Exploring Body Image Related Cognitive Fusion as a Maintenance Mechanism of Eating Disorder Pathology

Jennifer L. Barney

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EXPLORING BODY IMAGE RELATED COGNITIVE FUSION AS A PSYCHOLOGICAL PROCESS AMONG FEMALES IN RESIDENTIAL TREATMENT FOR AN EATING DISORDER

by

Jennifer L. Barney

A dissertation submitted in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY in Psychology

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UTAH STATE UNIVERSITY
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2023
ABSTRACT

Exploring Body Image Related Cognitive Fusion as a Maintenance Mechanism of Eating Disorder Pathology

by

Jennifer L. Barney, Doctor of Philosophy

Utah State University, 2023

Eating disorders are serious mental health conditions that often cause significant physical and psychological impairment and frequently co-occur with at least one other psychiatric condition. These disorders are notoriously difficult to treat and currently, even interventions with the most empirical support are only found to be completely effective for approximately 50% of patients. Based on these findings, clinical psychologists have argued that a transdiagnostic approach for conceptualizing and treating eating disorders that identify and target core psychological processes may be beneficial. Cognitive fusion, or the problematic entanglement with the literal content of one’s thoughts, is a core process that has been included in recent transdiagnostic models of psychopathology. Individuals with eating disorders are thought to be specifically susceptible to cognitive fusion in relation to their body image related thoughts (i.e., body image related cognitive fusion). Although theories of eating disorder related psychopathology including body
image related cognitive fusion have recently been developed, research on this process in clinical samples is nascent. The research contained in this dissertation presents a preliminary investigation of body image related cognitive fusion among 175 females upon admission and over the course of treatment within a residential eating disorder treatment center. The first study validates a measurement of body image related cognitive fusion as a latent construct when using the only measure currently available to assess this construct (i.e., the Cognitive Fusion Questionnaire—Body Image) when utilized with a clinical sample. The second study then examines a cross sectional mediation model of the relationship between body image related fusion and eating disorder symptoms through intuitive eating behaviors. Finally, the third study evaluates how cognitive fusion appears to change over the course of residential treatment and whether these changes are predictive of observed treatment outcomes. Overall, this dissertation project presents an initial examination of body image related cognitive fusion as a core underlying process of eating disorder related psychopathology to inform future intervention development and research seeking to improve transdiagnostic treatment outcomes for clients with eating disorders.
PUBLIC ABSTRACT

Exploring Body Image Related Cognitive Fusion as a Maintenance Mechanism of Eating Disorder Pathology

Jennifer L. Barney

Eating disorders are serious mental health conditions that can have serious negative effects on a person’s physical and mental well-being. These disorders are typically complex, and individuals are often struggling with one or more comorbid mental health problems, making them difficult to treat. To address this complexity and hopefully improve treatment outcomes for those with eating disorders, psychology research examining individual differences that appear to be related to differential treatment responses is needed. Better understanding how these factors relate to each other can help treatment providers identify the treatment methods most likely to work best for a specific individual based on their individual characteristics as early as possible in the treatment process.

Body image related cognitive fusion is defined as the problematic entanglement with the literal content of one’s thoughts about one’s body and is a psychological process that those struggling with eating disorders are especially susceptible to. This dissertation is composed of three studies that focus on understanding how individual differences in body image related cognitive fusion may relate to treatment outcome among adolescent and adult females in residential treatment for an eating disorder. The first study examines the statistical performance of the Cognitive Fusion Questionnaire—Body Image, a
measure specifically designed to assess body image related cognitive fusion to test its validity and reliability when used with women experiencing clinically significant eating disorders. The second study explores how body image related fusion relates to eating disorder symptom severity and levels of intuitive eating behaviors at the time of admission to the residential facility. The third study examines changes in body image related cognitive fusion from admission to discharge and looks at whether these changes predict better treatment outcomes. Together, these three studies present an initial exploration of body image related cognitive fusion as a core underlying process of eating disorder related psychopathology to inform future intervention development and research.
ACKNOWLEDGMENTS

While completing this dissertation is truly an epic accomplishment, it is the community and connections that have supported me throughout this process that I am most grateful for. There are not enough words or pages in this dissertation to adequately express my thanks to everyone who has impacted me over the past 5 years, and even though I cannot list them all here, I hope you each know how much I sincerely value each of these connections.

To my advisor, Mike Twohig—thank you for being a truly remarkable mentor, helping me recognize my strengths, round out my growth edges, work to my true potential, and stay true to myself and my values.

To Sara Boghosian—I cannot express how grateful I am to have someone as passionate and nerdy as I am about both eating disorders and ACT to learn from these past 5 years—you have helped shape me into the confident eating disorder clinician I am today, and I can only hope to pass that same gift on to others as I enter into the next phase of my career.

To Tyson Barrett—there is no way I can thank you enough for the countless hours of statistical guidance you have provided me throughout this dissertation and my broader education. Thank you even more for your friendship and for making stats an area I truly enjoyed growing in instead of dreading (for those who know me—that’s a feat beyond compare!).

To Mike Levin and Karen Munoz—thank you both for devoting your time and unique perspectives related to ACT and health behavior change to this project and for
your constant support of the broader research we do in the ACT lab. The collaborations and ability to learn from these projects has been so meaningful to my grad school experience and is something I can only hope to experience within my future work experiences.

To the ACT labbies broadly—you all are truly remarkable. The opportunity to work with all of you, whether it was for just a year or for the entirety of my time in UT, has made a huge impact. Thank you for helping me realize what I value most within a group of colleagues, and especially for putting up with my “corner of chaos” that never seemed to stop expanding.

To my family—you each have helped me grow from the little kid who would tell anyone who would listen what I was thinking into the adult who will still tell anyone who will listen what I am thinking but will now also probably reference 10 psychology theories or research studies to support it! Thank you all for being a constant source of support and encouragement during the most inconsistent, unpredictable years of my life and for always being willing to listen—or at least pretend you are—to whatever thing I’m excited to talk about next. Yes, it is now finally okay for you to call me “Dr. J.”

To my friends, my “chosen families”—you have been the glue that has held me together even in the moments when it felt like things were falling apart faster than I could handle. Thank you for always having my back and creating a space where I feel I truly belong. It is not possible for me to put into words how thankful I am for the friendships I have maintained and the ones I have gained on this wild ride - I love you all so, so much.

Jennifer L. Barney
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Eating disorders are serious mental health conditions characterized by a persistent disturbance of eating and weight-related behaviors (e.g. dietary restriction, binge eating, purging, compulsive exercise) leading to significant impairments in physical and/or psychosocial functioning (American Psychiatric Association [APA], 2013). Individuals with eating disorders also frequently experience high levels of body image disturbance (Sharpe et al., 2018), and report lower levels of self-acceptance, quality of life, and psychological well-being (Tomba et al., 2014; Winkler et al., 2014). Recent evidence suggests that eating disorders are highly prevalent globally and that reported rates of clinical and sub-clinical disordered eating behaviors have more than doubled over the last two decades, making them a significant public health concern (Galmiche et al., 2019).

Further, high prevalence rates of psychiatric comorbidity are common among men and women diagnosed with eating disorders (Ulfvebrand et al., 2015). Combined with extreme variance in the severity and persistence of psychological and medical complications associated with disordered eating, this makes studying and effectively treating these disorders notoriously difficult (Thompson-Brenner et al., 2019). According to the American Psychological Association’s Evidence-Based Practice Presidential Task Force’s evaluation, Cognitive Behavioral Therapy for Eating Disorders (CBT-E) is the psychological intervention with the most empirical support for the treatment of Bulimia Nervosa (BN) and Binge Eating Disorder (BED), and Family-Based Treatment has strong empirical support for use with adolescents with Anorexia Nervosa (AN). However, no
effective psychological treatments have demonstrated strong empirical support for adults with AN. Further, although clinical trials of CBT-E for BN and BED have found significant reductions in binge eating, purging, and psychological symptoms, only 40-50% of individuals report ceasing binge eating and/or purging by post-treatment (Linardon et al., 2017). Additionally, about 25% of BN and BED patients and up to 50% of AN patients discontinue treatment prematurely (Agüera et al., 2017; Linardon et al., 2018). Poorer outcomes of CBT-E have been found to be particularly prevalent among individuals who report greater severity of eating pathology and/or additional comorbid psychopathology (Lydecker & Grilo, 2021; Vall & Wade, 2015).

Similar limitations have been observed with the use of taxonomic categorizations of individual mental health syndromes and the implementation of single-disorder intervention strategies. In response, there has been an increased emphasis on the development of transdiagnostic models and interventions of psychopathology within the field of clinical psychology (Hayes & Hofmann, 2018; Mansell et al., 2009). Specifically, high rates of observed psychiatric comorbidity suggest that current categorical classifications of individual syndromes may be inaccurate, and the examination of common biopsychosocial processes that cut across diagnostic categories may better explain individual experiences of psychopathology (Dalgleish et al., 2020). Further, when using evidence-based protocols designed with intervention methods for treating singular, taxonomy-based diagnoses, improvements are often observed among clients’ comorbid symptomology, even when these “secondary” disorders are not explicitly addressed during treatment (Dalgleish et al., 2020). Therefore, support for a transdiagnostic
approach to conceptualizing and treating mental health problems based on the foundation that core risk, protective, and maintenance factors of human suffering broadly exist has burgeoned clinically and empirically.

Cognitive fusion, defined as the tendency for humans to rigidly attach to the content of their thoughts as absolute truth to the point where their thoughts inflexibly dictate their behavior even when it is not effective or adaptive, is one of several transdiagnostic processes that has been theorized to be at the core of human experiences of psychological suffering. For example, an individual who is feeling lonely may experience the thought “Nobody cares about me, I am unlovable.” A fused response to this thought might look like this individual staying in bed for several days by themselves, disregarding texts or phone calls from friends or family. Unable to recognize this thought for what it is (a singular internal experience of sounds in one’s head), this individual might continue to engage in behaviors that further isolate themselves from others, exacerbating their experience of loneliness and increasing the frequency of distressing thoughts.

Theoretically, cognitive fusion is considered a primary psychological process of change contributing to a larger pattern of psychological inflexibility (i.e., rigid patterns of behaviors guided by one’s internal experiences rather than direct contingencies and personally held values), which is thought to cause experiences of psychological suffering broadly (Hayes et al., 2011). Cognitive fusion has been positively associated with symptoms of depression and shame (Bardeen & Fergus 2016; Dinis et al., 2015; Gillanders et al., 2014), anxiety and post-traumatic stress (Bardeen & Fergus 2016), and
obsessive-compulsive disorder (Reuman et al. 2018). High levels of cognitive fusion have also been found to be predictive of decreased abilities to regulate one’s psychological needs independent of clinical diagnoses (Faustino & Vasco 2020), and are negatively associated with general measures of psychological well-being and quality of life (Faustino & Vasco 2020, Faustino et al., 2023).

Theories of the development and maintenance of eating disorder pathology that incorporate cognitive fusion as an core underlying process posit that such individuals experience elevated levels of cognitive fusion with distressing thoughts, many of which are related to food and body image (Juarascio et al., 2016; Manlick et al., 2013). For example, an individual may experience thoughts such as “I am ugly” or “Eating more than 1,200 calories a day is unhealthy” as a result of constant mental comparisons and evaluations they are making with external systems throughout the day. Individuals who are highly fused to these thoughts, thus unable to appropriately distance themselves enough to recognize them as thoughts and flexibly respond in adaptive, contextually sensitive ways may engage in disordered eating behaviors (e.g., restricting caloric intake to feel successful at adhering to rules or in an effort to change their appearance). They are responding to these thoughts automatically, without considering other contextual factors such as the physical or social consequences of such behaviors (Juarascio et al., 2016).

Within this framework, it is not the thoughts themselves that are believed to contribute to disordered eating behaviors—it is the inability to psychologically distance themselves from the thought enough to respond flexibly in a contextually sensitive manner.

Recent empirical efforts have begun to examine this process, termed body image
related cognitive fusion, among individuals’ experiences of disordered eating and body image distress broadly. Utilizing the Cognitive Fusion Questionnaire-Body Image (CFQ-BI; Ferreira et al., 2015)—the only measure currently available to assess cognitive fusion with body image related thoughts—preliminary findings have largely supported proposed theories. Broadly, high levels of body image related cognitive fusion have been found to be positively associated with elevated disordered eating symptoms (e.g., Duarte & Pinto-Gouveia, 2017; Ferreira et al., 2014) and problematic inflexible eating patterns (Trindade & Ferreira, 2015). Elevated scores on the CFQ-BI are also negatively associated with overall psychological health and quality of life (Ferreira & Trindade, 2015) and were found to mediate the relationship between eating disorder symptoms experiences of body dissatisfaction (Bento et al., 2017; Ferreira & Trindade, 2015).

However, research examining the role of body image related cognitive fusion in the maintenance and treatment of disordered eating symptoms using clinical samples is nascent. Further, longitudinal examination of the relationships between body image related fusion and targeted outcomes of psychotherapy such as symptom reduction, adaptive eating behaviors, and improved quality of life does not yet exist. Such research is needed to determine if (1) the findings from previous research examining the associations between body image related fusion and disordered eating symptoms using community and non-clinical samples is generalizable to those with clinically significant levels of eating disorder pathology, and (2) whether changes in levels of body image related cognitive fusion appear to contribute to changes in targeted therapeutic outcomes over the course of therapeutic interventions in a theoretically consistent manner.
Evaluating whether body image related cognitive fusion is elevated in individuals diagnosed with eating disorders and whether changes in such elevations appear to mediate outcomes over the course of treatment would provide initial support for the theoretical assumption that psychological inflexibility is a core psychological process underlying eating disorder psychopathology. This knowledge is necessary for informing future treatment development and implementation, and denoting whether intervention methods designed to specifically mitigate body image related fusion (i.e., cognitive defusion strategies) might be particularly useful within this population.

This dissertation project first seeks to evaluate whether the CFQ-BI is a valid tool for assessing the process of body image related cognitive fusion among adolescent and adult females diagnosed with an eating disorder. Determining the validity of the CFQ-BI for adolescent and adult female samples with clinically significant eating pathology could support is needed because it has only been validated on nondiagnosed samples. The latter studies then seek to present an initial examination of the relationship between body image related cognitive fusion, eating disorder symptom severity, and adaptive eating behavior (i.e., intuitive eating) over the course of residential treatment. Broadly, these studies aim to provide a preliminary evaluation of the theoretical assumption that body image related cognitive fusion is a core process contributing to eating disorder pathology and that it may be particularly important to target this process within therapeutic interventions seeking to decreased disordered eating and increase more adaptive and flexible eating behaviors.
REFERENCES


CHAPTER 2
STUDY 1: CONFIRMATORY FACTOR ANALYSIS AND MEASUREMENT INVARIANCE OF THE COGNITIVE FUSION QUESTIONNAIRE-BODY IMAGE IN A CLINICAL EATING DISORDER SAMPLE

Abstract

Individuals with eating disorders (EDs) may be particularly susceptible to body image related cognitive fusion (i.e., excessive entanglement with one’s body image related thoughts such that they unduly influence on behavior). The Cognitive Fusion Questionnaire-Body Image (CFQ-BI) is the only existing measure of this construct, yet its psychometric properties have not been examined within a clinically diagnosed ED sample. The current study used confirmatory factor analysis and explored measurement invariance, construct validity, and incremental validity of the CFQ-BI when used with adolescent (n = 75) and adult (n = 100) females admitting to residential ED treatment. A modified version of the single-factor structure of the CFQ-BI best fit the data and configural, metric, and scalar invariance were supported across age groups (i.e., adolescents or adults) and ED behavioral presentations (i.e., restrictive behaviors or

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1 The first study utilized confirmatory factor analysis to evaluate the psychometric properties of the Cognitive Fusion Questionnaire—Body Image (CFQ-BI) when utilized in a sample of females diagnosed with an eating disorder. The manuscript was submitted to the journal Body Image and was accepted for publication in April 2021 and published in September 2021 (see permission to reprint in Appendix A).

binge/purge behaviors). Adults’ and individuals with binge/purge behavioral presentations reported significantly more body image related fusion compared to adolescents and adults, respectively. Body image related psychological flexibility and ED severity were both significantly correlated CFQ-BI scores in expected directions. These findings suggest the CFQ-BI is a valid measure for assessing body image related fusion among adolescent and adult females with varying ED behavioral presentations. Implications and future research directions are discussed.

**Introduction**

There is burgeoning empirical support for cognitive-behavioral theories (CBTs) of emotional disorders which posit that internal processes (e.g., thoughts, feelings, physical sensations) can influence behavioral change (Hofmann et al., 2012; Hofmann & Hayes, 2018). However, variations in response rate to specific CBT methods at both the individual and disorder specific level highlight the importance of identifying when and why specific cognitive and behavioral processes specifically influence varying forms of psychopathology (Hofmann & Hayes, 2018). Specifically, psychologists and clinicians have sought to elucidate what cognition processes appear most influential in the development and maintenance of various dysfunctional behavioral patterns to create targeted psychotherapy interventions to address them. To date, several cognitive processes have been theorized to be transdiagnostic contributors to psychopathology in this regard including irrational misappraisal (Barlow et al., 2004), repetitive negative thinking (McEvoy et al., 2013), and interpretative reasoning or expectancy reasoning.
biases (Morris & Mansell, 2018).

A cognitive process more recently theorized to contribute to a wide array of psychopathology is cognitive fusion (Hayes et al., 2011). Cognitive fusion is defined as the degree to which an individual becomes entangled with the specific content of cognitions (e.g., thoughts, memories, assumptions, beliefs, and images), responding to them as literally true. In other words, one perceives their thoughts to be their reality, rather than seeing them simply as mental events, and responds behaviorally based on the content of the thought being true (Gillanders et al. 2014). For example, if an individual were fused with the thought “I am stupid,” they would take this literally, as an inarguable truth about themselves, and may put little effort into learning endeavors, even if doing so is inconsistent with their personal values. Elevated levels of cognitive fusion has been found to be predictive of various forms of psychopathology (Gillanders et al., 2014; Krafft et al., 2019; Pinto-Gouveia et al., 2020) and psychological interventions such as Acceptance and Commitment Therapy (ACT) have developed an array of strategies to specifically target cognitive defusion in response (Hayes et al., 2011).

Recent conceptual frameworks of eating disorders (EDs) have been developed which posit that cognitive fusion may play an integral role in the development and maintenance of disordered eating behavior (Merwin et al., 2010; Trindade & Ferreira, 2014). Specifically, ACT based conceptualizations of EDs postulate that individuals with EDs may experience elevated levels of cognitive fusion with distressing thoughts about food, weight, and shape. For example, an individual with an ED may be fused to the thought “My life would be better if I was thinner,” rigidly using this thought to guide
their behaviors. In response, the “fused” individual may engage in a host of disordered eating behaviors such as dietary restriction, compulsive exercise, or purging even when doing so conflicts with direct contingencies (e.g., bodily cues of hunger/fullness; medical complications) or with personal values (e.g. interpersonal relationships; physical health; Manlick et al., 2013). Within this conceptualization, ACT theorizes that it is not the content of the thought that is problematic, but the fused relationship one has with the thought such that it dictates behavior without consideration of additional contextually relevant sources of information that may be present.

Much of the research to date examining the relationship between cognitive fusion and ED pathology has focused specifically on body image-related cognitive fusion as assessed by the Cognitive Fusion Questionnaire-Body Image (CFQ-BI; Ferreira et al., 2015). The CFQ-BI was developed by adapting items from a validated measure of general cognitive fusion (the Cognitive Fusion Questionnaire; Gillanders et al., 2014) to reflect levels of fusion with thoughts specifically regarding one’s physical appearance. The original development and validation of the CFQ-BI produced a 10-item, single factor measure that has demonstrated high internal consistency within diverse samples including middle school and university student samples (Ferreira et al., 2015), individuals diagnosed with clinically significant Binge Eating Disorder (BED; Duarte et al., 2017), and overweight/obese individuals seeking weight loss treatment (Lucena-Santos et al., 2017). The CFQ-BI also demonstrated good incremental validity when compared to an overall measure of cognitive fusion in predicting self-reported ED symptoms, and scores were able to adequately discriminate between females who self-reported severe eating
difficulties and those who did not (Ferreira et al., 2015). Further, the CFQ-BI demonstrated good internal reliability and temporal consistency when examined with a sample of male and female students (Ferreira et al., 2015) and had good convergent validity with measures of general cognitive fusion, psychological inflexibility, and characteristics of dispositional mindfulness/decentering (Ferreira et al., 2015; Lucena-Santos et al., 2017).

Findings from studies using the CFQ-BI have consistently shown that high levels of body image-related cognitive fusion are strongly associated with elevated global ED symptomology (Ferreira et al., 2014; Trindade & Ferreira, 2014) and binge eating severity (Duarte et al., 2017; Lucena-Santos et al., 2017). Conversely, elevated CFQ-BI scores were found to be negatively associated with overall psychological health and quality of life (Ferreira & Trindade, 2015). Mediation analyses have also provided initial evidence supporting the hypothesis that body image-related cognitive fusion appears to be a mechanism through which ED symptomology emerges and/or is maintained. Specifically, studies have found that scores on the CFQ-BI appear to mediate the relationship between ED symptomology and common risk factors for ED development such as body dissatisfaction (Trindade & Ferreira, 2014), perceived discrepancies between one’s real and ideal body size (Bento et al., 2017), and experiences of shame (Duarte & Pinto-Gouveia, 2017; Duarte et al., 2017).

Although these findings provide initial support for the hypothesized role of body image-related cognitive fusion in eating pathology, there are notable limitations in their generalizability and clinical relevance. First, the CFQ-BI has not yet been validated
within a sample of individuals diagnosed with clinically significant ED pathology. While the initial validation study does attempt to examine the CFQ-BI’s ability to discriminate between individuals with and without clinically significant eating pathology, analyses are based solely on self-report data using suggested cut off scores on a commonly used screening tool for ED symptomology as opposed to clinical diagnosis (Ferreira et al., 2015). Lucena-Santos et al. (2017) also examined the psychometric properties and the ability of CFQ-BI scores to predict binge eating severity within a “clinical sample,” however all participants in the study were obese or overweight individuals seeking weight-loss treatment. While reliable associations are observed between BED and overweight/obesity populations, the majority of individuals who experience overweight/obesity do not engage in recurrent binge eating and report significantly less functional impairment, subjective distress, and diminished quality of life relative to individuals who meet diagnostic criteria for BED (American Psychiatric Association, 2013). Existing research also fails to provide insight as to potential differences in body image-related cognitive fusion across ED diagnoses or individuals who present with different ED behavior profiles (i.e., EDs characterized by restrictive behaviors or EDs characterized by binging and/or purging behaviors). Finally, all but one study (Scardera et al., 2020) to our knowledge using the CFQ-BI to evaluate body image-related cognitive fusion in relation to eating pathology have been conducted by members of the same research team and primarily utilize samples from Portugal with a limited range of demographic characteristics (e.g., female, students or young adults from the general public, Portuguese speaking).
The current study, therefore, sought to examine the psychometric properties and proposed one-factor structure of the CFQ-BI within an English-speaking sample of adolescent and adult females diagnosed with clinically significant EDs admitting to residential treatment. We also sought to evaluate its convergent and incremental validity with theoretically relevant variables (i.e., body image related psychological flexibility and ED symptom severity). Finally, we conducted exploratory analyses to examine measurement invariance of the CFQ-BI when utilized with adolescent relative to adult patients, as well as between differing ED behavioral profiles (i.e., characterized by restrictive behaviors only or characterized by binging and/or purging behaviors). Based on previous validation research and the theoretical conceptualization of cognitive fusion within ED psychopathology we hypothesized that the confirmatory factor analysis would result in a single-factor model for the CFQ-BI and that higher scores on the CFQ-BI would be significantly associated with lower levels of body image related psychological flexibility and greater ED symptom severity. Due to the exploratory nature of our measurement invariance analyses, no specific hypotheses were made.

Methods

Participants

Participants included 175 adolescent and adult females admitting to Avalon Hills Eating Disorder Specialists, a for-profit residential ED treatment facility for adolescent and adult women between November 2015 and June 2020. The sample for the current study included individuals admitting to both adolescent (age range = 11-17 years, \( n = 75 \))
and adult (age range = n = 100) residential units. At the time of admission, all participants completed a clinical interview with the masters or doctoral level clinician primarily assigned to their case throughout the course of treatment in order to determine the appropriate ED diagnosis as defined by the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-5; American Psychiatric Association, 2013).

Suggested diagnoses were then reviewed with an integrated treatment team based on intake reports generated by the clinician, registered dietitian, and medical director, before a formal diagnosis was given and approved by a doctoral level clinical psychologist (i.e., the clinical director). Table 2.1 provides descriptive statistics of the sample.

**Table 2.1**

*Descriptive Statistics*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adolescents (n = 75)</th>
<th>Adults (n = 100)</th>
<th>Restrictive Bxs (n = 89)</th>
<th>Binge/Purge Bxs (n = 84)</th>
<th>All (N = 175)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age M(SD)</td>
<td>15.17 (1.47)</td>
<td>26.01 (8.21)</td>
<td>20.86 (8.43)</td>
<td>22.31 (8.2)</td>
<td>21.47 (8.29)</td>
</tr>
<tr>
<td>Ethnicity N(%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>67 (89.3)</td>
<td>93 (93.0)</td>
<td>82 (92.13)</td>
<td>77 (91.67)</td>
<td>160 (91.95)</td>
</tr>
<tr>
<td>Asian</td>
<td>2 (2.70)</td>
<td>1 (1.0)</td>
<td>2 (2.25)</td>
<td>1 (1.19)</td>
<td>3 (1.72)</td>
</tr>
<tr>
<td>Biracial</td>
<td>5 (6.76)</td>
<td>5 (5.0)</td>
<td>5 (5.62)</td>
<td>5 (5.95)</td>
<td>10 (5.75)</td>
</tr>
<tr>
<td>Native Hawaiian</td>
<td>0 (0)</td>
<td>1 (1.0)</td>
<td>0</td>
<td>1 (1.19)</td>
<td>1 (.57)</td>
</tr>
<tr>
<td>BMI M(SD)</td>
<td>19.27 (2.93)</td>
<td>20.16 (4.65)</td>
<td>18.4 (3.13)</td>
<td>21.30 (4.44)</td>
<td>19.79 (4.04)</td>
</tr>
<tr>
<td>Diagnosis N(%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AN-R</td>
<td>42 (56.0)</td>
<td>45 (45.0)</td>
<td>87 (97.75)</td>
<td>--</td>
<td>87 (49.71)</td>
</tr>
<tr>
<td>AN-B/P</td>
<td>24 (32.0)</td>
<td>38 (38.0)</td>
<td>--</td>
<td>62 (73.81)</td>
<td>62 (35.43)</td>
</tr>
<tr>
<td>BN</td>
<td>7 (9.33)</td>
<td>12 (12.0)</td>
<td>--</td>
<td>19 (22.62)</td>
<td>19 (10.86)</td>
</tr>
<tr>
<td>BED</td>
<td>1 (1.33)</td>
<td>2 (2.0)</td>
<td>--</td>
<td>3 (3.57)</td>
<td>3 (1.71)</td>
</tr>
<tr>
<td>ARFID</td>
<td>0 (0)</td>
<td>2 (2.0)</td>
<td>2 (2.25)</td>
<td>--</td>
<td>2 (1.14)</td>
</tr>
<tr>
<td>OSFED</td>
<td>1 (1.33)</td>
<td>1 (1.0)</td>
<td>--</td>
<td>--</td>
<td>2 (1.14)</td>
</tr>
</tbody>
</table>

*Note:* AN-R = Anorexia Nervosa-Restrictive Type; AN-B/P = Anorexia Nervosa-Binge/Purge Type; BN = Bulimia Nervosa; BED = Binge Eating Disorder; ARFID = Avoidant and Restrictive Food Intake Disorder; OSFED = Other Specified Feeding and Eating Disorder.
Procedures

All parts of the current study were approved by a university institutional review board. At the time of intake, all clients were informed about the opportunity to participate in research while receiving treatment and given details regarding what participation would entail. Clients and parents of adolescents under the age of 18 were informed that participation in the study was completely voluntary and that their choice to participate or not would have no impact on their clinical treatment. A total of 17 individuals/parents opted not to participate throughout the course of data collection. Those who consented to participation completed an online self-report assessment battery within the first three days following their intake. The assessment battery included demographic information, assessment of ED symptom severity, and a variety of other factors related to comorbid psychopathology, therapeutic processes, and targeted treatment outcomes. No compensation was provided to participants for data used in this study.

Measures

Cognitive Fusion Questionnaire-Body Image

The Cognitive Fusion Questionnaire-Body Image (CFQ-BI; Ferreira et al., 2015) is a 10-item self-report measure designed to assess cognitive fusion related to body image. Responses are rated on a 7-point Likert-type scale (1 = Never True; 7 = Always True) to indicate how frequently each item applies to the individual. For the current study, the English translations of each item as worded within the original validation article (Ferreira et al., 2015) were utilized. Internal consistency of the CFQ-BI was excellent within the current study (Cronbach’s alpha = .97).
**Body Image Acceptance and Action Questionnaire**

The Body Image Acceptance and Action Questionnaire (BIAAQ; Sandoz et al., 2013) is a 12-item self-report measure of body image flexibility. Items are rated on a 7-point Likert-type scale (1 = never true; 7 = always true), with higher scores indicating greater levels of psychological inflexibility related to body image. The BIAAQ has been found to have good psychometric properties in both clinical (Lee et al., 2017) and nonclinical samples (Sandoz et al., 2013). In the current study the BIAAQ demonstrated excellent internal consistency ($\alpha = .91$).

**Eating Disorder Examination Questionnaire**

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 2008) was utilized as a measure of ED symptom severity. The EDE-Q is a self-report measure of core attitudinal features and behaviors indicative of ED psychopathology. All items are responded to with regard to the individual’s experience throughout the previous 28 days. 22 items are answered using 7-point Likert-type scale, with higher ratings reflecting greater levels of pathology. Six items assessing the frequency of various behaviors (e.g., binge eating, self-induced vomiting, driven exercise) are also included. The EDE-Q generates four subscale scores: eating restraint; eating concerns; shape concern; and weight concern and a global score reflecting overall ED symptom severity calculated by averaging the scores from each subscale. In the current study, Cronbach’s

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2 Because of a researcher error, item 8 (“In the past 28 days how has thinking about shape or weight made it very difficult to concentrate on things you are interested in?”) and item 25 (“In the past 28 days how dissatisfied have you been with your weight?”) were omitted from the EDE-Q. However, missing data on the EDE-Q is notoriously common (Kelly, Lydecker, & Mazzeo, 2017) and guidelines for handling missing data indicate that totals can still be computed for the EDE-Q and each individual subscale if at
alpha was .92 for the global score, .88 for the restraint subscale, .79 for the eating concern subscale, .92 for the shape concern subscale, and .76 for the weight concern subscale. Only global scores were utilized for the analyses within the current study.

**Statistical analyses**

All analyses were conducted using RStudio (RStudio Team, 2020) based on R statistical software (R Development Core Team, 2021). Confirmatory factor analysis (CFA) was conducted using the ‘lavaan’ package (Rosseel, 2012) to assess the single-factor structure of the CFQ-BI proposed by Ferreira et al. (2015) within a clinical sample. Model estimation was based upon the maximum likelihood (ML) method. Missing data were imputed with multiple imputation methods using the ‘mice’ package (van Buuren & Groothuis-Oudshoorn, 2011) Only five item responses were missing from the CFQ-BI data among the entire sample.

Univariate coefficients of skewness ($Sk$) and kurtosis ($Ku$) were calculated using the ‘MVN’ package (Korkmaz et al., 2014) to assess the assumption of normality. Both $Sk$ (range = -.37 [item 7]) to -1.12 [item 5]) and $Ku$ (range = 2.16 [item 7] to 3.35 [item 3]) were below the identified critical values of $Sk > |2|$ and $Ku > |7|$ (Curran et al., 1996; Ryu, 2011) indicating that ML methods were appropriate for model estimation. In

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least half of a given subscale’s items are completed (Fairburn & Beglin, 2008). It should also be noted that more recent psychometric evaluation of the EDE-Q suggests limited support for the original, theoretically derived, four factor structure and scoring procedures, however due to the lack of consensus and current data supporting an alternative factor structure specifically within clinical samples and the sole use of this measure for validation purposes, we chose to use the guidelines set forth by Fairburn and Beglin (2008) for the current study. The two subscales impacted by the omission of these items (shape concern and weight concern) still each contained > 50% of their included items (shape concern = 87.5%; weight concern = 60%). Based on these scoring guidelines, we therefore chose to include these subscales in the analyses for the current study, pending no additional items were missing.
addition, Mardia’s multivariate skewness and kurtosis coefficients were calculated
(948.49 and 26.69, respectively) and indicated significant multivariate nonnormality ($p’s < .001$). As such, the mean-and-variance-corrected (MLMV) robust variant of the
maximum likelihood estimator was utilized for each model (Brosseau-Liard et al., 2012;
Savalei, 2018). See Table 2.2 for item-level statistics. Goodness-of-fit for the model was

**Table 2.2**

* Cognitive Fusion Questionnaire-Body Image Item Level Statistics

<table>
<thead>
<tr>
<th>Item</th>
<th>$M$</th>
<th>$SD$</th>
<th>$Sk$</th>
<th>$Ku$</th>
<th>Corrected item-total correlation</th>
<th>$\alpha$ if item deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My thoughts relating to my body image cause me distress or emotional pain.</td>
<td>5.51</td>
<td>1.55</td>
<td>-0.95</td>
<td>3.22</td>
<td>.84</td>
<td>.97</td>
</tr>
<tr>
<td>2. I tend to get very entangled in my thoughts concerning my body or body image.</td>
<td>5.50</td>
<td>1.61</td>
<td>-0.99</td>
<td>3.22</td>
<td>.90</td>
<td>.96</td>
</tr>
<tr>
<td>3. I feel upset when I have negative thoughts about my body (or physical appearance).</td>
<td>5.61</td>
<td>1.56</td>
<td>-1.01</td>
<td>3.35</td>
<td>.81</td>
<td>.97</td>
</tr>
<tr>
<td>4. I get very focused on distressing thoughts about my body image.</td>
<td>5.26</td>
<td>1.68</td>
<td>-0.77</td>
<td>2.72</td>
<td>.92</td>
<td>.96</td>
</tr>
<tr>
<td>5. It’s such a struggle to let go of upsetting thoughts about my body shape even when I know that letting go would be helpful.</td>
<td>5.46</td>
<td>1.76</td>
<td>-1.12</td>
<td>3.32</td>
<td>.83</td>
<td>.97</td>
</tr>
<tr>
<td>6. My thoughts regarding my body image distract me from what I’m actually doing.</td>
<td>4.79</td>
<td>1.77</td>
<td>-0.52</td>
<td>2.34</td>
<td>.85</td>
<td>.97</td>
</tr>
<tr>
<td>7. I get so caught up in my thoughts about my physical appearance that I am unable to do the things that I most want to do.</td>
<td>4.46</td>
<td>1.86</td>
<td>-0.36</td>
<td>2.16</td>
<td>.78</td>
<td>.97</td>
</tr>
<tr>
<td>8. I over-analyze my physical appearance or my body shape to the point where it’s unhelpful to me.</td>
<td>5.40</td>
<td>1.73</td>
<td>-1.03</td>
<td>3.18</td>
<td>.86</td>
<td>.97</td>
</tr>
<tr>
<td>9. I struggle with my thoughts related to my body or physical appearance.</td>
<td>5.65</td>
<td>1.62</td>
<td>-1.10</td>
<td>3.33</td>
<td>.88</td>
<td>.96</td>
</tr>
<tr>
<td>10. Once I’ve thought about my body or body shape in an upsetting way it’s difficult for me to focus on anything else.</td>
<td>5.04</td>
<td>1.77</td>
<td>-0.76</td>
<td>2.66</td>
<td>.89</td>
<td>.96</td>
</tr>
<tr>
<td>Total</td>
<td>52.70</td>
<td>14.94</td>
<td>-0.86</td>
<td>2.86</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>
evaluated using the normed chi-square (χ²/df, values < 5 considered acceptable), the comparative fit index (CFI, values ≥ .95 considered good and values > .90 considered acceptable), the root-mean-square error of approximation (RMSEA, values < .08 considered acceptable) with its 90% confidence interval, and the standardized root mean squared residual (SRMR, values < .05 considered good and values < .08 deemed acceptable; Hooper et al., 2008). We also examined the Akaike’s information criterion (AIC) and Schwarz’s Bayesian information criterion (BIC) when comparing estimated models to evaluate model parsimony and efficiency in representing the data. Although specific cutoffs have not been defined for AIC or BIC values, smaller values are indicative of a more parsimonious model.

Multigroup analyses were then conducted using the best fitting model to test potential measurement invariance of the CFQ-BI between adolescents and adults and then between restrictive and binge-purge ED diagnoses. We followed the stepped procedure outlined by Widaman and Reise (1997) to examine whether configural (i.e., invariance of model form between groups), metric (i.e., invariance in item contributions to the latent construct between groups), and/or scalar (i.e. equivalence of item intercepts between groups) existed when using the CFQ-BI. To test for configural invariance (step 1) we examined whether the model the same pattern of free and fixed loadings for each group. If configural invariance was confirmed, we moved to step 2 and tested for metric invariance by constraining factor loadings in the model to be equivalent in the two groups being compared. Liklihood-Ratio test comparisons of the constrained model and the configural invariance model (from step 1), with insignificant results of this test indicating
metric invariance is supported. If metric invariance was supported, we then moved to step 3 testing scalar invariance by adding additional constraints requiring item intercepts to be equivalent in the two groups being compared to the constrained model from step 2. This further constrained model was then compared with the constrained model from step 2 using Liklihood-Ratio tests, with insignificant results indicating that scalar invariance is supported. If support for all three forms of invariance is found, it is deemed appropriate to compare the means of latent construct (i.e., CFQ-BI scores) between groups. Therefore, if support was found for all three forms of invariance, independent sample t-tests were conducted to compare the mean scores on the CFQ-BI.

Results

Confirmatory Factor Analysis

In the single-factor model, the indicators all showed significant positive factor loadings, with standardized coefficients ranging from .777 to .938 (p’s < .001). Fit indices for the model varied, representing a poor to mediocre fit to the data, $\chi^2/df = 2.16$, $p < .001$; CFI = .85; RMSEA = .08, 90% CI upper = .105, lower = .055; SRMR = .043.

We reviewed residual correlations and modification indices to determine whether including additional parameters in the model may improve model fit. The largest modification index (mi = 61.57) indicated that the model fit would be improved if the error terms of item 6 (“My thoughts regarding my body image distract me from what I’m actually doing”) and item 7 (“I get so caught up in my thoughts about my physical appearance that I am unable to do the things that I most want to do”) were permitted to
covary. This was also consistent with the large residual correlation (coefficient = .188) observed between these variables. Upon reviewing the measure, we determined that these two items are the only items that describe the aspect of cognitive fusion where entanglement in thoughts elicits perceived *behavioral* problems as opposed to internal experiences of distress for respondents. Thus, it was unsurprising that these items demonstrated residual covariance beyond that observed among the ten items of the CFQ-BI as a whole. Considering the theoretical notion that cognitive fusion manifests as an entanglement with one’s thoughts such that they drive one’s behavioral choices, we made a post hoc model modification allowing these two items to covary.

We re-ran the confirmatory factor analysis with the modified model. All indicators once again showed significant positive factor loadings. Additionally, all fit indices showed values representing acceptable fit: $\chi^2/df = 1.78$, $p < .001$; CFI = .90; RMSEA = .067, 90% CI upper = .094, lower = .038; SRMR = .034. We also reviewed the AIC and BIC values for the modified model in comparison to the original model. Both values were lower for the modified model (AIC = 4806.528, BIC = 4872.989) relative to the original model (AIC = 4873.16, BIC = 4936.455), indicating the modified model provided a more efficient representation of the data. Based on the consistency of improved model fit and efficiency, the modified model was retained for multigroup analyses.

**Multigroup Analyses**

Multigroup analyses of the modified model were also conducted to test measurement invariance across adolescents and adults, with fit indices for each model
presented in Table 2.3. We first ran a CFA of the model within each group, with all fit indices denoting adequate fit and a consistent pattern of free and fixed loadings in each group, supporting the presence of configural invariance. We then evaluated metric invariance ($\Delta \chi^2 = 6.80, p = .66$) and scalar invariance ($\Delta \chi^2 = 11.24, p = .26$) models using Likelihood-Ratio tests, with non-significant changes in $\chi^2$ supporting both. These findings indicated no evidence that the CFQ-BI assesses body image-related cognitive fusion differently for adolescents and adults and that it was appropriate to compare the mean of adolescent scores ($M = 46.89, SD = 15.19$) on the CFQ-BI to that of adults ($M = 57.05, SD = 13.24$). An independent samples t-test was conducted and a significant difference was found ($t_{(173)} = -4.72, p < .001$) such that adolescents reported significantly lower levels of body image related cognitive fusion compared to adults.

Table 2.3

*Fit Indices for Measurement Invariance Models*

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>$df$</th>
<th>CFI</th>
<th>RMSEA</th>
<th>SRMR</th>
<th>AIC</th>
<th>BIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescent and adult models</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configural</td>
<td>199.45</td>
<td>68</td>
<td>.96</td>
<td>.04</td>
<td>.04</td>
<td>4709.61</td>
<td>4905.83</td>
</tr>
<tr>
<td>Metric</td>
<td>205.24</td>
<td>77</td>
<td>.96</td>
<td>.04</td>
<td>.05</td>
<td>4697.41</td>
<td>4865.14</td>
</tr>
<tr>
<td>Scalar</td>
<td>217.63</td>
<td>86</td>
<td>.95</td>
<td>.04</td>
<td>.06</td>
<td>4691.80</td>
<td>4831.05</td>
</tr>
<tr>
<td>Restrictive and binge/purge models</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configural</td>
<td>209.72</td>
<td>68</td>
<td>.91</td>
<td>.06</td>
<td>.04</td>
<td>4835.49</td>
<td>5031.71</td>
</tr>
<tr>
<td>Metric</td>
<td>216.32</td>
<td>77</td>
<td>.90</td>
<td>.06</td>
<td>.05</td>
<td>4824.09</td>
<td>4991.82</td>
</tr>
<tr>
<td>Scalar</td>
<td>226.48</td>
<td>86</td>
<td>.90</td>
<td>.06</td>
<td>.05</td>
<td>4816.25</td>
<td>4955.50</td>
</tr>
</tbody>
</table>

Multigroup analyses were also conducted using the modified model to compare measurement invariance across individuals with ED diagnoses classified by binge-
eating/purging behaviors with those classified with ED diagnoses indicating restrictive behaviors only (see Table 2.3 for fit indices). Individuals diagnosed with Anorexia Nervosa-Restrictive Type (AN-R) and Avoidant/Restrictive Food Intake Disorder (ARFID) were included in the “restrictive behaviors” group \( (n = 89) \) and individuals diagnosed with Anorexia Nervosa—Binge/Purge Type (AN-BP), Bulimia Nervosa (BN), and Binge Eating Disorder (BED) were included in the “binge-eating/purging behaviors” group \( (n = 84) \). The two participants in the sample diagnosed with Other Specified Feeding and Eating Disorder (OSFED) were not included in these analyses due to a lack of information on specific behavioral presentations warranting their diagnosis. Once again, configural invariance of the model was supported. Additionally, metric \( (\Delta \chi^2 = 7.09, p = .63) \) and scalar invariance \( (\Delta \chi^2 = 9.90, p = .36) \) were supported. The group mean of individuals with diagnoses classified by binge/purge behaviors \( (M = 55.53, SD = 14.67) \) were then compared to that of individuals with diagnoses classified by restrictive behaviors \( (M = 49.60, SD = 14.76) \) using an independent samples t-test. Once again a significant difference was found \( (t_{(173)} = 2.50, p = .01) \) indicating that individuals with disorders classified by binge/purge behaviors report levels of body image related cognitive fusion that are significantly greater than individuals with diagnoses classified by restrictive behaviors.

**Construct Validity**

To determine construct validity, we used Pearson correlations to compare average scores on the CFQ-BI \( (M = 52.41, SD = 14.84) \) with those on the BIAAQ \( (M = 60.01, SD = 16.08) \) and the EDE-Q \( (M = 3.91, SD = 1.56) \). CFQ-BI scores were significantly
associated with scores on the BIAAQ ($r = .76, p < .001$) such that individuals who report greater body image related psychological inflexibility also report higher levels of body image related cognitive fusion. Similarly, scores on the CFQ-BI were significantly correlated with scores on the EDE-Q ($r = .78, p < .001$), such that individuals who reported greater ED severity also reported higher levels of body image related cognitive fusion.

**Incremental Validity**

Incremental validity was examined for CFQ-BI scores over a measure of body image related psychological flexibility (BIAAQ) using partial correlations. Specifically, we controlled for body image related psychological flexibility on the relationship between CFQ-BI scores and ED severity. Results indicated that CFQ-BI scores were still significantly positively associated with ED severity ($r = .56, p < .001$) after controlling for body image related psychological flexibility.

**Discussion**

The current study evaluated the psychometric properties of the CFQ-BI, a measure designed to evaluate body image-related cognitive fusion, when utilized in a clinical sample. Specifically, we examined the psychometric properties of the original single-factor structure of the CFQ-BI when used with a sample of English-speaking adolescents and adults admitting to residential treatment for an ED and evaluated its convergent and incremental validity. We also evaluated measurement invariance when using the CFQ-BI with different age groups (i.e. adolescents or adults) and across
different ED behavioral presentations (i.e. restrictive or binge/purge behaviors).

Our results confirmed the single-factor structure of the CFQ-BI described in the initial validation study (Ferreira et al., 2015), but the model demonstrated poor fit with our sample. A modified single-factor model structure based on the theory-driven examination of modification indices that included an additional parameter allowing the residuals of items 6 and 7 to covary resulted in a more acceptable fit. When reviewing these items prior to making this post-hoc modification, we noted these were the only two items included in the measure that addressed the specific impact one’s entanglement with their body image related thoughts has on their behaviors. While the results of the CFA suggested that the modified model demonstrated acceptable fit within our sample, the impact of this additional parameter warrants further consideration. It is possible that the additional variance among the residuals of these two items above and beyond that observed between any of the items may be indicative of multidimensionality within the latent construct of body image related fusion. Specifically, if our theoretical interpretation of the difference between these items as capturing the behavioral impact of entanglement with body image related thoughts is accurate, it is possible that body image related fusion may actually be better defined as a multi-factor construct (e.g., having distinct factors defined for emotional distress and behavioral control). Future research is therefore needed to determine if the correlation between these items appears to be benign residual variance, or whether a new or amended version of the CFQ-BI containing a broader assessment of the behavioral factor is warranted.

Our analyses of structural invariance indicated that the modified single-factor
structure of the CFQ-BI remained consistent between adolescents and adults diagnosed with EDs and between individuals engaging primarily in restrictive disordered eating behaviors relative to those engaging primarily in binge and/or purging behaviors. Specifically, configural, metric, and scalar invariance was supported in both sets of group comparisons, indicating that the CFQ-BI appears to measure the latent factor of body image related cognitive fusion consistently across groups, and that the individual items appear to operate similarly within each group. The support for measurement invariance at each of these levels suggests that scores on CFQ-BI may be interpreted consistently across age and behavioral groups and that it was appropriate to statistically compare the scores between groups on this measure in the current study.

We found that the adolescents in our study reported significantly less body image related cognitive fusion relative to adults. While this finding suggests that differences in levels of body image related cognitive fusion may exist between age groups, our analyses are simply associative so conclusions as to why this difference exists cannot be made. However, this finding warrants future research to determine whether this finding is replicated in larger clinical samples and to explore potential mechanisms underlying this difference. For example, future studies might explore the hypothesis that cognitive fusion increases over time, resulting in age possessing a linear relationship with CFQ-BI scores. Preliminary research in flexible learning and hypothesis adaptation provides a basis for this hypothesis, highlighting that as one grows older, they appear to become “less flexible” and tend to prefer buying into familiar hypotheses, even when presented with new information inconsistent with these hypotheses (Gopnik et al., 2017). Alternatively,
it may be that adult clients have struggled with their ED symptoms longer than adolescent clients, and that the duration of ED symptoms is what accounts for the observed difference between these two groups. While these may be two plausible hypotheses, our findings do not suggest any specific underlying reason for the significant difference in adult and adolescent CFQ-BI scores, and the observed difference in the current study presents an area for future exploration.

We also found that individuals primarily engaging in restrictive disordered eating behaviors reported significantly less body image related cognitive fusion compared to those primarily engaging in binge and/or purge behaviors. Once again, this finding is the result of exploratory comparison analyses therefore no causal conclusion can be made as to why this difference emerged. However, this finding also presents directions for future research. Specifically, future studies should explore whether body image related fusion is predictive of specific ED behaviors, and if so, if it has greater predictive value for certain behaviors more so than others. It may also be that those individuals engaging in binge/purge presentations who are seeking treatment at a residential level of care tend to experience more severe psychological symptoms broadly that necessitate this level of intervention, as opposed to physical symptoms (e.g., low BMI; malnourishment) that may more often necessitate residential care for individuals engaging in restrictive behaviors. Although it is the case that in the current study the restrictive behaviors group did indeed have a lower average BMI relative to the binge/purge group, recent research suggests that lower BMI is frequently not associated with more severe ED symptomology (Grilo et al., 2015; Machado et al., 2017). It is, therefore, encouraged that future research examine
whether CFQ-BI scores appear to be uniquely related to certain physical, psychological, and behavioral symptoms differentially.

Future studies should also explore whether varying degrees of a third factor may influence this pattern within and across specific ED diagnoses. For example, research findings suggest that individuals who engage in binge/purge behaviors report higher levels of impulsivity and affective urgency (i.e., a tendency to act impulsively when experiencing heightened positive or negative affect) relative to individuals who engage in primarily restrictive behaviors. Theoretically, one may posit that impulsivity or non-acceptance of emotions may mediate the relationship between levels of body image related cognitive fusion within ED symptoms transdiagnostically. If so, the tendency for these factors to be particularly elevated among individuals who engage in binge/purge behaviors may explain the higher scores observed in our study. Alternatively, it may be that the functionality of specific disordered eating behaviors explains their relationship with body image related cognitive fusion. For example, findings from a recent study suggest that restrictive behaviors appear to primarily serve automatic positive reinforcement functions (Wang et al., 2020), whereas binge eating, and purging have been found to be predominantly maintained by automatic negative reinforcement (Wedig & Nock, 2010). Once again, the findings from the current study solely denote that differences may exist, but present possible directions for future research.

The current study is not without limitations. The generalizability of our results is limited in several ways. Our sample was composed only of female participants and was relatively homogeneous with regard to ethnicity. It was also a convenience sample made
up of individuals seeking treatment at the same residential treatment facility, with all clients admitting to the facility eligible to participate. This is likely to have introduced heterogeneity in comorbid psychopathology. Further, over 80% of the sample diagnosed with either AN-R or AN-BP which is similar to the diagnostic distributions observed in other recent studies of residential ED samples (e.g. Fisher et al., 2020; Muzi et al., 2020). Therefore, while our findings may be generalizable to other clinical ED samples seeking intensive care, future research is needed to determine whether our findings would be replicated in solely bulimia nervosa and/or binge eating samples, as well as those not currently seeking treatment or being treated at lower levels of care that still meet clinical criteria for an ED diagnosis. Future research using the CFQ-BI among individuals with EDs should further examine the psychometric properties when differentiating between individuals with varying comorbid diagnoses (e.g., mood disorders vs. anxiety disorders) to determine if the factor structure observed in the current sample is upheld. Our also does not include a comparative sample of healthy controls to determine whether levels of body image related cognitive fusion appear significantly elevated in individuals with clinically significant EDs. Such research is needed to denote whether distinct elevations in body image-related cognitive fusion exist in clinical populations, and whether there appears to be a clinical “cutoff” or threshold that may differentiate individuals with or without ED pathology.

Our samples for measurement invariance analyses are also small which may increase the risk of Type I error and limit the robustness of our results. However, Δχ² and fit indices appear to be fairly robust to sample size when using maximum likelihood
estimators, and may actually be more susceptible to over-rejecting models that
demonstrate good fit when samples are too large (Finch et al., 2018; Putnick & Bornstein,
2016). Our findings consistently demonstrated acceptable measurement invariance
therefore sample size may be less problematic in the current study. Nonetheless,
replication with variable sample size is recommended to strengthen support of these
findings. Similarly, our adolescent and adult samples were unequal (n = 75 and n = 100
respectively). Simulation research suggests that measurement invariance findings may be
biased such that they are more likely to mask violations in invariance when groups are
“severely” unbalanced, however within this study “severely unbalanced” was defined as a
ratio difference of 1:2 or larger (Yoon & Lai, 2018). Based on these limitations, readers
should consider the measurement invariance analyses presented in the current study as
preliminary and interpret them with this in mind.

Although our modified model did demonstrate adequate fit, our use of
modification indices also innately introduces an increased risk for overfitting the model
to the data. This fact, combined with the poor fit observed using the previously validated
model of the CFQ-BI suggests that further confirmatory research is warranted to
determine whether the psychometrics of the CFQ-BI within clinical ED samples using the
modified model are sustained. Additionally, our study’s cross-sectional design prevents
us from drawing any conclusions regarding temporal stability of the CFQ-BI’s
psychometrics in this population or about causality in terms of the relationships observed
between included variables. As previously denoted, cognitive fusion is conceptualized as
a psychological process thought to maintain a variety of psychopathology, and as a core
treatment target of ACT. Therefore, future longitudinal studies examining whether levels of body image related cognitive fusion appear to change following ACT-based treatments for EDs and whether such changes are associated with other targeted outcomes is needed to evaluate the theoretical accuracy and efficacy of ACT for EDs. Lastly, the unintentional omission of two items on the EDE-Q introduces possible error in the ED severity scores used for comparison in the current study.

**Conclusion**

Our study is the first to our knowledge to evaluate the psychometric properties of the CFQ-BI in a clinically significant ED sample. It is also the first to evaluate these properties using the English version, within a western English-speaking sample. Overall, our findings indicate that the CFQ-BI appears to assess the process of body image-related cognitive fusion adequately and consistently within a clinical ED sample when the modified factor model allowing the residuals of items 6 and 7 to covary is used. Clinicians, especially those seeking to target cognitive fusion within treatment with clients experiencing clinically significant EDs may find this assessment particularly useful in understanding the severity of body image related fusion the client is struggling with in order to develop a complete and process-oriented case conceptualization. Our findings also provide support for using the CFQ-BI as a valid assessment tool in future research with ED samples, which is particularly useful considering its brevity and ease to administer. While our study provides support for the use of the CFQ-BI within individuals diagnosed with clinically significant EDs cross-sectionally, future research should seek to replicate these findings in more diverse clinical sample and to determine
whether the CFQ-BI is an appropriate and sensitive assessment tool to evaluate temporal changes of body image-related fusion in response to therapeutic interventions targeting this process. Finally, future studies should seek to more directly examine the processes through which the relationship between CFQ-BI scores and ED behaviors may emerge to better inform etiological theories and intervention methods.

References


CHAPTER 3

STUDY 2: EXAMINING A MEDIATION MODEL OF BODY IMAGE-RELATED COGNITIVE FUSION, INTUITIVE EATING, AND EATING DISORDER SYMPTOM SEVERITY IN A CLINICAL SAMPLE

Abstract

Purpose: This study sought to explore the associations between Intuitive Eating (IE), eating disorder (ED) symptom severity, and body image-related cognitive fusion within a clinical sample. IE was also examined as a possible mediator in the relationship between body image-related fusion and ED symptoms.

Methods: This study includes cross-sectional analyses with data from 100 adult females and 75 adolescent females seeking residential treatment for an ED. Self-reported demographic information, ED symptoms, IE behaviors, and body image-related cognitive fusion were collected from participants within the first week of treatment following admission to the same residential ED treatment facility.

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\[3\] The second study examined the associations between body image related cognitive fusion, eating disorder symptom severity, and intuitive eating behaviors among a sample of females being admitted to residential treatment for an eating disorder. A mediation model exploring whether individual components of intuitive eating acted as mediators in the relationship between body image related fusion and eating disorder symptom severity was also tested. The manuscript was submitted to the journal *Eating and Weight Disorders—Studies on Anorexia, Bulimia, and Obesity*, was accepted for publication in December 2021 and published in February 2022.
**Results:** ED symptom severity was significantly negatively associated with three of the four domains of IE; unconditional permission to eat, reliance on hunger and satiety cues, and body-food choice congruence. A significant mediational effect of IE on the relationship between body image-related fusion and ED symptoms through IE behaviors was observed ($\beta = 11.3$, SE = .003, $p < .001$). This effect was only observed for the unconditional permission to eat ($\beta = .13$, $p = .003$) and reliance on hunger and satiety cues ($\beta = .10$, $p = .005$) domains of IE when the domains were subsequently analyzed individually.

**Conclusion:** Unconditional permission to eat and reliance on hunger and satiety cues appear to be particularly influential domains of IE in the relationship between body image-related fusion and ED symptom severity. It is possible that changes in these IE domains may be mechanisms through which body image-related fusion influences ED symptoms. Future longitudinal research is needed to better understand the relationship between body image-related cognitive fusion and IE and the potential for targeting these constructs specifically in the context of ED treatment.

**Introduction**

Eating disorders (EDs) are serious, sometimes fatal conditions characterized by a persistent disturbance of eating-related behaviors (e.g. restriction; bingeing; purging) that significantly impair one’s physical health and/or psychosocial functioning (American Psychiatric Association, 2013). Individuals with EDs also frequently experience a range of body image disturbances including dissatisfaction, preoccupation, and overvaluation of
weight and shape (Sharpe et al., 2018). Etiological and maintenance models posit that engagement in dieting and exercise behaviors when primarily motivated by desires to changes one’s weight/shape is a risk factor for the development of disordered eating pathology (Pennesi & Wade, 2016). Empirical studies exploring this relationship have consistently found internalization of the thin ideal, social pressures to be thin, history of dieting, weight suppression, and body image disturbance are all significantly predictive of future ED onset (Stice, 2016). Similarly, rigid dietary control (i.e. inflexible, dichotomized “all or nothing” dietary rules dictating what, when, and how one should eat) has reliably been linked with disordered eating (Linardon & Mitchell, 2017; Westenhoefer et al., 2013).

Such findings suggest that strategies minimizing dietary control motivated by external cues and promoting more adaptive and sustainable patterns of eating may be particularly useful for the treatment of EDs. Intuitive eating (IE) is one such approach characterized by a strong connection with and understanding of internal physiological hunger and satiety cues when determining eating behaviors to adequately meet physical and emotional needs (Tribole & Resch, 2012). The authors of the IE approach discuss how humans are innately born with the wisdom and ability to integrate instinct, emotion, and thought in the ways necessary to facilitate IE behaviors. However, as humans grow older, they develop more advanced cognitive abilities and encounter diverse social contexts (e.g., familial, cultural, media) which often promote different messages surrounding food and body. The complex integration of these psychosocial factors into the individual’s eating behaviors transitions them from primarily instinctual, to a dynamic
interplay between instinct, thoughts, feelings, and perceived social norms (Tribole & Resch, 2012). Therefore, simply having these abilities does not guarantee successful IE. For many, over time accessing these abilities becomes increasingly difficult due to lack of practice and/or internalization of conflicting messages from various external environments which can cause significant deviations from the adaptive eating behaviors IE describes. The IE framework therefore strives to increase the adaptive use of these abilities and remove potential barriers to doing so (Tribole & Resch, 2012).

Tribole and Resch outline 10 principles of IE which guide individuals in how to build and practice IE within their own lives (Tribole & Resch, 2012). These principles have been clustered into four core theoretical domains that together contribute to overall levels of engagement in IE. The first domain, Unconditional Permission to Eat, refers to how willing an individual is to eat when they experience physical hunger and to refuse categorical labels such as “good” or “bad,” “allowed” or “forbidden,” in relation to specific foods. The second domain, Reliance on Hunger and Satiety Cues, refers to an individuals’ trust in their internal bodily cues of hunger or satiety and how much they rely on these cues to guide their eating behaviors. Third, the Eating for Physical Rather Than Emotional Reasons domain refers to an individual’s reasoning for choosing to engage in patterns of eating behavior in which they are eating to satisfy physical hunger and meet their bodies nutritional needs and/or eating to cope with emotional distress. Finally, the fourth domain, Body-Food Choice Congruence, refers to the extent individuals match their food choices to align with their bodies’ nutritional needs to promote healthy physical functioning. The first three domains were included as
individual subscales within the original Intuitive Eating Scale developed to measure IE as a latent construct (Hawks et al., 2004), and more recently a revised version of the measure, the Intuitive Eating Scale—2 (IES-2), was created to incorporate the additional Body-Food Choice Congruence domain (Tylka & Kroon Van Diest, 2013).

A breadth of research exists indicating that IE is inversely related to levels of disordered eating symptoms as well as many ED risk factors including internalization of the thin ideal, body dissatisfaction, body shame, and negative affect (Bruce & Ricciardelli, 2016; Linardon et al., 2021). A recent meta-analysis of IE in relation to psychological correlates found that IE was significantly and negatively associated with binge-purge symptoms, eating restraint, emotional eating, global eating pathology, internalization of appearance ideals, and shape and weight concerns (Linardon et al., 2021). Among the 97 studies included, only four examined IE behaviors among individuals with clinically significant eating disorders, and all four compared these samples to healthy controls. Healthy controls consistently reported significantly higher levels of intuitive eating compared to individuals with eating disorders, with a large pooled effect size (Linardon et al., 2021). Similarly, Van Dyck et al. (2016) found that women with an ED had significantly lower scores on all IES-2 subscales compared to woman without an ED diagnosis. Further, the authors found that when looking at individual ED diagnoses, women with binge eating disorder had higher scores on the Unconditional Permission to Eat subscale when compared to women with anorexia nervosa or bulimia nervosa, and that women diagnosed with anorexia nervosa had higher scores on the eating for physical rather than emotional reasons subscale compared to
those with bulimia nervosa or binge eating disorder. Research also suggests that at least some components of intuitive eating are associated with various indices of well-being above and beyond the variance accounted for by low ED symptomology (Tylka & Wilcox, 2006). Further, the absence of ED symptomology does not always predict IE/adaptive eating behaviors (Cadena-Schlam & López-Guimerà, 2015; Tylka & Wilcox, 2006). These findings suggest that IE and ED symptomology are distinct but related constructs and provide initial support for investigating IE as a potential intervention target for individuals with EDs.

Despite the consistent finding that IE behaviors are inversely related to ED symptoms across clinical and nonclinical samples, there is little research to date exploring changes in IE in relation to ED symptoms over time, and even less examining the incorporation of IE practices when treating individuals with EDs. In a prospective study of IE behaviors among young adults, individuals characterized as “intuitive eaters” at time one reported lower levels of unhealthy weight control behaviors (i.e. fasting, using meal substitutes, skipping meals, smoking cigarettes, using diet pills, diuretics, or laxatives, and/or making oneself vomit in a desire for weight loss) and lower rates of binge eating accompanied by loss of control at 5-year follow up (Christoph et al., 2021). Notably however, individuals were categorized as “intuitive eaters” in this study based only on their responses to two questions taken from the original Intuitive Eating Scale (i.e., ‘I stop eating when I feel full’ and ‘I trust my body to tell me how much to eat’). In another prospective study among a sample of 1,270 women, higher baseline levels of intuitive eating predicted lower odds of onset for eight ED related symptoms (i.e.,
objective binge eating, subjective binge eating, purging, driven exercise, fasting, overvaluation of weight and shape, and fear of weight gain) at 8-month follow up (Linardon, 2021). Further, intuitive eating uniquely predicted lower odds of subjective binge eating or purging onset above and beyond those predicted by body appreciation and self-compassion (Linardon, 2021). In a 2-year pilot study evaluating an inpatient/residential eating disorder treatment program focused on the development of intuitive eating practices, participants had significant increases in patient’s IE behaviors from pre- to post-treatment. This study also found that when different ED diagnoses were considered, individuals diagnosed with bulimia nervosa reported the lowest levels of IE at baseline but experienced the greatest improvement in IE from pre- to post-treatment whereas individuals diagnosed with anorexia nervosa or eating disorder not otherwise specified reported higher levels of IE compared to those with a bulimia nervosa diagnoses at baseline and experienced only moderate improvements in this regard. Finally, in a study examining the presence of adaptive eating among individuals in recovery from an eating disorder, findings indicated that individuals who were in full recovery from their eating disorder (defined as absence of a current ED diagnoses, BMI \(\geq 18.5\) kg/m2, absence of any binge eating, purging, or fasting behaviors within the previous 3 months, and scores within 1 SD of age-matched community norms on measures of ED-related cognitions) did not differ from healthy controls on overall levels of intuitive eating or any IE domains. These individuals also reported significantly greater levels of total IE behaviors, Unconditional Permission to Eat, and Reliance on Hunger and Satiety Cues when compared to individuals in partial recovery or currently
diagnosed with a clinically significant ED, and significantly greater levels of Eating for Physical Rather than Emotional Reasons compared to individuals with a current ED.

While these findings are promising, significant gaps in the literature exist that are essential for informing future interventions for EDs that target increases in IE behavior. First, much of the research examining the relationship between IE and ED symptomology examines IE as a unidimensional construct and does not consider the four theoretically and empirically supported domains of IE individually. Understanding the unique role each domain may play in the development and maintenance of disordered eating behaviors among those with clinically significant EDs is essential to inform the development of effective and efficient interventions targeting IE for individuals with EDs. Second, the vast majority of research exploring the relationship between IE and ED symptoms to date has been conducted using college students and/or nonclinical community samples. While this literature provides initial insights as to how variations in IE levels may relate to elevated ED symptomology, empirical replication of these findings within clinically significant samples is needed in order to generalize this knowledge and appropriately inform clinical intervention. The current study therefore seeks to address these gaps by examining the unique relationship between each of the four IE domains and ED symptom severity within a clinically significant ED sample.

The research denoting the inverse relationship between IE and ED symptomology also presents an important question for additional research: what are the most important barriers impeding the adaptive use of one’s intuition, thoughts, and feelings that may explain why some individuals engage in lower levels of IE and, in turn, develop higher
levels of ED pathology? Understanding the mechanisms through which this relationship occurs in this way is vital for identifying therapeutic processes that may be most beneficial to target in IE interventions for those with EDs. Further, identification of these mechanisms would provide insight as to when and why certain instances of lower IE behavior are indicative of elevated ED pathology and others are not. One process that may theoretically play a role in the inverse relationship between IE and ED in this way is body image-related cognitive fusion. Body image-related cognitive fusion is defined as the entanglement with the verbal content of ones’ thoughts related to body image, interpreting them as complete truth and acting accordingly, rather than recognizing them as simply thoughts representing only one interpretation of reality (Trindade & Ferreira, 2014). Recently, theoretical models of ED psychopathology have been developed that posit body image-related cognitive fusion may be a core maintenance mechanism of ED symptoms (Manlick et al., 2013; Merwin & Wilson, 2009). These models propose that due to high levels of body image-related fusion, individuals utilize unhealthy eating and weight-related behaviors associated with EDs (e.g. dietary restriction; binging and/or purging; over-exercise) in an effort to alleviate their distressing body image-related thoughts without consideration of health or values-based contingencies.

High levels of body image-related cognitive fusion are consistently associated with poorer psychological health and quality of life (Ferreira & Trindade, 2015) as well as higher levels of ED symptomology (Duarte et al., 2017; Ferreira et al., 2014). Previous path analysis research has found that body image-related cognitive fusion appears to play a significant role in explaining inflexible eating patterns among young women (Trindade
Further, body image-related fusion was found to be a key process in explaining the links between several known ED risk factors and self-reported ED symptoms among female college students (Trindade & Ferreira, 2014). Based on these findings, we propose that body image-related cognitive fusion may indirectly influence ED symptom severity through its effect on IE behaviors. In other words, we hypothesize that increases in body image-related cognitive fusion explain decreased engagement in IE behaviors, and that this relationship subsequently influences one’s experience of elevated ED symptoms.

The current study seeks to expand upon previous knowledge regarding the inverse relationship between IE and ED symptoms by: (1) examining the unique associations between each of the four IE domains and ED symptom severity in a clinically significant ED sample, (2) examine IE as a potential mediator in the relationship between body image-related cognitive fusion and ED symptom severity, and (3) if IE is observed as a mediator in this relationship, test a parallel mediation model to explore whether certain domains of IE appear to drive this mediating effect. Because lower levels of IE, higher levels of body image-related cognitive fusion, and higher levels of ED symptom severity are all commonly associated with lower psychological well-being and higher of depression- and anxiety-related symptoms, we also sought to examine whether the observed relationships between each variable remained significant even after variance explained by levels of depression and anxiety symptoms was considered. Based on previous findings, we predict that lower scores on the unconditional permission to eat, reliance on hunger and satiety cues, and eating for physical rather than emotional reasons
domains of IE would all be significantly associated with elevated ED symptom severity and higher levels of body image-related fusion. With regard to the body food choice congruence domain of IE, we predict that lower body food choice congruence would be associated with higher body image-related fusion, but not higher ED symptom severity based on previous findings that this domain tends to be linked more closely to body-related variables as opposed to ED symptomology (Tylka & Kroon Van Diest, 2013; Van Dyck et al., 2016). We further predict that the relationship between body image-related fusion and ED symptom severity will be mediated by IE behaviors. Due to the exploratory nature of our analyses considering each IE domain independently, we did not have any specific a priori hypotheses about whether all or only some of the IE domains would drive this mediating effect.

Methods

Participants

All data were collected at a for-profit residential treatment facility located in the Western U.S. for adolescent (ages 11-17) and adult (aged 18 and older) females struggling with eating disorders, where the average length of stay for clients is between 4 and 6 months. The current study included 175 females consecutively admitted to either the adolescent ($n = 75$) or adult ($n = 100$) residential treatment unit between November 2015 and June 2020. All participants were diagnosed with an eating disorder as defined by the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (American Psychiatric Association, 2013). Descriptive statistics for the sample are presented in Table 3.1.
Table 3.1

Descriptive Statistics

<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>Adolescents ($n = 75$)</th>
<th>Adults ($n = 100$)</th>
<th>All ($N = 175$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age $M(SD)$</td>
<td>15.17 (1.47)</td>
<td>26.01 (8.21)</td>
<td>21.47 (8.29)</td>
</tr>
<tr>
<td>BMI $M(SD)$</td>
<td>19.27 (2.93)</td>
<td>20.16 (4.65)</td>
<td>19.79 (4.04)</td>
</tr>
<tr>
<td>Ethnicity $N(%)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>67 (89.3)</td>
<td>93 (93.0)</td>
<td>160 (91.95)</td>
</tr>
<tr>
<td>Asian</td>
<td>2 (2.70)</td>
<td>1 (1.0)</td>
<td>3 (1.72)</td>
</tr>
<tr>
<td>Biracial</td>
<td>5 (6.76)</td>
<td>5 (5.0)</td>
<td>10 (5.75)</td>
</tr>
<tr>
<td>Native Hawaiian</td>
<td>0 (0)</td>
<td>1 (1.0)</td>
<td>1 (.57)</td>
</tr>
<tr>
<td>Diagnosis $N(%)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AN-R</td>
<td>42 (56.0)</td>
<td>45 (45.0)</td>
<td>87 (49.71)</td>
</tr>
<tr>
<td>AN-B/P</td>
<td>24 (32.0)</td>
<td>38 (38.0)</td>
<td>62 (35.43)</td>
</tr>
<tr>
<td>BN</td>
<td>7 (9.33)</td>
<td>12 (12.0)</td>
<td>19 (10.86)</td>
</tr>
<tr>
<td>BED</td>
<td>1 (1.33)</td>
<td>2 (2.0)</td>
<td>3 (1.71)</td>
</tr>
<tr>
<td>ARFID</td>
<td>0 (0)</td>
<td>2 (2.0)</td>
<td>2 (1.14)</td>
</tr>
<tr>
<td>OSFED</td>
<td>1 (1.33)</td>
<td>1 (1.0)</td>
<td>2 (1.14)</td>
</tr>
<tr>
<td>Years since ED symptoms began</td>
<td>2.73 (1.70)</td>
<td>11.62 (9.12)</td>
<td>7.87 (8.28)</td>
</tr>
</tbody>
</table>

*Note.* AN-R: Anorexia Nervosa-Restrictive Type; AN-B/P: Anorexia Nervosa-Binge/Purge Type; BN: Bulimia Nervosa; BED: Binge Eating Disorder; ARFID: Avoidant and Restrictive Food Intake Disorder; OSFED: Other Specified Feeding and Eating Disorder.

**Procedures**

All parts of the study were approved by a university institutional review board. Participant recruitment was conducted via convenience sampling where, throughout the data collection period, every client admitting to the residential treatment facility (and parents or legal guardians of adolescent clients) was informed about the opportunity to participate in research and given details regarding what participation would entail. All were informed that participation in the study was voluntary and that their choice to participate or not would have no impact on the clinic treatment they would receive while
at the residential facility. A total of 17 individuals and/or parents opted not to participate in the study. Clients who provided informed consent (and assent in the case of adolescents) completed an online self-report assessment battery within the first three days following their intake. The assessment battery included demographic information, assessment of ED symptom severity, and a variety of assessment measures related to comorbid psychopathology, therapeutic processes, and targeted treatment outcomes.

**Measures**

*Eating Disorder Examination Questionnaire*

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 2008) was utilized to assess eating disorder symptom severity and includes 28 self-report items that assesses core attitudinal features and behaviors indicative of eating disorder psychopathology. Each item is answered on a 7-point Likert scale (0 = *No days*; 6 = *Everyday*) indicating how often the respondent engaged in a disordered eating behavior or experienced an eating disorder related cognition over the last 28 days. Due to researcher error, item 8 (“In the past 28 days how has thinking about shape or weight made it very difficult to concentrate on things you are interested in?) and item 25 (“In the past 28 days how dissatisfied have you been with your weight?) were unintentionally omitted. However, missing data on the EDE-Q is notoriously common (Kelly et al., 2017) and guidelines for handling missing data provided by the authors of the EDE-Q indicate that valid totals can still be computed for the EDE-Q if a majority of the items are completed (Fairburn & Beglin, 2008). In the current study, Cronbach’s alpha for the EDE-Q was .92.
**Cognitive Fusion Questionnaire-Body Image**

The Cognitive Fusion Questionnaire-Body Image (CFQ-BI; Ferreira et al., 2015) is a 10-item self-report measure designed to assess cognitive fusion related to body image. Responses are rated on a 7-point Likert scale (1 = *Never True*; 7 = *Always True*) to indicate how frequently each item (e.g. “I get so caught up in my thoughts about my physical appearance that I am unable to do the things that I most want to”) applies to the individual. The CFQ-BI has been previously validated in both clinical (Barney et al., 2021) and nonclinical samples (Ferreira et al., 2015) and has been found to have good incremental validity relative to general measures of cognitive fusion, as well as excellent internal consistency (Cronbach’s alpha = .96). Internal consistency of the CFQ-BI was also excellent within the current study (Cronbach’s alpha = .97).

**Intuitive Eating Scale-2**

The Intuitive Eating Scale-2 (IES-2; Tylka & Kroon Van Diest, 2013) measures individuals’ tendency to attend to their physical hunger and satiety cues and utilize these cues to determine when, what, and how much to eat. The IES-2 consists of 23 self-report items with responses rated on a 5-point likert scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*) with regard to one’s attitudes and behaviors. Higher scores indicate higher levels of intuitive eating. Internal consistency for the total scale in the current sample was excellent (α = .92). The IES-2 also produces four subscale scores: Unconditional Permission to Eat (α = .89), Reliance on Hunger and Satiety Cues (α = .92), Eating for Physical rather than Emotional Reasons (α = .94), and Body-Food Choice Congruence (α = .85).
**Beck Depression Inventory, 2nd Edition**

The Beck Depression Inventory, 2nd Edition (BDI-II; Beck et al., 1996) is a widely used measure of depression severity and is composed of 21-items related to various affective, cognitive, and physical symptoms frequently associated with depression. Items are rated from 0-3 with regard to severity, and a total score (0-63) is calculated by summing item scores such that higher scores indicate greater levels of depression. The psychometric properties of the BDI-II are well established among (Wang & Gorenstein, 2013), including in clinical eating disorder samples (Udo et al., 2015). Internal consistency in the current sample was excellent ($\alpha = .91$).

**Beck Anxiety Inventory**

The Beck Anxiety Inventory (BAI; Beck et al., 1988) is a widely used self-report measure of anxiety symptom severity composed of 21 items rated on a 4-point likert scale (0 = not at all to 3 = severely) with regard to how distressing symptoms had been during the past month. The psychometric properties of the BAI are well established (Beck et al., 1988; Fydrich et al., 1992) and the BAI demonstrated excellent internal consistency in the current sample ($\alpha = .91$).

**Data Analysis**

All analyses were conducted with R in RStudio, version 3.5.2 (R Core Team, 2019; RStudio Team, 2019). The psych (Revelle & Revelle, 2015) package was utilized to examine assumptions; the jmv (Selker et al., 2020) package was utilized to calculate descriptive statistics and bivariate correlations; and the lavaan package (Rosseel, 2012)
was used for the mediation analyses. Missing data was addressed using the full information maximum likelihood (FIML) estimation function in the lavaan package, which is recommended as the most pragmatic approach to missing data estimation for SEM analyses and has been demonstrated to produce unbiased parameter estimates and standard errors (Cham et al., 2017). Bivariate relationships between ED symptom severity, body image-related fusion, the four domains of intuitive eating, depression symptoms, and anxiety symptoms were examined first using Pearson correlations. We then conducted a mediation analysis to test the prediction that IE scores would mediate the relationship between body image-related cognitive fusion and ED symptom severity. Based on the results of these analyses, we then used parallel mediation analysis to examine which of the four domains of intuitive eating appeared to contribute to the hypothesized mediated relationship, and to determine whether any of the domains appeared to drive the mediation more than others. Bootstrapping with 5,000 bootstrapped samples was used to calculate 95% confidence intervals for all indirect effects. All coefficients and indirect effect results are presented in standardized units. In all analyses, age, BMI, depression symptoms, and anxiety symptoms were included as control variables. In an effort to control for potential differences based on ED diagnosis despite the large differences in sample sizes for each diagnosis, we created a dichotomous variable categorizing participants into two groups based on ED behavioral profile consistencies between diagnoses and included inclusion in either group as an additional control variable. Specifically, we included all participants diagnosed with either Anorexia Nervosa-Restrictive Subtype or Avoidant and Restrictive Food Intake Disorder (i.e.,
diagnoses characterized by restrictive behaviors) in group 1, and all participants diagnosed with Anorexia Nervosa—Binge/Purge Subtype, Bulimia Nervosa, or Binge Eating Disorder (i.e., diagnoses characterized by engagement in binging and/or purging behaviors). The two individuals diagnosed with Other Specified Feeding or Eating Disorder were not included in either group due to having no access to the clinical data used regarding these individuals’ behavioral profiles to determine this diagnosis. This categorization method is consistent with those used in previous research (e.g., Barney et al., 2021; Raykos et al., 2014).

**Results**

Means and standard deviations on each measure as well as the results of the bivariate correlation analyses are presented in Table 3.2. Notably, when compared to the three non-clinical female samples included in the validation study of the IES-2 (Tylka & Kroon Van Diest, 2013), the average total IE score within the current sample was >1 standard deviation lower (indicating less IE behavior). At the domain level however, the mean level of eating for physical rather than emotional reasons and body-food choice congruence reported in the current sample was consistent with the mean reported in all three non-clinical female samples. Conversely, the mean scores in both the unconditional permission to eat domain and the reliance on hunger and satiety cues domain were both >1.5 standard deviations below those reported in the validation studies by Tylka and Van Diest.

Higher levels of ED symptom severity were positively associated with higher
Table 3.2

Means, Standard Deviations, and Bivariate Correlations

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EDE-Q</td>
<td>3.94</td>
<td>1.56</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>2. CFQ-BI</td>
<td>52.70</td>
<td>15.08</td>
<td>.79***</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>3. IES-Total</td>
<td>2.87</td>
<td>.70</td>
<td>-.64***</td>
<td>-.58***</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4. IES-UPE</td>
<td>2.29</td>
<td>1.03</td>
<td>-.71***</td>
<td>-.57***</td>
<td>.59***</td>
<td>—</td>
<td>—</td>
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<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5. IES-RHSC</td>
<td>2.21</td>
<td>1.08</td>
<td>-.65***</td>
<td>-.56***</td>
<td>.82***</td>
<td>.61***</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6. IES-EPR</td>
<td>3.60</td>
<td>1.14</td>
<td>-.11</td>
<td>-.17*</td>
<td>.64***</td>
<td>-.10</td>
<td>.23***</td>
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<td>7. IES-BFCC</td>
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<td>-.19*</td>
<td>-.20**</td>
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<td>.10</td>
<td>.29***</td>
<td>.12</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8. BAI</td>
<td>26.45</td>
<td>12.04</td>
<td>.52***</td>
<td>.46***</td>
<td>-.27***</td>
<td>-.37***</td>
<td>-.24***</td>
<td>-.02</td>
<td>-.07</td>
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</tr>
<tr>
<td>9. BDI</td>
<td>33.82</td>
<td>12.47</td>
<td>.65***</td>
<td>.66***</td>
<td>-.46***</td>
<td>-.48***</td>
<td>-.42***</td>
<td>-.11</td>
<td>-.22***</td>
<td>.61***</td>
</tr>
</tbody>
</table>

Note. EDE-Q: Eating Disorder Examination Questionnaire Global Score; CFQ-BI: Cognitive Fusion Questionnaire-Body Image Total Score; IES-Total: Intuitive Eating Scale-2 Total Score; IES-UPE: Intuitive Eating Unconditional Permission to Eat Subscale Score; IES-RHSC: Intuitive Eating Reliance on Hunger and Satiety Cues Subscale Score; IES-EPR: Intuitive Eating—Eating for Physical Rather than Emotional Reasons Subscale Score; IES-BFCC: Intuitive Eating Body-Food Choice Congruence Subscale Score; BAI: Beck Anxiety Inventory Score; BDI: Beck Depression Inventory-II Score

*  $p < .05$.

**  $p < .01$.

***  $p < .001$. 
body image-related fusion scores, and negatively associated with higher levels of
unconditional permission to eat, reliance on hunger and satiety cues, and body-food
choice congruence. Surprisingly, no association was found between ED symptom
severity and the eating for physical rather than emotional reasons IE domain. Higher
levels of body image-related cognitive fusion were significantly negatively associated
with scores on all IE domain subscales, indicating that individuals who were more fused
with their body image-related thoughts reported less engagement in all four domains of
IE behavior.

To test the prediction that IE behaviors mediate the relationship between body
image-related cognitive fusion and ED symptom severity, we conducted a simple
mediation model using total IE scores as the mediator. Consistent with our hypothesis,
the indirect effect of body image-related cognitive fusion on ED symptom severity
through IE behaviors was significant ($\beta = .11$, $SE = .003$, $p < .001$). In the total model,
age ($\beta = .08$, $SE = .007$, $p = .040$), BMI ($\beta = -.09$, $SE = .015$, $p = .029$), and anxiety ($\beta = .16$, $SE = .008$, $p = .009$) were all significant individual predictors of ED symptom
severity. In other words, higher age, lower BMI, and higher anxiety were significantly
predictive of higher ED symptom severity. Only age ($\beta = -.21$, $SE = .005$, $p = .001$) and
ED behavioral profile ($\beta = .14$, $SE = .094$, $p = .042$) were significant predictors of the
mediator (total IE scores) such that younger individuals and individuals with a restrictive
ED behavior profile reported significantly higher levels of IE.

The finding that total IE scores did mediate the relationship between body image-
related fusion and ED symptom severity supported additional parallel mediation analyses
examining each of the domains of IE independently as mediators (Figure 3.1). The results of these analyses revealed that body image related cognitive fusion is indirectly related to ED symptom severity through its relationship with both the unconditional permission to eat and reliance on hunger and satiety cues domains of IE. Specifically, body image-related cognitive fusion had a significant, negative direct effect on reported levels of unconditional permission to eat (a1 path) and unconditional permission to eat scores had a significant, negative direct effect on ED symptom severity after controlling for the effect of body image-related cognitive fusion on ED symptom severity (b2 path).

**Figure 3.1**

*Parallel Mediation Model Illustrating Unconditional Permission to Eat, Reliance on Hunger and Satiety Cues, Eating for Physical Rather than Emotional Reasons, and Body-Food Choice Congruence as Mediators of the Relationship Between Body Image-Related Fusion and ED Symptom Severity.*

Note. All coefficients are standardized.

***$p < .001$***
of body image-related fusion (b1 path). Similarly, body image-related cognitive fusion had a significant, negative direct effect on reported levels of reliance on hunger and satiety cues (a2 path), and lower reliance on these cues had a significant, negative direct effect on ED symptom severity after controlling for the effect of body image-related fusion (b2 path). The indirect effect of body image-related cognitive fusion on ED symptom severity through unconditional permission to eat was statistically significant ($\beta = .14, p = .001, \text{ci} = .007 \text{ to } .024$). The indirect effect of body image-related cognitive fusion on ED symptom severity through reliance on hunger and satiety cues was also statistically significant ($\beta = .08, p = .004, \text{ci} = .003 \text{ to } .015$).

In contrast, neither of the direct effects of body image-related cognitive fusion on the eating for physical rather than emotional reasons (a3 path) or body-food choice congruence (a4 path) domains of IE were statistically significant. Similarly, neither the direct effect of eating for physical rather than emotional reasons on ED symptom severity (b3 path) or the direct effect of body food choice congruence on ED symptom severity (b4) after controlling for the effects of body image-related fusion were statistically significant. Finally, the indirect effects of body image-related fusion on ED symptom severity through the eating for physical rather than emotional reasons domain ($\beta = -.004, p = .573, \text{ci} = -.002 \text{ to } .001$) and the body food choice congruence domain ($\beta = -.000, p = .970, \text{ci} = -.001 \text{ to } .001$) were both not statistically significant.

With regard to covariates included in the total model anxiety scores ($\beta = .11, SE = .007, p = .036$), and ED behavioral profile ($\beta = -.15, SE = .126, p < .001$) were both significant predictors of ED symptom severity whereas age ($\beta = .06, SE = .006, p = .062$),
BMI (\(\beta = .04, SE = .014, p = .254\)) and depression scores (\(\beta = .096, SE = .008, p = .132\)) were not. In other words, higher anxiety scores and having a diagnosis characterized by a binge and/or purge behavioral profile were significantly predictive of higher level of ED symptom severity within the model. When examining the covariates predictive significance of each mediator (i.e. each individual IE domain) within the model, age was only a statistically significant predictor of scores on the Reliance on Hunger and Satiety Cues IE domain (\(\beta = -.22, SE = .008, p = .001\)), depression scores were only a significant predictor of scores on the Body-Food Choice Congruence IE domain (\(\beta = -.29, SE = .009, p = .015\)), and ED behavioral profile was only a significant predictor of scores on the Eating for Physical Rather than Emotional Reasons IE domain (\(\beta = .32, SE = .183, p < .001\)). No other covariates were significant individual predictors of the four mediators within the model.

Overall, body image-related cognitive fusion had a significant direct effect on ED symptom severity, even when taking into account the indirect effects of body image-related fusion through all four domains of intuitive eating (\(c'\) path). Further, the total effect of body image-related cognitive fusion on ED symptom severity was significant (\(\beta = .61, SE = .007, p < .001\)) and the mediation model as a whole explained 78.9% of the total variance in ED symptom severity.

**Discussion**

Overall, the results of our study indicate that females diagnosed with an ED seeking residential treatment report lower overall levels of IE compared to non-clinical
female samples, and that at the domain level this decrease appears to be due to lower reported levels of unconditional permission to eat and lower reliance on hunger and satiety cues. ED symptom severity was significantly, negatively associated with all but the eating for physical rather than emotional reasons domain of IE. A significant indirect effect of body image-related cognitive fusion on ED symptom severity through IE behaviors was also observed and the unconditional permission to eat and reliance on hunger and satiety cues domains of IE appear to drive this mediation effect.

The non-significant association between the eating for physical rather than emotional reasons IE domain and ED symptom severity is somewhat inconsistent with previous literature that has found significant associations between the eating for physical rather than emotional reasons domain of IE and ED symptoms in non-clinical samples (e.g., Duarte et al., 2016; Tylka & Kroon Van Diest, 2013). One possible explanation for this finding may be due to the high proportion of individuals diagnosed with Anorexia-Restrictive subtype within our sample. Prior research examining emotional eating behaviors across eating disorder diagnoses has found that individuals with Anorexia Nervosa tend to report eating less than usual (i.e., engaging in restrictive eating behaviors) in response to negative emotions, particularly among those with an AN-restrictive type diagnosis (Meule et al., 2021; Ricca et al., 2012). Because the eating for physical rather than emotional reasons subscale of the IES-2 only assesses one’s tendency to use food as a coping mechanism for emotional distress as a result of negative affect (Tylka & Kroon Van Diest, 2013), it is possible that this subscale does not capture the ways in which individuals with Anorexia Nervosa diagnoses use food as an emotional
coping mechanism. This is further supported by our finding that individuals with an eating disorder diagnosis categorized by binge and/or purge behaviors reported significantly lower levels of IE within this domain. Future research should therefore seek to examine the relationship between the individual IE domains and ED symptom severity in more diverse diagnostic samples, and specifically examine potential differences across diagnostic profiles.

The statistically significant association observed between the body-food choice congruence domain of IE and ED symptom severity was contrary to our prediction, although this correlation was comparatively much smaller than those observed between ED symptom severity and the unconditional permission to eat and reliance on hunger and satiety cues domains. This subscale was added as a core domain of IE more recently than the other three IE domains and has consequently been less well-explored (Cadena-Schlam & López-Guimerà, 2015). While previous research has found little to no association between scores on the body-food choice congruence subscale and ED symptomology (Tylka & Kroon Van Diest, 2013; Van Dyck et al., 2016) there are notable differences between the samples used in these studies relative to ours that may account for these differences. First, the samples in these studies were made up of college students/community members as opposed to those currently experiencing a clinically significant eating disorder. Therefore, it is possible that a general lack of ED symptomology, or differences in the way the items making up the body-food choice congruence subscale are interpreted by those with clinically significant EDs, may have prevented a significant relationship from being observed. Specifically, the three items
included in the body-food choice congruence subscale focus on a desire to eat “nutritious foods” most of the time, typically eating foods perceived to give one’s body “stamina or energy” and to eat foods that “make one’s body perform well.” Many individuals with EDs report elevated levels of orthorexic behavior (Bartel et al., 2020; Segura-Garcia et al., 2015), where a focus on only consuming “healthy” or “nutritious” foods becomes a persistent fixation and/or alters eating behavior to an extreme where avoidance of foods considered “unhealthy” leads to an overly-restricted diet. It is therefore possible that the items of the body-food choice congruence subscale may be highly endorsed by individuals who are experiencing orthorexia symptoms, despite the pathological aspects of these food choices, which are inconsistent with the adaptive strategies promoted by IE. Future research should explore the overlap and validity of this subscale in adequately assessing IE among individuals experiencing orthorexia or eating disorder pathology in this way.

Further, previous samples were made up of male and female community members, whereas the current sample included only females. It is therefore possible that gender differences moderate the relationship between body-image food congruence and ED symptom severity. In fact, Van Dyck et al. (2016) found that scores on the body-food choice congruence scale of the IES-2 were significantly different between males and females, and found that among females body-food choice congruence was significantly associated with various behavioral ED risk factors, whereas among men these scores were only significantly associated with body image-related factors. While specific conclusions cannot be made based solely on the current findings, future research should
seek to examine the role of body-food choice congruence in relation to ED symptoms among both male and female individuals with clinically significant ED symptoms to better understand the nature of this relationship.

Findings also revealed that the body image-related relationship between body image-related fusion and ED symptom severity appears to be mediated by the unconditional permission to eat and reliance on hunger and satiety cues domains on IE, but not the eating for physical rather than emotional reasons or body-food choice congruence domains. Unconditional permission to eat incorporates the willingness to eat when hungry and to eat foods one enjoys and desires and encourages an “emotionally neutral” stance toward all foods. Individuals who experience a high level of body image-related cognitive fusion may become “fused” to emotionally charged thoughts or messages they have received about foods’ impact on their body (e.g. “chocolate causes bloating” or “avoiding sugar will result in weight loss”) such that these thoughts drive their eating behaviors without consideration of their preferences or dietary needs. Similarly, reliance on hunger and satiety cues requires a willingness to let one’s own visceral signals of hunger and fullness dictate when and how much one chooses to eat. However, if an individual is highly fused to thoughts such as “someone my height and weight should only eat 1500 calories or less a day,” they may rigidly adhere to this rule regardless of whether or not it is in line with their bodily signals. As body image-related cognitive fusion begins to affect the unconditional permission to eat and reliance on hunger and satiety cues domains of IE in this way, our findings suggest that among individuals with clinically diagnosed EDs, the severity of their ED symptoms increases.
These findings are consistent with previous research indicating that a history of dieting and attempts to follow rigid food rules are associated with elevated ED symptoms (Keel et al., 2007; Stewart et al., 2002) and the importance of “rejecting the diet mentality” emphasized as the first principle for adopting an IE framework (Tribole & Resch, 2012), and suggest that these two IE domains may be particularly important when considering future interventions for EDs.

Our findings provide initial support for the theory that interventions targeting increases in IE behaviors, particularly unconditional permission to eat and reliance on hunger and satiety cues may be beneficial for women struggling with EDs. Our study also suggests that these IE domains may be particularly impacted by elevated levels of body image-related cognitive fusion among individuals with EDs, and that this predicts increased ED severity. These findings are encouraging for future exploration of interventions directly targeting body image-related cognitive fusion for individuals with EDs to determine whether they might be useful for promoting increased engagement in adaptive IE behaviors, especially unconditional permission to eat and reliance on hunger and satiety cues to guide eating behavior. However, it is important to note the cross-sectional nature of the relationships observed in the current study, and longitudinal replication demonstrating whether this pattern is sustained over time is needed.

Recent research examining the use of interventions such as Acceptance and Commitment Therapy (ACT), which specifically focus on decreasing one’s fusion with distressing thoughts and feelings, for individuals with EDs have been found to be effective in reducing ED symptoms and body image distress (Fogelkvist et al., 2020;
Juarascio et al., 2013). A core therapeutic process in ACT is cognitive defusion, which seeks to remove unhelpful attachments to one’s thoughts and increase one’s ability to mindfully observe them with dispassionate curiosity (Luoma et al., 2007). While defusing from one’s thoughts related to body image alone may not influence one’s eating behaviors, it may provide individuals with the ability to “step back” from these thoughts and choose their eating behaviors based on what “works” for their overall well-being, as opposed to acting primarily to alleviate or neutralize their thoughts. In this way, defusion interventions for individuals with EDs may provide individuals with strategies to distance themselves from distressing thoughts about their body while engaging in more adaptive IE behaviors regardless of the content of their thoughts at any given time. While theoretically, this process is in line with those posited by ACT interventions, longitudinal replication of our analyses and research specifically examining cognitive defusion as a process mechanism in interventions for EDs is needed to support this notion. To date, there is a small but growing body of evidence suggesting that ACT is effective in decreasing ED symptom severity and body image concerns (Linardon et al., 2019), and that among a sample of overweight/obese women, led to significant improvements in IE from pre- to post-intervention (Boucher et al., 2016). However, to our knowledge, no studies have explicitly examined the use of ACT-based interventions targeting body image-related fusion within individuals with eating disorders, or examined this as a possible therapeutic mechanism of change that may promote adaptive eating behaviors such as IE within these populations.
Limitations

The findings from this study should be interpreted with some limitations in mind. First, the data utilized for analyses were cross-sectional, meaning longitudinal conclusions regarding the temporal nature of the observed mediation effects cannot be made. Future research should therefore seek to examine the proposed model in a longitudinal manner. Second, all individuals in our study were admitting to a residential level of care. Thus, replication of these findings is needed in clinical samples receiving lower level of care (e.g., day treatment programs; outpatient services) and non-treatment seeking samples to determine the generalizability of our results. Third, the relative homogeneity of our sample with regard to gender, ethnicity, and diagnoses limits the generalizability of our findings. While our sample is relatively consistent with the diagnostic composition commonly observed among residential ED samples, the low level of Bulimia Nervosa, Binge Eating Disorder, and Avoidant and Restrictive Food Intake Disorder diagnoses prevents us from drawing conclusions generalizable to these populations. Similarly, the majority of our clients identified as white females and resided in the United States, which limits the generalizability of our findings to male ED clients or individuals with EDs from non-white or non-westernized cultures.

Conclusion

In conclusion, our findings suggest that the unconditional permission to eat and reliance on hunger and satiety cues domains of IE are particularly influential in the relationship between body image-related cognitive fusion and ED symptom severity. Specifically, our study provides initial support for the theory that increases in body
image-related fusion are related to decreased levels of unconditional permission to eat and reliance on hunger and satiety cues, and that this relationship, in part, predicts elevated ED symptoms. Based on these findings, future research examining these mediational effects longitudinally to determine whether changes in body image-related fusion appear to drive changes in IE, and consequently, changes in ED symptoms is warranted. Such research would provide further support for the possible benefits of using cognitive defusion interventions with one’s body image-related thoughts to promote adaptive IE behaviors and/or reducing ED symptomology.

What is Already Known on this Subject?

Consistent evidence denotes an inverse relationship between IE behaviors and ED symptoms, however much of the research to date has been conducted in non-clinical samples and examines IE as a singular construct. Further, theoretical models incorporating cognitive processes such as body image-related fusion that may influence one’s engagement in various IE behaviors and/or experiences of ED symptoms have not yet been explored in an effort to better understand this relationship.

What this Study Adds?

This study highlights that each of the unique IE domains appears to be differentially related to ED symptom severity and suggests that unconditional permission to eat and reliance on hunger and satiety cues may be particularly relevant in predicting ED symptom severity. Further, these findings provide initial support for the theoretical notion that elevated levels of body image-related fusion predict decreases in these IE
behaviors, and this effect, in turn predicts elevated ED symptom severity. These preliminary findings highlight the need for future longitudinal examination of this process and suggest body image-related cognitive fusion may be important to address in therapeutic interventions for EDs seeking to promote IE behaviors.

References


CHAPTER 4
STUDY 3: THE ROLE OF BODY-IMAGE RELATED COGNITIVE FUSION IN PREDICTING RESIDENTIAL EATING DISORDER TREATMENT OUTCOMES

Abstract

This study examined whether body image related cognitive fusion changed over the course of residential eating disorder treatment and whether observed changes were predictive of targeted treatment outcomes. Self-report questionnaires including an assessment of eating disorder symptom severity, body image related cognitive fusion, intuitive eating behaviors, and eating disorder related quality of life were completed by 137 females at the time of their admission and discharge from a residential eating disorder treatment facility. Results indicated that levels of body image related cognitive fusion decreased significantly from pre- to post-treatment. Greater improvements in body image related fusion were predictive of lower eating disorder symptom severity, higher engagement in intuitive eating behavior, and lower impact of one’s eating disorder on quality of life at discharge even after accounting for variation explained by age, BMI, and mood or anxiety related symptoms. These results suggest that body image related

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The third study examined whether body image related cognitive fusion significantly improves over the course of residential eating disorder treatment, and whether greater improvements in this construct are predictive of better treatment outcomes (i.e., eating disorder symptoms, intuitive eating behaviors). A completed draft of this manuscript is presented below and will be submitted for peer-review to the journal Eating Disorders: The Journal of Treatment and Prevention upon completion of this dissertation project.
cognitive fusion may be an important cognitive process to directly target when working with eating disorders and highlights important considerations for future research and treatment development in this area.

**Introduction**

Transdiagnostic conceptualizations of psychopathology and interventions have received increased empirical support. Transdiagnostic approaches to understanding and treating psychopathology are based on the notion that core psychological processes exist and contribute to human suffering, cutting across traditional diagnostic categorizations (Dalgleish et al., 2020). Proponents of transdiagnostic theories argue that identification of these processes and how they function across presentations of psychopathology can inform the development of targeted intervention strategies and facilitate more efficient treatment methods for a range of psychological problems. To date, several transdiagnostic approaches to classification, core biopsychosocial processes, and clinical intervention strategies have been proposed on the basis of this notion (for a comprehensive review see Dalgleish et al., 2020).

Eating disorders are a form of psychopathology that professionals have argued may benefit from a transdiagnostic approach (Cooper & Dalle Grave, 2017). Currently, the *Diagnostic and Statistical Manual, 5th Edition* (DSM-5; American Psychiatric Association, 2013) presents categorized diagnostic criteria for various eating disorders on the basis that each is distinct based. However, research suggests that all eating disorders, regardless of symptom-based classification, appear to share core underlying maintenance
processes such as the overvaluation of weight and shape, low self-esteem, and mood intolerance (Lampard et al., 2013). Further, it is common for individuals to shift between meeting diagnostic criterion over the course of their illness, suggesting that underlying core processes, rather than specific symptom categorization, may better explain such psychopathology (Cooper & Dalle Grave, 2017). Based on this assumption, the cognitive behavioral approach to understanding bulimia nervosa was extended during the past 20 years to encompass core maintaining processes that appear to underlie eating disorders broadly (Cooper & Fairburn, 2011; Fairburn et al., 2003). Based on the resulting transdiagnostic maintenance model, the current “gold standard” treatment for eating disorders—Enhanced Cognitive Behavioral Therapy (CBT-E; Cooper & Fairburn, 2011)—was developed to specifically target these processes.

Although results from empirical trials using CBT-E with transdiagnostic and disorder-specific samples have been promising, not all who receive this treatment experience improvements and many patients still experience clinically significant levels of disordered eating at post-treatment (Atwood & Friedman, 2020). Additional research is needed to identify mediators and moderators of treatment outcome to identify for whom current intervention methods appear particularly effective and why, and in what ways individuals who do not receive such benefits may differ. Moreover, research exploring the possibility of additional core biopsychosocial processes underlying eating disorders is needed. Identification of such processes could further inform transdiagnostic theories of eating disorders and inform the development of targeted intervention methods that may benefit a broader range of individuals.
Cognitive fusion (i.e. the excessive entanglement with the content of one’s thoughts such that they are regarded as complete truths and rigidly used to dictate behavior, even when doing so is unhelpful; Luoma et al., 2007) is one additional cognitive process that may contribute to eating disorder pathology. Cognitive fusion is argued to contribute to psychological inflexibility, a transdiagnostic process theorized to perpetuate human suffering and contribute to psychopathology broadly (Gillanders et al., 2014). Theoretically, individuals with eating disorders may experience high levels of cognitive fusion with their thoughts related to food and body image due to the foundational importance each appear to have in their perceived self-worth (Ferreira et al., 2014). For example, an individual with an eating disorder may experience the thought “I need to lose weight in order for people to like me.” This individual may fully “buy into” this thought as their complete reality and experience significant distress in response. As they become increasingly fused with this thought they may begin to engage in rigid, disordered eating or exercise behaviors in an effort to achieve weight loss and alleviate their distress despite negative consequences these behaviors may have in various aspects of their life.

Research exploring the role of body image related cognitive fusion in the development and maintenance of disordered eating has recently emerged following the development of the Cognitive Fusion Questionnaire—Body Image (CFQ-BI; Ferreira et al., 2015). Higher levels of body image related cognitive fusion have consistently been found to be associated with higher levels of eating disorder psychopathology among individuals with eating disorders (Barney et al., 2021; Duarte et al., 2017) and within
community samples (Bento et al., 2017; Scardera et al., 2021; Trindade & Ferreira, 2014). CFQ-BI scores have also been found to mediate the impact of body dissatisfaction and shame on inflexible eating behaviors among female college students (Trindade & Ferreira, 2015) and to mediate the impact of external shame on binge eating severity among individuals diagnosed with binge eating disorder (Duarte et al., 2017). A recent study examining the role of intuitive eating within the relationship between body image related cognitive fusion and eating disorder symptom severity also found that the unconditional permission to eat and reliance on hunger and satiety cues components of intuitive eating mediated this relationship cross-sectionally (Barney et al., 2022). These findings suggest that high levels of body image related cognitive fusion may lead individuals to rely on their thoughts about their body and food rather than their body’s intuitive cues of hunger and fullness to dictate their eating behaviors, which contributes to an elevated pattern of disordered eating symptoms.

Although these findings provide initial support for the notion that higher levels of body-image related cognitive fusion are associated with elevated eating disorder symptomology, additional research is needed to ascertain whether body image related cognitive fusion may be a core transdiagnostic process of eating disorder psychopathology. Most notably, no research currently exists examining if/how body image related cognitive fusion changes over time and if such changes are associated with changes in levels of disordered eating pathology and related psychological factors over time. Such information would provide guidance on whether body image related cognitive fusion can decrease over time and suggest whether targeting this process specifically may
be beneficial in future clinical interventions for eating disorders. These findings can not only inform future transdiagnostic models of eating disorder psychopathology but may provide initial support for the development and implementation of intervention strategies specifically designed to target body image related cognitive fusion.

To begin answering these questions, this study examined whether levels of body image related cognitive fusion change significantly between pre- and post-treatment within a transdiagnostic sample of females receiving residential treatment for an eating disorder and whether observed changes are associated with changes in targeted treatment outcomes (i.e., symptom severity; intuitive eating; quality of life). We hypothesized that levels of body image related cognitive fusion would decrease significantly from pre- to post-treatment, and that these decreases would be significantly associated with decreases in symptom severity and increases in intuitive eating behaviors, and eating disorder specific quality of life. We then examined whether changes in body image related cognitive fusion were predictive of better treatment outcomes after controlling for pre-treatment scores in the observed outcome as well as age and changes in BMI, depression, and anxiety. We hypothesized that changes in body image related fusion would be a significant predictor of greater improvement on all treatment outcomes after controlling for these factors.

Methods

Participants and Setting

All data were collected at a for-profit residential treatment facility located in the
western United States. The treatment facility provides specialized, 24-hour residential treatment for adolescent and adult females struggling with eating disorders. Interdisciplinary treatment is provided to address medical, psychological, interpersonal, and dietary complications associated with individuals’ eating disorder symptoms. Therapeutic intervention includes individual, family, and group sessions using a transtheoretical approach primarily informed by Psychodynamic theory, Dialectical Behavioral Therapy, Acceptance and Commitment Therapy, and Interpersonal Neurobiology.

The sample for the current study was recruited from adolescent and adult females who consecutively admitted to the same residential treatment facility between November 2015 and June 2020. Individuals who did not provide data at both intake and discharge were excluded from the current study. A total of 175 individuals (n = 100 adults, n = 75 adolescents) completed the intake assessment battery; however, 24 adults and 14 adolescents did not complete the discharge assessments but reasons for the loss of these participants are unknown. Therefore, the final sample for the current study consisted of 137 females (n = 61 adolescents, n = 76 adults). Following a clinical interview during the admission process, all participants were diagnosed by their primary therapist with an eating disorder based on their reported symptomology as defined by the Diagnostic and Statistical Manual—Fifth Edition (DSM-5). Sample demographics can be found in Table 4.1.

**Procedures**

All parts of the study were approved by a university institutional review board.
Table 4.1

Participant Demographics and Clinical Characteristics

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Mean</th>
<th>SD</th>
<th>n</th>
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</thead>
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<tr>
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</table>

AN-Restrictive = Anorexia Nervosa-Restrictive; AN-Binge/Purge = Anorexia Nervosa-Binge/Purge; ARFID = Avoidant/Restrictive Food Intake Disorder; OSFED = Other Specified Feeding/Eating Disorder; BED = Binge Eating Disorder.

Informed consent was obtained from all participants (and their caregiver when the participant was under 18 years old) at the time of admission to the residential treatment center. As a part of the informed consent process, all participants were informed that participation in the study was voluntary and that the clinical treatment they received would in no way be impacted by their choice of whether or not to participate. All individuals who provided informed consent completed an online self-report assessment battery which included demographic information, measures of eating disorder symptom severity, assessment of comorbid psychiatric symptoms, and measures of targeted treatment outcomes, within the first 3 days following their admission. The same assessment battery was then delivered within three days of the participants scheduled
discharge to obtain post-treatment scores.

**Measures**

*Eating Disorder Examination Questionnaire*

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 2008) was utilized to assess eating disorder symptom severity. It is comprised of 28 self-report items answered on a 7-point Likert scale (0 = *No days*; 6 = *Everyday*) indicating how often the respondent engaged in a disordered eating behavior or experienced an eating disorder related cognition during the last 28 days. The EDE-Q produces a global score of eating pathology, as well as four subscales of individual symptom clusters: restraint, eating concern, weight concern, and shape concern. Due to researcher error, item 8 (“In the past 28 days how has thinking about shape or weight made it very difficult to concentrate on things you are interested in?”) and item 25 (“In the past 28 days how dissatisfied have you been with your weight?”) were unintentionally omitted in both the pre- and post-assessment batteries used for the current study. However, missing data on the EDE-Q is notoriously common (Kelly et al., 2017) and guidelines for handling missing data points indicate that valid totals can still be computed for the EDE-Q if a majority of the items are completed (Fairburn & Beglin, 2008). In the current study, Cronbach’s alpha for the EDE-Q was .92.

*Cognitive Fusion Questionnaire-Body Image*

The Cognitive Fusion Questionnaire-Body Image (CFQ-BI; Ferreira et al., 2015) consists of 10-items rated on a 7-point Likert scale (1 = *Never True*; 7 = *Always True*)
assessing the frequency with which one experiences fusion with their body-image related thoughts. The CFQ-BI has been previously validated in both clinical (Barney et al., 2021) and nonclinical samples (Ferreira et al., 2015) and has been found to have good incremental validity relative to general measures of cognitive fusion. The CFQ-BI has also demonstrated excellent internal consistency in previous validation studies (Cronbach’s alpha = .96), as well as in the current study (Cronbach’s alpha = .97).

**Intuitive Eating Scale-2**

The Intuitive Eating Scale-2 (IES-2; Tylka & Kroon Van Diest, 2013) consists of 23 self-report items with responses rated on a 5-point Likert scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*) measuring an individuals’ tendency to attend to their physical hunger and satiety cues and utilize these cues to determine when, what, and how much to eat. Higher scores on the IES-2 indicate higher levels of engagement in intuitive eating behaviors. The IES-2 produces a total score, as well as scores on four individual subscales representing different theoretical aspects of intuitive eating: unconditional permission to eat, reliance on hunger and satiety cues, eating for physical rather than emotional reasons, and body-food choice congruence. Internal consistency for the IES-2 in the current sample was excellent (α = .92).

**Eating Disorder Related Quality of Life Scale**

The Eating Disorder Related Quality of Life Scale (EDQOL; Engel et al., 2006) is a measure of general functioning and quality of life specifically tailored for eating disorder populations. The EDQOL consists of 25 items grouped into four factors that
relate to areas of functioning commonly impacted by eating disorders: psychological
functioning, physical functioning, financial functioning, and work/career functioning.
Only total EDQOL scores were used in the current study.

**Beck Depression Inventory, 2nd Edition**

The Beck Depression Inventory, 2nd edition (BDI-II; Beck et al., 1996) is 21 items related to various affective, cognitive, and physical symptoms frequently associated with depression. Items are rated from 0-3 with regard to severity, a total score (0-63) is calculated by summing item scores such that higher scores indicate greater levels of depression. The psychometric properties of the BDI-II are well established (Wang & Gorenstein, 2013), including use with clinical eating disorder samples (Udo et al., 2015). Internal consistency in the current sample was excellent ($\alpha = .91$).

**Beck Anxiety Inventory**

The Beck Anxiety Inventory (BAI; Beck et al., 1988) is composed of 21 items rated on a 4-point Likert scale ($0 = \text{not at all}$ to $3 = \text{severely}$) with regard to how distressing symptoms commonly associated with anxiety have been for the respondent during the past month. The psychometric properties of the BAI are well established (Beck et al., 1988; Fydrich et al., 1992) and the BAI demonstrated excellent internal consistency in the current sample ($\alpha = .91$).

**Statistical Analysis**

All analyses were conducted using RStudio (RStudio Team, 2020) based on R statistical software version 4.0.3 (R Development Core Team, 2021). Missing data was
addressed using multiple imputation at the item level with the “mice” package (van Buuren et al., 2015), and all other analyses were conducted using the “mice,” “miceadds” (Robitzsch et al., 2017), “MKmisc” (Kohl & Kohl, 2021), “performance” (Lüdecke et al., 2021), and “psych” (Revelle, 2018) packages.

Descriptive statistics (Table 4.1) were calculated for all measures at each time point. A paired-samples t test including effect size was then used to evaluate the significance of within-group changes in body image related fusion over the course of treatment. Change scores were then calculated on all variables (discharge—intake) and Pearson’s correlations were used to examine the associations between changes in body image related fusion and all treatment outcomes (i.e., eating disorder symptom severity, intuitive eating, eating disorder related quality of life). Individual multiple linear regression models were then built for each treatment outcome to determine if changes in body image related cognitive fusion were significantly predictive of better outcomes after controlling for the pretest of the corresponding outcome and changes in depression, anxiety, and body mass index. Assumptions of the linear regression models were assessed and any problematic violations were corrected for.

**Results**

**Descriptive Statistics and Correlations**

Participants’ body image related cognitive fusion (CFQ-BI) scores were compared before and after receiving residential treatment for their eating disorder. Consistent with our prediction, participants reported higher levels of body image related cognitive fusion at intake ($M = 54.12, SD = 14.2$) than at discharge ($M = 35.29, SD =$
15.79). Results of the paired-samples t-test indicated that this improvement in body image related cognitive fusion scores was statistically significant, $t(123.47) = 12.92, p < .001$, with a large effect size ($d = 1.13$).

Individual change scores for body image related cognitive fusion and each of the outcome variables of interest; eating disorder symptom severity (EDE-Q); intuitive eating behaviors (IES-2) and eating disorder related quality of life (EDQOL) were calculated. Means and standard deviations of change scores for each measure, as well as Pearson’s correlations can be found in Table 4.2. As hypothesized, improvements in body image related cognitive fusion were significantly associated with improvements in eating disorder symptoms, improvements in total intuitive eating behaviors, and improvements in reported impact of one’s disordered eating behaviors on their overall quality of life. Improvements in body image related fusion were also significantly associated with improvements on all intuitive eating subscale scores (represented by increases in subscale scores) except for the Body Food Choice Congruence subscale.

**Multiple Regressions**

Multiple linear regression models were built to determine whether changes in body image related cognitive fusion were predictive of better treatment outcomes. All models controlled for age, BMI at intake, change in BMI from intake to discharge, depression and anxiety scores at intake, changes in depression and anxiety scores from intake to discharge, and body image related cognitive fusion scores at intake.

The first multiple linear regression model examined eating disorder symptom
<table>
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<th>Variable</th>
<th>$M$</th>
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<th>3</th>
<th>3a</th>
<th>3b</th>
<th>3c</th>
<th>3d</th>
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<td>2. EDE_Change</td>
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<td>3. IESTotal_Change</td>
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<td>3a. IESupe_Change</td>
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<td>3c. IESPne_Change</td>
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<td>3d. IESbfc_Change</td>
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<td>0.20*</td>
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<tr>
<td>4. EDQOL_Change</td>
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<td>0.65***</td>
<td>-0.51***</td>
<td>-0.47***</td>
<td>-0.44***</td>
<td>-0.31***</td>
<td>-0.11</td>
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</tr>
</tbody>
</table>

CFQ = Cognitive Fusion Questionnaire-Body Image  
EDE = Eating Disorder Examination Questionnaire  
IEStotal = Intuitive Eating Scale-2 Total Score  
IESupe= Intuitive Eating Scale-2 Unconditional Permission to Eat subscale score  
IEScues= Intuitive Eating Scale-2 Reliance on Hunger/Satiety Cues subscale score  
IESpne = Intuitive Eating Scale-2 Eating for Physical not Emotional Reasons subscale score  
IESbfc = Intuitive Eating Scale-2 Body-Food Choice Congruence subscale score  
EDQOL = Eating Disorder Quality of Life Scale

* $p < .05$  
** $p < .01$  
*** $p < .001$
severity scores at discharge as the dependent variable. Within this model, change in body image related cognitive fusion had the largest estimated effect size ($\beta = .68 \ p < .001$) on EDE-Q scores at discharge. For every 1 standard deviation decrease in CFQ-BI change scores, there was a .68 standard deviation decrease in predicted EDE-Q discharge scores after controlling for covariates (Figure 4.1). In other words, greater improvements (i.e., decreases) in body image related fusion were predictive of lower eating disorder symptom severity at discharge. Age ($\beta = .29, \ p < .001$), EDE-Q scores at intake ($\beta = .28, \ p = .001$), CFQ-BI scores at intake ($\beta = .48, \ p < .001$), BDI scores at intake ($\beta = .29, \ p = .002$) and change in BDI scores from intake to discharge ($\beta = .49, \ p < .001$) were also statistically significant predictors within the model. Linear hypothesis tests were used to test for statistically significant differences between the estimated effect size of CFQ-BI change scores and all other predictors included in the model. The estimated effect of CFQ-BI change scores within the model was found to be significantly greater than the estimated effects of all other variables ($p$’s between .004 and .03) except BDI scores at intake ($F = 6.77, \ p = .06$) and change in BDI scores from intake to discharge ($F = 1.43, \ p = .30$). Results of the complete model can be found in Table 4.3.

A second multiple linear regression model was built examining total intuitive eating scores at discharge as the dependent variable. Within this model, change in body image related cognitive fusion ($\beta = -.20, \ p = .02$) was a significant predictor of intuitive eating behaviors at discharge after accounting for all control variables (Figure 4.2).

---

5 The assumption of linearity was not fully met, however was corrected using a log transformation of EDE-Q discharge scores. The resulting conclusions were identical for both; therefore, the non-transformed results are presented here.
Specifically, for every 1 standard deviation decrease in CFQ-BI change scores there was a .20 standard deviation increase in intuitive eating behaviors. In other words, greater improvements in body image related cognitive fusion from intake to discharge were predictive of higher reported intuitive eating behaviors at discharge. Age ($\beta = -.12$, $p = .02$), IES total scores at intake ($\beta = .12$, $p = .05$), and change in BDI scores from intake to discharge ($\beta = -.25$, $p = .01$) were also statistically significant predictors within the model. Linear Hypothesis tests were used to test for statistically significant differences between the estimated effect size of CFQ-BI change scores and all other predictors.
Table 4.3
Multiple Regression Analysis Predicting Eating Disorder Symptom Severity at Discharge

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>Beta</th>
<th>Adjusted $R^2$</th>
</tr>
</thead>
<tbody>
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<td>Age</td>
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<td>.01</td>
<td>.29***</td>
<td>.82</td>
</tr>
<tr>
<td>EDE_Intake</td>
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<td>.05</td>
<td>.28**</td>
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<td>BMI_Intake</td>
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<td>.02</td>
<td>.08</td>
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<td>BMI_Change</td>
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<td>.08</td>
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</tr>
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<td>BDI_Intake</td>
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<td>.30**</td>
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<td>BDI_Change</td>
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<td>.01</td>
<td>.49***</td>
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<td>.05</td>
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<td>.48***</td>
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<td>CFQ_Change</td>
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</tbody>
</table>

** $p < .01$
*** $p < .001$

included in the model. The estimated effect of CFQ-BI change was only found to be significantly different from the estimated effect of IES total scores at intake ($F = 12.81, p = .02$). Results of the complete model can be found in Table 4.4.

Additional multiple linear regression models were examined using each of the IES subscales as the dependent variable based on previous findings that body image related cognitive fusion may be differentially related to each domain (Barney et al., 2022). As hypothesized, changes in body image related cognitive fusion was a significant predictor of unconditional permission to eat ($\beta = -.29, p = .001$) and reliance on hunger and satiety cues ($\beta = -.33, p = .02$) scores at discharge, but not eating for physical not emotional reasons ($\beta = -.11, p = .25$) or body food choice congruence ($\beta = .07, p = .53$) scores at discharge. Results of the complete models for each IES subscale can be found in Table 4.4.
A final multiple linear regression model was built with eating disorder related quality of life scores at discharge as the dependent variable (Figure 4.3). Change in body image related cognitive fusion ($\beta = .25, p < .001$) had the largest estimated effect on eating disorder related quality of life at discharge. For every 1 standard deviation decrease in CFQ-BI change scores, there was a .25 standard deviation decrease in EDQOL scores at discharge. In other words, decreases in body image related cognitive fusion from intake to discharge were significantly predictive of lower reported impact of an individual’s eating disorder on their quality of life at discharge. Age ($\beta = .09, p = .03$),
Table 4.4

Multiple Regression Analysis Predicting Intuitive Eating Scores at Discharge

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<table>
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<th>SE</th>
<th>Beta</th>
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* $p < .05$
** $p < .01$
*** $p < .001$

### Figure 4.3

*Plotted Multiple Linear Regression of EDE Discharge Scores Predicted Based on Change in CFQ-BI Scores After Controlling for Covariates*
BDI scores at intake ($\beta = .15$, $p = .04$), change in BDI scores from intake to discharge ($\beta = .16$, $p = .04$), change in BAI scores from intake to discharge ($\beta = .17$, $p = .01$), and CFQ-BI scores at intake ($\beta = .13$, $p = .04$) were also statistically significant predictors within the model. Linear Hypothesis tests were used to test for statistically significant differences between the estimated effect size of CFQ-BI change scores and all other predictors included in the model. The estimated effect of CFQ-BI change was only found to be significantly different from the estimated effect of BMI at intake ($F = 10.25$, $p = .03$). Results of the complete model can be found in Table 4.5.

### Table 4.5

*Multiple Regression Analysis Predicting Eating Disorder Related Quality of Life Scores at Discharge*

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* $p < .05$
** $p < .01$
*** $p < .001$

**Discussion**

The current study examined the relationship between changes in body image related cognitive fusion and targeted treatment outcomes (i.e., eating disorder symptom
severity, intuitive eating behaviors, and eating disorder related quality of life) among 
adolescent and adult females over the course of residential eating disorder treatment. As 
predicted, self-reported levels of body image related cognitive fusion decreased 
significantly from intake to discharge, with a large effect, and this decrease was 
associated with greater improvements in all treatment outcomes. Further, the results of 
hierarchical linear regression models revealed that greater improvements in body image 
related cognitive fusion significantly predicted lower eating disorder symptom severity, 
higher engagement in intuitive eating behavior, and lower impact of one’s eating disorder 
on quality of life at discharge. Importantly, changes in body image related cognitive 
fusion uniquely predicted a statistically significant amount of the variation in all 
treatment outcomes even after accounting for variation explained by age, changes in 
BMI, changes in depression and anxiety symptoms, pre-treatment BMI, depression, and 
anxiety levels.

To our knowledge, this is the first study to examine changes in body image 
related cognitive fusion over the course of a clinical intervention for an eating disorder. 
Our findings provide preliminary support that body image related cognitive fusion may 
represent an important transdiagnostic process of change in eating disorder treatment. 
Specifically, our findings suggest that improvements in body image related cognitive 
fusion predict lower levels of eating disorder symptomology, higher levels of overall 
intuitive eating behavior, and decreased impacts of one’s eating disorder on quality of life 
following residential treatment for adolescent and adult females with heterogeneous 
eating disorder diagnoses. Moreover, changes in body image related cognitive fusion had
the strongest estimated effect in predicting all observed treatment outcomes except total intuitive eating scores. However, at the subscale level, change in body image related fusion was found to have the largest estimated effect in predicting discharge unconditional permission to eat and reliance on hunger and satiety cue scores. This is consistent with previous research suggesting that these two intuitive eating domains may be particularly influential in predicting ED symptom severity (Barney et al., 2022; Koller et al., 2020). Such findings support the theory that directly targeting body image related cognitive fusion in future treatments for eating disorders may be beneficial, and clinicians working with these individuals should consider the incorporation of intervention methods specifically designed to target this process in treatment.

Importantly, the intervention participants received was transtheoretical in nature and, although one of the many theories used to inform therapeutic methods (i.e. Acceptance and Commitment Therapy) identifies decreases in cognitive fusion as a direct target, it is unknown whether body image related cognitive fusion was intentionally targeted during treatment and if so, through what methods and how frequently. Future eating disorder intervention research exploring the use of treatment methods specifically designed to target body image related cognitive fusion is therefore needed to further clarify its importance and utility as a therapeutic process. Further, research examining whether different “doses,” frequency, or use of these interventions at specific points over the course of treatment would provide information for improving the efficiency and efficacy of such treatment.

Secondary to changes in body image related cognitive fusion, changes in
depression symptom severity and age were the only other predictors that emerged consistently as statistically significant predictors of treatment outcome. Specifically, greater decreases in depression symptom severity from intake to discharge and younger age were each significant predictors of lower eating disorder symptom severity, greater total intuitive eating scores, and lower impact of one’s eating disorder on quality of life at discharge. Previous studies have found that higher baseline levels of depression are predictive of better treatment outcomes across varying clinical eating disorder samples (Castellini et al., 2012; Fewell et al., 2017; Vall & Wade, 2015) and have hypothesized that targeting depression symptoms directly in eating disorder treatment may be beneficial. Our findings further support this hypothesis, and future research exploring the efficacy of specific treatment mechanisms implemented during treatment to target these symptoms when working with eating disorder clients is warranted. Similarly, our finding that lower age consistently predicted better treatment outcomes is consistent with previous findings that earlier age at eating disorder onset and/or shorter duration of one’s eating disorder symptoms predict better treatment outcomes (Linardon et al., 2017; Vall & Wade, 2015). Such findings consistently highlight the importance of early detection and intervention for these disorders.

Interestingly, greater improvement in anxiety symptom severity was only a significant predictor of better eating disorder related quality of life and higher levels of the unconditional permission to eat domain of intuitive eating. Further, baseline anxiety severity was not a significant predictor within any of the multiple regression models examined. A small body of previous literature has previously found that lower levels of
generalized and social anxiety (Smith et al., 2018) and lower levels of worry (Fewell et al., 2017) predicted better treatment outcomes among transdiagnostic eating disorder samples being treated at a residential level of care. However, both studies only accounted for baseline levels of anxiety in their predictive models, whereas the current study accounted for both baseline anxiety and changes in anxiety from baseline to discharge, which may explain why baseline anxiety was not a significant factor in our model. Additionally, as noted by Fewell et al., worry is a distinct element of anxiety which is often primarily associated with cognitive symptoms. It may be that among individuals with eating disorders, cognitions relating to body image represent a significant portion of their worries, and that these symptoms were better assessed by the CFQ-BI, whereas the BAI which was used to assess anxiety symptoms includes more questions examining physiological symptoms of anxiety (e.g. racing heart; feeling shaky/unsteady). Future research is therefore needed to better understand the role of anxiety within treatment seeking eating disorder samples, and may specifically benefit from studies examining the differential roles of cognitive and physiological symptoms associated with anxiety. Additionally, research examining the overlap between anxiety symptomology and cognitive fusion—both generally and related to body image specifically—may be useful to help clarify comorbid/differential diagnoses, and better understand possible maintaining factors of eating disorder symptom severity that can be directly targeted in treatment.

Finally, it is worth noting that neither BMI at intake or change in BMI from intake to discharge were significant predictors of any treatment outcomes observed in the
current study. This is consistent with recent research indicating that psychosocial factors emerged as more predictive of treatment outcomes, both within transdiagnostic eating disorder samples as well as samples only including individuals with a diagnosis of anorexia nervosa (Fewell et al., 2017). Therefore, although weight gain is an important component of treatment—particularly among individuals with anorexia nervosa diagnoses (Vall & Wade, 2017), improvement in this factor alone is likely insufficient in promoting positive treatment outcomes. An emphasis on targeting important psychosomatic processes identified as predictors of better treatment outcomes is warranted.

Limitations and Future Directions

There are several limitations to the current study that need to be noted. First, all participants received treatment in the same residential facility, and no control group was included. It is therefore possible that factors other than, or in addition to, the clinical intervention received may have played a causal role in the observed outcomes. Further, due to the innately limited contextual variation within residential treatment, replication of these findings in lower levels of care (e.g., day treatment or outpatient programs) is needed to understand whether similar outcomes may be observed when individuals are regularly engaging in daily activities unrelated to treatment.

Second, the pre-post design of the current study prevents the ability to describe how or when the observed changes occur over the course of treatment. Future research is needed to assess how changes in body image related cognitive fusion appear to change over time, and when these changes occur in relation to changes in targeted treatment
outcomes. Such knowledge would inform future intervention development by denoting whether targeting body image related cognitive fusion early in treatment, later in treatment, or consistently throughout treatment in addition to other therapeutic processes may be more effective in improving treatment outcomes.

Third, the relative homogeneity among eating disorder diagnoses included in the current sample limits the generalizability and ability to fully understand body image related cognitive fusion as a transdiagnostic process within eating disorders. Although there is evidence to support the theoretical notion that cognitive fusion is a process that appears to occur, and be associated with, a broad range of mental health indexes that go beyond specific diagnostic criteria (Cookson et al., 2020; Faustino et al., 2021) it is possible that body image related cognitive fusion differentially impacts the unique behavioral or psychosocial factors differentiating individual eating disorder diagnoses. Future research examining possible differences in how body image related cognitive fusion occurs and appears to change over the course of treatment between different diagnoses is needed. Similarly, the homogeneity of our sample with regard to gender and ethnicity limits the generalizability of our findings to non-female, non-white samples.

Fourth, the current study only includes participants who provided at least partial data at both intake and discharge. Although high attrition rates are common among eating disorder samples for a variety of reasons, we are unable to know why no discharge information was gathered for some participants due to the separation between the data collection process for the current study and the clinical treatment received by all individuals within the residential facility. The current sample does, however, include
participants who discharged for reasons other than treatment completion (e.g., loss of insurance coverage; transitioning to another level of care; need to return to life responsibilities such as work or childcare). Unfortunately, no data were collected to denote what percentage of the current sample were not considered “treatment completers.”

**Conclusion**

Overall, the current study supports the theoretical notion that body image related cognitive fusion may be an important transdiagnostic process of change within eating disorder treatment. Specifically, our study expands upon previous research denoting the cross-sectional association between body image related cognitive fusion and eating disorder symptom severity demonstrating that body image related fusion does appear to improve over the course of treatment and that these changes are predictive of better treatment outcomes broadly among individuals with eating disorders. These findings suggest that developing and implementing treatment strategies to directly target body image related fusion when working with individuals with eating disorders may be useful, and that future research exploring the efficacy of such interventions and the timeline of these changes in relation to targeted treatment outcomes is needed.

**References**


CHAPTER 5
GENERAL DISCUSSION

Although research examining body image related cognitive fusion as a core maintenance mechanism of disordered eating pathology has garnered increased attention within the past decade (e.g., Scardera et al., 2020; Trindade & Ferreira, 2014), studies examining the construct within clinical samples have been largely nonexistent. This dissertation aimed to explore body image related cognitive fusion as a possible underlying process of change of eating disorders and begin to examine its utility as a core process to target. This section includes a general discussion of the major findings and discusses implications for future research and clinical intervention.

Major Findings

Preliminary research examining the relationship between body image related cognitive fusion and disordered eating symptoms has largely supported the theory that higher levels of body image related fusion are associated with, and predictive of, higher disordered eating symptoms (Duarte et al., 2017; Ferreira et al., 2014; Scardera et al., 2021). However, prior to this dissertation, all but one study (Duarte et al., 2017) examining levels of body image related cognitive fusion in relation to disordered eating pathology did not include participants diagnosed with an eating disorder. Further, the Cognitive Fusion Questionnaire–Body Image (CFQ-BI; Ferreira et al., 2015), which is the only measure to our knowledge that specifically assesses body image related cognitive fusion had not been psychometrically validated for use with a clinically
diagnosed sample of individuals with eating disorders.

As such, the first study of this dissertation examined the psychometric properties of the CFQ-BI within a sample of treatment-seeking adolescent and adult females with an eating disorder diagnosed by a treatment team of licensed mental health clinicians, registered dietitians, and medical professionals. The original single-factor structure of the CFQ-BI demonstrated adequate fit, however a modified model including an additional specification allowing the error terms of item 6 and item 7—the only two items directly asking about behavioral changes one makes in response to distressing body image thoughts - to covary, resulted in a better model fit. Multi-group analyses within this study also indicated that adolescents and individuals who primarily engage in restrictive disordered eating behaviors reported significantly lower CFQ-BI scores (i.e., lower levels of body image related cognitive fusion) relative to adults and individuals primarily engaging in binge and/or purge behaviors respectively.

The second study replicated previous findings from non-clinical samples that higher levels of body image related cognitive fusion significantly predicted higher levels of global eating pathology within the clinical sample. While Duarte et al. (2017) examined this relationship previously within treatment-seeking clinical sample, all individuals within their study were diagnosed with Binge Eating Disorder. This dissertation expanded on this work by including a clinical sample with a broader array of eating disorder diagnoses and behavioral symptom profiles (i.e., restrictive, binge eating behaviors and/or purging behaviors).

In addition to replicating previous findings within a clinical sample, this study
also examined the relationships between body image related cognitive fusion, disordered eating severity, and intuitive eating. Intuitive eating, an adaptive approach to eating that is inversely related to disordered eating symptoms (Linardon et al., 2021), appears to be a protective factor against the onset of core eating disorder symptomology and is associated with positive eating disorder treatment outcomes (Richards et al., 2017). In our study, levels of intuitive eating at intake were significantly negatively associated with levels of body image related fusion and eating disorder symptom severity. The effect of body image related cognitive fusion on eating disorder symptom severity was partially mediated by intuitive eating. Further, while all four intuitive eating domains (i.e., unconditional permission to eat, reliance on hunger and satiety cues, eating for physical but not emotional reasons, and body-food choice congruence), only the unconditional permission to eat and reliance on hunger and satiety cues domains appeared to contribute to the mediational effect of intuitive eating on the relationship between body image related cognitive fusion and disordered eating severity.

The third study in the dissertation elaborated on the cross-sectional analyses in study two by exploring the relationship between these three variables longitudinally. Specifically, we examined how body image related cognitive fusion, eating disorder symptom severity, and levels of intuitive eating changed between admission to and discharge from residential eating disorder treatment. Significant improvements in body image related cognitive fusion were observed from pre- to post-treatment, and these improvements were found to significantly predict lower levels of eating disorder symptom severity and higher self-reported engagement in intuitive eating behaviors at
discharge. Improvements in body image related cognitive fusion were predictive of better outcomes even after improvements in depression and anxiety symptoms and effects of pre-treatment age and BMI were considered.

**Clinical Implications**

The findings from this dissertation have useful clinical implications. Higher levels of body image related cognitive fusion appear to predict greater eating disorder psychopathology and our findings present preliminary evidence that greater improvements in body image related cognitive fusion are predictive of better treatment outcomes (i.e., lower eating disorder symptom severity and higher engagement in intuitive eating behaviors). Clinicians may consider using the CFQ-BI to assess levels of body image related fusion when beginning to work with individuals struggling with eating disorders to inform case conceptualization and possible avenues for intervention. Specifically, if clients’ scores indicate high levels of body image related fusion, clinicians may consider using interventions specifically targeting cognitive defusion, in an effort to promote improvements in this area (Luoma & Hayes, 2009).

The mediation analyses in our second study present an initial model for understanding how body image related cognitive fusion may influence disordered eating symptoms via intuitive eating. Specifically, it may be that individuals become fused to “conditions” or “rules” around eating, as opposed to giving themselves unconditional permission to eat. When such fusion occurs, individuals use these cognitive rules, rather than using their body’s hunger and satiety cues, to inform their eating behavior.
Consistent with this theory, previous research has found that those who engage in either rigid or flexible forms of dietary control (i.e., adherence to dietary rules dictating what, when, or how much to eat) report higher levels of disordered eating symptoms than those who engage in intuitive eating practices (Linardon & Mitchell, 2017). Cognitive defusion interventions may be especially useful to help clients achieve distance from rigid rules or beliefs driving their eating behaviors. Specifically, cognitive defusion may help clients to see these thoughts as they are and recognize that do not have any inherent power over their behavioral choices. Distancing from their thoughts may then simultaneously allow space for clients to notice any bodily cues related to hunger or satiety they may be having, which may influence more adaptive eating behaviors.

**Empirical Implications**

While this dissertation provides foundational evidence that targeting body image related cognitive fusion directly in the treatment of eating disorder psychopathology may be beneficial, additional research is imperative. First, our study is the first to validate the psychometric properties of the CFQ-BI when used with a clinically significant eating disorder sample, however future research exploring body image related fusion as a construct within more diverse samples (both diagnostically and demographically) is needed. The salience of different behaviors and cognitions related to disordered eating, as well as whether or not they are experienced as distressing/pathological, varies significantly across cultural contexts (Becker, 2007; Soh et al., 2006) and among individuals with diverse gender and sexual identities (Gordon et al., 2019; Murray et al., 2019). Future research is therefore necessary to determine (1) whether body image
related cognitive fusion occurs across various sociodemographic samples and (2) if so, whether the CFQ-BI adequately and accurately measures this construct consistently across groups. Additionally, replicating the findings in studies two and three across demographically diverse samples is also needed to adequately inform future intervention development and generalizability.

Second, while the findings from this dissertation project suggest that changes in body image related fusion over the course of residential treatment are predictive of lower eating disorder symptom severity at discharge, future research is needed to better understand this relationship. Although statistically significant changes in body image related fusion were observed from pre to post treatment, limitations to our study design prevent us from drawing conclusions about how or why these changes occur. Participants in the current study received a broad array of therapeutic interventions emphasizing a multitude of theorized processes of change and targeted treatment outcomes. We are unable to determine what dosage, if any, each client received of interventions specifically targeting body image related cognitive fusion. Further, without the presence of a comparison group, it cannot be determined whether interventions specifically designed to address body image related cognitive fusion are effective and/or necessary for facilitating these observed effects over the course of clinical interventions. Future studies are needed exploring the use of therapeutic strategies designed to promote cognitive defusion, such as those used within Acceptance and Commitment Therapy (Luoma et al., 2007), and the direct effects they may have on body image related cognitive fusion and eating disorder symptom severity. Specifically, future research exploring potential differences in body
image related fusion and eating disorder symptoms when treatment does or does not include techniques specifically targeting cognitive defusion or utilizing these strategies at varying doses between groups may be beneficial.

Finally, the unique relationships identified between body image related fusion and intuitive eating, particularly within the context of treatment for individuals with eating disorders warrants further exploration. The studies included in this dissertation are the first to our knowledge to explore the relationship between body image related cognitive fusion and the four domains of intuitive eating as assessed by the Intuitive Eating Scale-2 (IES-2). The indirect effects of body image related fusion on eating disorder symptom severity observed in study two, present initial evidence that body image related cognitive fusion may be an important mechanism underlying whether an individual engages in intuitive eating or disordered eating behaviors. Specifically, future studies should seek to explore the relationships between body image related fusion, intuitive eating, and disordered eating symptoms longitudinally in an effort to establish temporal precedence (i.e., which factor(s) appear to drive observed effects). Such knowledge is essential, as it may highlight the importance of specific interventions that can be used to promote healthier, more adaptive eating behaviors for both individuals in treatment for an eating disorder, as well as individuals within the greater community.

Conclusion

Overall, this dissertation provides foundational evidence that body image related cognitive fusion may be an important process underlying the maintenance of clinically
significant eating disorder symptoms. It also appears that body image related cognitive fusion may be a useful process to target within the treatment of eating disorders, in an effort to decrease eating disorder symptom severity and promote more adaptive eating behaviors. Future research incorporating these findings into the development and empirical evaluation of clinical interventions for treating eating disorders is recommended.

References


Appendix A

Permissions to Reprint Study 1
Confirmatory factor analysis and measurement invariance of the Cognitive Fusion Questionnaire-Body Image in a clinical eating disorder sample

Author: Jennifer L. Barney, Tyson S. Barrett, Tera Lensegrav-Benson, Benita Quakenbush, Michael P. Twohig
Publication: Body Image
Publisher: Elsevier
Date: September 2021
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CURRICULUM VITAE

JENNIFER L. BARNEY
2810 Old Main Hill
Department of Psychology, Utah State University
Logan, UT 84322-2810
jen.barney@usu.edu

Education

Ph.D. Utah State University, Logan, UT
2023 Combined Clinical/Counseling Psychology (APA accredited)
Dissertation: Examining Body Image Related Cognitive Fusion as a Psychological Process Among Females in Residential Treatment for an Eating Disorder
Advisor: Michael P. Twohig, Ph.D
Predoctoral Clinical Internship: Park Center, Inc., Fort Wayne, IN

M.S. Drexel University, Philadelphia, PA
2015-2017 Psychology (APA accredited)
Thesis: Assessing the valuing process in acceptance and commitment therapy: A review and analysis of current measurement tools
Chair: Adrienne S. Juarascio, Ph.D.

B.A. University of Connecticut, Storrs, CT
2009-2013 Majors: Psychology; Human Development and Family Studies (Honors)
Undergraduate Honor’s Thesis: The Effects of Divorce on Parent-Child Relationship Satisfaction and Time Parents Spend with Their Children as Indicators of Parents’ Overall Mental Health
Chair: Edna Brown, Ph.D.

Research Experience

7/2018 - Present Graduate Research Assistant
Avalon Hills Eating Disorder Program, Logan UT
Supervisor: Michael P. Twohig, Ph.D.
- Maintain patient online assessment battery and research database
- Analyze and communicate results to therapists.
- Facilitate data analysis, data collection, and research design.
- Collaborate with administration and treatment teams to publish research.
Evaluation of Mobile App for Problematic Pornography Viewing

Project Coordinator
Center for Clinical Research, Utah State University
Supervisor: Michael Levin, Ph.D.
• Manage all self-report survey administration (via email) and data collection processes
• Facilitate all communication with study participants
• Manage distribution of participant compensation (extra credit points) via university’s SONA research participation portal
• Train and supervise undergraduate research assistants in monitoring online data collection and administration of daily text reminders to participants

Outside the Therapy Office: Enhancing Integrative Cognitive Affective Therapy with Ecological Momentary Interventions to Improve Treatment for Binge Eating Pathology

Project Coordinator
Laboratory for Innovations in Health-Related Behavior Change, Drexel University
Supervisor: Adrienne S. Juarascio, Ph.D.
• Managed Institutional Review Board & Grant Proposal and Review documents.
• Conducted phone-screens and in person assessment batteries including neurocognitive and behavioral measures.
• Data collection, management, and analysis.
• Collaborated in design and construction of smartphone application and online clinician portal.
• Facilitated communication and transfer of materials/documents between research personnel collaborating cites (Drexel University, University of Minnesota, Minneapolis and University of North Dakota, Fargo)
• Trained and supervised undergraduate research assistants.

A Component Analysis of Strategies to Improve Emotion Regulation

Graduate Research Assistant
Laboratory for Innovations in Health-Related Behavior Change, Drexel University
Supervisor: Adrienne S. Juarascio, Ph.D.
• Co-authored workshop treatment manuals.
• Conducted phone-screens and in-person assessment batteries including neurocognitive and behavioral measures and loss of control screen interviews.
• Co-led 3-hour skills-based workshops for emotional eating.
• Assisted in Institutional Review Board document management.
• Data management, data analysis, and drafting publications.

9/2015 - 8/2017  The INSPIRE Project: Addressing Weight History to Improve Behavioral Treatments for Bulimia Nervosa  
Graduate Research Assistant  
Laboratory for Innovations in Health-Related Behavior Change, Drexel University  
Supervisor: Adrienne S. Juarascio, Ph.D.  
• Conducted phone-screens and in-person assessment batteries including neurocognitive and behavioral measures and loss of control screen interviews.

6/2012—12/2012  Undergraduate Research Assistant  
UConn Department of Psychology, Storrs, CT  
Supervisor: Amy Gorin, Ph.D.

Clinical Experience

10/2022- Present  Support Group Facilitator  
National Alliance for Eating Disorders  
Clinical Supervisor—Joann Hendelman, Ph.D., RN, FAED, CEDS, CEDRN  
• Co-lead in person pro-recovery support groups for individuals recovering from/in recovery from an eating disorder.  
• Attend monthly group clinical supervision led by Dr. Hendelman with other clinicians and RDs trained to facilitate groups.

8/2022- Present  Pre-Doctoral Psychology Resident  
Park Center, Parkview Behavioral Health Institute  
Primary Clinical Supervisor—Laura Oyer, Ph.D.  
• Major rotation implementing evidence-based individual, group, and family therapy interventions for clients diagnosed with eating disorders (IOP and outpatient).  
• Provide outpatient individual and couple’s therapy for a range of clinical populations within a community mental health setting  
• Conduct psychological assessments for children and adults  
• Minor rotations include Parkview Adult Inpatient Psychiatric Unit; Pain Management Clinic; and Pediatric Primary Care Clinic

9/2020—7/2022  Practicum Student Therapist  
Behavioral Health Clinic—Advanced Practicum, Sorenson Center for Clinical Excellence  
Supervisor: Sara Boghosian, Ph.D.  
Total Hours to Date: 436.5; Direct Contact Hours to Date: 249  
• Adolescent and adult community population
• Specialization in treating clients with eating disorders and body image distress in an outpatient setting
• Individual therapy using Acceptance and Commitment Therapy and Dialectical Behavioral Therapy
• Collaboration with community providers for integrated treatment approach (e.g., physicians; registered dietitians)
• Integrated family members into treatment as appropriate (e.g., adolescents’ parents)
• Co-lead ACT-based Body Image Distress groups and DBT Skills Training Groups for Adolescents
• Conducted Comprehensive Neurocognitive ADHD and Behavioral Health Assessments with Children and Adolescents & Completed Integrated Reports

6/2019—6/2020
Practicum Student Therapist
Behavioral Health Clinic—Anxiety Specialty, Sorenson Center for Clinical Excellence
Supervisor: Michael P. Twohig, Ph.D.
Total Hours to Date: 214; Direct Contact Hours to Date: 114.5
• Child, adolescent, and adult community population
• Presenting problems included GAD, OCD, Trichotillomania, Depression, and emotion dysregulation
• Structured clinical interviews and individual therapy
• Cognitive and personality testing
• Acceptance and commitment therapy and exposure and response prevention

5/2019—5/2021
Practicum Student Therapist
Avalon Hills Eating Disorder Specialists, Logan UT
Supervisor: Tera Lensegrav-Benson, Ph.D.
Total Hours to Date: 523.75; Direct Contact Hours to Date: 270.75
• Adolescent & Adult populations in residential treatment setting
• Primary presenting concern was eating disorders; comorbidities included GAD, OCD, depression, self-harm, problematic substance use, and ASD.
• Group therapy (ACT, DBT, process), individual therapy (mindfulness skills training, exposures), and family co-therapy

10/2018—6/2020
Research Study Therapist
Center for Clinical Research, Utah State University
Supervisor: Michael P. Twohig, Ph.D.
Total Hours to Date: 160.5; Direct Contact Hours to Date: 103
• Telepsychotherapy treatment for adolescents with trichotillomania.
• Acceptance and Commitment Therapy, Habit Reversal Training.

9/2018—6/2019  
Practicum Student Therapist  
Psychology Community Clinic, Utah State University  
Supervisors: Susan Crowley, Ph.D. & Sara Boghosian, Ph.D.  
Total Hours: 422.75; Direct Contact Hours: 111.75

• Adult, adolescent, and child clients at university community clinic.  
• Treated clients with generalized anxiety, depression, attention-deficit hyperactivity disorder, and trauma.  
• Acceptance and commitment therapy, cognitive behavioral therapy, motivational interviewing, and behavioral parent training.

3/2014—1/2015  
Residential Counselor  
Cambridge Eating Disorder Center, Cambridge, MA

• Adult and adolescent clients in a residential setting.  
• Co-facilitated psychoeducational and skills-based group therapy sessions.  
• Collaborated with integrated treatment teams including medical doctors, psychiatrists, psychologists, and dieticians to implement individualized patient behavioral and meal plans.  
• Supervised therapeutic meals and snacks.

Direct Intervention: 816.5  
Assessment: 73.75  
Supervision: 369.5  
Support/Indirect: 511.25

Publications

Peer-Reviewed Journal Articles


**Book Chapters**


**Encyclopedia Entries**


**Submitted Manuscripts**

1. Smith, B. M., **Barney, J. L.**, Ong, C. W., Barrett, T. S., Levin, M. E., &
Twohig, M. P.
(under review). Physiological, behavioral, and self-report outcomes of acceptance and regulation approaches to exposures for intrusive thoughts.

Conference Presentations

3. **Barney, J.L.,** Barrett, T.S., Lensegrav-Benson, T., Quakenbush, B., & Twohig, M.P.
(June, 2021). *The role of body image related cognitive fusion in eating disorder in intuitive eating behaviors and symptom severity among females in residential treatment for eating disorders.* In San-Miguel, G. (Chair), *Processes of psychological flexibility in the development and maintenance of disordered eating symptoms.* Paper presented at the 19th annual Association for Contextual Behavioral Sciences World Conference, online.

2. Smith, B. M., **Barney, J. L.,** Ong, C. W., Barrett, T. S., Levin, M. E., & Twohig, M. P.

1. **Barney, J.L.** (June, 2019) *ACT Interventions for Eating- and Weight-Related Concerns.* Symposium chaired at the 17th Annual Association for Contextual Behavioral Sciences World Conference in Dublin, Ireland.

Posters


   (April, 2018). The effects of loss of control eating on overweight and obese individuals with clinically significant emotional eating. Poster presented at the 39th Annual Meeting & Scientific Sessions of the Society of Behavioral Medicine, New Orleans, LA.


**Teaching Experience and Course Design Experience**

3/2022  **Guest Lecturer**  
Department of Psychology, Utah State University  
PSY 3210: Abnormal Psychology  
Topic: “Eating Disorders”

10/2021  **Guest Lecturer**
Department of Psychology, Utah State University
PSY 3210: Abnormal Psychology
Topic: “Eating Disorders”

1/2020  
**Guest Lecturer**

Department of Psychology, Utah State University
PSY 3210: Abnormal Psychology
Topic: “Eating Disorders”

4/2019  
**Guest Lecturer**

Department of Psychology, Utah State University
PSY 4230: Psychology of Gender
Topic: “Eating Disorders: Theory, Identity, and Treatment”

2/2019  
**Guest Lecturer**

Department of Psychology, Utah State University
PSY 3210: Abnormal Psychology
Topic: “Eating Disorders”

10/2018  
**Guest Lecturer**

Department of Psychology, Utah State University
PSY 4230: Psychology of Gender
Topic: “Eating Disorders, Gender, & Sexuality”

10/2018  
**Guest Lecturer**

Department of Psychology, Utah State University
PSY 3210: Abnormal Psychology
Topic: “Eating Disorders”

10/2017  
**Guest Lecturer**

Department of Psychology, Utah State University
PSY 3210: Abnormal Psychology
Topic: “Eating Disorders”

2017-2018  
**Graduate Teaching Assistant**

Department of Psychology, Utah State University
PSY 1400: Analysis of Behavior: Basic Principles
- Graded weekly assignments and course exams.
- Held weekly office hours for class/exam help.

6/2016-6/2017  
**Advanced Course Design Assistant**

Department of Psychology, Drexel University
- Assisted all professors teaching online courses with course content design and management through Blackboard Learning System
platform.

1/2016-3/2016  **Course Design Assistant**  
Department of Psychology, Drexel University  
PSY 355: Health Psychology  
- Assisted in online course content development and management through Blackboard Learning System Platform.  
- Graded student coursework.  
- Facilitated weekly online course discussion groups.

3/2016  **Guest Lecturer & Graduate Teaching Assistant**  
Department of Psychology, Drexel University  
PSY 101: General Psychology I  
Lecture Series Topic: “Psychological Therapies”

10/2015  **Guest Lecturer**  
Department of Psychology, Drexel University  
PSY 101: General Psychology I  
Topic: “Social Psychology”

**Professional Development Trainings**

2/2022  **Body Image Summit: Helping Every Body Find Peace with Food and Weight**  
Sonya Renee Taylor (Keynote); Sand Chang, PhD; Diana Hill, PhD; Judith Matz, LCSW; Andrew Walen, LCSW, Amy Pershing, LCSW/ACSW, Nicole Garber, MD, Aaron Flores, RD; Jenni Schaefer, Author; Jessica Wilson, RD, MS; and Ann Saffi Biasetti, PhD, LCSWR, CEDS  
Two-day online event hosted by PESI, Inc.  
- Multiple seminars focused on inclusivity and anti-diet approaches when working with individuals struggling with food, weight, and body image related concerns.

7/2021  **Dialectical Behavior Therapy Skills Training for Children and Adolescents: Rescuing the Dysregulated Child**  
Jean Eich, Psy.D, LP  
5-module online training program through PESI, Inc.

10/2019  **11th Annual Eating Recovery Foundation Conference: Navigating Resistance and Emerging Treatments for Eating Disorders, Mood and Anxiety Disorders, and Trauma**  
Eating Recovery Foundation & ERC Pathlight, Denver, CO.  
- Attended various clinically-oriented trainings and keynote
addresses

4/2019  *Focused Acceptance and Commitment Therapy: The Basics and Beyond*
ACT Research Laboratory, Utah State University
Kirk Strosahl, PhD

3/2019  *Network Analysis: Implications for Eating Disorder Research*
International Conference on Eating Disorders, 2019
Ross D. Crosby, PhD, Markus Moessner, Dphil, Kathryn E. Smith, Ph.D.

2/2019  *Allies on Campus Facilitator Training*
Access and Diversity Center, Utah State University
Macy Keith, LGBTQA+ Program Coordinator

4/2018  *Allies on Campus Training Seminar*
Access and Diversity Center, Utah State University

9/2018  *Advanced ACT: Doing Experiential Work Without Exercises: 2-Day Workshop*
Center for Clinical Research, Utah State University
Matthieu Villatte, Ph.D., Jennifer Villatte, Ph.D.

9/2017  *6th Annual Acceptance and Commitment Therapy: 2-Day Workshop*
Center for Clinical Research, Utah State University
Michael P. Twohig, Ph.D., Eric Lee, M.A.

10/2016  *Process-Focused ACT: An Intermediate Acceptance and Commitment Therapy Workshop: 2-Day Clinical Training*
Association for Behavioral and Cognitive Therapies 50th Anniversary Convention
Steven C. Hayes, Ph.D.

4/2016  *Integrative Cognitive-Affective Therapy for Bulimia Nervosa: 2-Day Clinical Training*
Department of Psychiatry, University of Minnesota
Stephen Wonderlich, Ph.D.

**Editorial Activity**

2021  Ad-hoc Reviewer for *Eating Behaviors*

2020  Ad-hoc Reviewer for *Cognitive & Behavioral Practice*

2018, 2019  Ad-hoc Reviewer for *Eating Disorders: The Journal of Treatment & Prevention*

2018  Ad-hoc Reviewer for *Clinical Psychology Review*

2018  Ad-hoc Reviewer for *Behavior Therapy*

2017  Ad-hoc Reviewer for *Journal of Contextual Behavioral Science*
Ad-hoc Reviewer for *Physiology & Behavior*

**Current Professional Organization Membership**
- Academy for Eating Disorders
- American Psychological Association
- Association for Contextual and Behavioral Sciences

**Honors and Awards**

- **2021-2022** Dale and Adele Young Scholarship, *Utah State University College of Education and Human Services—Logan, UT*
- **2020-2021** Mildred Cragun Watts & Gary M. Watts Scholarship, *Utah State University College of Education and Human Services—Logan, UT*
- **2020-2021** Walter R. Borg Scholarship for Applied Practice and Research, *Utah State University Department of Psychology—Logan, UT*
- **2019-2020** Michael Bertoch Scholarship, *Utah State University Department of Psychology—Logan, UT*
- **2019** Alex DeVinny Memorial Scholarship, *Academy for Eating Disorders, International Conference on Eating Disorders—New York, NY*
- **2015-2017** Dean’s Fellowship Award, *Drexel University, Office of Graduate Admissions - Philadelphia, PA*
- **2009-2013** Elk’s Legacy Scholarship, *Elks National Foundation—Chicago, IL*
- **2009-2013** Dean’s List, *University of Connecticut—Storrs, CT*