Masuda et al.'s lab, which turned out not to be significant. This then led to the development of additional alternative hypotheses, discussed below, which did produce significant findings. In summary, the extent of the negative relationship between psychological flexibility and severity was found not to be impacted (moderated) by self-concealment.

Findings Associated With Post-hoc Analyses

Mediation model. In this model, the indirect effect of psychological flexibility on eating-disorder severity mediated by self-concealment was tested. In other words, this model sought to answer the question: Does self-concealment help explain the relationship between psychological flexibility and eating-disorder severity? This research question was tested by Masuda et al. (2011) utilizing the same variables and mediation model. In their study, Masuda et al. found a significant result; thus, this question was tested in the present study in order to attempt to replicate a previous finding. However, in the present study, this model was not found to be significant. Essential differences between the present study and previous research may explain this result. Masuda et al.'s study looked at a sample of college undergraduates, while the present study included a variety of different-aged individuals not located at the same university. Furthermore, Masuda et al. utilized disordered eating (DE) as the independent variable which led

to a subclinical sample, as opposed to the present study which looked at those who have been clinically diagnosed with an eating disorder and used eating-disorder severity as the independent variable. The non-significant finding in the present study for this mediation model suggests that for an older sample (higher median age) with more clinical severity of eating disorder pathology, self-concealment does not help explain the relationship between psychological flexibility and severity. This non-significant finding led to the development of the moderated mediation model discussed below. The homogeneity of Masuda et al.'s sample may have limited their ability to obtain representative results. The sample in the present study is more representative of the population of eating-disordered individuals across the United States at the present time in terms of race, age, and gender (Walsh, Attia, Glasofer, & Sysko, 2016).

Moderated mediation model. This model tested the indirect effect of self-concealment and whether psychological flexibility and eating-disorder severity depend on the treatment condition of subjects (treatment vs. no treatment groups). Two significant findings emerged. First, the moderated mediation model found that greater self-concealment, diminished psychological flexibility, and no treatment were all significantly related to increases in eating-disorder severity. This result falls within expectations and is consistent with existing literature. This model continues to add to the literature, suggesting that diminished psychological flexibility is related to eating-disorder pathology (Masuda et al., 2010; Masuda & Wendell, 2010; Rawal et al., 2010). Moreover, as previously stated, diminished psychological flexibility has been posited as a factor that plays a role in the maintenance of eating disorders and is consistent with emotion regulation models of eating disorders (Heffner & Eifert, 2004; Lavender & Anderson, 2010). This model also continues to add to the growing body of evidence, suggesting that self-concealment is significantly related to severity of eating-disorder pathology. Because self-

concealment has been posited as a strategy to avoid unpleasant affect (and other types of avoidance), this finding adds weight to the suggestion that self-concealment may be pertinent to understanding the underlying mechanisms of eating-disorder maintenance. In other words, this finding essentially reiterates and strengthens the findings in Hypotheses 1 and 2, but expands on them to include another variable—treatment condition—that was found to have a significant relationship with eating-disorder severity. This result is consistent with existing literature stating that those who seek treatment demonstrate lower symptom severity and fewer relapses over the course of an eating disorder (Carter et al., 2011; Herzog et al., 1999; Keel et al., 2005).

Second, this model also found a significant interaction between psychological flexibility and eating-disorder severity moderated by treatment condition. In other words, the extent to which someone self-conceals helps to explain the relationship between psychological flexibility and severity. Furthermore, whether a participant reported being in treatment significantly related to the relationship between psychological flexibility and eating-disorder severity. That is, this model found that if a participant reported having been in treatment, diminished psychological flexibility was found to impact eating-disorder severity, partly due to self-concealment. However, if the participant had not had treatment, this effect was no longer significant.

This is a novel finding which augments existing literature. One explanation for this finding could be that self-concealment is a precursor to diminished psychological flexibility, which in turn impacts level of severity. It was established in the literature that individuals with eating disorders may develop behaviors, such as starvation or bingeing and purging, to avoid emotional experiences they find intolerable. Avoidance has been linked to self-concealment, perhaps driven by shame, stigma, or denial of uncomfortable internal emotional states. Thus, a person who self-conceals will likely present with diminished capacity to tolerate strong emotion

(diminished psychological flexibility) and would likely be at a higher risk for developing an eating disorder (as a strategy to control negative affect), and then at greater risk for severity once the eating disorder is established. This conceptualization of the relationship between these variables will be referred to later on in this discussion as the *precursor model*. Regarding the effect of treatment condition, further research is needed to understand better the impact of treatment on these variables and the antecedents vs. the impact of eating disorders.

Limitations

Questions of reliability and validity are raised due to the nature of the study—an online self-report survey—such as the impact of social desirability on participants’ responses. The scope of this concern was broadened due to the specific population of interest—subjects with eating disorders who have been noted to attend to social desirability and are often reluctant to disclose personal information, particularly related to eating-disorder thoughts and behaviors (Swan & Andrews, 2003). In the present study, this methodology raises questions about the extent to which participants with eating disorders accurately remember and represent their experience with frequency and intensity of symptoms. For example, it is possible that participants’ attempt to “fake-good,” which has often been noted in eating-disorder patients (Ambwani & Chmielewski, 2013), may have prompted them to underreport the frequency and intensity of their eating disorders. Additionally, the methodology utilized raises questions about the extent to which participants who have an eating-disorder history accurately remember experiences, symptoms, and emotions over the course of their disorder. Additionally, an inherent limitation arises from one of the variables of interest, self-concealment. Since many of the subjects studied exhibited a tendency to self-conceal, this presents the possibility that subjects may underreport or deny relevant phenomena. Given the present methodology, it is unclear

whether reports are subject to error, although the anonymous nature of the study may have decreased bias and omission of this nature.

The sample also had somewhat homogenous characteristics. The majority of participants were Caucasian (83%), female (96%), and single (57%). This sample's demographic characteristics are consistent with the sample of eating-disordered individuals currently being studied in the United States (Walsh et al., 2016). It has also been noted in the literature that people of color and men are presenting to eating-disorder treatment in ever-increasing numbers in recent years (Sinha & Warfa, 2013). However, what remains uncertain are the demographic traits of eating-disordered individuals who are reluctant to present for treatment or do not enter research studies. Additionally, the majority of participants in the sample reported a diagnosis of anorexia nervosa (47%) or a combination of anorexia and bulimia diagnoses (21%), as opposed to bulimia nervosa (11.5%). This meant that in this study, it was not possible to reliably investigate differences between AN vs. BN; instead, pure AN vs. non-pure AN groups were created. This supports the transdiagnostic model mentioned throughout (Ben-Tovim et al., 2001; Fairburn et al., 2003; Malicki et al., 2014; Milos et al., 2013), but diverged from the original plan for how to examine diagnostic groups.

Additionally, some question formats may have limited the ability to generalize and utilize findings. For example, the binary classification of treatment history vs. no treatment history may not have fully captured the scope of this very important topic. More specific questions related to length and type of treatment—for example, inpatient vs. outpatient treatment—would have broadened the scope of the study's ability to examine treatment condition.

Finally, other risk factors for the development and maintenance of eating disorders have been identified (Fairburn, 2008; Striegel-Moore & Bulik, 2007) and were not looked at in the

present study. These risk factors include neuroticism, perfectionism, and early trauma, and they certainly warrant investigation as they relate to severity.

Clinical Implications

The findings of this study add evidence to and expand on a growing body of literature suggesting the unique importance of self-concealment, psychological flexibility, and treatment as they relate to severity of eating disorders. These specific variables and their relationship to one another and to severity can help inform the treatment of eating disorders and relapse prevention.

The sample under investigation in the present study was consistent with a transdiagnostic view of eating disorders. It is clear from both research and clinical observation that individuals with eating disorders experience significant fluctuation across diagnostic categories over time, with particularly high fluctuation between AN and BN diagnoses (Milos et al., 2005). The transdiagnostic model posits that while behavioral tendencies may vary in individuals with eating disorders over the course of illness, the underlying mechanisms that help to functionally maintain these disorders are more stable. In the present study, 21% of the sample identified as having been diagnosed with both AN and BN over time, while 19% of the sample identified with no formal diagnosis. Too few participants identified their diagnosis as bulimia; thus, differences between diagnostic groups were explored with AN vs. non-AN groups. No significant differences were found across all analyses between these two groups, suggesting that while participants were identifying as diagnostically divergent, their experience of self-concealment, psychological flexibility, and severity did not differ by diagnosis.

Historically, eating-disorder research has often placed an emphasis on the type and frequency of symptoms and focused less on the ways in which eating disorders are functionally maintained. The shift towards understanding important mechanisms for maintenance of an eating

disorder and repeated return to eating-disorder cognition and behavior over time may help to prevent the common phenomenon of relapse and help individuals with eating disorders to sustain their health. Existing treatments for eating disorders are often successful at helping patients to attain certain markers for health at least initially, but these treatments are not as useful at preventing relapse over the long term (Carter et al., 2012). Therefore, understanding and breaking down the enduring properties of the eating disorder may give way to more permanent relapse prevention. Present findings indicated that self-concealment has a significant relationship to eating-disorder severity. This helps to substantiate the notion that individuals with eating disorders have a great deal of difficulty tolerating negative thoughts and feelings, leading them to conceal them from others and even perhaps from themselves. This intolerance is, in fact, characteristic of diminished psychological flexibility, which has been thought to play a significant role in the development and maintenance of eating disorders and is consistent with emotion-regulation models of eating disorders. These models suggest that eating-disorder symptoms, including distorted cognitions and dysfunctional behaviors, might be understood as maladaptive strategies to regulate emotional experience.

The clinical implications that arise from this understanding of the role of self-concealment and psychological flexibility in maintaining eating disorders relate to literature on both mindfulness-based and acceptance-based treatment strategies. Examples of these therapies include Mindfulness-Based Cognitive Therapy (MBCT), Dialectical Behavioral Therapy (DBT), and Acceptance and Commitment Therapy (ACT). These therapies are inherently designed to build psychological flexibility related to negative affect—in other words, find ways to tolerate distressing feelings rather than attempting to control or eliminate the negative internal emotional experience through maladaptive coping strategies. These therapies also encourage open dialogue

about negative affect, along with loosening harsh self-judgment, which in turn may discourage self-concealment (Vandereycken & Van Humbeeck, 2008). However, while the literature has alluded to this, and it is logical to assume that therapies designed to increase awareness and acceptance would potentially reduce self-concealment, this component on its own has not been as widely examined as psychological flexibility and could benefit from future research.

Juarascio et al. (2013) studied the addition of ACT-based treatment for a group of individuals with either AN or BN in a residential treatment setting vs. a control group receiving “treatment as usual.” The authors found that patients in the ACT group demonstrated significantly larger decreases in eating pathology as well as lower rates of re-hospitalization in the 6 months following discharge. While this study had limitations, including a small sample size and lack of follow-up past the 6-month mark, results suggested that ACT has promise as a viable treatment option that may reduce the risk of relapse, at least in the short term (Juarascio et al., 2012).

In a pilot study of women with disordered eating and distorted body image, Pearson et al. (2012) found that participation in a brief ACT workshop led to significant reductions in self-reported body image disturbance and significant increases in acceptance and psychological flexibility, as compared with a waitlist control group. The authors suggested that honesty or the ability to disclose (low self-concealment) and psychological flexibility are two of the most important indicators of mental wellness. However, this study did not include follow-up and so could not assess for lasting impact of these effects over time. An additional study by Butryn et al. (2013) focused specifically on assessing the utility of mindfulness, which is recommended as a component of both ACT and DBT treatment protocols. Butryn et al. found that for eating-disordered patients in a residential treatment facility who reported lower levels of acceptance

(related to body image and other factors), awareness (described as access to open and honest assessment of symptomatology and affect), and greater levels of emotional avoidance at baseline also reported higher levels of eating-disorder pathology. Additionally, all patients studied were given a daily mindfulness practice, and those who demonstrated increases in body image acceptance and awareness had the greatest decreases in eating-disorder symptoms. Finally, decreases in the avoidance of positive emotions, decreases in negative beliefs about emotion, and social concerns about displaying emotion were significantly associated with improvements in all eating-disorder symptom measures.

In a 2010 article discussing emotion and cognition in individuals with eating disorders, Merwin et al. stated, “Recognition and awareness of internal experience may be a precondition to cognitive diffusion or the ability to have distance and perspective from the literal meaning of cognitive activity” (p. 897). Taken a step further, Merwin et al.’s notion of recognition and awareness suggests that the ability to assess one’s experience honestly, which could be demonstrated by an ability to freely self-disclose (or the absence of self-concealment), may lead to increased psychological flexibility or the ability to tolerate negative affect and withstand the desire to engage in symptoms (of an eating disorder, for example). This framework is consistent with the precursor model, noted earlier in this discussion. Based on the review of literature and the results of the present study, the precursor model posits that self-concealment acts as a precursor or antecedent to diminished psychological flexibility, which subsequently impacts level of severity of eating-disorder pathology. It is unknown whether a predisposition to self-conceal makes an individual susceptible to develop an eating disorder or it is a tendency that develops more in tandem with or as an outcome of eating pathology. However, it has been established that the desire to hide, conceal, or otherwise avoid honestly and openly confronting

the disorder is an experience common to individuals with eating disorders (Evans & Wertheim, 2002; Petterson, Rosenvinge, & Ytterhus, 2008; Smart & Wegner, 1999; Vandereycken & Van Humbeeck, 2008). This avoidance may be instigated by a variety of factors, including but not limited to shame, the ego-syntonic nature of the disorder, avoidance of seemingly intolerable emotional states, or fear of losing the disorder as a primary coping mechanism. It is clear from this understanding of self-concealment that a person who is engaged in concealing—whether in behavior, cognition or both—and who may be trying to suppress negative feelings may actually experience more intense negative affect as a result. This, in turn, may strengthen the desire to conceal and engage in disordered-eating behaviors in order to cope with these intensifying feelings. Thus, eating-disorder severity increases in the presence of self-concealment and a pattern of dysfunctional emotion regulation is created wherein the individual is likely to present with difficulty tolerating intense emotional experiences or diminished levels of psychological flexibility. Therefore, eating-disordered individuals who self-conceal are at higher risk for diminished psychological flexibility, and both factors set the stage for heightened eating-disorder severity and subsequently worse outcomes.

If this precursor model of the underlying mechanisms of eating disorders and the ways in which they are maintained is accurate, then perhaps these novel treatment approaches are actually targeting the factors that cause relapse, as opposed to more symptom-focused treatments that may offer too shallow of a solution to last in the long term. Some treatment centers and outpatient therapists already incorporate these types of treatments into clinical practice (Manlick, Cochran, & Koon, 2013); however, further research and strong advocacy for the benefits of emotion regulation strategies in eating disorders might give way to greater success in treating this type of pathology.

Future Directions

The findings of the present study indicate several recommendations for future research. One recommendation would be for a longitudinal study of eating-disordered individuals receiving Acceptance and Commitment Therapy (ACT) vs. a control therapy that does not target underlying mechanisms of eating disorders thought to be maintained by variables such as self-concealment and psychological flexibility. This study would assess the ability of each treatment to target maladaptive methods of emotion regulation and the ways in which the impact and success of the treatments were maintained over time. Relapse would serve as the most important outcome measure of longitudinal research of this nature.

A recent development in eating-disorder interventions is the concept of mindfulness-based eating-disorder prevention programs. Historically, eating-disorder prevention programs have produced little to no evidence of real success (Beccia, Dunlap, Hanes, Courneene, & Zwickey, 2017). However, while implementation and research on current approaches remain nascent, some preliminary evidence suggests that mindfulness-based prevention interventions might produce more sustaining effects than previous prevention strategies. A recent meta-analysis of 20 such eating disorder prevention programs found significant increases in self-esteem, body appreciation, and significant reductions in body image concerns and negative affect at post-intervention follow-up, compared with a waitlist of control groups across multiple studies (Beccia et al., 2017). While quantity and quality of available research were limited and long-term follow-up was non-existent, this analysis suggests that there is potential for mindfulness-based approaches to help prevent the development of eating disorders, perhaps by targeting the mechanisms of the precursor model or other emotion-regulation models of eating disorders,

before they even have a chance to evolve into pathology. More research on prevention could expand on this opportunity and reduce the prevalence of eating disorders in the future.

Future studies might also seek to investigate other variables and their relationship to severity and relapse prevention. Examples include perfectionism (Brannan & Petrie, 2008) and trauma history (Tagay, Repic, Schlottbohm, Reyes-Rodrigues, & Senf, 2014), factors that have been noted to have some relationship with both the treatment-resistant nature of eating disorders and the incidence of relapse. A large number of studies has examined perfectionism specifically as it relates to AN, and it has been noted that individuals with AN have higher levels of perfectionism when compared to healthy controls and when compared to individuals with other disorders such as depression and anxiety with no reported eating pathology (Bardone-Cone et al., 2007). It has also been suggested that perfectionism and accompanying rigidity may lead to a longer course of illness and increased risk of relapse in individuals with eating disorders (Goldstein, 2014). Trauma history has also been widely discussed in the eating-disorder literature and associations have been found between trauma exposure in both childhood and adulthood and eating disorders (Trottier, Monson, Wonderlich, & Olmsted, 2017). It has also been noted that the relationship between traumatic experiences and eating disorders appears to be mediated by emotional and behavioral dysregulation, and that biological vulnerabilities may also be relevant to this relationship, all of which contribute to elevated risk for severity and length of illness (Trottier & MacDonald, 2017). While these variables have been examined previously in relation to eating disorders, more can be done to investigate how they might influence the underlying mechanisms that maintain eating disorders and cause relapse. These variables may also elucidate distinctions between responses to specific types of treatment and invite the opportunity for more individually tailored treatments.

Furthermore, following the transdiagnostic model of eating disorders, evidence suggests that, in addition to the overlap in psychological mechanisms at play, there may also be common causal and preserving biological and physiological underpinnings across diagnoses of AN and BN (Baumeister et al., 2007; Frank, 2015; Milos et al., 2005; Mishra et al., 2017). Research in this area has noted that brain structure and function would be suitable research targets to further investigate brain function and behavior relevant to eating disorders that reaches beyond typical diagnostic classifications. Future neurobiological research should continue to focus on modeling eating disorders in the brain to help develop specifically targeted biological interventions (Frank, 2015). Research on the neurobiology of eating disorders is considered nascent, but it could eventually help to identify the reasons why treatments seem to work only up to a point and relapse prevention remains elusive.

In sum, prior research has suggested that the variables of self-concealment and psychological flexibility and the relationship between these two variables are important in understanding the underlying mechanisms of eating-disorder severity and, therefore, have meaningful implications for treatment and relapse prevention. The present study found a significant relationship between self-concealment, diminished psychological flexibility, and eating-disorder severity, thereby expanding on the existing body of research and adding weight to the claim that treatments targeting emotion regulation are likely to be best at resolving the underpinnings of how eating disorders are functionally maintained and why they remain so challenging to treat. Future research can further this investigation, hone the specifics of tailored treatments, and work towards reliable relapse prevention for future generations of individuals who struggle with eating disorders.

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Appendix A

Informed Consent

Please read the form below before beginning the survey.

Severity of Eating Disorders Study

You are being asked to take part in a single anonymous research study about eating disorders. This study will consist of a single survey, which will take about 10-20 minutes to complete. Please read this form carefully.

What this study is about: The purpose of this study is to learn more about the experience of having an eating disorder and some personality factors that may be related to the severity of eating disorders.

What we will ask you to do: If you agree to be in this study, you will complete a one-time anonymous survey about your eating disorder history. The survey will take about 10-20 minutes to complete all parts. This will include demographic questions, questions about your eating disorder, questions about your emotional experience, and questions about your tendencies with regard to disclosing or not disclosing personal information. These topics may involve personal and sensitive information. You are free to skip any question(s) that you do not wish to answer.

Benefits: There are no direct benefits to you. However, your answers will be important in understanding aspects of the experience of eating disorders.

Risks/Discomforts: The principal risk involved in this study is that sharing of personal or sensitive information may bring up difficult topics or uncomfortable feelings. Taking part in this study is completely voluntary. You may choose to skip any questions you do not want to answer. If you decide to take part in this study, you are free to withdraw at any time with no penalty to you or loss of benefits to which you are otherwise entitled.

Compensation: As a thank you for your time, we will be offering entry into a lottery. Six survey takers will win a \$50 Amazon gift card. At the end of the survey, we will ask for your email address for the lottery. This information will only be used for the lottery and will not be linked to your responses if you are not interested in being contacted for the follow-up interview.

Your answers are confidential: Precautions have been taken to keep your information confidential. The records of this study will be kept private. Research records will be kept in a locked file; only the researchers will have access to the records. All identifying information will be removed from any future use of the material in articles or other publications.

How the results will be used: Data from the survey and/or interview may be reported in professional publications and conferences. All published information will be de-identified to protect confidentiality. By participating in this project, you will be helping to advance knowledge in the field of psychology, specifically as related to eating disorders.

If you have questions: If at any point you have questions or concerns regarding this research, you can contact the principal investigator, Zoe White at (203) 980-9112. This study has been reviewed and cleared by the Teachers College, Columbia University Institutional Review Board (IRB). If you have concerns or

questions about your rights as a participant or about the way the study is conducted, you may contact the IRB at (212) 678-4105.

We thank you for your time and consideration.

Statement of Consent: I have read the above information and have received answers to any questions I asked. I consent to take part in this study by clicking "Next" and beginning the survey.

With great appreciation,

Zoe White, M.S.

Supervisor: Barry Farber, Ph.D.

Teachers College, Columbia University

Appendix B

Introductory Email to Clinicians and Participants

Dear clinicians and patients,

My name is Zoe White and I am a clinical psychology doctoral student at Columbia University. I am working on my dissertation titled, “Self-concealment, psychological flexibility and severity of eating disorders.” This research is meant to contribute to literature and explore treatment implications in the field of eating disorders.

This study is conducted online and should take approximately 15 minutes to complete. **I seek to recruit participants who are over the age of 18 and have struggled with an eating disorder including Anorexia Nervosa or Bulimia Nervosa currently or in the past.**

Participant information will be protected. No identifying information is being collected in this study aside from general demographic data. All responses will be anonymous. Collected data will be secure within the password protected Qualtrics software and kept confidential.

Participants will be provided with my contact information should they wish to discuss the study with me. These communications will not be linked to the participant’s survey responses in any way.

Participation in this study is voluntary and respondents may choose to withdraw at any time. Those who complete the study will have the option to enter into a drawing for a \$20 Amazon gift card.

The study may be accessed through this link:

[TC Columbia Eating Disorders Survey](#)

Please do not hesitate to contact me if you have further questions or would like to discuss my study in greater detail.

Thank you so much for your time.

Sincerely,
Zoe L. White

Zoe Louise White, MS, MPhil
PhD Candidate in Clinical Psychology
Teachers College Columbia University
ED.TC.Study@gmail.com
203-980-9112

Appendix C

Exclusion Criteria

Exclusions:

1. Are you 18 years of age or older
 - a. Yes
 - b. No
2. Do you currently or have you ever had Anorexia Nervosa or Bulimia Nervosa?
 - a. Yes
 - b. No

Appendix D
Demographic Form

1. Age (enter)
2. Gender
 - a. Female
 - b. Male
 - c. Transgender
 - d. Other
3. Ethnicity
 - a. White (non-hispanic)
 - b. Black (non-hispanic)
 - c. Hispanic or Latino
 - d. Native American
 - e. Asian / Pacific Islander
 - f. Other
4. Marital Status
 - a. Married
 - b. Divorced
 - c. Separated
 - d. Widowed
 - e. Single

5. Have you received treatment for AN or BN in your lifetime?
 - a. Yes
 - b. No
6. What was your diagnosis?
 - a. AN
 - b. BN
 - c. Both at different times
 - d. No formal diagnosis
7. Height (enter)
8. Weight (enter)
9. If female, over the past four months have you missed your period?
 - a. Yes
 - b. No
10. If female, how many times over the past four months have you missed your period?
(enter)

Appendix E

Self-Concealment Scale (SCS)

This scale measures self-concealment, defined here as a tendency to conceal from others personal information that one perceives as distressing or negative. Please tick the box, to the right of each of the following 10 statements, that best describes how much you personally agree or disagree with the statement.		<i>1=strongly disagree</i>	<i>2=moderately disagree</i>	<i>3=don't disagree or agree</i>	<i>4=moderately agree</i>	<i>5=strongly agree</i>
1.	I have an important secret that I haven't shared with anyone					
2.	If I shared all my secrets with my friends, they'd like me less					
3.	There are lots of things about me that I keep to myself					
4.	Some of my secrets have really tormented me					
5.	When something bad happens to me, I tend to keep it to myself					
6.	I'm often afraid I'll reveal something I don't want to					
7.	Telling a secret often backfires and I wish I hadn't told it					
8.	I have a secret that is so private I would lie if anybody asked me about it					
9.	My secrets are too embarrassing to share with others					
10.	I have negative thoughts about myself that I never share with anyone					

Total Score =

Appendix F

Eating Disorder Examination Questionnaire (EDE-Q)

EATING QUESTIONNAIRE

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all the questions. Thank you.

Questions 1 to 12: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.

On how many of the past 28 days	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
1 Have you been deliberately <u>trying</u> to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
2 Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?	0	1	2	3	4	5	6
3 Have you <u>tried</u> to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
4 Have you <u>tried</u> to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
5 Have you had a definite desire to have an <u>empty</u> stomach with the aim of influencing your shape or weight?	0	1	2	3	4	5	6
6 Have you had a definite desire to have a <u>totally flat</u> stomach?	0	1	2	3	4	5	6
7 Has thinking about <u>food, eating or calories</u> made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
8 Has thinking about <u>shape or weight</u> made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
9 Have you had a definite fear of losing control over eating?	0	1	2	3	4	5	6
10 Have you had a definite fear that you might gain weight?	0	1	2	3	4	5	6
11 Have you felt fat?	0	1	2	3	4	5	6
12 Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

Questions 13-18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past four weeks (28 days)

-
- 13 Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (given the circumstances)?
-
- 14 On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)?
-
- 15 Over the past 28 days, on how many **DAYS** have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?
-
- 16 Over the past 28 days, how many times have you made yourself sick (vomit) as a means of controlling your shape or weight?
-
- 17 Over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight?
-
- 18 Over the past 28 days, how many times have you exercised in a “driven” or “compulsive” way as a means of controlling your weight, shape or amount of fat, or to burn off calories?
-

Questions 19 to 21: Please circle the appropriate number. Please note that for these questions the term “binge eating” means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

19 Over the past 28 days, on how many days have you eaten in secret (ie, furtively)? Do not count episodes of binge eating	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
	0	1	2	3	4	5	6
20 On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight? Do not count episodes of binge eating	None of the times	A few of the times	Less than half	Half of the times	More than half	Most of the time	Every time
	0	1	2	3	4	5	6
21 Over the past 28 days, how concerned have you been about other people seeing you eat? Do not count episodes of binge eating	Not at all	Slightly		Moderately		Markedly	
	0	1	2	3	4	5	6

Questions 22 to 28: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past 28 days	Not at all		Slightly		Moderate-ly		Markedly
22 Has your <u>weight</u> influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
23 Has your <u>shape</u> influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
24 How much would it have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks?	0	1	2	3	4	5	6
25 How dissatisfied have you been with your <u>weight</u> ?	0	1	2	3	4	5	6
26 How dissatisfied have you been with your <u>shape</u> ?	0	1	2	3	4	5	6
27 How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?	0	1	2	3	4	5	6
28 How uncomfortable have you felt about <u>others</u> seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	0	1	2	3	4	5	6

What is your weight at present? (Please give your best estimate.)

What is your height? (Please give your best estimate.)

If female: Over the past three-to-four months have you missed any menstrual periods?

If so, how many?

Have you been taking the "pill"?

THANK YOU

Appendix G

Acceptance and Action Questionnaire (AAQ)

8

The Acceptance and Action Questionnaire – Revised (AAQ-R)

Below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following scale to make your choice.

1-----2-----3-----4-----5-----6-----7
never very seldom seldom sometimes frequently almost always always
true true true true true true true

- _____ 1. I am able to take action on a problem even if I am uncertain what is the right thing to do.
- _____ 2. When I feel depressed or anxious, I am unable to take care of my responsibilities.
- _____ 3. I try to suppress thoughts and feelings that I don't like by just not thinking about them.
- _____ 4. It's OK to feel depressed or anxious.
- _____ 5. I rarely worry about getting my anxieties, worries, and feelings under control.
- _____ 6. In order for me to do something important, I have to have all my doubts worked out.
- _____ 7. I'm not afraid of my feelings.
- _____ 8. I try hard to avoid feeling depressed or anxious.
- _____ 9. Anxiety is bad.
- _____ 10. Despite doubts, I feel as though I can set a course in my life and then stick to it.
- _____ 11. If I could magically remove all the painful experiences I've had in my life, I would do so.
- _____ 12. I am in control of my life.
- _____ 13. If I get bored of a task, I can still complete it.
- _____ 14. Worries can get in the way of my success.
- _____ 15. I should act according to my feelings at the time.
- _____ 16. If I promised to do something, I'll do it, even if I later don't feel like it.
- _____ 17. I often catch myself daydreaming about things I've done and what I would do differently next time.
- _____ 18. When I evaluate something negatively, I usually recognize that this is just a reaction, not an objective fact.
- _____ 19. When I compare myself to other people, it seems that most of them are handling their lives better than I do.