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Yoga As An Intervention Among College Students: Measuring Changes In Body Dissatisfaction, Disordered Eating, Self-Compassion, Mindfulness, And Experiential Avoidance

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YOGA AS AN INTERVENTION AMONG COLLEGE STUDENTS: MEASURING
CHANGES IN BODY DISSATISFACTION, DISORDERED EATING, SELF-COMPASSION,
MINDFULNESS, AND EXPERIENTIAL AVOIDANCE

By

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Bachelor of Arts, Montclair State University, 2011
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A Dissertation

Submitted to the Graduate Faculty

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in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

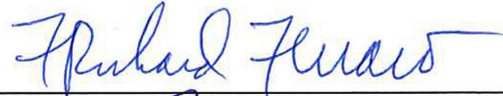Grand Forks, North Dakota

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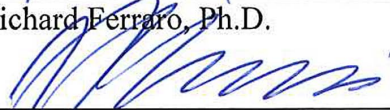
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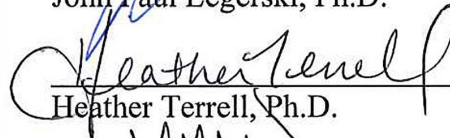
This dissertation, submitted by Rachel A. Kramer in partial fulfillment of the requirements for the Degree of Doctor of Philosophy from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

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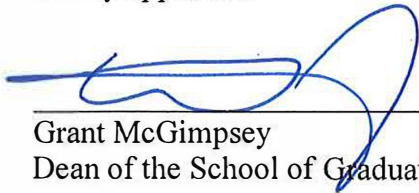
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This dissertation is being submitted by the appointed advisory committee as having met all of the requirements of the School of Graduate Studies at the University of North Dakota and hereby approved.

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PERMISSION

Title   Yoga as an Intervention Among College Students: Measuring Changes in Body Dissatisfaction, Disordered Eating, Self-Compassion, and Experiential Avoidance

Department   Psychology

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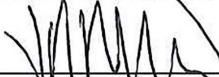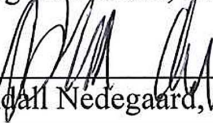In presenting this dissertation in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, I agree that the library of this University shall make it freely available for inspection. I further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised my dissertation work or, in his absence, by the Chairperson of the department or the dean of the School of Graduate Studies. It is understood that any copying or publication or other use of this dissertation or part thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of North Dakota in any scholarly use which may be made of any material in my dissertation.

Rachel A. Kramer
April 23, 2018

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ABSTRACT

The purpose of this dissertation was to elaborate and expand research examining the incorporation of yoga in the prevention and treatment of eating disorders in addition to the amelioration of body image and related factors through a two-study design. Study One recruited participants from a Midwestern psychology subject pool. One-hundred fifty women completed Study One. Results indicated that self-compassion, mindfulness, and body appreciation were negatively related to eating disorder pathology, body mass index (BMI), and experiential avoidance. BMI, eating disorder pathology, and experiential avoidance were all positively correlated with one another. Mediational analyses indicated the self-compassion was a significant mediator between overweight preoccupation and disordered eating as well as experiential avoidance and eating disorder pathology included global EDE-Q scores, appearance evaluation, and overweight preoccupation. Study Two was a repeated measures quasi-experimental design assessing changes in self-compassion, mindfulness, body appreciation, body dissatisfaction (overweight preoccupation, appearance orientation, appearance evaluation) and eating disorder pathology associated with yoga-practice over the course of eight weeks. Participants (university students) were recruited from 8-week yoga courses meeting three times a week for 50 minutes and completed measures at Time 1 (first day of class) and Time 2 (last 2 classes – 8 weeks later). While the explanatory relationship noted in Study One was not assessed, there were significant changes over time. Participants reported improvements in self-compassion, yoga self-efficacy, and body appreciation. Additionally, participants reported less appearance

orientation. Less parsimonious results were noted for body dissatisfaction and eating disorder variables. However, the results are promising and suggest that yoga may be beneficial in improving body appreciation and self-compassion which could buffer against later development of eating disorder pathology and greater body dissatisfaction.

CHAPTER I

INTRODUCTION

Yoga has become one of the most popular forms of complementary medicine offered as a treatment for many conditions including diabetes (Innes & Vincent, 2007), sleep difficulties, PTSD (Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012), and more recently eating disorder treatment and prevention (Carei, Fyfe-Johnson, Breuner, & Marshall, 2010; Field, 2011; Impett, Daubenmeir, & Hirschmann, 2006; McIver, O'Halloran, & McGartland, 2009). Yoga practice has been associated with many positive outcomes. For one, yoga is a practice that emphasizes self-compassion, self-kindness, and the integration of the body (through physical practice), and mind (through breath-work and meditation). As such, yoga is a method that helps individuals learn to become more aware of the inner workings of their body and understand bodily cues (Sengupta, 2012). Yoga also helps to promote mindfulness, as mindfulness is entrenched in the teachings and actual practice. Yoga also enhances body awareness, such as interoceptive awareness, and body responsiveness, the ability to understand bodily cues, and trust one's bodily cues respectively (Rani & Rao, 1994).

Yoga may be helpful for eating disorder treatment for many reasons. For one, eating disorder patients are noted to report higher levels of perfectionism and impulsivity (Halmi, Sunday, Strober, Kaplan, Woodside, Fichter, 2000). Patients diagnosed with eating disorders are also noted to have lower ability to recognize bodily cues and are more likely to mistake physical sensations and emotions with fullness or hunger (Fassino, Pierò, Gramaglia, & Abbate-Daga,

2004; Merwin, Zucker, Lacy, & Elliott, 2010). Individuals with eating disorders may also be more likely to report difficulty tolerating and recognizing emotions (Holliday, Uher, Landau, Collier, & Treasure, 2006). Some research also suggests that eating disorder patients are more likely to try to ignore internal processes and emotions because such cues may cause them discomfort. Yoga is a beneficial practice because it may teach a client a non-judgmental way of looking at bodily abilities and oneself in general without placing judgment or potentially react to negative thoughts or feelings impulsively. Yoga practitioners are encouraged to move until their body says to slow down and, contrary to the mindset of those with an eating disorder, listen and respect their body's desires (Sengupta, 2012). Yoga may also improve body awareness, emotion regulation, and decrease avoidance of negative experiences and emotion (Rani & Rao, 1994). Research also suggests that mindfulness-based treatments have been employed in eating disorder treatment and have yielded promising results (Juarascio, Forman, & Herbert, 2010; Juarascio et al., 2013; Kristeller, Baer, & Quillian-Wolever, 2006). However, most of these treatments do not actively present exposure to many of the physical cues and sensations that individuals with eating disorders are uncomfortable with, while yoga does.

Some research studies have evaluated the effectiveness of yoga as an adjunct treatment to eating disorder treatment (Carei, et al., 2010; Impett, Daubenmier & Hirschman, 2009; McIver et al., 2009), while others have looked at correlates between yoga practice, body image, and eating disorder pathology (Daubenmeier, 2005; Delaney & Anthis, 2010). However, there is still a dearth of research published on this topic. This dissertation will hopefully elaborate and contribute to the growing research area, especially since it is incorporated in around two-thirds of residential eating disorder treatment centers (Frisch, Herzog, and Granko, 2006).

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Body Dissatisfaction

Body dissatisfaction relates directly to a person's body image, or a person's perceptions, thoughts, and feelings about their body (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Researchers have measured body image through weight satisfaction or body shape satisfaction; others have looked at body esteem, body schema, appearance satisfaction, and appearance orientation, to name a few (Thompson et al., 1999). Therefore, body dissatisfaction relates to negative perceptions of many different features related to one's body including a concern about body weight, shape, attractiveness, etc. (Cash & Szymanski, 1995).

Body dissatisfaction has been extensively studied considering the robust research support that it is a significant risk factor in the development of eating disorders and since body dissatisfaction has been an increasingly more common phenomenon that impacts the majority of women and men. This phenomenon, labeled normative discontent, appears to be the norm rather than the exception (Rodin, Silberstein, & Striegel-Moore, 1985). Researchers have cited that 56% of females are dissatisfied with their general appearance and 89% endorse wanting to lose weight (Garner, 1997). Forty-three percent of males reported dissatisfaction with their appearance and 52% reported dissatisfaction with their weight. Cash and Henry (1995) also noted that 50% of women expressed dissatisfaction with their weight. Research has suggested that males may report lower levels of body image dissatisfaction (Cooper & Fairburn, 1983; Furnham & Calnam, 1998).

More recent research suggests that this discrepancy among genders is decreasing (Drewnowski & Yee, 1987). Men will report a greater desire to be larger and more muscular (Silberstein, Striegel-Moore, Timok, & Rodin, 1988), while women will report wanting to lose

weight (Drewnowksi & Yee, 1987). Specifically, in their research sample, 36.1% of males endorsed wanting to be heavier, and 42.8% endorsed wanting to be thinner; 8.1% of females wanted to be heavier, while 74.6% endorsed wanting to be thinner. College students also endorse high levels of body dissatisfaction and researchers have noted rates as high as 90% for body image dissatisfaction (Delene & Brogowicz, 1990) and 10% of college students have been observed to endorse pathological levels of body dissatisfaction (Klemchuck, Hutchinson, & Frank, 1990).

The general population also agrees that most men and women are not happy with their bodies. Tantleff-Dunn and colleagues (2011) asked university students about their perceptions of how American men and women feel about their body. The study suggested that a large proportion of males and females perceive that over half of Americans are dissatisfied with different features of their body. For instance, 98% of women participants and 90% of male participants believe that over half of the American female population is concerned with their physical appearance, 61% of women and 49% of men think that over half of women in the general public fear being fat, and 96% of women and 99% of men believe that over half or more than half of American women worry about their weight. While numbers are a bit lower, 82% of women and 77% of men report that they believe that half or more than half of men are worried about physical appearance, 63% and 66% of women and men respectively believe that half or over half of American males fear being fat, and 59% of women and 54% of males reported that half or more than half of American males are conscious of their weight.

Not only is body dissatisfaction fairly common, it is also associated with many adverse outcomes. For instance, body dissatisfaction has been associated with feelings of depression

(Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006). In a study of female and male adolescents, Paxton and colleagues (2006) evaluated whether body dissatisfaction could independently predict depressive symptoms over five years. After controlling for the baseline depressive mood, demographic variables such as SES and ethnicity, and BMI, Paxton and colleagues (2006) noted that body dissatisfaction uniquely and longitudinally (five years) predicted depressive symptoms for early-adolescent (M = 12.7 years) and mid-adolescent girls (M = 17.2), and only the early-adolescent boys (M = 12.8).

In another longitudinal study of adolescents, Stice and his colleagues (2000) assessed factors such as body dissatisfaction, depressive symptoms, bulimic symptoms, and dietary restraint. Upon analyzing the data, Stice and his colleagues (2000) noted that elevations uniquely predicted the onset of major depression when controlling for initial depressive symptoms. After using Cox proportional hazards regression analyses, the researchers noted that for each unit change of body dissatisfaction the likelihood of the onset in major depression increased by 31% (Stice, Hayward, Cameron, Killen, & Taylor, 2000).

Harring, Montgomery, and Hardin (2010) evaluated how inaccurate weight perception and related distress relates to unhealthy weight management strategies and depressive symptoms. Women with an average BMI according to health standards who over-reported their weight were found to be more likely to endorse depressive symptoms over the past year. The inverse relationship was observed among males such that overweight males who underreported their weight were less likely to endorse depressive symptoms. There was no relationship noted between overweight females who underreported their weight and depression and average weight males who over-reported their weight and depression.

The relationship between negative body image and depression appears to also go in the reciprocal direction, such that depressive symptoms predict body dissatisfaction and bulimic symptoms. For instance, Wierdman and Pryer (2000) conducted a study including women enrolled in a university-based eating disorder treatment program. They examined the relationship between body dissatisfaction, depression, and bulimic symptoms among women diagnosed with bulimia or anorexia nervosa and among female college students. For both groups, depression was significantly related to body dissatisfaction as well as bulimia. The results suggest that depression and bulimic symptoms among the clinical sample independently predicted body dissatisfaction. These studies suggest an inverse relationship whereby depression may predict body dissatisfaction and vice versa. Among non-clinical female students, depression was not a significant predictor of depression or bulimia, while drive for thinness was.

Body dissatisfaction has also been linked with disordered eating and is considered to be a principal etiological and defining characteristic of all three recognized eating disorders in the DSM-5, e.g., anorexia nervosa, bulimia nervosa, and binge eating disorder (American Psychiatric Association, 2013; Stice & Shaw, 2002). For instance, Jacobi and colleagues (2011) recruited college women for a three-year study to evaluate what factors may be the most predictive of subclinical to full diagnostic criteria for DSM-IV-TR eating disorder criteria. The researchers noted that a history of negative comments from a coach or teacher about eating, weight, and shape in addition to negative comments from siblings was also noted to predict sub-clinical eating disorder pathology among college-aged women. A reported history of depression was also noted to be one of the most significant predictors of sub-clinical eating disorder pathology.

In a meta-analysis, Stice and Shaw (2002) evaluated which factors were predictive of the onset of body dissatisfaction and eating disorder pathology and maintained eating disorder symptoms over time. The meta-analysis incorporated many factors and found that thin-ideal internalization and negative body image independently predicted eating disorder symptomology. Stice and Shaw (2002) noted that body dissatisfaction is influenced by the internalization of the thin ideal (thin-ideal internalization) and that higher adiposity may suggest an individual is further away from the thin ideal. The risk of development of eating disorder pathology develops from the relationship between body dissatisfaction and dieting. Research has established a strong relationship between the two. Additionally, negative body image also increases negative affect, which in turn may increase the risk of binge eating. The latter theory comes from the affect-regulation/escape model of eating disorders (Haedt-Matt & Keel, 2011).

Eating Disorders

Individuals with eating disorders such as anorexia nervosa, and bulimia nervosa experience severe physiological and psychological changes and are cited to have the highest mortality rates among psychiatric disorders (Arcelus, Mitchell, Wales, & Nielsen, 2011). Rastam and colleagues (2004) have noted that prevalence rates of bulimia nervosa (BN) are one percent for females and 0.1 percent in males (Smink, Van Hoeken, & Hoek, 2012). Prevalence rates among females for anorexia nervosa (AN) range from 0-0.9%, suggesting an average of 0.3% in young females (Smink et al., 2012). Epidemiological studies indicate a lower prevalence rate for anorexia nervosa among males and estimate that less than 1.0 per 100,000 per year meet diagnostic criteria (Currin, Schmidt, Treasure, & Jick, 2005; Lucas, Crowson, O'Fallon, & Melton, 1999; Hoek, 2006). Furthermore, another eating disorder, more recently considered in

the DSM-5, binge eating disorder (BED), has a lifetime prevalence rate of 3.5% among women and 2.0% among men (Hudson, Hiripi, Pope, & Kessler, 2007).

According to the Diagnostic and Statistical Manual-5 (American Psychiatric Association, 2013), individuals with AN restrict energy intake, often below what is required to maintain weight, have an intense fear of gaining weight or persists engaging in activities that interfere with weight gain, and has a disturbance in how they perceive their weight or shape for at least three months. The DSM-5 (APA, 2013) describes BN as a period of at least 3 months where an individual engages in recurring binge eating episodes and then behaviors following their binges to prevent weight gain called compensatory behaviors. Compensatory behaviors include using laxatives, self-induced vomiting, diuretics, and excessive exercise. According to the DSM-5, these compensatory behaviors have to occur on average once a week over these three months. Similarly to AN, BN is also marked by significant concern and fear of gaining weight, and they engage in self-evaluation related to their weight and shape (APA, 2013). Specifically, individuals with AN and BN engage in significant body checking or body avoidance behaviors as a direct result of their overevaluation of weight and shape (Shafran, Fairburn, Robinson, & Lask, 2004), are likely to engage in dietary restraint where they try to limit foods they are eating to control weight (Killen, Taylor, Hayward, Haydel, Wilson, Hammer, et al., 1996; van Strien, Frijters, Bergers, & Defares, 1986).

Binge Eating Disorder (BED), is diagnosed when individuals engage in recurrent binges characterized by eating an amount of food that is larger than most would eat in a discrete period, and a sense of lack of control over eating during the episode. Individuals who meet criteria for BED must endorse at least three associated features of the binge, including: eating more quickly

than normal, eating large amounts of food when not feeling hungry, eating alone because one is embarrassed about the amount being ingested, feeling disgusted with themselves or guilty after the binge, and/or eating until uncomfortably full. The individual must be distressed about their binging. These binge episodes should occur around once a week for at least a three-month period (APA, 2013).

Eating disorders are not only associated with eating difficulties, and distorted body image, but have also been noted to be associated with many other psychological disorders such as anxiety and depression (Godart, Flament, Perdereau, & Jeammet, 2002; Godart et al., 2007; Hudson, Hiripi, Pope, Kessler, 2007; Kaye, Bulik, Thornton, Barbarich, & Masters, 2004). For instance, in a study conducted to evaluate comorbidity and life-time prevalence of anxiety disorders among individuals with eating disorders (AN and BN), Kaye, Bulik, Thornton, Barbarich, and Masters (2004) noted that 55% of all participants meeting criteria for AN also met a diagnosis of at least one anxiety disorder throughout their lifetime, and 68% of individuals meeting criteria for BN also met criteria for an anxiety disorder at one point in their lives. The most common anxiety disorder that Kaye and colleagues noted (2004) was OCD, which occurred in almost 40% of participants with an eating disorder. The second highest diagnosis was social phobia (20%). An epidemiological study conducted by Hudson and colleagues (2007) also noted similar findings suggesting that around 47.9% of individuals with AN had a diagnosis of any anxiety disorder and about 80.6% of individuals with BN had a diagnosis of at least one anxiety disorder. Hudson and colleagues (2007) also noted that around 65.1% of individuals diagnosed with BED also met criteria for an anxiety disorder.

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Comorbidity among eating disorder diagnoses and depression is also high. Hudson et al., (2007) noted that around 42.1% of individuals with AN, 70.7% of individuals with BN, and 46.4% of individuals diagnosed with BED met criteria for a mood disorder. Another study conducted by Godart and colleagues (2007) noted that research studies have generally suggested that around 40 to 60% of individuals diagnosed with AN meet criteria for a mood disorder while there is a wider range of lifetime prevalence for mood disorders among individuals with BN, in a range as high as 50 to 90%.Comorbidity among other disorders appears to be reasonably high as well. For instance, many individuals with eating disorders also meet diagnostic criteria for substance use disorders (Hudson, Hiripi, Pope, & Kessler, 2007), borderline personality disorder, and PTSD.

Associated Features of Eating Disorders

Research has suggested there are many associated features that are likely to be trait variables associated with the development and maintenance of eating disorders. One noteworthy trait is perfectionism (Halmi et al., 2000). Halmi and colleagues (2000) evaluated whether individuals with DSM-IV subtypes endorsed higher levels of perfectionism than healthy controls. The researchers noted that both AN subtypes (restricting or binge/purge) scored significantly higher on the overall Multidimensional Perfectionism scale than controls and specifically higher on most subtests. For instance, the participants with the diagnosis of AN endorsed substantially higher concern for making mistakes, maintaining their standards, a desire to achieve their parent's expectations, feelings of doubt about their action and organization. Individuals with AN-restrictive type also endorsed higher levels of concern about parental criticism over AN-binge/purging type; all AN subtypes scores on the parental criticism subtest were significantly

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greater than the control conditions., individuals with anorexia have been noted to exhibit tendencies of perfectionism and rumination (Halmi et al., 2000).

Another related trait associated with the development and maintenance of eating disorders is poor emotional awareness and recognition. For instance, research has noted that individuals with eating disorders endorse higher levels of alexithymia, which is a difficulty in describing and even identifying emotional states (Rastam, Gillberg, Gillberg, & Johansson, 1997; Schmidt, Jiwany, & Treasure, 1993). However, some researchers suggest that alexithymia related to eating disorders is more related to depressive symptoms rather than the eating disorder itself (Eizaguirre, Saenz de Cabezon, Alda, Olariaga, & Juaniz, 2004).

Harrison and colleagues (2009) have also reported that emotion recognition, which consists of the ability to perceive emotions accurately in faces, music, and designs, may be more difficult for individuals with eating disorders (Mayer, Caruso, & Salovey, 1999). Zonneville-Bender and colleagues have demonstrated this in three separate studies (Zonneville-Bender et al., 2002; 2004a; 2004b). When adolescent and adult patients diagnosed with anorexia were asked to label emotions freely or with a forced choice approach, patients demonstrated lower emotional recognition using both methods compared to controls.

A similar feature, emotion regulation, has also been noted to be highly related to eating disorder pathology. Research has consistently supported that patients diagnosed with eating disorders demonstrate poor emotion regulation and may experience dysregulation and inhibition in the face of emotions (Holliday, Uher, Landau, Collier, & Treasure, 2006). Holliday and colleagues (2006) reported that patients with AN might be more likely to demonstrate social avoidance, anxiousness, and affective lability. In general, anorexia is typically associated more

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with poor emotion recognition while bulimia is more related to poor emotion regulation (Harrison, Tchanturia, & Treasure, 2009). Furthermore, some research suggests that eating disorder pathology is maintained because individuals with eating disorders engage in disordered eating to regulate affect (Cooper, Wells, & Todd, 2004; Waller, Kennerley, & Ohanian, 2004). Many models of Binge Eating Disorder suggest affect regulation could be a significant factor contributing to the maintenance of BED (Heatherton & Baumeister, 1991; Paxton and Diggins, 1997).

Further research also confirms the relationship between eating disorder pathology and difficulty regulating and recognizing emotion. Women with a diagnosis of AN completed the Difference in Emotional Regulation Scale (DERS) and were compared to controls of a similar age. The DERS is made up of six subscales including non-acceptance of emotional responses, difficulties in engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. Participants diagnosed with AN reported higher levels on all six subscales of the DERS and a large effect was noted. Individuals with AN also endorsed greater difficulty in recognizing emotions than the control group (Harrison, Tchanturia, Treasure, 2009).

Another study conducted by Corstorphine and colleagues (2007) examined how distress tolerance, the ability to manage difficult, intense emotions may relate to eating disorder pathology. Corstorphine and colleagues (2007) noted that compared to healthy controls, participants with anorexia and bulimia endorsed a greater tendency to avoid situations that may lead to negative affect and were less willing to accept difficult emotions and use adaptive behavioral strategies (Corstorphine, Mountford, Tomlinson, Waller, & Meyer, 2007). This study,

among others, further supports a direct relationship between emotional states and eating

behavior, particularly disordered, in eating disordered populations (McManus & Waller, 1995;

Meyer, Waller, & Waters, 1998).

Another notable feature of eating disorders that has been supported through research is

poor interoceptive awareness (Ainley and Tsakiris, 2013; Fassino, Pierò, Gramaglia, & Abbate-

Daga, 2004; Matsumoto, Kitabayashi, Narumoto, Wada, Okamoto, Ushijima, et al., 2006;

Merwin, Zucker, Lacy, & Elliott, 2010; Pallatos, Kurz, Schreder, Kleemann, Schopf, et al.,

2008). Women who report significant symptoms of eating disorders endorse less ability to

understand their physical cues and are also noted to ignore them more often. Less awareness of

bodily sensations may complicate treatment and general functioning; patients may confuse

hunger or fullness with anxiety symptoms, stress, etc.

Prevention Methods for Body Image Disturbance and Eating Disorders

Given that body dissatisfaction is widespread, and is implicated in the etiology of eating

disorders, researchers have been diligent about trying to establish effective preventative

measures and treatments for body dissatisfaction and eating disorders alike. This is especially

true because eating disorders are cited to have the highest mortality rate of all psychiatric

disorders (Arcelus, Mitchell, Wales, & Nielsen, 2011; Smink, Van Hoeken, & Hoek, 2012).

Furthermore, relapse rates are relatively high among individuals diagnosed with eating disorders

and treatments are expensive and not always fully covered by insurance (Collin, Power, Karatzia,

Grierson, & Yellowlees, 2010).

One form of prevention for body image disturbances and eating disorder pathology

consists of "primary" prevention also known as "universal" prevention and is given to all

participants (mainly females). Selective prevention is more targeted prevention for individuals who are considered to be at higher risk for the target problem, in this base body dissatisfaction and eating disorder symptoms. Piran (1999) created an intervention for ballet students who are noted to be at greater risk for eating disorder symptomology and negative body image for example. Finally, some treatments are considered to be "indicated" or ones provided for individuals who are seeking out help (Levine and Piran, 2004).

Levine and Piran (2004) evaluated two types of eating disorder and body image prevention programs. They noted there were effective prevention methods using both a social cognitive model (SCM), which works under the notion that negative beliefs about one's body and learning about what one's body "should" be like relate to eating disorder symptomology and negative body image (Cash, 2002), and a non-specific vulnerability stressor model.

Under the SCM model, Smolak and Levine (2001) noted that children between the ages of 9 and 11 who completed a 20-lesson group promoting healthy eating and exercising, positive body image, and skepticism about dieting reported using fewer unhealthy weight management techniques, and girls reported healthier body esteem. The control group was also noted to improve, but the authors suggest there may have been a spill-over effect. Another study was conducted in Israel and assessed females ages of 15 and 16. The adolescent females were taught about nutrition, exercise, and sociocultural factors related to body image. At the six-month follow-up, the girls in the group were less likely to initiate unhealthy dieting and binge-eating and endorsed more regular eating patterns (Neumark-Sztainer, Butler, Palti, 1995).

There is one prevention program that focuses on implementing treatment among adolescents using the NSVSM model entitled "Everybody's Different." This group is initiated by

a classroom teacher and addresses knowledge growth, evaluation of value, and life skills (O'Dea & Abraham, 2000). Participants in the group compared to control reported improvements in body satisfaction, but unlike with the SCM model, these improvements did not persist after a year (O'Dea & Abraham, 1995).

Cognitive Behavioral Therapy has also been employed as a targeted treatment for individuals reported body dissatisfaction. Cash and Hrabosky (2004) created the group to incorporate psycho-education about the nature and causes of negative body image, training to assess an individual's thoughts about their body image, guided exercises to challenge negative thinking, skills to manage anxiety related to body image, and relapse prevention. Participation in this group contributed to decreases in anxiety and improvements in body image among participants (Cash & Hrabosky, 2004). In a review, Levine and Piran (2004) did not find a difference between the SCM or NSVS programs which may suggest that effects may be more short-term and more potent treatments should be developed (Levine & Piran, 2004). Other research has also indicated maintenance of these gains do not last long term (Sapia, 2001).

More modern treatments have been developed to address concerns about the effectiveness of eating disorder and body dissatisfaction prevention programs. For instance, Stice's dissonance group was originally developed under the dual pathway model of bulimia which claims that reducing thin-ideal internalization will reduce negative affect and continued disordered eating pathology (Pearson, Follette, & Hayes, 2012). For this group, participants participate in a three-hour session during which they critique the thin ideal, which is believed to lead to discomfort (dissonance) as participants typically endorse the thin ideal. This dissonance is theorized to relate to a decrease in eating disorder symptoms, dieting, negative affect, and body

image. Indeed, many studies indicate support for this preventative treatment (Stice, Shaw, Burton, & Wade, 2006; Stice Shaw, Becker, & Rohde, 2008). For instance, Stice and colleagues (2013) conducted a study comparing the dissonance group to a control group. The dissonance group showed greater improvements in body dissatisfaction and eating disorder pathology (Stice, Butryn, Rohde, Shaw, & Marti, 2013) than controls.

Further, the dissonance-based body image intervention was compared to a different three-hour group focusing on healthy weight. The healthy weight intervention, the group is created to teach and promote healthy eating and exercise patterns to enhance body satisfaction and hopefully decrease unhealthy eating behaviors. Stice, Chase, Stomer, and Appel (2001) noted that in general, the dissonance intervention showed a greater reduction in thin-ideal internalization and body dissatisfaction than the healthy weight intervention even after one month. However, participants in both groups also reported less dieting, negative body image, and disordered eating than the controls. Data also suggests that these positive changes also last even after two to three years (Stice, Marti, Spoor, Presnell, & Shaw, 2008) which is much longer than for NSVSM and CSM models (Levine & Piran, 2004).

It is clear that there are many effective treatments for body dissatisfaction, but there are some arguments that they are not sufficient enough considering the high rate of eating disorder pathology development. Furthermore, some research suggests that prevention attempts are most effective when participants are at risk (Mitchell, Mazzeo, Rausch, & Cooke, 2007). Others argue that interventions should include activities individuals that may be at risk could participate in; prevention methods should be incorporated in these activities (Neumark-Sztainer, Eisenberg,

Wall, & Loth, 2011). In addition, prevention measures are only as useful as they are effectively disseminated.

Eating Disorders Treatment

Many treatments have been developed for the treatment of eating disorders. One of the most effective, or most utilized, has been cognitive behavioral therapy (CBT; National Institute for Clinical Excellence: NICE, 2004). Fairburn, Marcus, and Wilson (1993) have modified CBT specifically for clients diagnosed with bulimia, which provides 20 sessions with three major stages. These include the normalization of eating, reducing dieting, the binge-purge cycle, and modifying values and altering beliefs related to the individual's disordered eating. CBT has also been used to treat AN, but many research studies suggest that it may not be effective. However, Halmi and colleagues (2005) also argue that these studies may not have been well designed.

Another treatment with strong research support is Family Based Therapy (FBT), also known as the Maudsley model (Rhodes, Gosbee, Madden, & Brown, 2005). This treatment has been effective, but works best when the individual is a child or adolescent who lives with a family who is willing to engage in treatment since a big part of the treatment is family based. Interpersonal therapy (IPT) has also been a treatment of choice for individuals with eating disorders, specifically bulimia nervosa and has also been found to be fairly effective (Agras, Telch, Arnow, Eldredge, Detzer, Henderson, et al., 1995; Agras, Walsh, Fairburn, Wilson, & Kraemer, 2000).

Unfortunately, many of these therapies do not seem to achieve ideal outcomes. For instance, some studies show that only about 30 to 50% of patients stop the binge-purge cycle after completion of CBT-E (Wilson, Grilo, & Vitousek, 2007). Some researchers suggest that

many patients with eating disorders express little desire to change (Vanderlinden, 2008) making a treatment involving altering thoughts potentially less effective.

Ameliorating Treatment and Development of Alternative Treatments

Because eating disorder treatments do not seem to produce outcomes deemed acceptable, researchers have started to evaluate other therapeutic interventions. Similar to treatment with other disorders, there has been a trend towards using third wave practices such as Acceptance and Commitment Therapy (ACT; Juarascio et al., 2010; 2013), Dialectical Behavioral Therapy (DBT; Safer, Telch, & Agras, 2001) in treatment. Furthermore, clinicians and researchers have incorporated mindfulness, emotion regulation, tolerance of distress, and awareness of thoughts versus modification of thoughts as used in CBT-E and earlier eating disorders treatment.

For instance, researchers have started to evaluate how Acceptance and Commitment Therapy (ACT) may be useful in the treatment of eating disorders. The central tenets for this theoretical shift relate to the fact that it may not be beneficial to try to change how a person feels or thinks about their body, especially because some of their thoughts may be true; their body may not be perfect. ACT works to try to promote non-judgmental attitudes or greater acceptance, which may feel more realistic to the client than to shift thoughts about weight and shape. ACT also works under the belief that trying to control experiences is ineffective or even counterproductive (Hayes, 2004). Much of disordered eating behavior involves controlling eating and exercise behavior in an ineffective, dangerous manner (Hayes, 2004). It is the belief therefore that teaching acceptance and mindfulness skills to help people manage difficult thoughts or feelings may be helpful for individuals who tend to react rigidly or avoid emotional distress (Lillis, Hayes, Bunting, & Masuda, 2009; Lillis, Hayes, & Levin, 2011)

Juarascio and her colleagues (2010) have looked specifically at how ACT may work as a treatment and a prevention measure for eating pathology. Juarascio and colleagues (2010) conducted a study of Acceptance and Commitment Therapy (ACT) treatment compared to the standard CBT treatment among university-counseling center students who reported disordered eating pathology. Participants attended around 12 sessions, and Juarascio and colleagues (2010) noted a significant interaction effect between time and group; the CBT group showed a slight decrease in eating pathology over time while the ACT group showed a greater decrease in eating disorder symptoms. However, ACT did not moderate changes in depressive or anxiety symptoms differently than CBT (Juarascio, Forman, & Herbert, 2010).

Juarascio and colleagues (2013) also compared treatment as usual (TAU) and ACT as an addition to TAU in a residential treatment center. The researchers noted that both ACT and TAU patients reported adequate treatment acceptability. Both TAU and ACT groups showed favorable eating disorder outcomes, while the ACT group demonstrated greater improvements in experiential avoidance. Moreover, experiential avoidance, the tendency to avoid difficult emotion and activities has also been noted to relate to eating disorder symptoms. ACT participants also demonstrated clinically significant change in eating disorder symptoms as measured by the EDE-Q than individuals in the TAU condition (38% versus 17%). TAU participants were more likely to be hospitalized again (18%) versus ACT patients (3.5%), although these analyses neared significance levels.

Dialectical behavioral therapy (DBT) has also been studied as an alternative treatment for eating disorders (Safer et al., 2001). DBT focuses more on emotion regulation, tolerating distress as it presents itself, mindfulness, and interpersonal effectiveness. DBT for eating disorders has

been modified and does not always utilize the last training module (interpersonal effectiveness). Training in emotion regulation, distress tolerance, and mindfulness using DBT have been indicated to be promising (Safer et al., 2001). For instance, Telch and colleagues (2000) conducted a trial with 11 women meeting diagnostic criteria for BED. These women attended 20 weekly 2-hour group sessions. Nine out of the 11 women reported they stopped binge eating entirely by the time the group was over and they expressed less urges to eat when feeling negative emotions and an improved ability to regulate their moods as well.

Promising results were also noted in a DBT group versus control study (Telch , Agras, & Linehan, 2001). By the end of treatment, only 12.5% of controls versus 89% of DBT group participants stopped binging (Telch et al., 2001). Safer and colleagues (2001) have also demonstrated similar results in a randomized controlled trial, although the treatment outcome results (measured by fewer binges) was not as promising.

Mindfulness

Researchers have also started to evaluate how mindfulness relates to body dissatisfaction and eating disorder pathology (Lavender, Jardin, & Anderson, 2009; Pidgeon & Appleby, 2014; Prowse, Bore, Dyer, 2013). Mindfulness, as defined by Kabat-Zinn, (2003, p. 145) is the "awareness that evolves through paying attention purposely to the present moment with a non-judgmental attitude while paying attention to each moment as it comes" (Prowse, Bore, & Dyer, 2013). Mindfulness is perceived to engender acceptance and attempts to reduce the impact of judgmental thoughts turned inward by encouraging less fusion and connection to the judgment (Alberts, Thewissen, & Raes, 2012). It is also considered to be an exposure that may allow individuals to observe and differently engage in aversive thoughts and feelings.

Exposures are deemed to reduce emotional reactivity and ineffective or problematic avoidance and compensatory behaviors (Baer, Fischer, & Huss, 2005). Furthermore, mindfulness is considered to be a way of training oneself to disengage from challenging thoughts or unwanted reactivity to emotions (Kristeller, Baer, & Quillian-Wolever, 2006).

Mindfulness, as a trait, has been noted to relate to eating disorder behaviors as well as body image. For instance, Pidgeon and Appleby (2014) have investigated how dispositional mindfulness relates to body image dissatisfaction. Women from a community sample completed many measures assessing mindfulness, body image and guilt, depressive symptoms, and self-esteem. Women who endorsed high dispositional mindfulness endorsed significantly less body image dissatisfaction compared to women who reported lower levels of mindfulness. The same trends were supported for body shame, preoccupation with weight, and general psychological distress (Pidgeon & Appleby, 2014). Another study corroborated data suggesting that women who endorse greater mindfulness report lower body dissatisfaction and shame (Pidgeon & Appleby, 2014; Prowse, Bore, & Dyer, 2013).

Some studies have examined how mindfulness relates to disordered eating. One study noted that college students who endorsed binge eating behavior report lower emotional clarity and ability to use adaptive emotion regulation strategies (Lavender, Jardin, & Anderson, 2009; Whiteside, Chen, Neighbors, Hunter, Lo, & Larimer, 2007). Wildes and colleagues (2010) have also reported that patients with anorexia endorse similar levels of avoidance of situations and emotions similar to individuals diagnosed with social phobia and avoidant personality disorder (Wildes, Ringham, & Marcus, 2010). Similarly, Prowse and colleagues (2013) evaluated eating disorder symptoms, mindfulness, and body image acceptance in male and female college

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students. Individuals who endorsed greater eating disorder symptoms reported being less accepting of their bodies and reported higher levels of stress and anxiety. There was also a relationship between eating disorder symptoms and lower mindfulness; individuals reporting more disordered eating were less likely to act with awareness and accept situations without judgment as measured by the Kentucky Inventory of Mindfulness Skills.

Lavender and colleagues' research (2009) has also supported these findings. Women who reported higher mindfulness, in particular, the ability to act with awareness, to respond less reactively to inner experiences, and to not judge their inner experiences endorsed less eating disorder symptoms in general. In another study, Lavender and colleagues (2009) noted that mindfulness and thought suppression, a tendency to avoid awareness of aversive thoughts, were significantly related and predictive of bulimic symptoms. Thought suppression positively predicted bulimic symptoms, while mindfulness negatively predicted bulimic symptoms. Overall, they noted that thought suppression explained a greater percentage in predicting bulimic symptomology than mindfulness.

Mindfulness-based treatments, which relate significantly to DBT and ACT treatments, have also been incorporated in eating disorders treatment. For instance, mindfulness-based cognitive therapy (MBCT; Baer, Fisher, & Huss, 2005) has been modified for treatment of eating disorders, specifically BED. Typically, MBCT is provided in a group setting for ten sessions. For this study, material specifically addressed binge eating.

Kristeller and Hallett (1999) have developed Mindfulness-based eating awareness training to focus on mindfulness, similar to MBCT. However, Kristeller and Hallett (1999) also integrated CBT into the treatment. The treatment is perceived to be beneficial as an intervention by

reducing participants' avoidance of painful emotions, shame, and negative thoughts. MB-EAT also emphasizes mindfulness and emotion regulation during experiences while eating. MB-EAT has promising research support as a treatment; participants in the MB-EAT group reported that their binges per week dropped from slightly over four to one and a half. Few individuals met criteria for BED at the end of the study (Kristeller et al., 2006).

Self-Compassion

While many researchers have focused on negative body image and risk factors that predict disordered eating and eating disorder pathology, other researchers have started to evaluate how protective factors and positive body image may also relate to eating disorder pathology and related outcomes (Mahlo & Tiggerman, 2016; Piran, 2015). One of these factors is self-compassion. Self-compassion is a trait defined by the ability to acknowledge, yet accept, one's flaws, possess an awareness that one is not alone in their struggles and the ability to be mindful or present and aware of how one is feeling over being judgmental of one's flaws (Neff, 2003a; 2003b).

There are three main factors that self-compassion is comprised of, the first being self-kindness (SK). Self-kindness is the ability for a person to be accepting and kind to themselves regardless of any perceived shortcomings. This factor relates specifically to accepting any imperfections they may perceive without judging them (Neff, 2003a; 2003b). The second factor, common humanity (CH), occurs when an individual starts to perceive their flaws or struggles as universally experienced. Common humanity is the ability realize others may experience difficulties, perceive individual flaws, etc. which improves an individual's perception others can relate to their lived experiences versus feeling isolated from others. A person who is high in CH,

who has failed an exam for instance, may be able to acknowledge that other students have experienced and felt similarly to them in that situation. They believe they would not be and are not alone in feeling that way. The third factor, mindfulness (MI), is the ability to be aware and nonjudgmental of how one feels about their flaws, ideas, feelings. It is the ability to be aware without ruminating on the flaw (Neff, 2003a; 2003b). This factor relates more directly to mindfulness defined by Kabat-Zinn (2003).

There are also three complimentary yet not orthogonal negative factors including nonjudgment, isolation, and over-identification. Being non-judgmental, but aware of one's feelings, emotions, and potential flaws are hypothesized to allow a person to live authentically and improve because they do not feel over-identified with the trait (Neff, 2003a; 2003b). Furthermore, individuals who perceive they are unique in how they feel or are overly focused on the flaw typically experience greater distress and difficulty dealing with life stressors and responding flexibly (Neff, 2003a; 2003b).

Self-compassion (SC) has been compared to self-esteem (SE), and the correlations among the two have been noted to be fairly high (r= .60-.70). However, while SC and self-esteem appear similar, researchers claim that they are qualitatively different. For instance, self-compassion is considered to be individualized and focused on an individual's perception of themselves, while self-esteem is considered to be related to more external comparisons, laden with social comparison and based more on achievement (Neff, 2003a; 2003b). Indeed, research has supported that SC is a greater predictor of quality of life and lower levels of anxiety and depression in comparison to SE (Neff, Rude, & Kirkpatrick, 2007).

Self-compassion has also been noted to correlate negatively with neuroticism and positively correlated with extroversion, openness to experience, and conscientiousness (Neff, Rude, & Kirkpatrick, 2007). Neff (2003a; 2003b) has also conducted a correlational study and noted that SC correlates positively with life satisfaction and the ability to effectively process emotions as a coping skill. Neff and Vonk (2009) have demonstrated that self-compassion is negatively correlated with social comparison, public self-consciousness, anger, self-rumination, and the need for cognitive closure. Individuals reporting higher levels of SC feel less need to evaluate themselves because of external factors (Neff, 2003a; 2003b; Neff & Vonk, 2009). Studies have also indicated that while SE correlates with narcissism, SC does not (Leary, Tate, Adams, Batts-Allen, & Hancock, 2007).

Self-compassion has also been evaluated as a factor related to eating disorder symptomology and body image considering the strong evidence from previous studies that indicate that SC is beneficial and a buffer against negative reactions to one's shortcomings. Given that body dissatisfaction is defined by a negative reaction to flaws of one's body (Tantleff-Dunn, Barnes, and Larose, 2011), researchers have started to evaluate whether the ability to be generally understanding and non-judgmental towards oneself is protective against body dissatisfaction and disordered eating (Albertson, Neff, & Dill-Shackleford, 2014).

There has been significant empirical support that SC is negatively correlated with body dissatisfaction and disordered eating (Breines, Toole, Tu, & Chen, 2014; Magnus, Kowalski, & McHugh, 2010). For instance, Breines and her colleagues (2014) conducted a study to assess how SC relates to body image disordered eating. This two-part study employed a diary method that lasted for four days. When participants endorsed higher levels of SC over the course of the

four days, participants were found to be more likely to report less disordered eating. The researchers also had participants discuss areas of their body they found to be "flawed" as a negative body image induction and then asked participants to eat chocolate to assess how restrained eating may relate to SC and body shame. SC predicted lower body shame and less anticipated disordered eating (Breines et al., 2014).

In another study evaluating body image factors such as weight concern, body shape dissatisfaction, and appreciation of one's body, Wasylkiw, and colleagues (2012) have noted that SC positively predicted body appreciation and negatively predicted weight concern and body shape preoccupation. SC was also supported to be negatively correlated with social physique anxiety (Magnus, Kowalski, & McHugh, 2010). Magnus et al., (2010) also noted that there was a negative relationship between SC and obligatory exercise. These findings suggest that as a person endorses greater SC, they may endorse a lower desire to work out because they feel obligated to do so. Participants reporting higher self-compassion were more likely to report exercising for intrinsic purposes (e.g., enjoyment and fun).

More recent studies have evaluated how SC acts as both a buffer against disordered eating and body image or how it even helps to explain the relationship between related variables. Kelly and colleagues (2014) evaluated how SC may act as a buffer between BMI and eating disorder symptoms and body image flexibility. Body image flexibility is the extent that an individual can tolerate negative body-related thoughts and feelings to be able to pursue and engage in life activities despite their negative thoughts. As expected, SC was positively related to body image flexibility and negatively related to disordered eating. The researchers noted that SC moderated the relationship between BMI and disordered eating. The relationship between BMI

and disordered eating was significant among participants who reported low or medium levels of SC; the relationship between BMI and disordered eating was not significant for participants that reported high SC suggesting that SC may protect against the positive relationship between BMI and disordered eating. SC did not significantly moderate the relationship between BMI and weight concerns or shape concerns.

Tylka, Russell, and Neal (2015) have also noted that SC moderates the relationship between thin-ideal internalization and disordered eating. SC appears to buffer against the relationship between media thinness-related pressure and disordered eating. Women who endorsed higher levels of SC also perceived lower thinness-related pressures from friends, family, and partners (Tylka, Russell, & Neal, 2015).

Research also suggests that there is a positive relationship with SC and distress tolerance, intuitive eating, and body image flexibility, similar to findings suggested by Kelly and colleagues (Kelly, Vimalakanthan, & Miller, 2014; Schoenefeld & Webb, 2013). Body image acceptance mediated the relationship between SC and intuitive eating as well as body image flexibility in a study of undergraduate women. Furthermore, SC was negatively related to binge eating severity suggesting that individuals who reported higher SC reported lower severity of binge eating symptoms. The ability to tolerate emotions was noted to mediate the relationship between SC and binge eating severity, and this relationship explained a significant amount of variance between SC and binge eating severity (Webb & Forman, 2013).

A few experimental studies have also indicated that SC may improve body dissatisfaction. Albertson and colleagues (2014) recruited women to participate in a three-week intervention where they were asked to listen to a SC meditation tape daily and compared the

intervention group to waitlist controls on measures including self-compassion, body appreciation, body shame, and contingent self-worth due to appearance. Individuals in the SC meditation group demonstrated lower levels of body shame, contingent self-worth based on appearance, and body dissatisfaction. They also reported increased SC and body appreciation. These improvements were maintained three months after the end of the intervention.

Gilbert has also developed Compassion Focused Therapy (CFT), which emphasizes self-compassion as a modality and central feature of treatment (Gilbert, 2014). CFT focuses more on helping participants to be more accepting and mindful of their thoughts about themselves without judgment. CFT has been supported to be an effective treatment for anxiety and mood disorders and has been applied to other disorders (Gilbert, 2005). Researchers have started to evaluate how CFT in conjunction with CBT-E, which is considered to be the gold standard of eating disorder treatments, may be effective in the treatment of AN, BN, and BED (Fairburn, Marcus, & Wilson, 1993; Gale, Gilbert, Read, & Goss, 2014; Kelly & Carter, 2015). One of the first studies, conducted by Gale and colleagues (2014) attempted to evaluate whether adding CFT to CBT-E would be effective in ameliorating eating disorder symptomology. Ninety-nine participants diagnosed with AN, BN, and EDNOS participated in a 16-week group treatment program employing CFT. After completion of the treatment program, participants endorsed significantly less eating disorder pathology as measured by the EDE-Q. There was also an evident increase in subjective well-being, social life functioning and a decrease in self-reported symptoms and risk to self as measured by the Clinical Outcomes in Routine Evaluation (Gale et al., 2014).

Compassion-focused therapy has also shown benefits in the treatment of BED (Kelly & Carter, 2015). Kelly and Carter (2015) paired CFT with CBT-E in a self-help intervention for

BED and compared it to behavioral techniques for changing BED symptoms (coming up with alternative behaviors when a participant notices an urge to binge), and a waitlist control. After treatment, patients in the CFT group reported lower global eating disorder pathology than in the behavioral or control groups. However, there were no observed differences in the total number of binges between groups. Overall SC was not noted to be significantly different among the CFT and behavioral groups, but the positive subscales of SC were considerably higher among the CFT group versus the controls and behavioral group (Kelly and Carter, 2015).

Eating disorder patients who are more self-critical at the time of admission are more likely to endorse severe eating disorder symptoms due to their shame (Kelly, & Carter, 2015). Researchers have therefore worked to understand how SC may predict change in eating disorder symptoms (Kelly, Carter, & Borairi, 2014). Kelly and colleagues (2014), noted that greater changes in shame related to larger improvements and symptom reduction early in treatment. Early improvements in SC helped to explain the reductions of shame and improvement in eating disorder symptomology. Fear of self-compassion, or being kind towards oneself has also been noted to be a strong predictor of eating disorder pathology in an eating disorder group, while low levels of SC itself was noted to be a predictor of eating disorder symptoms in college women (Kelly, Vimalakanthan, & Carter, 2014).

Experiential Avoidance

Experiential avoidance, a construct established from ACT, but present in many old schools of clinical psychology (Kelly, 1955; Mowrer, 1947) is considered to be a construct involving two main features and may also significantly relate to body dissatisfaction and disordered eating. The first part is the reluctance to experience aversive private experiences

including thoughts, emotions, bodily sensations and memories. The second part relates to taking action to change this "aversive" experience or events that may cause them (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Experiential avoidance is perceived to be ineffective since it impairs individuals from engaging in desired behaviors or ineffective (Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004). It is considered to be one of the critical factors, or roots, of an individual's suffering. Furthermore, there are many ways people may engage in experiential avoidance, this includes thought suppression, and thought control (Clark, Ball, & Pape, 1991). Emotion suppression is also considered to be another form of experiential avoidance and consists of trying to avoid experiencing or sitting with emotions that are perceived to be uncomfortable (Gross & John, 2003).

Experiential Avoidance (EA) is associated with a variety of psychological disorders including substance use disorders (Baker, Piper, McCarthy, Majeski, & Fiore, 2004; Marlatt & Gordon, 1985), PTSD (Orcutt, Pickett, & Pope, et al., 2005; Plumb, Orsillo, & Luterek, 2004), Generalized Anxiety Disorder (Kashdan, Barrios, Forsyth, and Steger, 2006), among other disorders (Begotka, Woods, & Wetterneck, 2004), although some research is contradictory (See Boeschen, Koss, Figueredo, & Coan, 2001; Forsyth, Parker, & Finlay, 2003; Roemer, Salters, Raffa, & Orsillo, 2005). In general, psychological flexibility, the ability to regulate emotions, thoughts, and feelings by remaining in the present moment without judging or avoiding the situation and then acting accordingly to continue to follow goals is related to enhanced psychological functioning (Brown, Ryan, & Creswell, 2007)

Research suggests that individuals with AN, BN, and BED may have difficulties regulating emotions, understanding physical cues (interoceptive awareness), and may tend to

avoid aversive thoughts and feelings (Fassino, Piero, Gramaglis, & Abbate-Daga, 2004; Merwin et al., 2010). Individuals with eating disorders may also report that they often feel preoccupied with thoughts about controlling their eating, weight, and shape to avoid negative or distressing feelings and the potential for gaining weight (Cooper, Wells, & Todd, 2004; Fairburn Cooper, & Shafran, 2003). By engaging in their eating disorder, individuals may learn that they can avoid physical sensations and even emotions (Serpell, Treasure, Teasdale, & Sullivan, 1999). As a result, researchers have begun to focus on the relationship between eating disorder symptoms and EA, which appears to be related to the difficulties noted above. For instance, research has indicated that individuals with BED and BN may binge as a result of negative emotions and will then feel relieved post-binge, at least short term (Kingston, Clarke, & Remington, 2010). Binge episodes are considered to be EA from negative emotions. Individuals who reported that they expected eating to provide emotional relief or escape from negative emotions (negative eating expectancies) are more likely to report bulimic symptoms, further supporting this relationship (Hayaki, 2009). Furthermore, individuals with eating disorders often have significant fears of gaining weight (Killen et al., 1996) and thus may engage in the form of experiential avoidance (body avoidance) as a way of coping (Lillis, Levin, & Hayes, 2011) which is comforting short-term, but long-term likely maintains this ineffective behavioral pattern.

Masuda, Le, and Cohen (2014) have noted that among Asian American and European American participants that there was a significant relationship between psychological flexibility and disordered eating cognitions including fear of weight gain, approval of weight, and self-control of eating habits. Masuda and colleagues (2014) research supported that as a person endorses more eating disorder cognitions, they are more likely to report experiential avoidance or

more likely to report lower psychological flexibility. Additionally, Masuda and colleagues (2010) have noted that disordered eating cognitions and psychological flexibility were both uniquely related to general distress.

Researchers have also examined how EA relates to disordered eating and negative body image in college samples. For instance, Butryn and colleagues (2011) recruited college women to complete several measures assessing EA, disordered eating, and mindfulness. In the college sample, eating disorder symptomology was found to be a significant predictor of experiential avoidance. Additionally, when the EA was considered as an independent variable that predicts eating disorder symptoms, there was a significant relationship between EA and eating disorder symptoms.

Another study evaluated how a specific form of EA, thought suppression, and dispositional mindfulness would relate to bulimic symptoms (Lavender, Jardin, & Anderson, 2009). Undergraduate males and females completed measures evaluating their current levels of dispositional mindfulness, thought suppression and bulimic symptoms. Among the female undergraduates, BMI explained about 4.4% of the variance in bulimic symptoms, and when mindfulness and thought suppression were added to the model, they also predicted significant bulimic symptoms and accounted for an additional 13.7% of the variance. The total model explained 18.1% of the variance in bulimic symptoms. For the male undergraduate sample, BMI was also a significant predictor of bulimic symptoms explaining 8.2% of the variance in bulimic symptoms; thought suppression and mindfulness also accounted for 9.8% of the variance and the full model helped to explain 17.9% of the variance in bulimic symptoms among men.

While EA is associated with eating disorder symptoms, researchers have also started to assess whether improvements in eating disorder symptomology relate to changes in EA. Rawal and colleagues (2010) evaluated how rumination and EA among college students and women in a residential treatment facility for eating disorders relate. In the eating disorder sample, participants who improved over time endorsed lower levels of EA. Butryn and colleagues (2013) also noted similar results among another eating disorder sample seeking treatment in a residential eating disorder treatment center. Greater EA related to eating disorder symptoms. Additionally, decreases in avoidance of emotions were significantly related to improvements in eating disorder symptoms following treatment. Juarascio and colleagues (2013) study comparing TAU and ACT (which targets experiential avoidance) noted that individuals in the ACT treatment reported less EA, less eating disorder symptoms and were less likely to be hospitalized again (3.5% compared to 18% in the TAU group).

Additional relationships were noted; in addition to supporting the relationship between decreases in EA and a reduction of eating disorder symptoms, researchers also report increases in flexibility in accepting one's body image and mindfulness through effective treatment (Butryn et al., 2013; Cowdrey & Park, 2012). Body image flexibility has also been evaluated in relation to eating disorder pathology, body image, and general psychological distress (Sandoz, Wilson, & Merwin, 2011). Body image flexibility (BIF) is related to EA in that it is the ability to continue to live according to values despite difficult emotions or thoughts related to the perception of one's body. In a study of undergraduate women and men, body image flexibility mediated the relationship between eating disorder cognitions and eating disorder symptoms. Individuals with

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lower body image flexibility were more likely to report eating disorder cognitions and then eating disorder symptoms as a result (Wendell, Masuda, & Le, 2012).

Yoga

Yoga is a practice that is a set of postures, meditation, and breath-work and was noted to be described first in the Yoga Sutras, written in 300 BC by Patanjali (Freeman, 2004) and intended to bring a balance and health to the physical, emotional, and mental aspects of a person (Sengupta, 2012). Different styles of yoga include Hatha, Ashtanga, Iyengar, Anusara, Bikram, and Forest yoga (Field, 2011). Indeed, yoga has been considered to be a growing practice in the United States. Research suggests that about 36 million Americans in the United States reported practicing yoga in 2016, which has increased significantly from 2012 when 20.4 million Americans reported practicing yoga. Roughly 28% of all Americans are projected to have tried yoga at some point in their lives (Peregoy, Clarke, Jones, Stussman, & Nahin, 2016), and around 1.5 million children have reported practicing yoga as of 2008 (Barnes, Bloom, & Nahin, 2008). While there are many styles derived from the ancient Sanskrit writing, there is a common understanding that yoga is considered to involve breathing techniques (pranayama), physical postures (asanas), and a rich background of philosophical and practice guidelines. These different philosophies include the discussion of how one should interact with one's physical body, treat others, and perceive the world.

For instance, in Patanjali's Yoga Sutra's, Patanjali describes eight limbs, i.e., paths, of yoga. These include the yamas, which are considered to be the five ways that people should view and treat others, niyamas, which include the five ways to treat and view oneself, and asanas, which are physical postures and movements and are the critical components to many modern

yoga practices currently. The other limbs include pratyahara, dharana, dhyana, and samadhi. Pratyahara is the goal of withdrawing oneself from a sense of the outside world and learning to focus attention inward; dharana is the ability to garner concentration. Dhyana is the focus on meditation, while Samadhi is a state of enlightenment or self-knowledge (Delaney & Anthis, 2010).

The yamas include, ahimsa (the belief in non-violence and kindness to animals and other creatures), satya (to be truthful in speech), asteya (not stealing), brahmacharya (celibacy), and aparigraha (not accumulating too much). The niyamas include sauca (cleanliness and person hygiene), santosa (contentment, as a state of mind and trying to be grateful for what you have), tapas (trying to persevere), svadhyaya (self-study or learning about oneself), and ishvara pranidhana (surrounding one-self with god and/or spiritual values). As a whole, the yogic philosophy is one of self-acceptance, growth, understanding, and forgiveness; it is considered to be vastly different from other physical practices mainly because of its focus on merging the mind (i.e. thoughts, attention, and focus) and the body (physical practice and poses) (Freeman, 2014).

There are many goals that people attempt to achieve in practicing and teaching yoga. Some of these include nonjudgmental awareness, strength, and balance (Salmon, Lush, Jablonski, & Septon, 2009). Along with meditative practices, yoga places emphasis on focused attention, controlled breathing, and relaxation at points. It is an excellent opportunity for sustained attention to one's body and breath simultaneously and considered to be useful in engendering greater awareness of body cues and awareness of the body given its steady focus on proprioceptive and interoceptive cues (Salmon et al., 2009).

Practicing yoga has also been noted to improve mindfulness (Curtis, Osadchuk, & Katz, 2011; Gard, Brach, Hölzel, Noggle, Conboy, & Lazar, 2012). For instance, Hewett and colleagues (2011) assessed improvements in mindfulness related to yoga practice among fifty-one participants enrolled in 20 or more Bikram classes over eight weeks. Participants completed measures of mindfulness, perceived stress, and physical fitness at the beginning of the course and then after the 20 sessions. Hewett and colleagues (2011) noted significant changes in perceived stress, flexibility, and mindfulness. Yoga was also supported to be beneficial in improving mindfulness in women with fibromyalgia over eight weeks of 75-minute classes that met twice a week on mindfulness (Curtis, Osadchuk, & Katz, 2011). Pain levels were also noted to decrease. Additionally, comparative studies have indicated that participants who reported more extended periods of yoga practice report greater mindfulness than among individuals with less yoga experience (Brisbon & Lowery, 2009).

In a study comparing yoga and mindfulness practice as an attempt to understand whether the two related practices yield different results in body awareness and emotion regulation (Daubenmeir, Mehling, Bartmess_Levasseu, Acree, & Stewart, 2012). Individuals who practice yoga regularly reported significantly higher levels of mindfulness than the meditation group. In particular, participants reported greater emotional awareness, ability to notice emotions, greater trust in emotions.

Yoga is effective at improving factors beyond mindfulness. Rani and Rao (1994), for instance, conducted a study where they compared people who practiced yoga for three months versus controls and noted that participants who were in the yoga group reported greater awareness of their body sensations than controls (interoceptive awareness). Khalsa and

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colleagues (2008) have also evaluated how yoga may be beneficial in enhancing interoceptive awareness. They measured interoceptive awareness using heartbeat perception measures; subjects determine whether an exteroceptive stimulus, such as a tone is in line with their heart beat. Individuals who were in the group who reported practicing mindfulness and yoga techniques reported improved ability to detect their heart-rate detection accurately than individuals who did not report meditating or practicing yoga (Khalsa, Rudrauf, Damasio, Davidson, Lutz, & Tranel, 2008). While meditation is different from yoga, yoga utilizes forms of meditation in most classes, and the practice itself may be considered a moving meditation.

Additionally, Gard and colleagues (2012) assessed whether yoga leads to changes in self-compassion given promising results from a pilot study evaluating changes in self-compassion in individuals training to be yoga instructors (Conboy, Wilson, & Braun, 2010). In a comparison study, Gard et al., (2012) noted that participants from a yoga immersion program reported greater self-compassion in addition to mindfulness as a result of yoga practice than the control and that both self-compassion and mindfulness explained the relationship between changes in perceived stress and quality of life.

Yoga has been successfully used as an adjunct or treatment for many medical conditions. For instance, yoga has been noted to be effective in ameliorating back pain (Galantino, Bzdewka, Eissler-Russo, & Holbrook, 2004; Jacobs, Mehling, Goldberg, & Eppel, 2004) even when compared to other forms of exercise (Sherman, Cherkin, Erro, Miglioretti, & Deyo, 2005). Yoga has also been noted to improve osteoarthritis (Kolasinksi, Garkinkel, Tsai, Matz, Van Dyke, & Schumacher, 2005), cardiovascular disease (Innes & Vincent, 2007; Jayasinghe, 2004), fatigue

for many different populations including cancer, MS, asthma, and dialysis patients (Boehm, Ostermann, & Büssing, 2012).

Yoga has also been noted to help normalize function of the autonomic nervous system by decreasing levels of salivary cortisol (Michalsen, Grossman, Acil, Langhorst, Ludtke, & Esch, et al., 2005; West, Otte, Geher, Johnson, & Mohr, 2004), blood glucose (Khatri, Mathur, Gehlot, Jain, & Agarwal, 2007), and 24-hour nor-epinephrine and epinephrine levels (Selvamurthy, Sridharan, Ray, Tiwary, Hedge, Radhakrishnan, et al., 1998). Yoga has also been associated with positive changes in blood pressure and cortisol (Büssing, Michalson, Khalsa, Telles, & Sherman, 2012) and HPA axis functioning.

Beyond treating medical conditions, yoga has also been utilized to support treatment of psychological disorders, namely depression and anxiety. For instance, Pilkington and colleagues (2005) have noted that five randomized controlled trials indicated positive changes in depressive symptoms. In another study, a group of 17 individuals diagnosed with unipolar depression participated in 20 classes led by Iyengar yoga teachers and completed pre and post-intervention questionnaires. Eleven of the 17 participants reported significant decreases in depressive symptoms, and many reached the remission stage of depression after the intervention. Participants whose depression remitted showed a greater capacity for emotion regulation (Shapiro, Cook, Davydov, Ottaviani, Leuchter, & Abrams, 2007).

Studies indicate mixed results in the use of yoga as a technique to reduce anxiety (Li & Goldsmith, 2012). For instance, Banerjee and colleagues (2007) have evaluated how a routine yoga would affect anxiety among post-operative breast cancer patients and noted a significant decrease in anxiety for the yoga group compared to controls. Waelde and colleagues (2004) have

also evaluated how yoga may impact anxiety in a community sample of women compared to controls. The yoga group participated in 90-minute yoga sessions, twice a week for eight weeks. No significant differences were noted for depression, while the yoga group compared to the control group had significant reductions in both state and trait anxiety scores as measured by the STAI (Javnbakht, Kenari, & Ghasemi, 2009).

Yoga has also been utilized with individuals diagnosed with PTSD, where about 28.8% of VA's responding to a survey reported that they provide yoga as a part of treatment (Libby, Reddy, Poliver, & Desai, 2012). A review article reported data from many studies suggesting that yoga may be effective in reducing PTSD symptoms, perceived stress, and respiration rate in victims of a natural disaster (Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012). PTSD symptoms were also noted to decrease for individuals with exposure to combat and terrorism who practiced yoga (Telles, Singh, & Balkrishna, 2012).

In sum, yoga has become a wider-spread intervention and increasingly mainstream (Field, 2011). Yoga is a practice that a variety of ages practice and research supports yoga's benefits both regarding increasing mindfulness, body awareness (Rani & Rao, 1994), medical conditions, and psychological conditions, many of which are associated with eating disorder pathology.

Yoga, Body Dissatisfaction, and Eating Disorders

Yoga has also been implemented in eating disorder treatment programs given the success noted in the treatment of other disorders and the fact that much of yoga theoretically works on improving many of the factors associated with disordered eating (Frisch, Herzog, & Franko, 2006). Frisch and colleagues (2006) reported that around two-thirds of residential treatment

centers assessed offered yoga to patients (18 treatment centers). This number is only increasing (Lisa Diers, Personal communication, June 30, 2016). However, there are limited research studies that discuss how yoga, body image, and eating disorder pathology relate.

Yoga is perceived to be beneficial for the treatment of eating disorders and body image disturbances for many reasons. For one, Frederickson and Roberts (1996) suggest that adding physical activity is a beneficial addition to treatment and prevention of disordered eating and body image disturbance because it should protect against thin-ideal internalization and self-objectification. It is expected that it allows for pride and greater knowledge and acceptance of body functionality versus appearance. However, other studies have demonstrated that specific kinds of physical activity are associated with greater body dissatisfaction and eating disorder pathology for males and women. For instance, studies indicate that gymnasts, dancers, and image or weight focused (e.g. wrestling) sports are more likely to report this (Furnham, Badmin, & Sneade, 2002; Milligan and Pritchard, 2006; Schwarz, Gairrett, Aruguete, & Gold, 2005).

Solenberger (2001) conducted a study evaluating the amount of physical exercise and the relationship between eating disorder symptomology, thin-ideal internalization, and body image dissatisfaction. Individuals with AN and BN who reported high levels of exercise endorsed greater body dissatisfaction, eating disorder symptoms and drive for thinness. It appears that patients who reported higher amounts of aerobic exercise reported higher degrees of preoccupation with their weigh and thin-ideal internalization, while participants who reported engaging in strength exercises reported less thin-ideal internalization or weight preoccupation (Solenberger, 2001).

Researchers have also evaluated whether aerobic or weight training may be effective at improving negative body image. Henry and colleagues (2006) assessed body image after participants engaged in aerobic and strength training courses, just aerobic courses, or no exercise (controls) and noted that body image improved more for the aerobic and strength-training group versus the control and aerobic exercise only group (Henry, Anshel, & Michael, 2006). Yoga has been differentiated from routine aerobic and strength training exercises (Field, 2011; Gard, Brach, Hölzel, Noggle, Conboy, & Lazar, 2012; Mahlo & Tiggermann, 2016). Yoga focuses less on competition (e.g., winning a race, making a weight class, or scoring the most points), but rather practicing listening to one's body, remaining in the present moment, accepting where one's body is in the moment, and merging breathing with physical postures (Rani & Rao, 1994). As such, yoga may be a physical activity that emphasizes different values than some of these noted physical activities that have caused significant body image distress and disordered eating.

Other hypotheses related to body dissatisfaction, disordered eating and yoga suggest that yoga will improve body awareness and responsiveness through exposure and greater practice in mindfulness and focus on learning to focus on both thoughts and physical sensations (Rani & Rao, 1994). Research has supported that yoga improves interoceptive awareness and body awareness which are two features significantly related to eating disorder pathology and body image dissatisfaction. (Fassino, Piero, Gramaglia, & Abbate-Daga, 2004; Masumoto et al., 2006; Merwin et al., 2010; Rani & Rao, 2004).

Furthermore, yoga encompasses a value-system of kindness towards the self and acceptance both regarding experiencing emotions and noticing thoughts without judgment (Gard et al., 2012; Sengupta, 2012). Individuals who report disordered eating, body dissatisfaction, and

related traits are more likely to report shame, lower self-compassion and self-esteem, and less tolerance of painful emotions (Halmi et al., 2000; Holliday et al., 2006; Rastam, et al., 1997; Wasylkiw, MacKinnon, & MacLellan, 2012). Thus, yoga may be a beneficial practice and method to intervene with eating disorder pathology or related risk factors including perfectionism, shame, and poor self-concept.

In research evaluating the impact of yoga on body dissatisfaction and eating disorder pathology, findings are diverse. For instance, Neumark-Sztainer and colleagues (2011) conducted correlational research which indicates that yoga practitioners are as likely, or more likely to endorse body image concerns than young adults who do not practice yoga. In general, the study indicated that around 55.2% of women and 33.1% of men reported unhealthy weight control behaviors while 21.2% and 7.8% of young women and men respectively reported extreme weight control behaviors. Unhealthy weight control behaviors included fasting, using food substitutes, skipping meals, and smoking cigarettes to curb one's appetite; extreme weight behaviors included taking diet pills, making oneself vomit, and the use of laxatives and diuretics. Neumark-Sztainer and her colleagues (2011) also noted that about 17.6% of young women and 5.2% of men participated in an average of 30 minutes or more of yoga or Pilates weekly.

Hierarchical logistic regressions results supported that young women who practice yoga and Pilates were less likely to report body dissatisfaction than women who did not participate in yoga or Pilates. However, disordered eating was reported equally among both groups of females. Men who participated in yoga endorsed significantly more extreme weight control behaviors and binge eating than individuals who did not report practicing yoga (Neumark-Sztainer et al., 2011).

Daubenmeier (2005) also conducted a study comparing individuals who have practiced yoga, aerobics, or who have not engaged in any physical activity in the past two years. Daubenmeier (2005) noted that women who practiced yoga reported greater body awareness, responsiveness, body satisfaction, and less objectification. Findings also suggested that yoga practitioners endorsed lower levels of self-objectification, which is the tendency to see one's body as an object (Daubenmeier, 2005) than women who did aerobics. Yoga practitioners also reported higher satisfaction with physical appearance and less disordered eating attitudes compared to individuals who did not report practicing yoga. Greater body responsiveness among the yoga participants also significantly predicted lower self-objectification, greater body satisfaction, and less disordered eating attitudes.

Delaney and Anthis (2010) evaluated whether the type of yoga specifically predicted different levels of body awareness and body satisfaction. They broke down kind of yoga classes into three categories. The high mind-body group was considered to be physically demanding and requires a great amount of flexibility and agility while also emphasizing meditation, breathing, and yogic philosophy. The medium mind-body category included "Hatha" classes where physical poses and breath-work were of high importance, but the physical demands and yoga philosophy were a bit less intense. The low mind-body classes were considered to be classes in gyms and wellness centers which focused more on asanas and did not include spiritual elements. The researchers noted that body awareness was higher for medium mind-body classes than for low classes and that body part satisfaction had a similar trend. They also noted that more yoga practice, in general, was associated with heightened body awareness and that body part satisfaction was positively related to a person's sense of efficacy practicing yoga.

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Dittman and Freedman (2009) noted similar results and found that individuals who practiced yoga for more spiritual reasons versus appearance reasons were more likely to practice yoga at home and report greater levels of body image satisfaction. However, they noted that there were no differences between groups on body awareness or responsiveness and that women who practiced yoga for spiritual reasons versus appearance-related reasons reported more histories of eating disorder pathology.

Mahlo and Tiggerman (2016) assessed differences between types of yoga styles, body dissatisfaction, and disordered eating. They further contributed by evaluating how yoga relates to the embodiment model of positive body image (Menzel & Levine, 2011), which proposes that participation in activities that encourage greater body awareness will lead to mind-body integration and protective against external perspectives of the self, also known as self-objectification. The model proposes that participation in activities that lead to an improved sense of self-mastery and coordination will increase awareness and attentiveness to the body, and a sense of empowerment about one's body which will decrease viewing the body solely as an object and parts (Mahlo & Tiggerman, 2016).

To address this, Mahlo and Tiggerman (2016) compared three groups – a control group of college students, a group participating in Iyengar yoga courses and a group participating in Bikram yoga classes. Bikram is performed in a heated room with a specific sequence of yoga poses while Iyengar is a practice emphasizing alignment and the most popular style of yoga practiced in Australia where the study was run. The researchers noted a significant indirect effect of yoga practice on positive body image explained by higher levels of embodiment and reduced self-objectification. Intriguingly, while Bikram is a practice considered to be an intense practice

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(practiced in a room that is 104 degrees Fahrenheit) than Iyengar, participants in either group did not report differences in positive body image, embodiment, self-objectification or a related factor, drive for thinness. However, Bikram participants endorsed a greater desire to practice yoga for appearance and weight loss purposes (Mahlo & Tiggerman, 2016).

Only one study has examined how yoga relates to body image in males (Flaherty, 2014). Flaherty (2014) evaluated body image dissatisfaction in 3 different groups of males; men who reported practicing yoga for at least two years, beginning yoga students have signed up for a yoga class and not taking aerobic or weight-training classes, and the non-yoga/exercise group who has been weight-lifting for at least two years. Flaherty (2014) noted that experienced yoga practitioners endorsed lower body dissatisfaction than men who exercised Yoga beginners did not endorse different levels of body dissatisfaction than the experienced yoga group. These results may suggest males with lower levels of body dissatisfaction or desire to look more muscular are more likely to practice yoga.

A few studies have evaluated how yoga may act as a preventative strategy for body dissatisfaction, disordered eating, and related factors. These studies have provided contradictory results (Cook-Cottone, Beck, and Kane, 2008; Cook-Cottone, Jones, & Haugli, 2010; Impett, Daubenmeir, and Hirschman, 2006; Mitchell, Mazzeo, Rausch, & Cooke, 2007). Cooke-Cottone and her colleagues (2010) have evaluated how yoga may be beneficial as a prevention strategy for stress, body dissatisfaction, and disordered eating among 5th-grade girls in elementary schools. The prevention program incorporated more than just yoga, but also DBT skills, dissonance-induction content related to body dissatisfaction, and body image interventions inspired from eating disorder treatments. The yoga sessions included practice with breath-work,

self-talk, and emotional regulation during postures. The program yielded similar effects for both white and minority fifth-grade females and demonstrated improvements in drive for thinness, bulimia, body dissatisfaction, physical self-concept, and social self-concept which are all factors that relate to body image dissatisfaction (thin-ideal internalization, body dissatisfaction, and physical self-concept) and eating disorder pathology. However, Cook-Cottone and her colleagues (2010) did not find that the program improved other related factors including perceived stress.

Another study was conducted to compare yoga as a preventative measure to disordered eating compared to a dissonance-based intervention in a college sample (Mitchell, Mazzeo, Rausch, Cook, 2007). The Dissonance-based group met for six 45-minute sessions and discussed origin and perpetuation of their desire to be thin and discussed how the media perpetuates the thin ideal. The yoga condition met for the same amount, at the same time. Anxiety, body image, eating disorder symptoms, body dissatisfaction, and alexithymia (the ability to recognize emotion) was measured at the beginning of the six-week period and then at the end of the intervention. Unlike with Cook-Cottone and colleagues' findings (2010), Mitchell and her colleagues (2007) did not note significant improvements for the yoga group, while the dissonance-based group showed improvements in anxiety, alexithymia, body dissatisfaction, and drive for thinness. However, Mitchell et al. (2007) noted that there might have been a dosage effect, such that more yoga would have yielded greater changes in the predicted direction. Other researchers confirm that the lack of change noted in the yoga group may have related to a dosage effect (Klein & Cook-Cottone, 2013; Pacanowski, Diers, Crosby, & Neurmark-Sztainer, 2017).

Impett and colleagues (2006) have also tried to evaluate whether yoga may ameliorate embodiment (body awareness and body responsiveness), and self-objectification, which is

associated with thin-ideal internalization, thus body dissatisfaction and positive and negative mood. Participants were recruited from a yoga studio in San Francisco, California for a 2-month yoga immersion and filled out surveys each of the six weekends. There was a significant change in self-objectification for the women participants from the beginning of the study to the end; no other significant changes in body awareness, responsiveness, mood, or quality of life were noted (Impett, Daubenmier, and Hirschman, 2006). They also evaluated whether a frequency of practicing yoga related to improvements in mood and embodiment; Impett and colleagues (2006) noted that the frequency individuals practiced yoga related to improvements in life satisfaction and self-acceptance from the beginning to the end of the treatment.

Furthermore, only three randomized controlled trials (RCTs) and one non-randomized empirical study to date have evaluated that effectiveness of yoga in the treatment of eating disorder pathology and related factors (Carei et al., 2010; Hall, Ofei-Tenkoran, Machan, & Gordon, 2016; McIver et al., 2009; Pacanowski et al, 2017). In the first RCT conducted evaluating yoga and eating disorder pathology, participants from an eating disorder treatment program diagnosed with AN, BN, and Eating Disorder Not Otherwise Specified (EDNOS) were recruited to participate in the study and either randomly assigned to a waitlist or yoga group. The yoga group attended one hour of yoga, two times a week for eight weeks and met one on one with a yoga instructor. Carei and colleagues (2010) obtained measurements of eating disorder pathology, BMI, depression, anxiety at three different time points: baseline, post-intervention (week 9) and after a one month follow up.

The researchers noted that both groups' eating disorder symptoms improved from baseline to post-intervention, however, the yoga group continued to demonstrate improvements

at the 12-week mark, while the waitlist group reported significantly more eating disorder symptoms at the 12-week mark. Depression and anxiety also decreased for both groups. Furthermore, BMI did not significantly decrease among participants diagnosed with AN in the yoga condition and showed improvements, suggesting that it did not adversely affect clients' BMI over time.

Carei et al. (2010) also evaluated how yoga may affect food preoccupation, the tendency to ruminate over the foods one has eaten, before and after each yoga session. Waitlist participants were also given the same assessment at the same time as the yoga participants. Individuals in the yoga condition reported less food preoccupation after doing yoga each time, and Carei and colleagues (2010) noted medium to large effect sizes every time.

Researchers have also evaluated whether yoga may be a beneficial treatment for binge eating disorder (McIver et al., 2009). Participants were randomly assigned to a waitlist control or a yoga group to last for 12 weeks. Participants in the yoga condition practiced yoga for a 60-minute session of yoga weekly throughout these 12 weeks. The yoga practice included 5 minutes of breath-work, 45 minutes of asana, and 10 minutes of deep relaxation. Participants in the yoga group reported significant decreases in binge eating from pre-to-post assessment; a large effect size was noted (Cohen's $d = 2.2$). Participants in the waitlist condition did not report any significant changes over time. McIver and colleagues (2009) also assessed whether progress was maintained three months after the intervention and noted that there was not a significant difference in binge eating between the 3-month follow up and post-test at 12 weeks suggesting that these significant improvements were maintained.

In the third randomized control study, Pacanowski and colleagues (2017) evaluated state-based changes in emotion regulation, anxiety, and negative affect as measured by the Positive and Negative Affect Scale (PANAS) as opposed to longer-term changes. To do so, participants were randomized to a control condition (treatment as usual) or a yoga group that participated in an hour-long yoga course before dinner. Participant's pre-meal and post-meal negative affect was assessed in addition to having outside observers rate both groups' anxiety during the meal. Pacanowski and colleagues' results (2017) were promising. Participants who were in the yoga condition reported lower pre-meal negative affect and were rated to be less anxious during the meal. Changes in reported eating disorder symptoms were not different among groups. However, the study was conducted over five days of residential treatment. While there were no significant changes noted in eating disorder symptoms the scale assessing eating disorder symptomology (EDE-Q) assesses eating disorder behavior over 28 days and was likely not an ideal measure to assess symptom change as a result. Regardless, the significant findings that anxiety decreased, as a result, might suggest that adding yoga pre-meal may improve patient's ability to engage in behaviors required for recovery from their eating disorder while in treatment. This is pivotal since patients are often restricted to short stays often related to insurance limits, or financial constraints (Frisch et al., 2006).

One non-randomized study also supports yoga as an adjunct to outpatient eating disorder treatment among adolescents (Hall et al., 2016). Adolescents diagnosed with AN, BN, and avoidant restrictive food intake disorder (ARFID) were recruited to practice yoga once a week for 12 weeks. Completers reported decreases in state anxiety, depressive symptoms, especially as they relate to eating disorder pathology, and changes in shape and weight concern as measured

by the Eating Disorder Evaluation-Questionnaire which assesses four aspects of eating disorder pathology. Restraint in eating or worry about the food that one eating (eating concern) was not significantly different from baseline.

The Current Dissertation

The current dissertation is intended to elaborate on the literature evaluating how yoga relates to body dissatisfaction and eating disorder pathology through a repeated measures design. Furthermore, the study also assessed how factors associated with body dissatisfaction, disordered eating and yoga are related. To do so, two studies were conducted. In Study One, participants were recruited from a Midwestern university psychology pool. Participants completed assessments inquiring participants previous yoga participation, general demographics, body dissatisfaction and conversely body appreciation, eating disorder pathology, mindfulness,, self-compassion, and experiential avoidance.

For Study Two, participants were recruited from yoga classes that met three times a week for eight weeks. Only a few studies have evaluated how yoga improves eating disorder symptoms and body image during treatment in eating disorder samples, and even fewer studies have evaluated changes in disordered eating and body dissatisfaction among populations at risk of eating disorder pathology (Cook-Cottone et al., 2008; Impett et al., 2006; Mitchell et al., 2007). In the one study comparing a yoga group that met one time a week to a dissonance-based body image prevention group, Mitchell and colleagues (2007) did not find significant improvement in body image among the yoga group compared to the dissonance-based group. However, the participants only participated in yoga once a week, and the authors suggest that there may have been a dosage effect (Mitchell et al., 2007). Indeed, for the two prevention

studies that resulted in successful decreases in eating disorder pathology and body

dissatisfaction, participants engaged in yoga two or three times a week (Cook-Cottone et al.,

2008; Impett et al., 2006). Correlational studies have also supported this; individuals who

reported practicing yoga more often were noted to report lower body image dissatisfaction and

eating disorder symptoms (Daubenmeir, 2005). However, Neumark-Sztainer et al. (2011) have

noted that adolescents who engage in yoga and Pilates still report significant eating disorder

symptoms. To amend for such limitations in Mitchell et al. (2000), participants in this study

practiced yoga three times a week. Most research studies on yoga, body image, and disordered

eating, have been conducted using females only. This dissertation extended the literature by also

assessing this relationship among college-males given that only one study has evaluated how

yoga related to body dissatisfaction among males (Flaherty, 2014).

Instead of just evaluating how yoga may improve negative body image and disordered

eating in a repeated measures design, Study Two also assessed whether body appreciation, self-

compassion, and mindfulness improve over time. For one, yoga philosophy encompasses

teachings that garner body appreciation, acceptance, and awareness, an improvement in body

appreciation was expected (Rani & Rao, 1994). Researchers have encouraged evaluation of

positive body image as well, considering many theories suggest that while negative body image

and disordered eating may be difficult to prevent, the opposite, that is, promotion of positive

body image may be effective as well (Piran, 2015). Furthermore, yoga is an activity that

cultivates positive beliefs and greater acceptance more in line with ACT, DBT, and mindfulness

models versus the CBT model which attempts to challenge negative beliefs and feelings. It was

hypothesized that teaching acceptance might lead to greater acceptance of one's body (Hayes et al., 2004; Sengupta, 2012).

Therefore, both studies included self-compassion (SC) and mindfulness as crucial variables. Research supports that SC and mindfulness often buffer against many negative body image features and disordered eating. Improvements in SC and mindfulness are associated with improvements in symptoms during eating disorder treatment (Kelly, Carter, Borari, 2014). Since yoga as a practice also attempts to improve self-acceptance and mindfulness practices have been shown to strengthen self-compassion, it was assumed that yoga might relate to changes in both SC and mindfulness. These changes were expected to also relate to changes in disordered eating and body dissatisfaction. This dissertation is the first study to evaluate how yoga may improve self-compassion and mindfulness and how that improvement relates to changes in body image and disordered eating.

An additional inquiry evaluated how experiential avoidance relates to body dissatisfaction, eating disorder pathology, and how yoga may impact a person's tendency to engage in experiential avoidance. Research suggests that experiential avoidance is linked to eating disorder symptomology and body dissatisfaction and that improvements in EA relate to improvements in eating disorder symptoms (Juarascio et al., 2013; Lavender et al., 2010; Prowse et al., 2013). Furthermore, yoga is cited to relate to improvements in body awareness and interoceptive awareness in general and also to decreases in eating disorder pathology (Fassino et al., 2004; Khalsa et al., 2008; Rani & Rao, 1994). Since yoga and mindfulness may act as an exposure to negative emotions and cognitions related to the body, experiential avoidance will likely decrease (Kristeller et al., 2006).

In sum, two studies were conducted to a) first assess the general relationship between the variables of interest, and b) evaluate changes in variables upon completing a yoga class meeting for eight weeks (50 minutes, three times a week). The variables of interest include mindfulness, self-compassion, experiential avoidance in addition to body dissatisfaction, body appreciation, and eating disorder symptoms. Study one utilized correlation, regression, and mediational analyses to assess the relationships between variables to assess which specific factors might be beneficial to incorporate in yoga or what factors that often improve to yoga may be the active ingredient in the prevention of eating disorder pathology and body dissatisfaction.

Study Two was a quasi-experimental study recruiting participants from yoga classes meeting three times a week for 8 weeks. Study Two assessed changes in body dissatisfaction, eating disorder symptoms, self-compassion, body appreciation, mindfulness, and experiential avoidance from the first day of yoga (Time 1) to the last yoga class (Time 2) eight weeks later.

CHAPTER II

STUDY ONE INTRODUCTION

Eating disorder pathology has many etiological factors that researchers have evaluated in detail to develop prevention and treatment protocols that are effective. These factors include body dissatisfaction, perfectionism, and low self-esteem, poor interoceptive awareness, anxiety, and depression to name a few (Fairburn, 2008; Stice, 2002). Many theoretical models have been established to explain body dissatisfaction and the development of eating disorder pathology. And while research is promising, there is significant work to be done to develop a parsimonious understanding of body image (dissatisfaction) and eating disorder pathology.

Some researchers have suggested that eating disorder pathology and body image disturbance occurs through psychosocial factors (Thompson, Heinberg, & Altabe, & Tantleff-Dunn (1991). This tripartite model of eating disorder pathology suggests that individuals are likely to develop eating disorder pathology or body dissatisfaction as a result of peer, parental, and media pressures. This relationship is explained through thin-ideal internalization and appearance comparisons. Individuals who experience high levels of pressure and then internalize the thin ideal are more likely to report eating disorder pathology.

Furthermore, the transdiagnostic model employs a cognitive-behavioral lens in explaining eating disorder pathology. This model emphasizes that eating disorder pathology results from self-critical and negative schemas that increase perfectionism, low self-esteem, intolerance of mood, and interpersonal difficulties. In this model, individuals may start to fixate on their body

weight, shape, and eating behaviors. Often this leads to a narrowing of their view of themselves where they over-evaluate the importance of their weight and shape and narrow their focus from being well rounded (e.g., a student, friend, etc.) to their body weight and shape. This over-focus on body weight and shape may be maintained through continuous dieting, loss of control of eating behavior, and continued fear of being overweight, gaining weight, and loss of control of eating (Fairburn, Cooper, & Shafran, 2003).

More recent models have also evaluated how emotion impacts the development and maintenance of eating disorder pathology (Wildes, Ringham, & Marcus, 2010; Schmidt & Treasure, 2006; Slade, 1982). It is argued that especially with anorexia, individuals may engage in eating disorder pathology in order to avoid thinking about or facing aversive stimuli, especially negative emotions or negative perceptions of oneself. Indeed, research supports that engaging in disordered eating has related to decreases in anxiety and negative affect, which is maintained through continued avoidance (Wildes et al., 2010). Heatheron and Baumeister (1991) have also suggested a similar model to explain binge eating behavior.

While only assessing a non-clinical sample, Study One was designed to evaluate the relationship between eating disorder symptoms and body dissatisfaction with avoidance behaviors (similar to the emotion regulation and escape models) as well as high self-acceptance and attunement (mindfulness) which relate to cognitive schemas (CBT/transdiagnostic model). On top of further evaluating factors associated with eating disorder pathology and disordered eating, Study One was also designed to examine how factors related to both eating disorder pathology and yoga are related given yoga's use during eating disorder treatment to continue to build upon preliminary models suggesting the use of yoga in treatment. Lastly, Study One was

intended to provide further rationale for the implementation of yoga in eating disorder treatment and prevention strategies through examining explanatory relationships via mediation among factors that are believed to improve through yoga practice and are often problematic for individuals diagnosed with eating disorders.

To reiterate, the main features of eating disorder pathology include body image disturbance and an over-emphasis of one's weight on self-image (APA, 2013). Individuals who report disordered eating and meet DSM-5 criteria for eating disorders often report that they are terrified of weight gain and displeased with their body shape (Fairburn & Beglin, 2008; Killen et al., 1996; Stice, 2002). Individuals may fixate on typical body regions they perceive to differ from the lionized thin ideal. It is common for individuals endorsing disordered eating or who meet criteria for an eating disorder also to report a preoccupation and fear of being overweight (overweight preoccupation).

Eating behavior is the other major factor impacted among individuals with eating disorder diagnoses and even body image disturbance. Such individuals often report restriction of food via fasting or trying to limit the amount eaten (restriction). Individuals diagnosed with eating disorders may also report an overall concern about the types of food or food groups they eat (e.g., carbohydrates and fats; eating concern and food preoccupation). Often individuals report loss of control over eating in the form of binging and often compensatory behaviors such as self-induced vomiting, purging, etc. (van Strien et al., 1986).

While there are many validated treatments for eating disorders, there is still need for improvements in care – many patients relapse and treatment outcomes are considered to be poor to moderate at best (Stice, Marti, Shaw, & Jaconis, 2009). Furthermore, disordered eating and

body dissatisfaction are becoming increasingly prevalent and are leading etiological component to eating disorder pathology, and thus are essential features to utilize prevention strategies and treatment on (Bucchianeri, Arikian, Hannan, Eisenberg, & Neumark-Sztainer, 2013). While not a primary intervention nor a primary prevention strategy, yoga has been incorporated as an adjunct to eating disorder outpatient (Hall et al., 2016), inpatient or residential treatment (Carei et al., 2010; Pacanowski et al., 2017), and studied as a prevention measure (Cook-Cottone et al., 2008; Mitchell et al., 2007).

Variables that relate to yoga and eating disorder pathology include mindfulness, self-compassion, and experiential avoidance. For instance, self-compassion has been noted to relate to less dieting behavior (Ferreira, Pinto-Gouveia, & Duarte, 2013) and also less preoccupation with food (Breines et al. 2014). Furthermore, SC is associated with less body dissatisfaction, concern with one's weight, and body appreciation with is inversely predictive of disordered eating behavior. Yoga, which emphasizes self-acceptance and listening to one's body may relate to improvements in self-compassion over time as the practice emphasizes accepting what your body is capable of doing (physical poses, breathwork, and mindfulness). Indeed, one study has supported that yoga improves self-compassion (Gard et al., 2012).

Other research has supported that individuals with eating disorders report lower mindfulness. For instance, individuals who report binging and purging have reported lower levels of mindfulness. Furthermore, individuals are likely to also report less awareness of behavior and report feeling over-taken by negative thoughts (Prowse et al., 2013). Yoga is associated with improvements in mindfulness over time and yoga practitioners continuously

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report higher levels of mindfulness than individuals who do not practice yoga (Brisbon &

Lowery, 2009; Curtis et al., 2011; Gard et al., 2012; Hewett et al., 2011).

Furthermore, experiential avoidance (EA) has been continuously associated with eating

disorder symptomology and relates to the escape model of eating disorder pathology (Heatherton

& Baumeister, 1991). For one, participants with greater eating disorder pathology often report

body image avoidance and avoidance of mirrors (Shafran et al., 2004). Furthermore, individuals

with eating disorders are likely to experience lower interoceptive awareness than individuals

without an eating disorder diagnosis. While research has not determined how this occurs, it may

be related to tendency to avoid aversive stimuli and individuals report discomfort with feelings

of hunger and often report feeling "fat" which correlates with feeling bloated or uncomfortable in

one's skin (Ainley & Tsakiris, 2013; Fairburn et al., 2008; Fassino et al., 2004).

Individuals with body image disturbance and eating disorder pathology are also likely to

report avoiding eating foods they enjoy because of anxiety about how food will impact their

weight or how people will perceive their body weight – and they may fear that others will see

them as fat (Fairburn & Beglin, 2008). As such, EA appears to be impactful (Juarascio et al.,

2013). Yoga, is a practice that essentially incorporates body and breathing and is largely a

practice that emphasizes noticing feelings in one's body, identifying them, etc. (Salmon et al.,

2009). Research has demonstrated that individuals develop increased body awareness and

attunement through yoga practice (Rani & Rao, 1994), which may help to decrease experiential

avoidance and potentially the relationship between EA and eating disorder pathology.

In Study One, it was expected that self-compassion and mindfulness would be positively

related – individuals who report higher levels of self-compassion would endorse greater

mindfulness. It was also expected that SC and MI would be negatively related to body

dissatisfaction, eating disorder sympotms, and BMI given previous research findings. An

associated factor, body appreciation was also hypothesized to negatively related to disordered

eating and body dissatisfaction. Furthermore, research supports that EA predicts disordered

eating and body dissatisfaction (Burtryn et al., 2011; Juarscio et al., 2013), this relationship was

expected to be replicated in this study. Additionally, it was expected that SC and MI would be

negatively related to EA given that individuals reporting higher levels of SC and MI are

predicted to be more accepting of perceived flaws (Breines et al., 2012).

Self-compassion and mindfulness were also evaluated as explanatory variables. Stice and

colleagues (2002) have provided substantial evidence that individuals reporting higher body

dissatisfaction are at higher risk for developing eating disorder symptoms as they hold more

rigidly the thin ideal (perception they need to look similar to a thin model aesthetic), thus putting

them at greater risk for internalizing perceived flaws. Self-compassion and mindfulness are

perceived to counteract negative beliefs about one's body which impact disordered eating

because participants may be more accepting of such perceived flaws and more able to respond

without judgment (Neff, 2003; Wasylkiw et al., 2012). It was hypothesized that self-compassion

and/or mindfulness would explain the relationship between EA and eating disorder pathology.

Experiential avoidance, the tendency to avoid aversive experiences and stimuli is

associated with eating disorder pathology and body dissatisfaction. For instance, individuals with

eating disorders may engage in eating disorder symptomology to avoid negative emotions and

also anxiety about eating food they fear will make them gain weight by using compensatory

behaviors or restriction. Similarly, body avoidance and poor interoceptive awareness have been

established as side effects and associated factors of eating disorder pathology. Poor interoceptive awareness may also relate to experiential avoidance since interoceptive awareness often results from individuals prolonged disregarding of hunger and fullness cues and individuals who engage in body avoidance avoid looking at their bodies out of fear they will see themselves as overweight. Self-compassion and mindfulness were expected to explain the relationship between experiential avoidance and eating disorder symptoms and body dissatisfaction; individuals who report a higher tendency to avoid aversive stimuli may be more likely to report less self-acceptance or mindfulness which may lead to increased body dissatisfaction and disordered eating behaviors.

Furthermore, individuals who practice yoga are more likely to report greater mindfulness (Salmon et al., 2009), self-compassion (Gard et al., 2012) in addition to less body dissatisfaction and disordered eating (Daubenmeir, 2005). Thus, it was expected that in this sample, individuals who report practicing yoga more frequently would report greater mindfulness, self-compassion and less disordered eating and body image concern.

Hypotheses

Hypothesis 1a: Self-compassion will be negatively associated with experiential avoidance, eating disorder symptoms, and body dissatisfaction and positively associated with body appreciation and mindfulness. Individuals reporting higher self-compassion will report lower experiential avoidance, disordered eating, and body dissatisfaction. Individuals reporting higher self-compassion will report greater body appreciation and mindfulness.

Hypothesis 1b: Experiential avoidance will be positively associated with body dissatisfaction and eating disorder symptoms and negatively correlated with body appreciation and mindfulness.

In other words, individuals reporting higher levels of experiential avoidance will report higher degrees of disordered eating and body dissatisfaction and lower body appreciation and mindfulness.

Hypothesis 1c: Mindfulness will be positively associated with self-compassion and body appreciation and negatively associated with body dissatisfaction, disordered eating, and experiential avoidance. Higher levels of mindfulness will be related to lower levels of body dissatisfaction and disordered eating and higher self-compassion and body appreciation.

Hypothesis 1d: BMI will correlate positively with eating disorder symptoms, experiential avoidance, and body dissatisfaction, and will negatively with self-compassion, mindfulness, and body appreciation. Higher BMI will be associated with higher levels of disordered eating and body dissatisfaction and lower self-compassion, mindfulness, and body appreciation.

Hypothesis 2: Self-compassion will mediate the relationship between body dissatisfaction and eating disorder symptoms. Individuals reporting higher body dissatisfaction will report lower self-compassion, which will lead to increased eating disorder pathology as measured by the Global EDE-Q.

Hypothesis 3a: (exploratory): Self-Compassion will mediate the relationship between experiential avoidance and eating disorder symptoms. Engaging in experiential avoidance will contribute to lower self-compassion which will contribute to higher amounts of eating disorder symptoms.

Hypothesis 3b: (exploratory): Self-Compassion will mediate the relationship between experiential avoidance and body dissatisfaction (namely overweight preoccupation, appearance evaluation, and appearance orientation). Individuals who report higher experiential avoidance

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will report lower self-compassion which leads to greater body dissatisfaction – including

overweight preoccupation, appearance evaluation, and appearance orientation.

Hypothesis 4: Participants who have practiced yoga before will report higher yoga-self efficacy,

self-compassion, mindfulness, and less experiential avoidance.

CHAPTER III

STUDY ONE METHOD

Participants

Participants self-selected to participate in Study One from a SONA participant pool in the

psychology department of a Midwestern University. There were no exclusion criteria to

participate in Study One. A total of 167 participants including 150 women (89.8%) and 17 men

(10.2%) participated in the study. Due to the poor spread in gender, only women were included

for Study One (n = 150). Participants were largely representative college demographics, (M =

19.93, SD = 2.61). The majority of students were either Freshman (n = 50, 33.6%), Sophomores

(n = 51, 34.2%) with less Juniors (n = 31, 20.8%), Seniors (n = 16, 10.7%), and one studied

identified as "other" (0.7%). Participants were mostly Caucasian (n = 140, 94.6%). See Tables 1,

2, and 3 for full demographic details.

Procedure

Study One was conducted in lab and utilized a sample of students from the SONA Systems©

(Tallinn, Estonia) pool of the psychology department of a Midwestern university. Participants

enrolled online and then participated in person and responded to questionnaires using pen and

paper. Participants were given one SONA credit for compensation, which took participants 30 to

45 minutes. Research assistants were present to answer any questions participants had about the

questionnaires and after participants completed the packet, the research assistants entered the

data on excel sheets later input into IBM SPSS V24.0. Two research assistants reviewed data and

ensured that data was entered accurately in excel sheets and coded any missing responses in

SPSS.

Table 1: Demographic Details for Study One

Variable	N	Percent
	167	100
Gender*		
Women	150	89.8
Men	17	10.2
Ethnicity[a]		
Caucasian	140	93.3
African American	2	1.4
Hispanic	2	1.4
Asian American	2	1.4
American Indian	2	1.4
Other	0	0.0
Sexual Orientation[a]		
Straight	139	92.7
Gay/Lesbian	3	2.0
Bisexual	2	1.4
Pansexual	3	2.0
Other	1	0.7
Grade		
Freshman	50	33.6
Sophomore	51	34.2
Junior	31	20.8
Senior	16	10.7
Other	1	0.7
	M	SD
Age	19.93	2.61
BMI	23.33	3.05
Average Hours of exercise weekly	7.34	7.14

* men were removed from analyses, n = 150 women, [a] = 2 participants did not provide a
response

Table 2: Study One: Self-Reported Eating Disorder History

Variable	N	Percent
Eating Disorder (ED) History		
No Previous ED Diagnosis	147	98.0
Previous ED Diagnosis	3	2.0
Anorexia Nervosa	2	1.3
Bulimia Nervosa	1	0.7
Binge Eating Disorder	0	0

Table 3: Study One: Yoga Experience

Variable	N	%
Practiced Yoga Before		
Yes	127	84.7
No	23	15.3
Ashtanga	5	4.0
Anusara	0	0
Bikram	15	11.9
Flow	49	38.9
Forrest	1	0.8
Iyengar	0	0
Jivamukti	0	0
Kripalu	1	0.8
Kundalini	0	0
Prenatal	0	0
Restorative	10	7.9
Sivananda	1	0.8
Viniyoga	6	4.7
Vinyasa/Power	57	44.9
Yin	6	4.7
Pilates	51	39.8
Other[a]	7	6.0
Average Styles of Yoga Previously Attempted	1.8	($SD = 2.23$)

[a] participants reporting other reported practicing PiYo, Tai Chi, or "Yoga for Athletes"

Measures

Demographic questionnaire. Information about the participant's age, year in school, ethnicity, sexual orientation, and gender identity were assessed. Additionally, participants responded to questions assessing the level of experience participating in yoga, yoga styles they have tried, and their general opinion of yoga. Participants were also asked the amount of time

that they participated in other physical activities to assess the overall amount of exercise the participants participated in each week. Furthermore, individuals reported their weight and height to obtain a measure of BMI. While research suggests that BMI may not be the most accurate measure of adiposity, and that sometimes individuals report their weight to be heavier or lighter than it is, research suggests that self-reported and actual BMI measurement will provide similar prediction of health risk and categorization (Stommel & Schoenborn, 2009). A previous history of a diagnosis of an eating disorder was also obtained. See Appendix A for the demographics questionnaire.

Eating disorder pathology. Participants completed the *Eating Disorder Examination Questionnaire (EDE-Q*; Fairburn, & Beglin, 1994; 2008). The EDE-Q is a self-report measure that has been derived from the Eating Disorder Examination (EDE) interview (Fairburn & Cooper, 1993; Fairburn, Cooper, & O'Connor, 2008). This measure was selected because it is considered one of the better measures of eating disorder symptomology and is widely used to assess eating disorder pathology in both clinical and community settings (Binford, Le Grand, & Jellar, 2005; Grilo, Masheb, & Wilson, 2001; Kelly, Carter, & Borairi, 2013; Mond, Rodgers, Hay, Owen, & Beumont, 2004; Wilfley, Schwartz, Spurrell, & Fairburn, 1997). Furthermore, it is one of the few eating disorder assessments that has been normed on college-aged males (Lavender, De Young, & Anderson, 2009). Research suggests that the EDE-Q demonstrates acceptable retest-reliability, which is important for repeated measures designs (Luce and Crowther, 1997; Luce, Crowther, & Pole, 2008) who report a retest reliability after three weeks of .81 to .94. However, Luce and colleagues (2008) noted that there was a lower range of internal

consistency (between .57 to .70) for binge eating, self-induced, vomiting, and laxative use (behavioral items) which were not used for the current study.

The EDE-Q consists of a Global EDE-Q score (an average of all four subscales) and four subscale scores including Restraint (Restraint), Shape Concern (SC), Weight Concern (WC), and Eating Concern (EC). The Restraint scale assesses the degree to which people report trying to restrict food, SC indicates the amount of concern a person reports about their shape, WC indicates the degree of concern someone reports of their weight and EC is the degree a participant reports worrying about the foods they are eating. Luce, Crowther, and Pole (2008) published norms for undergraduate women at a university and noted internal consistencies that were mostly adequate with a range from .78 to .93. Lavender and colleagues (2009) noted similar results related to internal consistency among male college students in their sample. For Study 1, internal consistencies for all subscales of the EDE-Q were in the acceptable range: Restraint (α = .83), Eating Concern (α = .84), Weight Concern (α = .87), Shape Concern (α = .92), and Global EDE-Q (α = .93). Only the Global EDE-Q score was utilized to represent disordered eating in the sample in mediation analyses. Correlations included all four subscales (Restraint, Eating Concern, Weight Concern, Shape Conern).

Body Image

Multidimensional Body-Self Relations Questionnaire. The Multidimensional Body-Self Relations Questionnaire-Appearance Subscales (MBSRQ-AS; Cash, 2000) is widely used among men and women to assess body image disturbance. Given that body image is a multidimensional construct, getting a more nuanced understanding of body image was imperative. The MBSRQ-AS is a set of 34 items on a 5-point Likert Scale. The five subscales

include *Appearance Evaluation* (AE), *Appearance Orientation* (AO), *Body Areas Satisfaction* (BAS), *Overweight Preoccupation* (OP), and *Self-Classified Weight* (SCW). Appearance Evaluation (AE) measures the degree that someone feels about their physical appearance, specifically their physical attractiveness. Low scores on this scale indicate a greater unhappiness with their physical attractiveness. Appearance Orientation (AO) measures the amount of investment that the individual has with how they look; low scores suggest that participants are "apathetic" to their appearance and that their looks may not be that important to them while higher scores suggest an individual cares and focuses more on their appearance. The Body Areas Satisfaction (BAS) subscale evaluates specific aspects of a person's appearance – higher scores suggest greater satisfaction. The Overweight Preoccupation (OP) scale assesses the degree that someone reports being anxious about gaining weight, their degree of eating restraint, and weight vigilance. Self-Classified Weight (SCW) is a scale that assesses how an individual labels their own weight into a specific category ranging from underweight to overweight (Cash, 2000). Higher scores on OP and SCW suggest higher degrees of anxiety about weight and their beliefs about being overweight.

The MBSRQ is a scale that is promising for this study in that all subscales have adequate internal consistency for males (ranging from α = .70 - .88) and females (α = .73 - .88). Additionally, these subtests demonstrate adequate retest reliability with correlations for males ranging from .79 to .89 for males and .74 to .91 for women over a 1-month period. It also appears that comparisons of similarities and differences between males and females are possible on this scale (Cash, 2000; Vossbeck-Elsebusch, Waldorf, Legenbauer, Bauer, Cordes, & Vocks, 2014). Internal consistency was acceptable for most scales with the exclusion of Self-Classified

Weight (α = .69) below the suggested .80 cut-off. For Study One, AE (α = .89), AO (α = .83), BAS (α = .84), and OP (α = .75) were in the acceptable range. Of note, only the AE, AO, and OP scales were utilized as participants already completed an assessment of body appreciation/esteem and SCW only had two items with poor internal consistency.

Body Appreciation. The Body Appreciation Scale-2 (BAS-2) was also included in order to understand the potential relationship with self-compassion, yoga, eating disorder symptoms, and greater appreciation and acceptance of one's body (Avalos, Tylka, & Wood-Barcalow, 2005; Tylka and Wood-Barcalow, 2015). This scale is a 10-item self-report scale assessing the individual's positive view of their body. The scale ranges from 1 (never) to 5 (always) where the items are averaged, and a higher score indicates greater body appreciation. The psychometric properties are promising and the scale has a Cronbach's alphas ranging from .94 for women and .93 for males (Tylka and Wood-Barcalow, 2015). Retest reliability over three weeks is also fairly high (r = .90) for both males and females. The BAS-2 was used as opposed to the original BAS because items were specifically written to be appropriate for both male and female samples (Tylka and Wood-Barcalow, 2015). In Study 1, internal consistency was excellent (α = .94).

Self-Compassion. To measure self-compassion, participants were given the *Self-Compassion Scale (SCS),* a 26-item, self-report questionnaire developed by Neff (2003a). The SCS consists of six different factors, including a) self-kindness (SK), b) self-judgment (SJ), c) common humanity (CH), d) isolation (IS), e) mindfulness (MI), and f) the over-identification (OI) in addition to a total score (SCS). The SCS is a 5-point Likert scale; participants who select 1, report almost never to the specific item, while 5 indicates almost always. The scale has promising psychometrics. For instance, the items are inter-correlated (Neff, 2003a). Research has

also supported that the SCS has adequate concurrent validity (e.g. correlates with social connectedness), convergent validity (e.g., correlates with therapist's ratings) and discriminant validity (e.g. there is no correlation between the SCS and social desirability; Neff, 2003a; Neff, Rude, & Kirkpatrick, 2007). The SCS has a retest reliability of $r = .93$ (Neff, 2003a). The SCS is widely used in research analyzing self-compassion and the original scale developed by the lead researcher in self-compassion (Neff, 2003). Internal Consistency for Study 1 was acceptable for the overall SCS ($\alpha = .93$), positive factors (SK, CH, MI; $\alpha = 91$) and negative factors (SJ, IS, OI; $\alpha = .92$). There was a broader range of internal consistency, partially due to a decrease in items in each scale. Self-Kindness ($\alpha = .82$), CH ($\alpha = .95$), SJ ($\alpha = .82$), and IS ($\alpha = .80$) were in the acceptable range while, MI ($\alpha = .77$), and OI ($\alpha = .79$) were in the questionable to fair range of internal consistency. Overall SCS scores were utilized to simplify analyses and decrease amount of statistical analyses required (protecting against Type II error).

Experiential Avoidance. Experiential avoidance was assessed using the *Acceptance and Action Questionnaire-II* (AAQ; Bond, Hayes, Baer, Carpenter, Guenole, Orcutt, et al., 2011). This assessment is a single factor questionnaire consisting of 10 self-report items on a 7-point Likert scale. The AAQ-II demonstrated adequate psychometric properties with an internal consistency alpha range of .76 to .78 in the validating study (Bond et al., 2011). The AAQ-II demonstrated a retest-reliability correlation of .81 for three months. There is no data on retest-reliability for less time. Despite this, previous measures are noted to have lower internal consistency (AAQ-I; Hayes, Strosahl, Wilson, Bissett, Pistorello, Toarmino, et al., 2004) or not demonstrate adequate convergent validity with a correlation of .60, when it should be closer to .80 or higher with the established measure (Schmalz & Murrel, 2010) and for this reason, the

AAQ-II was used for this study. At all time points and measurements, the AAQ-II demonstrated adequate internal consistency in Study One ($\alpha = .86$).

Mindfulness. Mindfulness was measured by the *Five Factor Mindfulness Questionnaire (FFMQ*; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). This scale is unique in that it combined items that existed from previous mindfulness questionnaires and consists of 39 items rated on a 5-point Likert scale ranging from 1 ("Never or very rarely true") to 5 ("Very often, or always true). The FFMQ consists of five factors: Observe, Describe, Act with Awareness, Nonjudgment, and Nonreactivity. Higher scores for each factor suggest greater skill in each factor. The Observe scale, assesses the ability to notice changes in mood and thoughts. Describe is a factor representative of the ability to articulate feelings clearly. Act with Awareness (ActAware) is a factor that assesses the tendency to instead of acting as if on autopilot, being present with one's activities. The factor Nonjudgment assesses the ability to take a non-judgmental stance of one's feelings, while the factor, Nonreactivity, assesses the ability to let thoughts and feelings enter into one's awareness without getting fused with them. The internal consistencies for the college sample were adequate to good for a sample of students in the study establishing the construct validity of the measure ($\alpha = .72-.92$) however the internal consistency of Nonreactivity was questionable ($\alpha = .67$; Baer, Smith, Lykins, Button, Krietemeyer, et al., 2008). While Baer et al. (2006) did not report test-retest reliability, Deng, Liu, Rodriguez, and Xia (2011) reported test retest reliabilities over a month ranging from, $r = .44$ for ActAware and Observe, $r = .74$.

Internal consistencies for Study One were in the fair to excellent range, Observe ($\alpha = .73$), Describe ($\alpha = .89$), ActAware ($\alpha = .87$), Nonjudgement ($\alpha = .91$), and Nonreactivity ($\alpha =$

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.74). Only the Global FFMQ score was used as a measure of mindfulness ($\alpha = .88$), which is acceptable.

Yoga Self-Efficacy. To assess the degree of comfort with yoga practice participants completed the *Yoga Self-Efficacy Scale* (YSES; Birdee, Sohl, & Wallston, 2016). The YSES is a 12-item scale assessing participants' comfort with different aspects of the yoga practice, including breathing, meditation, and poses. The YSES is scored on a 10-point Likert scale where endorsing 1 suggests they "strongly disagree" with the statement, while selected 10 suggests they "strongly agree" with the statement. The YSES had excellent internal consistency ($\alpha = .93$) and adequate test-retest reliability over two weeks ($r = .79$). For Study One, the YSES demonstrated excellent internal consistency ($\alpha = .91$).

Statistical Analyses

Paper and pencil assessment responses were uploaded to an excel sheet by three research assistants and were reviewed for accuracy twice by different RAs to check for accuracy. Any discrepancies were fixed and answers that were unclear/uncodable were coded as missing. Data was then uploaded to SPSS v24 and coded according to scoring protocol. General descriptive analyses were run to obtain information about demographics and overall distributions of variables. To analyze Hypothesis 1, bivariate correlations were conducted. Correlations between BMI, self-compassion, body appreciation, experiential avoidance, mindfulness, body dissatisfaction, and disordered eating were run.

In order to evaluate Hypothesis 2, regression analyses were first conducted to evaluate the relationship between self-compassion, disordered eating, and body dissatisfaction (Appearance Evaluation, Appearance Orientation and Overweight Preoccupation). A step-wise

approach was utilized such that BMI was entered at Step 1, Self-Compassion and Mindfulness at Step 2, and Appearance Evaluation, Appearance Orientation, and Overweight Preoccupation at Step 3. To complete the mediation analyses, Hayes (2009) PROCESS Macro on SPSS v24 was utilized. To run the mediation, a bootstrap estimation method approach of 5,000 samples was employed using Model 4. BMI was included as a covariate. Overweight Preoccupation was entered as the predictor variable (X), self-compassion as the mediating variable (M) and Global EDE-Q (disordered eating; Y) as the dependent variable.

To evaluate Hypothesis 3a, similar analyses from Hypothesis 2 were utilized. First regression analyses using a step-wise approach were conducted to assess how BMI, self-compassion, mindfulness, and experiential avoidance would predict disordered eating (EDE-Q). BMI was entered as an independent variable at Step 1, Experiential Avoidance at Step 2, and Self-Compassion and Mindfulness (given the significant correlation between the two) at Step 3. Then the same mediation analyses using Hayes (2009) Process Model 4 with a bootstrap estimation method approach using a sample of 5,000 was employed where EA was the predictor variable, SC as the mediator (M) and Global EDE-Q (Y) as the dependent variable.

To evaluate Hypothesis 3b, regression analyses using a step-wise approach were conducted to assess how BMI, experiential avoidance. self-compassion, and mindfulness would predict body dissatisfaction including AE, AO, and OP. Separate regressions were run for each. BMI was entered as an independent variable at Step 1, Experiential Avoidance at Step 2, and Self-Compassion and Mindfulness at Step 3. Then based off of regression results mediation analyses using Hayes (2009) Process, Model 4 with a bootstrap estimation method approach

using a sample of 5,000 was employed where EA was the predictor variable, SC as the mediator (M) and AE, AO, or OP (Y) as the dependent variable. BMI was included as a covariate.

To address hypothesis 4, one-way ANOVAs were run to assess differences in YSES, SCS, MI, and EA based on whether participants have tried yoga before. Furthermore, regression analyses were conducted to assess whether frequency in yoga practice predicted SCS, MI, YSES, and EA.

CHAPTER IV

STUDY ONE RESULTS

In addition to obtaining a summary of demographic details (see Tables 1, 2, and 3), for all

continuous measures means and standard deviations were calculated in order to assess overall

responding on items measuring self-compassion (SC), mindfulness (MI), body dissatisfaction

(MBSRQ-AS), body appreciation, eating disorder pathology (EDE-Q), experiential avoidance

(EA), and yoga self-efficacy (YSES). See Table 4 for descriptive data.

Table 4: Study One: Means and Standard Deviations for Independent and Dependent Variables

Variable	M (SD)	Range
Self-Compassion (SCS)	3.08 (0.61)	2.98
Mindfulness (FFMQ)	3.29 (0.42)	2.18
Body Dissatisfaction (MBSRQ-AS)		
Appearance Evaluation	3.28 (0.80)	4.00
Appearance Orientation	3.48 (0.62)	3.00
Body Areas Satisfaction	3.35 (0.68)	3.11
Overweight Preoccupation	2.81 (0.92)	4.00
Body Appreciation (BAS-2)	36.62 (7.59)	36.00
Disordered Eating (EDE-Q)		
Global EDE-Q	1.78 (1.32)	4.95
Restraint	1.53 (1.36)	5.60
Weight Concern	2.20 (1.65)	5.60
Shape Concern	2.52 (1.65)	6.00
Eating Concern	0.86 (1.15)	5.20
Experiential Avoidance (AAQ-II)	27.97 (9.45)	49.00
Yoga Self-Efficacy (YSES)	74.95 (13.30)	63.00

To evaluate Hypothesis 1, correlational analyses were conducted for all variables.

Hypothesis 1 was fully supported. SC was a positive predictor of MI, body appreciation, and

negatively associated with eating disorder variables, body dissatisfaction, and EA. MI was also

positively correlated with body appreciation and negatively correlated with eating disorder

pathology, body dissatisfaction, and EA. EA was positively correlated with disordered eating and

body dissatisfaction and negatively related to body appreciation. See Tables 5A and 5B for

correlations.

Table 5A: Correlations Among Variables for Study One

Variables	1	2	3	4	5	6	7	8
1. BMI	1.00							
2. AAQ-II	.240**	1.00						
3. BAS-2	-.352***	-.556***	1.00					
4. FFMQ	-.175*	-.584***	.480***	1.00				
5. AE	-.454***	-.521***	.833***	.422*	1.00			
6. AO	.082	.042	-.240**	-.061	-.141	1.00		
7. BAS	-.358**	-.508***	.782***	.438***	.840***	-.211**	1.00	
8. OP	.253**	.297***	-.587***	-.273**	-.514***	.561***	-.554***	1.00
9. YSES	.077	-.188*	.206*	.286**	.196*	-.076	.216**	-.064
10. SCS	-.255**	-.663***	.561***	.631***	.487***	-.236**	.512***	-.382***
11. RE	.171*	.214*	-.474***	-.202*	-.400***	.458***	-.474***	.715***
12. EC	.177*	.308***	-.497***	-.328***	-.457***	.388***	-.488***	.629***
13. SC	.375***	.462***	-.707***	-.398***	-.708***	.451***	-.764***	.763***
14. WC	.426**	.419***	-.696***	-.419***	-.701**	.457***	-.731***	.720***
15. Global EDE-Q	.340***	.404***	-.678***	-.385***	-.647***	.484***	-.696***	.787***

*p < .05, **p < .01, ***p < .001
1 = BMI, 2 = AAQ-II (Acceptance and Action Questionnaire-II), 3 = BAS-2 (Body Appreciation Scale-2), 4= FFMQ (Five Facet Mindfulness Questionnaire), 5= AE (Appearance Evaluation), 6= AO (Appearance Orientation), 7 = BAS (Body Areas Satisfaction Scale), 8 = OP (Overweight Preoccupation), 9 = YSES (Yoga Self-Efficacy Scale), 10 = SCS (Self-Compassion Scale), 11 = RE (Restraint), 12 = EC (Eating Concern), 13 = SC (Shape Concern), 14 = WC (Weight Concern), 15 = Global EDE-Q (Global Eating Disorder Evaluation-Questionnaire)

Table 5B: Correlations for Study One

Variables	9	10	11	12	13	14
9. YSES	1.00					
10. SCS	.325***	1.00				
11. RE	-.130	-.340***	1.00			
12. EC	-.110	-.372***	.709***	1.00		
13. SC	-.179*	-.510***	.733***	.714***	1.00	
14. WC	-.201*	-.501***	.705***	.723***	.927***	1.00
15. Global EDE-Q	-.175*	-.485***	.865***	.851***	.947***	.946***

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

1 = BMI, 2 = AAQ-II (Acceptance and Action Questionnaire-II), 3 = BAS-2 (Body Appreciation Scale-2), 4= FFMQ (Five Facet Mindfulness Questionnaire), 5= AE (Appearance Evaluation), 6= AO (Appearance Orientation), 7 = BAS (Body Areas Satisfaction Scale), 8 = OP (Overweight Preoccupation), 9 = YSES (Yoga Self-Efficacy Scale), 10 = SCS (Self-Compassion Scale), 11 = RE (Restraint), 12 = EC (Eating Concern), 13 = SC (Shape Concern), 14 = WC (Weight Concern), 15 = Global EDE-Q (Global Eating Disorder Evaluation-Questionnaire)

Regression and mediation analyses were also conducted to evaluate Hypothesis 2, 3a, and 3b. To address Hypothesis 2, multiple regression analyses were first conducted to evaluate the well-established relationship between body dissatisfaction and eating disorder syptoms. In this case, BMI was entered at Step 1, SC and MI at Step 2, and all body dissatisfaction factors at Step 3. BMI was a significant predictor of Global EDE-Q at Step 1 and Step 2 but not when body dissatisfaction was added to the model. At Step 2, SC was a significant predictor while MI was not a significant predictor of Global EDE-Q, however, at Step 3, SC was no longer a significant predictor of Global EDE-Q. At the last step, AE, AO, and OP all predicted Global EDE-Q scores. Lower scores on AE suggest greater body dissatisfaction, hence the negative relationship noted between AE and Global EDE-Q. The final model predicted about 71% of the variance in Global EDE-Q scores. See Table 6 for regression table.

To assess Hypothesis 3A, multiple regression analyses were conducted with BMI entered in the first step (Step 1), EA was added at Step 2, and finally SC and MI were added as Step 3 to assess how the variables predict Global EDE-Q. The order was determined based off of the fact that BMI often predicts eating disorder symptoms and it was imperative to control for this variance, secondly, research supports the relationship between EA and disordered eating (Della Longa & De Young, 2018); self-compassion and mindfulness were considered potential mediators and were more exploratory factors. See Table 7 for the full regression results which resulted in statistically significant predictions of Global EDE-Q at all Steps. Of note, BMI was predictive of Global EDE-Q at all stages, AAQ-II was significant at Step 2 but not in the final model. Self-compassion was a significant predictor of Global EDE-Q at Step 3, while FFMQ was not a significant predictor. The final model explained about 29% of total Global EDE-Q.

To assess Hypothesis 3B three variables were included as dependent variables (Appearance Evaluation (AE), Appearance Orientation (AO), and Overweight Preoccupation (OP). with EA as the predictor variable and SC and/or MI included as the mediator variable. First, multiple regression analyses were also conducted with BMI entered in the first step (Step 1) and then EA was added at Step 2, and finally SC and MI were added as Step 3 to assess how the variables predict Overweight Preoccupation with a similar rationale for which variables to include at each step. See Table 8. BMI was a unique predictor of OP at all steps. Experiential avoidance was only a predictor of OP at Step 2. At the last stage, SC was the only significant predictor of OP; MI did not significantly predict OP above SC. Model 3 explained 17.1% of the variance in OP.

Multiple regression analyses were also conducted with BMI entered in the first step (Step 1) and then EA was added at Step 2, and finally SC and MI were added as Step 3 to assess how the variables predict another factor related to body dissatisfaction, Appearance Evaluation. See Table 9. In this model BMI was a significant predictor of AE at all Steps. Experiential Avoidance was also a significant predictor of AE at Step 2 and Step 3. Furthermore, SC when included in Step 3, was also a significant predictor of AE while MI was not. The full model predicted around 41% of Appearance Evaluation.

Further, multiple regression analyses were also conducted with BMI entered in the first step (Step 1), EA at Step 2, and SC and MI as Step 3 to predict AO. See Table 10. In this regression, Model 1 and Model 2 were not significant. Model 3 was significant with SC being the only variable significantly predicting AO. Model 3 only accounted for about 6.6% of the

variance in AO. Mediation analyses were not assessed given that AAQ-II did not explain any

variance at Step 2 and Model 1 and Model 2 were not significant.

Table 6: BMI, Mindfulness, Self-Compassion, Appearance Evaluation, Appearance Orientation, and Overweight Preoccupation as Predictors of Global EDE-Q Scores

	Model 1				Model 2				Model 3			
	B	SE B	β	95% CI	B	SE B	β	95% CI	B	SE B	β	95% CI
BMI	-.147	.034	.340***	.079, .214	.099	.032	.229***	.035, .162	.017	.022	.040	-.027, .061
SCS					-.747	.199	-.354***	-1.14, -.354	-.174	.136	-.082	-.443, .095
FFMQ					-.374	.300	-.116	-.966, .218	-.171	.195	-.053	-.443, .095
AE									-.454	.105	-.272***	-.662, -.247
AO									.251	.124	.118*	.006, .496
OP									.746	.094	.524***	.560, .942
R²	.116				.294				.712			
F for CHR²	18.300***				17.452***				66.526***			

*p < .05, ** p < .01, ***p < .001, F for CHR² = Change in R² F-value

Table 7: BMI, Experiential Avoidance, Self-Compassion, and Mindfulness as Predictors of Disordered Eating (Global EDE-Q)

	Model 1				Model 2				Model 3			
	B	SE B	β	95% CI	B	SE B	β	95% CI	B	SE B	β	95% CI
BMI	.147	.034	.345***	.080, .213	.109	.033	.256***	.043, .174	.097	.032	.229**	.034, .160
AAQ-II					.048	.011	.328***	.025, .071	.011	.015	.074	-.018, .040
SCS									-.682	.219	-.327**	-1.98, -0.24
FFMQ									-.242	.307	.076	-.849, .365
R^2	.119				.219				.294			
F for CHR²	18.969***				17.718***				7.311**			

*p < .05, ** p < .01, ***p < .001, F for CHR² = Change in R² F-value

Table 8: BMI, Experiential Avoidance, Self-Compassion, and Mindfulness as Predictors of Overweight Preoccupation

	Model 1				Model 2				Model 3			
	B	SE B	β	95% CI	B	SE B	β	95% CI	B	SE B	β	95% CI
BMI	.078	.024	.263**	.031, .125	.059	.025	.198*	.010, .107	.052	.024	.176*	.005, 100
AAQ-II					.023	.008	.225**	.006, .040	.002	.011	.016	-.020, .023
SCS									-.444	.167	-.301**	-.773, -.114
FFMQ									-.063	.232	-.028	-.523, .396
R^2	.069				.115				.171			
F for CHR²	10.590***				7.364**				4.628*			

*p < .05, ** p < .01, ***p < .001, F for CHR² = Change in R² F-value

Table 9: BMI, Experiential Avoidance, Self-Compassion, Mindfulness as Predictors of Appearance Evaluation

	Model 1				Model 2				Model 3			
	B	SE B	ß	95% CI	B	SE B	ß	95% CI	B	SE B	ß	95% CI
BMI	-.121	.019	-.473***	-.158, -.083	-.089	.018	-.351***	-.124, -.055	-.086	.017	-.336***	-.120, -.051
AAQ-II					-.037	.006	-.418***	-.048, -.025	-.023	.008	-.268**	-.039, -.008
SCS									.240	.121	.190*	.002, .479
FFMQ									.098	.168	.051	-.234, .430
R^2	.224				.384				.411			
F for CHR²	41.022***				36.621***				3.144*			

*$p < .05$, ** $p < .01$, ***$p < .001$, F for CHR^2 = Change in R^2 F-value

Table 10: BMI, Experiential Avoidance, Self-Compassion, Mindfulness as Predictors of Appearance Orientation

	Model 1				Model 2				Model 3			
	B	SE B	ß	95% CI	B	SE B	ß	95% CI	B	SE B	ß	95% CI
BMI	.012	.017	.057	-.022, .045	.006	.018	.032	-.029, .042	.002	.017	.011	-.032, .037
AAQ-II					.006	.006	.085	-.006, .018	-.007	.008	-.096	-.012, .009
SCS									-.343	.122	-.341**	-.583, -.102
FFMQ									.104	.170	.068	-.231, .440
R^2	.003				.010				.066			
F for CHR²	0.457				0.933				4.139*			

*$p < .05$, ** $p < .01$, ***$p < .001$, F for CHR^2 = Change in R^2 F-value

Mediation analyses were conducted to evaluate whether SC (M) would mediate the established relationship between body dissatisfaction as measured by overweight preoccupation (OP) (X) and eating disorder pathology (Global EDE-Q) to assess hypothesis 2. Specifically, EA was entered as the independent variable, SC as the mediating variable, and Global EDE-Q as the dependent variable. BMI was included as a covariate as it correlated with all variables. Analyses using Hayes' (2009) PROCESS Model 4 with a bootstrapping sample of 5,000 yielded significant results.

Path A with body dissatisfaction (OP) predicting SC was significant, $b = -.229$, $SE = .053$, $t(141) = -4.30$, $p < .0001$, 95% CI [-0.334, -0.123]. For one unit increase in EA, participants reported .229 unit decreases in SC. BMI was also a significant predictor at this stage, $b = -.033$, $SE = .016$, $t(141) = -2.203$, $p = .044$, 95% CI [-0.065, -0.001]. Path b, with SC predicting Global EDE-Q was also significant, $b = -.425$, $SE = .113$, $t(140) = -3.770$, $p = 0.0002$, 95% CI [-0.647, -0.202]. BMI was also a significant predictor, $b = .049$, $SE = .022$, $t(140) = 2.212$, $p = .029$, 95% CI [0.005, 0.092]. This indicated that for individuals with similar levels of EA, one unit decrease in self-compassion related to .414 units increase in disordered eating as a result of EA. While the direct effect (c') with OP predicting Global EDE-Q while controlling for SC was also significant, $b = .967$, $SE = .076$, $t(140) = 12.779$, $p < .0001$, 95% CI [0.817, 1.117], there was a significant indirect effect of SC on Global EDE-Q, $b = .097$, $SE = .034$, 95% CI [0.040, 0.178]. BMI also significantly predicted Global EDE-Q, $b = .049$, $SE = .022$, $t(140) = 2.212$, $p = .029$, 95% CI [0.005, 0.092] The total effect model (c) was also significant, as a predictor of Global EDE-Q, $b = 1.064$, $SE = .074$, $t(141) = 14.298$, $p < .0001$, 95% CI 0.917,

1.211]. The total effect model explained 63.8% of the variance in Global EDE-Q. See Figure 1 for the mediation model.

To address hypothesis 3a, given the results of the regression analyses, mediational analyses using Hayes (2009) PROCESS Macro using a bootstrapping sample of 5,000 evaluated whether SC (M) mediated the relationship between EA (X) and Global EDE-Q (Y). BMI was included as a covariate. Results indicated that experiential avoidance was a significant and negative predictor of self-compassion (path a), $b = -.045$, $SE = .005$, $t(140) = -9.879$, $p < .0001$, 95% CI [-0.054, -0.036] suggesting that for one unit increase in EA, SC decreased .045 units. Path b was also significant; self-compassion was a negative predictor of eating disorder behaviors (EDE-Q Global), $b = -.745$, $SE = .200$, $t(139) = -3.718$ $p = .0003$, 95% CI [-1.141, -0.349]. For two cases that differ by one unit on SC but report similar EA are estimated to differ .745 units; specifically, one unit decrease in self-compassion yielded a .745 unit increase in eating disorder symptoms. While experiential avoidance positively predicted eating disorder symptoms, (path c), $b = .049$, $SE = .011$, $t(140) = 3.307$ $p < .0001$, 95% CI [0.027, 0.072], when self-compassion was held constant in the model, experiential avoidance was no longer a significant predictor of eating disorder symptoms (direct effect (c')), $b = .016$, $SE = .014$, $t(139) = 1.153$, $p = .251$, 95% CI [-0.012, 0.044]. There was a significant indirect effect, $b = .033$, $SE = .010$, 95% CI [0.016, 0.054] suggesting that SC explained the relationship between experiential avoidance and eating disorder symptoms (Global EDE-Q). BMI did not significantly predict self-compassion, $b = -.016$, $SE = .013$, $t(140) = -1.200$, $p = .234$, 95% CI [-0.042, 0.010] from path a, however, it did significantly predict Global EDE-Q with self-compassion in the model (path b), $b = 0.095$, $SE = .032$, $t(139) = 3.01$, $p = .003$, 95% CI [0.033, 0.158]. BMI was

also a significant predictor in the total model (c), $b = .107$, $SE = .033$, $t(140) = 3.253$, $p = .001$, 95% CI [0.042, 0.172]. Approximately 22.4 percent of the variance in eating disorder symptoms was explained by predictors ($R^2 = .224$). See Figure 2 for the mediation model.

Mediational analyses with Hayes (2009) PROCESS Macro using a bootstrapping sample of 5,000 were also conducted to assess SC as a mediator between EA and AE with BMI included as a covariate. Results indicated that EA was a significant predictor of SC (path a), $b = -.044$, $SE = .005$, $t(142) = -9.833$, $p < .0001$, 95% CI [-0.053, -0.035]. Individuals who reported one unit increase in EA reported a .044 unit decrease in self-compassion. Self-Compassion as also noted to predict AE (path b), $b = .267$, $SE = .110$, $t(141) = 2.43$, $p = .016$, 95% CI [.050, 0.484]; when EA is held constant, for one unit decrease in SC there was a .267 decrease in AE. BMI added as a covariate, was also a significant predictor, $b = -.085$, $SE = .017$, $t(141) = -4.903$, $p < .0001$, *95% CI* [-0/119, -0.051]. Path c', with EA predicting AE was also significant, $b = -.025$, $SE = .008$, $t(141) = -3.351$, $p = .001$, 95% CI [-0.040, -0.010]. The indirect effect of SC on the relationship between EA and AE was also significant, $b = -.012$, $SE = .006$, *95% CI* [=-0.023, -0.001]. The total effect of EA on AE was also significant, $b = -.037$, $SE = .006$, $t(142) = -6.24$, $p < .0001$, *95% CI* [-0.049, -0.025] with BMI as a significant predictor, $b = -.089$, $SE = .018$, $t(142) = -5.061$, $p < .0001$, *95% CI* [-0.124, -0.054]. This model including SC accounted for 41.3% of the variance in AE, $R^2 = .413$, which was great than when EA predicted AE alone, $R^2 = .338$. See Figure 3 for full mediation model.

An additional mediation analysis was conducted assessing SC (M) as a mediator of the relationship between EA (X) and OP (Y). BMI was entered as a covariate. Path a, with EA predicting SC was significant, $b = -.044$, $SE = .005$, $t(142) = -9.833$, $p < .0001$, *95% CI* [-0.053, -

0.035]. For one unit increase in EA, participants reported a .044 unit decrease in SC. BMI was

not a significant predictor, $b = -.014$, $SE = .013$, $t(142) = -1.095$, $p = .275$, 95% CI $[=0.041,$

0.012]. Path b where SC predicted OP was also significant, $b = -.456$, $SE = .142$, $t(141) = -3.002$,

$p = .003$, 95% CI $[-0.756, -0.0156]$. For one unit decrease in SC when EA was held constant,

participants reported a .465 increase in OP. The total effect, (EA on OP; path c) was also

significant, $b = .023$, $SE = .008$, $t(142) = 2.917$, $p = .004$, 95% CI $[0.008, 0.041]$. BMI was also a

significant predictor, $b = .057$, $SE = .025$, $t(142) = 2.324$, $p = .022$. When SC was held constant

in the model, the direct effect (c') of EA and OP was no longer significant, $b = .004$, $SE = .011$,

$t(141) = 0.402$, $p = .689$, 95% CI $[-0.017, 0.025]$. BMI was also a significant predictor, $b = .051$,

$SE = .024$, $t(141) = 2.014$, $p = .037$, 95% CI $[0.003, 0.098]$. The indirect effect (ab) was

significant, $b = .020$, $SE = .008$, 95% CI $[0.005, 0.037]$. The total model accounted for 17.3

percent of the variance of OP. See Figure 4 for full mediation model.
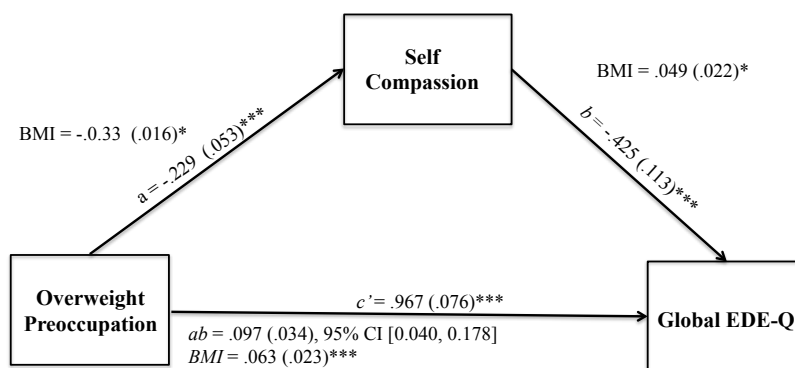
Figure 1. Mediation Model: Overweight Preoccupation, Self-Compassion, and Disordered
Eating
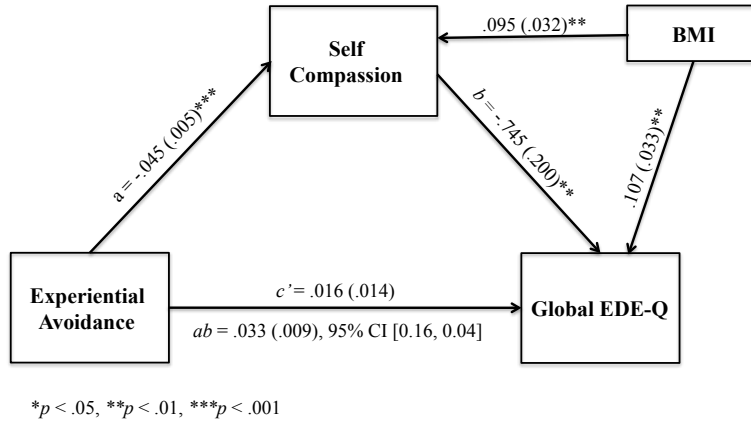
Figure 2. Mediation Model: Experiential Avoidance, Self-Compassion, and Disordered Eating
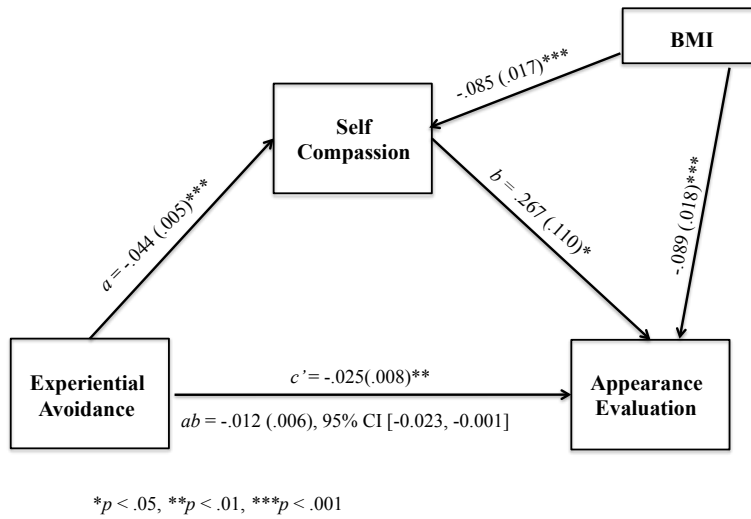
Figure 3. Mediation Model: Experiential Avoidance, Self-Compassion, and Appearance Evaluation
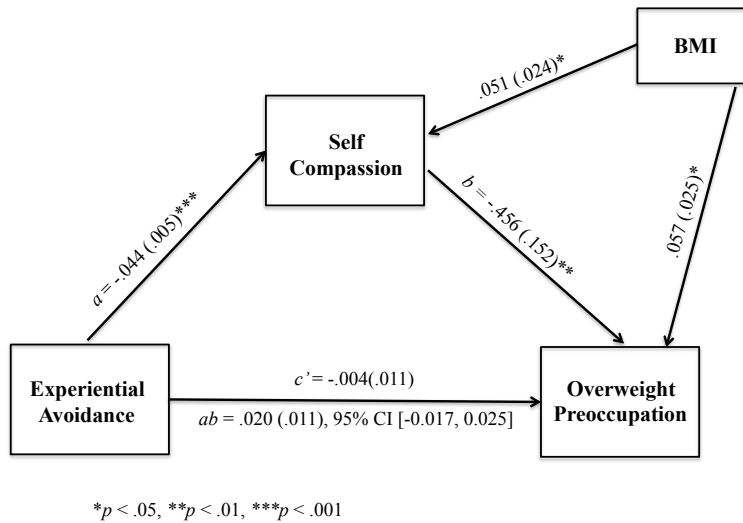
Figure 4. Mediation Model: Experiential Avoidance, Self-Compassion, and Overweight Preoccupation

Mediation analyses were not conducted to assess the relationship between EA, SC, and AO given that Model 1 and Model 2 of the regression analyses were not significant.

To assess Hypothesis 4, comparisons using ANOVAs and regression analyses were conducted. Participants who reported never trying yoga before (n = 23) were compared to individuals who reported trying yoga at least once prior (n = 127), there was a significant difference in YSES between groups. Participants who reported practicing yoga before (*M* = 76.18, *SD* = 12.58) reported greater YSES than individuals who have never tried yoga before (*M* = 66.28, *SD* = 14.75), $F(1,142) = 9.24$, $p = .003$, $\eta^2_p = .061$. There were no significant differences between individuals who have tried yoga before (*M* = 3.10, *SD* = 0.60) versus those who have not (*M* = 2.97, *SD* = 0.70) on SCS, $F(1,147) = 0.884$, $p = .349$, $\eta^2_p = .006$. There was also not a significant difference, $F(1,147) = 0.178$, $p = .647$, $\eta^2_p = .001$ between individuals swho have never tried yoga (*M* = 28.74, *SD* = 11.01) and individuals who have tried yoga (*M* = 27.83,

$SD = 9.18$) on EA, nor MI, $F(1,147) = 0.780$, $p = .379$, $\eta^2_p = .005$ with participants who have

tried yoga before ($M = 3.30$, $SD = 0.42$) reporting similar MI to individuals who have never tried

yoga ($M = 3.22$, $SD = 0.42$).

In evaluating whether the number of years that participants have practiced yoga, the

amount of yoga practiced in a week (hourly) and the number of weeks an individual reported

practicing yoga in the last month, such variables were not significant predictors of YSES,

$F(3,117) = 1.529$, $p = .211$, SCS, $F(3,115) = 0.836$, $p = .477$, FFMQ, $F(3,117) = 0.232$, $p = .873$,

or AAQ-II, $F(3,117) = 0.275$, $p = .843$. Of note, participants reported practicing yoga for an

average of 2.12 years ($SD = 1.83$) with the modal number of years being 1 year (37.6% of

participants). Most participants have practiced yoga for less than four years (88%) with only 15

participants (12%) practicing for more time. Furthermore, participants reported practicing an

average of 1.86 hours of yoga a week in the past month ($SD = 2.17$) with the modal average

hours being 0. Additionally, on average participants reported practicing yoga twice over a month

($M = 2.209$, $SD = 2.92$) with the modal response being 1 week in the past month. As such, it may

be that there was a floor effect, where participants were not participating often enough in yoga to

yield significant results.

CHAPTER V

STUDY ONE DISCUSSION

It was hypothesized that eating disorder symptoms including disordered eating and body dissatisfaction would negatively relate to previously established protective factors against eating disorder symptomology including self-compassion, mindfulness, and body appreciation and positively relate to experiential avoidance, a factor associated with eating disorder pathology. Furthermore, it was also hypothesized that BMI would correlate positively with eating disorder symptoms, body dissatisfaction, and experiential avoidance and negatively with self-compassion, mindfulness, body appreciation, and yoga self-efficacy. Lastly, it was hypothesized that body appreciation would correlate positively with self-compassion, mindfulness and yoga self-efficacy and negatively with body dissatisfaction, disordered eating, and experiential avoidance.

In the sample of 150 females (males were excluded), self-compassion and body appreciation correlated in the expected direction with all variables; higher self-compassion and body appreciation related to higher mindfulness and yoga self-efficacy, and lower self-reported BMI, experiential avoidance, eating disorder behaviors, and body dissatisfaction (overweight preoccupation, and appearance orientation). There was a positive correlation between self-compassion and appearance evaluation and mindfulness and appearance evaluation which also suggests that individuals who report higher levels of self-compassion and mindfulness likely report lower evaluation of their appearance.

Mindfulness also correlated with all variables as expected such that mindfulness was positively related to body appreciation and yoga self-efficacy and negatively with disordered eating, experiential avoidance, and body dissatisfaction (in the expected direction). Individuals who reported greater mindfulness were likely to report lower body dissatisfaction, eating disorder symptoms, and experiential avoidance. However, mindfulness did not correlate with BMI and Appearance Orientation. Overall eating disorder symptoms as measured by the Global EDE-Q correlated positively with BMI, experiential avoidance, appearance orientation, overweight preoccupation, and negatively with appearance evaluation. Individuals who reported higher levels of disordered eating reported higher BMI, experiential avoidance, and body dissatisfaction.

Yoga self-efficacy was not significantly correlated with BMI, appearance orientation, overweight preoccupation, restraint, or eating concern suggesting there was not a significant relationship noted between yoga knowledge and perceived skill and BMI, preoccupation with one's weight, dietary restraint (or restriction of food intake) and concern with what one is eating. Yoga self-efficacy was positively correlated with mindfulness, self-compassion, body appreciation, and was negatively associated with experiential avoidance shape and weight concern, in addition to overall eating disorder symptoms. These findings suggest that in general, individuals who report greater yoga skill and knowledge may endorse higher mindfulness, self-compassion, appreciation for their body and lower avoidance of aversive stimuli (experiential avoidance), concern with their body shape and current weight.

Experiential avoidance was significantly and positively correlated with BMI, appearance evaluation, overweight preoccupation and negatively with appearance evaluation. Experiential

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avoidance was not related to appearance orientation. This suggests that individuals who report greater avoidance of aversive stimuli whether it is negative thoughts, emotions, or physical sensations reported greater body dissatisfaction and higher BMIs.

Self-compassion, mindfulness, and experiential avoidance were also noted to predict eating disorder symptomology and body dissatisfaction and were noted to explain a significant portion of the variance ranging from 5 to 71% in the final models. As expected, BMI was a significant predictor for Global EDE-Q, AE, and OP. This relationship has been supported in previous research that suggests that the further away that an individual feels they are from the appearance ideals, the higher likelihood that individuals will report body dissatisfaction and disordered eating (Paxton, Eisenberg, & Neumark-Sztainer, 2006). BMI often predicted significant variance in the explanation of Global EDE-Q and body dissatisfaction when experiential avoidance was also added to the model.

Furthermore, even when controlling for BMI, individuals who reported greater experiential avoidance reported higher disordered eating, overweight preoccupation, and body dissatisfaction. While it appears that being at a higher weight for one's height may predict greater body dissatisfaction and disordered eating, the general desire to avoid aversive stimuli may also significantly contribute to disordered eating, continued distress about being overweight, or dissatisfaction with one's appearance. This finding corroborates previous research suggesting individuals reporting more eating disorder symptomology may be more likely to report higher levels of experiential avoidance (Butryn et al., 2011; Lavender et al., 2009).

After controlling for experiential avoidance, self-compassion, when added to the model was a significant negative predictor of eating disorder behaviors and body dissatisfaction while

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mindfulness did not predict eating disorder behaviors or body dissatisfaction above self-compassion. However, in this study, mindfulness and self-compassion were highly correlated, and self-compassion is a construct that includes mindfulness as a factor. Therefore, higher levels of self-compassion may relate to lower reported disordered eating or eating disorder pathology, body dissatisfaction, and avoidance of aversive stimuli. This finding also supports previous research that individuals who report higher self-compassion report lower disordered eating behaviors (Kelly et al., 2014), body dissatisfaction (Tylka et al., 2015; Wasylkiw et al., 2012), and experiential avoidance (Costa & Pinto-Gouveia, 2013).

Intriguingly when self-compassion and mindfulness were included in regressions together, self-compassion was the main factor that predicted eating disorder symptoms and body image dissatisfaction while mindfulness did not contribute unique variance. Self-compassion and mindfulness were highly correlated. As such, the variables may be too similar to separate. In future analyses it may be beneficial to assess mindfulness and self-compassion separately to understand how either variable relates to eating disorder behaviors and body dissatisfaction. Based on the regression results, several mediation analyses were run to evaluate the explanatory relationship of self-compassion and not mindfulness (given that it did not contribute unique variance) on the established relationship between body dissatisfaction and eating disorder symptoms, for one. Previous research suggests that individuals who report greater body dissatisfaction are at higher risk for eating disorder pathology (Stice & Shaw, 2002) and that this relationship is mediated by thin-ideal internalization and social comparison (Thompson et al., 1999). The transdiagnostic model of eating disorder pathology suggests that this relationship occurs because of negative self-schemas, high levels of perfectionism, interpersonal distress, and

aversive reactions to mood (mood intolerance) which in turn contributes to the maintenance of the eating disorder (Fairburn et al., 2003). Self-compassion has been associated with improvements in eating disorder symptoms during treatment (Kelly et al., 2014), greater self-acceptance (Neff, 2003), and less avoidance of aversive stimuli (Costa & Pinto-Gouveia, 2003). As such, self-compassion was assessed as a potential explanatory factor in the relationship between body dissatisfaction and eating disorder symptoms. Study One provided support that that self-compassion explains this relationship. Individuals who report lower experiential avoidance or avoidance of aversive stimuli may report greater self-acceptance, and as a result, less eating disorder symptoms, including disordered eating and concern with one's weight and shape.

In line with some of the models evaluating how eating disorder pathology is maintained through avoidance of aversive stimuli (e.g. emotions, thoughts, physical sensations; Heatherton & Baumeister, 1991; Schmidt & Treasure, 2006; Wildes et al., 2010), Study One also assessed the relationship between experiential avoidance and body dissatisfaction and disordered eating while specifically examining whether greater self-acceptance would explain this relationship. Self-compassion mediated the relationship between experiential avoidance and eating disorder symptoms as well as body dissatisfaction. This suggests that individuals who report higher amounts of experiential avoidance may then report lower levels of self-compassion, i.e., participants more prone to avoiding aversive stimuli (perhaps their body weight and shape) were less likely to be accepting and kind towards themselves. This tendency then predicted the greater tendency to engage in eating disorder behaviors (Global EDE-Q), be preoccupied with their body

weight (overweight preoccupation), and experience lower satisfaction with their body image (Appearance Evaluation).

Often individuals with eating disorders focus significantly on body image and eating behavior, so much so that they have a difficult time engaging in behaviors separate from their eating disorders or evaluating themselves beyond their self-perceived flaws (Fairburn, 2008). It is common for individuals reporting disordered eating, body image disturbance, or with eating disorder diagnoses to engage in body avoidance behaviors (avoiding the pool or looking in the mirror) and eating behaviors (going out to eat, eating "fear foods"; Waller et al., 2007) as they find these activities aversive. Individuals may also engage in eating disorder behaviors to lessen the impact of negative emotions (Heatherton & Baumeister, 1991).

It may be that self-compassion contributes to decreases in a person's focus or over-evaluation of perceived flaws in their body or eating patterns. Further, self-compassion may be negatively impacted by avoidance behaviors such that the more an individual avoids negative stimuli the more likely they are to be self-critical or less self-accepting. While individuals who report higher levels of avoidance of negative affect, thoughts, and uncomfortable physical sensations are likely to engage in eating disorder behaviors (potentially as a method of experiential avoidance), it seems that it is an individual's acceptance and kindness towards oneself that explains this relationship.

To reiterate, given experiential avoidance predicted self-compassion in Study One, which in turn predicted disordered eating and body dissatisfaction, it may be valuable to consider ways to improve self-acceptance. Improving self-compassion may make people less anxious about approaching feared situations such as eating foods they fear will cause weight gain or

viewing their bodies; individuals may become less anxious or attached to perceived flaws as a result of ameliorations in self-compassion (Brienes et al., 2015; Neff, 2003b). Indeed, exposure to body image and "feared foods" is considered to be a major factor contributing to improvements during eating disorder treatment (Waller et al., 2007). This in conjunction with a focus on improving self-compassion may be beneficial considering the significant mediation findings from Study One.

There are many tactics that can be used to improve self-compassion and mindfulness. Some researchers have used mindfulness meditation (Albertson et al., 2014) and others have utilized compassion-focused therapy (CFT; Gale et al., 2014; Kelly & Carter, 2015). However, neither of these practices are evidence-based or have specific treatment components including eating disorder symptoms. Yoga, while also not evidence-based, is offered in many eating disorder treatment centers; its use in treatment is increasing in popularity. Yoga emphasizes self-compassion via a focus on listening to one's body and improving body awareness (Carei et al., 2010; Frisch et al., 2006; Hall et al., 2016) which may reduce body dissatisfaction and rumination about one's body shape and weight. While there is a broad range of yoga styles and options, yoga generally is also a form of exposure to one's body; one main aim in yoga is to pay attention to the physical sensations and breath in one's body (Field, 2010, Rani & Rao, 1994; Salmon et al., 2009).

This study was one of the first to include a measure of yoga knowledge and skill, yoga self-efficacy to understand how yoga skill is related to self-compassion, mindfulness, and related features. Previous studies have looked at the frequency that participants practice yoga or type of yoga practiced. In evaluating perceived yoga knowledge and skill, Study One indicated that yoga

self-efficacy was positively related to self-compassion, mindfulness, and body appreciation through correlational analyses. These findings provide further support that individuals practicing yoga who feel confident about their yoga skills may also report greater self-compassion, mindfulness, and body acceptance (Daubenmeir, 2005; Gard et al., 2012; Mahlo & Tiggerman, 2016). While individuals who have reported trying yoga before reported greater yoga knowledge and skills compared to those who have not, there were no significant group differences on self-compassion, mindfulness, or body appreciation, nor any of the eating disorder pathology measures. This contradicts many of the previous research studies that indicate otherwise (Daubenmeir et al., 2012; Gard et al., 2012; Mahlo & Tiggerman, 2016) However, it difficult to conclude that there are no differences between the groups based off of the amount of yoga practiced alone. Participants who reported they have tried yoga before could have taken one class or 20 thus complicating the ability to adequately compare this study's groups. Furthermore, descriptive data suggests that participants were not practicing yoga regularly (modal number of weeks a participant practiced yoga was one week in a month). As such, it may be difficult to assess whether the lack of relationship noted between yoga practice and self-compassion, mindfulness, experiential avoidance, and yoga self-efficacy relates to infrequency of practice or a lack of a relationship among variables.

Regardless, the mediational findings suggest that self-compassion is a factor that would be beneficial to improve \ to ameliorate the relationship between experiential avoidance, body dissatisfaction, and disordered eating as well as body dissatisfaction and disordered eating. It appears self-compassion is a factor which mediates relationships established as pivotal maintenance factors in the CBT/transdiagnostic model (Fairburn et al., 2003) and the affect-

regulation models (Heatherton & Baumeister, 1991; Wildes et al., 2010). Indeed, early changes in self-compassion during treatment have been associated with greater improvements throughout treatment (Kelly et al., 2014).

These findings provide further support that yoga may be a beneficial adjunct to eating disorder treatment or prevention method against body dissatisfaction and eating disorder pathology. Since yoga improves interoceptive and body awareness (Daubenmeir et al., 2012; Khalsa et al., 2008; Rani & Rao, 1996), self-compassion (Gard et al., 2012) and mindfulness (Salmon et al., 2009), including yoga practice which is associated with greater body awareness, self-compassion, and mindfulness is likely beneficial. Thus, in Study Two, if changes in self-compassion and body dissatisfaction are noted, it may provide preliminary support that self-compassion is a prominent mechanism of action for symptom change during yoga practice (Carei et al., 2010; Hall et al., 2016). It may be that improvements reported in self-compassion versus mindfulness are more predictive of amelioration in eating disorder pathology.

CHAPTER VI

STUDY TWO INTRODUCTION

Eating disorder symptomology is complicated and involves cognitive, behavioral, and physiological symptoms (Waller et al., 2007). For instance, individuals diagnosed with eating disorders likely report significant attention to and negative evaluation of their weight and shape that is often noted to be distorted (APA, 2013). Furthermore, individuals with eating disorders are likely preoccupied with food and often have a more difficult time with cognitive flexibility (Tchanturia, Davies, Roberts, Harrison, Nakazato, Schmitdt, et al., 2012). Individuals with eating disorders often engage in body checking (e.g., looking at themselves in the mirror, pinching areas of their body) or body avoidance (e.g., avoiding looking at mirrors) as a result of their extreme focus on their weight and shape (Shafran et al., 2004) and may also avoid social situations especially as they relate to social eating events or events where their body is more easily observed (pools and beaches; Shafran et al., 2004). Physiologically, individuals diagnosed with eating disorders often exhibit poor interoceptive awareness, alexithymia, and eating disorders are also associated with cardiac (low heart rate) and bone health concerns, amenorrhea, and electrolyte imbalances (Fassino et al., 2004; Masumoto et al., 2006; Merwin et al., 2010).

Study Two was designed to be an extension of research evaluating whether yoga is a beneficial intervention or prevention method for body dissatisfaction and disordered eating on top of practice improving factors associated with eating disorder pathology (Carei et al., 2010;

Hall et al., 2016; Pacanowski et al., 2017). In this case, the additional variables assessed were self-compassion, mindfulness, and experiential avoidance – all factors associated with eating disorder pathology (Butryn et al., 2013; Breines et al., 2014; Della Longa & De Young, 2018; Lavender et al., 2009; Magnus et al., 2010). Study One in this dissertation yielded promising results that suggest it may beneficial to evaluate yoga as a method that improves body dissatisfaction and disordered eating given that yoga self-efficacy was associated with self-compassion, mindfulness and body appreciation. While there were no significant differences between participants who have tried yoga before or those who have not beyond yoga self-efficacy in Study One, participants did not report practicing yoga regularly for significant durations (potential dosage effect), and there was an uneven number of individuals in groups. Study Two involves more frequent yoga practice over a period that mimics inpatient eating disorder stays (Frisch et al., 2006) and may provide further insights into the benefits and potential negatives of yoga practice.

Study One provided preliminary support that self-compassion may explain the relationship between body dissatisfaction and disordered eating in addition to experiential avoidance and body dissatisfaction/disordered eating. Therefore, it is hypothesized that increasing self-compassion will ameliorate the relationship between body dissatisfaction and disordered eating in addition to experiential avoidance and eating disorder pathology. Since yoga emphasizes a stance of appreciation for one's body while accepting what it can versus cannot do (self-compassion) in addition to being present in the moment (mindfulness) and focusing on one's body and breath instead of focusing elsewhere (experiential avoidance), there is further support for this hypothesis (Neff, 2003b).

Previous correlational research supports yoga as a practice improving body image. For instance, individuals who practice yoga report greater levels of embodiment (appreciation of what one's body does, body awareness and body responsiveness (Daubenmeir, 2005; Delaney & Anthis, 2010; Dittman & Freedman, 2009; Flaherty, 2014; Mahlo & Tiggerman, 2016). Furthermore, yoga practice is associated with greater mindfulness and less self-judgment (Brisbon & Lowery, 2009; Curtis et al., 2011; Hewitt et al., 2011; Daubenmeir et al., 2012), and greater interoceptive awareness (Rani & Rao, 1994).

In terms research in the prevention of body dissatisfaction and disordered eating, two studies have yielded conflicting results (Cook-Cottone et al., 2008; Mitchell et al., 2007). In a study of 5th graders, Cook-Cottone and her colleagues (2008) examined how a program incorporating yoga, DBT skills and dissonance-based education about body image would predict less eating disorder symptoms (e.g., drive for thinness, bulimic symptoms, and body dissatisfaction). Results from the study were promising and suggested significant changes in body dissatisfaction and eating disorder symptoms; however, it is difficult to assess which component of the prevention program was most beneficial. Conversely, Mitchell and her colleagues (2007) assessed body dissatisfaction changes in college students practicing yoga one-time a week for six weeks, completing a dissonance-based program, or a control group and found that only the dissonance-based group reported changes in eating disorder pathology (Mitchell et al., 2007).

Studies assessing the impact of yoga as an adjunct in outpatient (Hall et al., 2016; McIver et al., 2009) and inpatient or residential treatment (Carei et al., 2010; Pacanowski et al., 2017) have provided evidence for the use of yoga during treatment; however results are promising.

Yoga practice during residential treatment appears to decrease pre-meal and in meal anxiety and negative affect (Pacanowski et al., 2017) and food preoccupation around meal time (Carei et al., 2010) during treatment, potentially making participants' treatment experience easier and more effective. In both inpatient and outpatient settings, participants also reported lasting changes in depressive symptoms and anxiety (Carei et al., 2010; Hall et al., 2016) and improvements in eating disorder pathology including less shape and weight concern (Hall et al., 2016) and less bingeing (McIver et al., 2009) which maintained over time.

Study Two was also established to assess changes in eating disorder symptoms related to yoga practice to support previous findings that yoga practice is related to changes in body dissatisfaction and eating disorder pathology. Even before completion of Study One, Study Two was designed to assess changes in variables considered to be the active ingredients (e.g., the mechanism of change) in eating disorder pathology produced through yoga practice, (i.e., self-compassion, mindfulness, and experiential avoidance) to provide further support for why yoga is beneficial.

This study is the first study examining changes in eating disorder pathology and body dissatisfaction over time while also assessing changes in mindfulness, experiential avoidance, body appreciation, and self-compassion. While research has evaluated how yoga relates to improvements in mindfulness (Bisbon & Lowery, 2009; Khalsa et al., 2008) and self-compassion (Braun, Park, Conboy, et al., 2012; Gard et al., 2012) such studies did not evaluate how such changes relate to eating pathology specifically. There is also no known research that has assessed changes in experiential avoidance as a result of practicing yoga in participants with eating disorder pathology. One study assessed changes in experiential avoidance among a sample of

veterans seeking treatment for PTSD over time (Dick, Niles, Street, DiMartino, & Mitchell, 2014) but did not find significant changes post-yoga intervention in their sample.

While Study Two was not a randomized control trial, nor did it employ a comparison group, Study Two was conducted on college students, a population at higher risk for eating disorder pathology (Fitzsimmons-Craft, 2011) and at a frequency that mimics the typical residential or inpatient stays that patients diagnosed with eating disorders (Frisch et al., 2006). Furthermore, many studies have not evaluated associated factors (self-compassion and experiential avoidance) with change over time. This study is the first to assess changes related to yoga practice in self-compassion and experiential avoidance over time while examining changes in eating disorder pathology. Furthermore, this is one of the first studies to assess changes in body dissatisfaction and disordered eating in a sample of men and women and to assess perceived yoga skills and knowledge as well.

Study Two Hypotheses

Hypothesis 1: Participants will report improvements (a significant increase) in self-compassion (SCS) from Time 1 to Time 2.

Hypothesis2: Participants will report improvements (a significant increase) in body appreciation (BAS-2) from Time 1 to Time 2.

Hypothesis 3: Participants will report a significant increase in mindfulness (overall FFMQ score) from Time 1 to Time 2.

Hypothesis 4: Participants will report a significant increase in yoga self-efficacy (YSES) from Time 1 to Time 2.

Hypothesis 5: Participants will report a decrease in body dissatisfaction (Appearance Orientation; Appearance Evaluation; Overweight Preoccupation) from Time 1 to Time 2. Of note higher scores on Appearance Evaluation indicate greater satisfaction with body image.

Hypothesis 6: Participants will report a decrease in eating disorder pathology (Global EDE-Q) from Time 1 to Time 2.

Hypothesis 7: Participants will report a decrease in experiential avoidance (AAQ-II) from Time 1 to Time 2.

CHAPTER VII

STUDY TWO METHOD

Participants

Participants were recruited from 8-week yoga courses offered by the Kinesiology Department of a Midwestern University. There were no exclusionary criteria for who could participate in the study. The study was conducted at two time points – Time 1 (first day of class) and Time 2 (last two classes of the 8-week course). Separate recruitment was offered at each time point so that participants did not feel obligated to participate at any time point. Essentially, participants were enrolled in a yoga courses that met thrice weekly for 50-minutes in classes with two difference instructors B.S. and C.C. The courses, while they varied in date and time, focused on teaching yoga asanas (poses), prana (breath-work), and yoga philosophy and history.

A total of 113 participants completed at least one part of the study. However, only 83 participants completed both parts of the study (73%). Of the participants who did not complete both parts, 18 participants only completed Time 1 (about 16% of the total sample). Twelve participants completed only Time 2 (about 11% of the total sample). Of note, professors of the course reported that some students were absent on days that participants were provided the assessment packets. A comparison to assess whether there were significant differences on relevant variables (BMI, age, AAQ-II, BAS-2, FFMQ, SCS, AE, AO, BASS, OP, Restraint, WC, SC, EC, and Global EDE-Q) among completers and non-completers was conducted. There were no significant differences ($p > .05$) between groups at Time 1 with the exception of weekly

exercise. Participants who completed both parts of the study reported less weekly hourly exercise at Time 1 ($M = 7.27$, $SD = 8.30$) than participants who only completed Time 1, ($M = 11.71$, $SD = 8.23$), $F(1,92) = 3.995$, $p = .049$, although significance was marginal. Unfortunately, among the 12 participants who completed Time 2 and not Time 1, there was no demographic information obtained. While this is unfortunate, the design of the study was established as to not exclude or coerce any participants.

Only assessing participants who completed both parts, participants were $M = 20.17$ ($SD = 1.43$) years of age. A total of 63 participants reported they were female (75.9%) and 18 reported they were male (21.7%). Two participants did not report their gender (2.4%). There was minimal diversity in the sample; two participants did not report their ethnicity (2.4%), while 73 participants reported they were Caucasian (88%), 2 reported they were African American (2.4%), four reported they were Hispanic (4.8%) and 2 reported they were American Indian (2.4%). Of note, in evaluating normalcy of variables, BMI was found to be negatively skewed and log10 transformations were conducted to adjust BMI scores. All other variables were considered to meet assumptions and were normally distributed. See Tables 11 and 12 for greater details about sample demographics.

Procedure

Participants, as noted above, were recruited at two times points and separately completed informed consent. The researcher came to the first or second yoga course (first week; Time 1) of classes to introduce her study to students in the yoga class. All participants were provided the research packets so that they did not feel like they were obligated to complete the study and participants completed the research packet and provided their packet back to the researcher. The

last week of class, 8 weeks later (Time 2) the researcher returned, obtained additional informed

consent, and followed the same procedure as Time 1. To ensure confidentiality, participants were

told to respond to three password prompts instead of providing names or identifying information.

To identify participant responses at each time point, the researcher matched the passwords from

Time 1 and Time 2 (See Appendix C). Participants were entered into a raffle to win a $25 gift

card to Target for completing Time 1. Participants were given $5 for completing Time 2.

Table 11: Study Two Descriptive Statistics

Variable	Completers		Non-Completers	
	N	%	N	%
	83	100	18	100
Gender				
Women	63	75.9	13	72.2
Men	18	21.7	5	27.8
Ethnicity				
Caucasian	73	90.1	15	88.2
African American	2	2.5	0	0
Hispanic	4	4.9	1	5.9
Asian American	0	0	0	0
American Indian	2	2.5	1	5.9
Other	0	0	0	0
Sexual Orientation[a]				
Straight	75	98.7	16	94.1
Gay/Lesbian	0	0	0	0
Bisexual	1	1.3	1	5.9
Grade				
Freshman	18	17.8	4	22.2
Sophomore	20	24.7	5	27.8
Junior	15	18.5	4	22.2
Senior	28	34.6	5	27.8
	M	*SD*	*M*	*SD*
Age	20.17	1.43	20.33	1.72
BMI	24.10	3.52	24.26	4.12
Average Hours of exercise weekly**	7.27	8.30	11.71	8.23
Average hours of yoga practice	0.78	1.01	1.00	1.41

[a] = data missing, 8 participants did not provide a response, e.g. participant did not reply
** significant difference per group ($p = .049$)

Table 12: Study Two Eating Disorder History

Eating Disorder (ED) History	Completers		Non-Completers	
	N	%	N	%
No Previous ED Diagnosis	77	95.1	17	94.4
Previous ED Diagnosis	4	4.9	1	5.6
Anorexia Nervosa	3	3.7	1	5.6
Bulimia Nervosa	1	1.2	0	0
Binge Eating Disorder	0	0	0	0

Of those who have completed both studies, information regarding prior yoga experience was evaluated. See Table 13 regarding previous yoga experience and the types of yoga participants have tried prior to the yoga course. Independent samples t-tests were run to evaluate if there were different in any variables at Time 1 or Time 2 between participants who have participated in any yoga before (n=37) versus those who have never participated in yoga (n=43). There were no significant differences in yoga self-efficacy, self-compassion, mindfulness, experiential avoidance, body appreciation, body dissatisfaction, disordered eating, or BMI ($p >$ .05). Participants who reported previous yoga experience reported they have practiced a variety of different styles of yoga with the majority of people indicating that they have tried Vinyasa/Power (30.8%) or Yoga Flow courses (33.33%) which are very similar.

Table 13: Study Two Self-Reported Yoga Experience

	Completers		Non-Completers	
	N	*%*	N	*%*
Practiced Yoga Before				
No	43	53.8	12	70.6
Yes	37	46.2	5	29.4
Styles of yoga practiced				
Ashtanga	0	0	0	0
Anusara	0	0	0	0
Bikram	4	10.3	1	12.5
Flow	13	33.33	3	12.5
Forrest	0	0	0	0
Iyengar	1	2.6	0	0
Jivamukti	0	0	0	0
Kripalu	0	0	0	0
Kundalini	0	0	0	0
Prenatal	0	0	0	0
Restorative	0	0	0	0
Sivananda	1	2.6	0	0
Viniyoga	3	7.7	0	0
Vinyasa/Power	12	30.8	1	12.5
Yin	1	2.6	0	0
Pilates	8	20.5	2	25.0
Other	4	11.1	1	12.5
	M	*SD*	*M*	*SD*
Years of yoga practice	2.07	1.73	1.60	0.89
Median hours of yoga practice weekly	1.00	-	0.00	-

Measures

Participants completed the same measures from Study One (SCS, BAS-2, FFMQ, AAQ-II, EDE-Q, MBSRQ-AS, YSES, demographics questionnaire) with the addition of a post-yoga (Time 2) questionnaire about satisfaction and participation in yoga practice. With the exception of the demographics questionnaire and post-yoga questionnaire, participants completed all assessments at Time 1 and Time 2.

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Demographics Questionnaire. The same demographics questionnaire that participants completed in Study One was used for Study Two in order to assess participants' age, year in school, ethnicity, sexual orientation, and gender identity were assessed. Additionally, participants responded to questions assessing the level of experience participating in yoga, styles they have tried, and their general opinion of yoga. Participants were also asked the amount of time that they participated in other physical activities to assess the overall amount of exercise the participants participated in each week. Furthermore, individuals reported their weight and height to obtain a measure of BMI. A previous history of a diagnosis of an eating disorder was also be obtained. See Appendix A for the demographics questionnaire.

Post-Yoga Questionnaire. Participants who completed both parts of the study completed a post-yoga questionnaire assessing yoga enjoyment on a scale from 0 to 10 with 10 indicating the most enjoyment and 0, the least. Participants also reported their perception of their instructor's knowledge of yoga on a 10-point Likert scale with 0 indicating no knowledge and 10 indicating the most. Participants reported their desire to practice yoga again in the future on a 7-point Likert scale with 0 being the lowest and 6 the highest. Furthermore, participants reported how they looked up information about yoga on a 5-point Likert scale with 0 indicated never and 5 indicating "a lot." Participants also indicated the degree that they would recommend the class to a friend from 0 (not at all) to 10 (completely). Participants also reported the number of classes that the participant missed. See Appendix B for the complete questionnaire.

Eating Disorder Patholgoy. As with Study One, to assess eating disorder pathology, participants completed the Eating Disorder Evaluation-Questionnaire (EDE-Q; Fairburn & Beglin, 1994; 2008). See Method section for Study One for further information on the EDE-Q.

Internal consistency for Time 1 was acceptable: Restraint (α = .84), Eating Concern (CA = .81), Weight Concern (α = .83), and Shape Concern (α = .92), Global EDE-Q (α = .92) and Time 2: Restraint (α = .85), Eating Concern (α = .81), Weight Concern (α = .88), and Shape Concern (α = .91), Global EDE-Q (α = .93).

Self-Compassion. See Study One for a full description of the SCS (Neff, 2003). Internal Consistency for Time 1 was acceptable for the overall SCS (α = .93), Positive SCS (SK, CH, MI; α =.91) and negative SCS (α =.92). There was a broader range of internal consistency, partially due to a decrease in items in each scale for the 6 subscales. For Time 2, there was also a range of internal consistency among all scales. The total internal consistency of SCS was excellent (α = .91) and the positive factors (α = .88) and negative factors (α = .88) were acceptable. Self-Kindness (α = .84), Common Humanity (α = .82), SJ (α = .80), OI (α = .82) were in the acceptable range, while MI (α = .72) and IS (α = .70) had fair internal consistency. Only total SCS scores were used at Time 1 and Time 2.

Experiential Avoidance. The Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) was utilized to assess experiential avoidance. See Study One for more details about the AAQ-II. At all time points (Time 1 and Time 2) the AAQ-II demonstrated adequate internal consistency; Time 1 (α = .86), and Time 2 (α = .90).

Mindfulness. Mindfulness was assessed as in Study One using the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). See Methods section for Study 1 for full details of the FFMQ. For Study 2, internal consistency ranged from adequate to excellent: Observe (α = .84), Describe (α = .87), Actaware (α = .89), Nonjudge (α = .94), and Nonreact (α = .72). Time 2 yielded similar internal consistency: Observe (α = .78), Describe (α = .91),

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Actaware (α = .91), Nonjudge (α = .93), and Nonreact (α = .77). Internal consistency for overall FFMQ at Time 1 (α = .84) and Time 2 (α = .92) were good.

Yoga Self-Efficacy. Yoga Self-Efficacy Scale (YSES) was included to assess knowledge and perceived yoga skills (see Study One Method section for further data on the YSES). For Study 2, internal consistency at Time 1 (α = .94) and Time 2 (α = .95) was excellent.

Body Appreciation. To assess body appreciation, the Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015) was utilized as it was in Study One (See Study One Method section for further details on the scale). For Study Two, Time 1 (α = .86) and Time 2 (α = .96) internal consistency was acceptable.

Body Dissatisfaction. To assess body dissatisfaction, the Multidimensional Body Self-Relations Questionnaire-Appearance Subscales (MBSRQ-AS; Cash, 2000) was used as it was in Study One (see Study One Method section for further information about the scale). Internal consistency was mostly acceptable. For instance, at Time 1 the MBSRQ-AS yielded adequate internal consistency for Appearance Evaluation (α = .87), Appearance Orientation (α = .84), and Body Areas Satisfaction Subscale (α = .82) and questionable internal consistency with Overweight Preoccupation (α = .75) and Self-Classified Weight (α = .79) Of note, Self-Classified Weight was not utilized for Study 2 as BMI is a better representation of participant's weight status. Time 2, internal consistency was acceptable for Appearance Evaluation (α = .91), Appearance Orientation (α = .80), BASS (α = .81), Self-Classified Weight (α = .81), and questionable for Overweight Preoccupation (α = .77).

Statistical Analyses

To assess demographic data, correlations, frequency, mean, and standard deviations were calculated for all variables. To assess Hypotheses 1 through Hypothesis 7, paired-samples t-tests were conducted to assess whether there were significant changes between Time 1 and Time 2. Bootstrapping using 1,000 samples was utilized to assess change. Furthermore, to assess whether there were differences in changes over time between yoga courses (due to different instructors), repeated-measures ANCOVA's were run with BMI entered as a covariate.

CHAPTER VIII

STUDY TWO RESULTS

As noted, participants who completed both parts of the study completed a post-yoga questionnaire assessing yoga enjoyment, their perception of their instructor's knowledge of yoga, desire to practice yoga again in the future, how often someone looked up information about yoga, if they would recommend the class to a friend and the number of classes that the participant missed. Fifty-eight participants who completed Time 1 and Time 2 were in yoga courses with B.S. and 17 participants completing both time points were in class with C.C. Generally, participants rated the yoga courses as enjoyable, $M = 8.11$, $SD = 1.45$, where 10 is the highest level of enjoyment. There was no difference in reported enjoyment between students taking classes with B.S. ($M = 9.22$, $SD = 1.16$) or C.C. ($M = 8.82$, $SD = 1.13$), $t(73) = 1.263$, $p = .211$. Furthermore, participants perceived their two instructors to be knowledgeable about yoga by rating them on a 0-10 scale (10 is the highest), $M = 9.38$, $SD = 1.25$. There were no perceived differences in yoga knowledge between B.S. ($M = 9.52$, $SD = 1.00$) or C.C. ($M = 9.24$, $SD = 1.09$), $t(73) = 1.005$, $p = .318$.

There was greater variability in participants' desire to continue yoga in the future. Generally only 5% reported that they would not likely participate in yoga in the future; two participants (2.5%) reporting they would "most likely not practice", two participants (2.5%) indicating they probably were not going to practice, 13 (16.5%) neutral, 21 participants (26.6%) reporting they would probably practice, 21 (26.6%) reported they most likely will practice, and

20 (25.3%) reported they would definitely practice again. The majority of participants reported they would "probably" or "most likely" practice yoga in the future (bimodal, 53.2%) with the median response being "probably" continuing to practice yoga. There was a slight difference noted between instructors (p = .043, Fisher's exact test) where individuals in courses with B.S. reported a greater likelihood of continuing to practice yoga than individuals in C.C.'s course.

Participants also reported variability in how much information they would seek out after class. Sixteen participants (20.3%) reported they never sought out information outside of class, 29 (36.7%) endorsed that they seldom/rarely sought out information 29 (36.7%) reported they "sometimes" sought out information about yoga, 4 (5.1%) reported they sought out information about yoga "often" and one participant (1.3%) reported they sought information about yoga "a lot." Participants reported a bimodally that they "sometimes" or "often" looked up information outside of their course. A Fisher's Exact test was utilized to assess differences in information sought out after class between participants in courses with the different instructors. There was not a significant difference in information seeking between participants in courses with either instructor (p = .115). Furthermore, participants on average missed 2.44 classes over the eight weeks (SD = 4.66). The amount of yoga classes that participants missed was not a significant predictor of enjoyment of yoga, b = .294, SE = .36, $t(77)$ = .823, p = .41. There were no significant differences in missed classes related to instructor, B.S. (M = 2.53, SD = 5.40) or C.C. (M = 2.19, SD = 1.20), $t(74)$ = .264, p = .793. Participants overall reported missing 2.44 courses (SD = 4.66), which is 8.3% of the course.

Additionally, participants appeared to indicate they were likely to recommend the yoga course to a friend, M = 9.3, SD = 1.25. There was not a significant difference between instructor,

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t(73) = .388, *p* = .388 on whether participants would recommend the yoga course in the future, B.S. (*M* = 9.36, *SD* = 1.21) and C.C. (*M* = 9.24, *SD* = 1.09). In evaluating whether there were differences between instructors in changes from Time 1 and Time 2, t-tests were conducted primarily to assess differences between groups on all dependent variables at Time 1 and Time 2. There were no significant differences between instructors (*p*s > .05). Repeated measures ANCOVA's were also run with BMI entered as a covariate to address whether instructor (between subject factor) was related to differences in changes over time. There were also no significant differences between instructors (*p*s > .05).

Correlations were calculated between variables at Time 1 and Time 2 to assess the relationship between variables and to also assess whether any covariates should be used in assessing changes in the dependent variables from Time 1 to Time 2. See Tables 14A and 14B for correlations between variables at Time 1. See Tables 15A and 15B for correlations among variables at Time 2

Table 14A: Correlations Among Variables for Study Two, Time 1

Variables	1	2	3	4	5	6	7	8
1. BMI	-							
2. AAQ-II	.090	-						
3. BAS-2	-.198	-.573***	-					
4. FFMQ	-.147	-.665***	.357***	-				
5. AE	-.303**	-.354***	.753***	.384***	-			
6. AO	-.218	.278	-.217	-.108	-.111	-		
7. BAS	-.141	-.445***	.766***	.191	.736***	-.239*	-	
8. OP	.197	.299***	-.326**	-.199	-.372***	.402***	-.378***	-
9. YSES	-.101	-.219	.347**	.219	.237*	.044	.376***	.055
10. SCS	-.095	-.677***	.572***	.642***	.404***	-.257*	.469***	-.317**
11. RE	.053	.101	-.187	-.073	-.081	.370***	-.200	.619***
12. EC	-.050	.468***	-.282*	-.347***	-.172	.394***	-.257*	.595***
13. SC	.161	.438***	-.688***	-.247***	-.647***	.323***	-.637***	.721***
14. WC	.135	.451***	-.658***	-.244***	-.639**	.346***	-.626***	.727***
15. Global EDE-Q	.063	.442***	-.582***	-.509***	-.509***	.426***	-.567***	.791***

$*p < .05$, $**p < .01$, $***p < .001$
1 = BMI, 2 = AAQ-II (Acceptance and Action Questionnaire-II), 3 = BAS-2 (Body Appreciation Scale-2), 4= FFMQ (Five Facet Mindfulness Questionnaire), 5= AE (Appearance Evaluation), 6= AO (Appearance Orientation), 7 = BAS (Body Areas Satisfaction Scale), 8 = OP (Overweight Preoccupation), 9 = YSES (Yoga Self-Efficacy Scale), 10 = SCS (Self-Compassion Scale), 11 = RE (Restraint), 12 = EC (Eating Concern), 13 = SC (Shape Concern), 14 = WC (Weight Concern), 15 = Global EDE-Q (Global Eating Disorder Evaluation-Questionnaire)

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Table 14B: Correlations for Study Two, Time 1 Continued

Variables	9	10	11	12	13	14
9. YSES	-					
10. SCS	.323**	-				
11. RE	-.119	-.144	-			
12. EC	-.083	-.408***	.601***	-		
13. SC	-.172	-.497***	.495***	.597***	-	
14. WC	-.137	-.512***	.477***	.583***	.946***	-
15. Global EDE-Q	-.158	-.483***	.723***	.773***	.933***	.926***

*p < .05, **p < .01, *** p < .001
1 = BMI, 2 = AAQ-II (Acceptance and Action Questionnaire-II), 3 = BAS-2 (Body Appreciation Scale-2), 4= FFMQ (Five Facet Mindfulness Questionnaire), 5= AE (Appearance Evaluation), 6= AO (Appearance Orientation), 7 = BAS (Body Areas Satisfaction Scale), 8 = OP (Overweight Preoccupation), 9 = YSES (Yoga Self-Efficacy Scale), 10 = SCS (Self-Compassion Scale), 11 = RE (Restraint), 12 = EC (Eating Concern), 13 = SC (Shape Concern), 14 = WC (Weight Concern), 15 = Global EDE-Q (Global Eating Disorder Evaluation-Questionnaire)

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Table 15A: Correlations Among Variables for Study Two, Time Two

Variables	1	2	3	4	5	6	7	8
1. BMI	1.00							
2. AAQ-II	.072	1.00						
3. BAS-2	-.196	-.489***	1.00					
4. FFMQ	-.087	-.681***	.376***	1.00				
5. AE	-.310**	-.321***	.764***	.292*	1.00			
6. AO	-.222	.256*	-.256*	-.146	-.176	1.00		
7. BAS	-.154	-.463***	.735***	.371***	.811***	-.338**	1.00	
8. OP	.045	.344***	-.375**	-.293**	-.495***	.431***	-.477***	1.00
9. YSES	.094	-.294*	.091	.441***	.047	.037	.033	-.105
10. SCS	-.110	-.737***	.528***	.661***	.419***	-.208	.495***	-.364***
11. RE	-.078	.241*	-.281*	-.177	-.364***	.449***	-.360***	.692***
12. EC	-.020	.578***	-.447***	-.426***	-.455***	.373***	-.492***	.642***
13. SC	.175	.577***	-.669***	-.424***	-.716***	.340***	-.686***	.700***
14. WC	.167	.493***	-.616***	-.378***	-.707**	.414***	-.678***	.685***
15. Global EDE-Q	.109	.536***	-.604***	-.413***	-.656***	.438***	-.647***	.767***

*$p < .05$, **$p < .01$, ***$p < .001$
1 = BMI, 2 = AAQ-II (Acceptance and Action Questionnaire-II), 3 = BAS-2 (Body Appreciation Scale-2), 4= FFMQ (Five Facet Mindfulness Questionnaire), 5= AE (Appearance Evaluation), 6= AO (Appearance Orientation), 7 = BAS (Body Areas Satisfaction Scale), 8 = OP (Overweight Preoccupation), 9 = YSES (Yoga Self-Efficacy Scale), 10 = SCS (Self-Compassion Scale), 11 = RE (Restraint), 12 = EC (Eating Concern), 13 = SC (Shape Concern), 14 = WC (Weight Concern), 15 = Global EDE-Q (Global Eating Disorder Evaluation-Questionnaire)

Table 15B: Correlations for Study Two, Time 2 Continued

Variables	9	10	11	12	13	14
9. YSES	1.00					
10. SCS	.265*	1.00				
11. RE	.042	-.265*	1.00			
12. EC	-.140	-.531***	.602***	1.00		
13. SC	-.108	-.661***	.581***	.780***	1.00	
14. WC	-.052	-.598***	.611***	.731***	.921***	1.00
15. Global EDE-Q	-.062	-.601***	.778***	.863***	.948***	.943***

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

1 = BMI, 2 = AAQ-II (Acceptance and Action Questionnaire-II), 3 = BAS-2 (Body Appreciation Scale-2), 4= FFMQ (Five Facet Mindfulness Questionnaire), 5= AE (Appearance Evaluation), 6= AO (Appearance Orientation), 7 = BAS (Body Areas Satisfaction Scale), 8 = OP (Overweight Preoccupation), 9 = YSES (Yoga Self-Efficacy Scale), 10 = SCS (Self-Compassion Scale), 11 = RE (Restraint), 12 = EC (Eating Concern), 13 = SC (Shape Concern), 14 = WC (Weight Concern), 15 = Global EDE-Q (Global Eating Disorder Evaluation-Questionnaire)

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Hypotheses 1 through Hypothesis 7

Paired *t*-tests were conducted to evaluate change from Time 1 to Time 2 where Time 2 was used as the comparison point. See Table 15 for means and standard deviations, *p*-values, and effect sizes for all *t*-tests. Hypothesis 1, that self-compassion would significantly improve from Time 1 to Time 2 was supported $t(76) = 2.44$, $p = .017$, $d = 0.28$. Hypothesis 2, that participants would report an increase in body appreciation was supported, $t(75) = 3.47$, $p = .001$, $d = 0.40$. Participants reported higher body appreciation at Time 2 compared to Time 1. Hypothesis 3, that participants would report greater mindfulness from Time 1 to Time 2 was not supported, $t(74) = 0.229$, $p = .82$, $d = 0.04$. Participants did not report differences in mindfulness from Time 1 to Time 2. Hypothesis 4 was also supported, $t(68) = 2.76$, $p = .007$, $d = 0.44$. Participants reported greater knowledge and confidence in their yoga skills at Time 2 compared to Time 1. In evaluating changes in body dissatisfaction, Hypothesis 5, participants did not report improvements in body dissatisfaction (Appearance Evaluation (AE)), $t(75) = 1.349$, $p = .181$, $d = 0.10$. However, participants did report less investment in their appearance (Appearance Orientation (AO)), $t(75) = -3.007$, $p = .004$, $d = 0.14$ from Time 1 to Time 2. They also reported less overweight preoccupation at Time 2 compared to Time 1, $t(75) = -2.379$, $p = .020$, $d = 0.26$. In evaluating hypothesis 6, participants also reported significantly less disordered eating behaviors as measured by the Global EDE-Q score at Time 2 than Time 1, $t(68) = -2.391$, $p = .020$, $d = 0.23$. Lastly, Hypothesis 7 was not supported such that, participants did not report a significant improvement from Time 1 to Time 2 in experiential avoidance, $t(73) = 0.215$, $p = .83$, $d = 0.02$. See Table 16 for means and standard deviations for Time 1 and Time 2.

Table 16: Means and Standard Deviations for Dependent Variables at Time 1 and Time 2

Variable	Time 1 M (SD)	Time 2 M (SD)	p	Cohen's d
SCS	2.96 (0.57)	3.06 (0.65)	.017	0.28
BAS-2	35.70 (6.80)	37.42 (7.50)	.001	0.40
FFMQ	3.24 (0.42)	3.25 (0.47)	.829	0.04
YSES	72.66 (14.41)	78.09 (14.36)	.007	0.44
AE	3.49 (0.61)	3.53 (0.66)	.181	0.10
AO	3.49 (0.56)	3.37 (0.55)	.004	0.14
OP	2.73 (0.93)	2.60 (0.93)	.020	0.26
Global EDE-Q	1.47 (1.14)	1.36 (1.28)	.020	0.23
EA	28.76 (9.49)	28.89 (10.86)	.830	0.02

SCS = Self-compassion, BAS-2 = Body Appreciation, FFMQ = Mindfulness, YSES = Yoga Self-Efficacy, AE = Appearance Evaluation, AO = Appearance Orientation, OP = Overweight Preoccupation, Global EDE-Q = Total EDE-Q score, EA = Experiential Avoidance

Given that women and men were included in analyses in Study 2, and the established relationship between BMI and many of the variables, Repeated Measures ANCOVAs were conducted to assess changes further to evaluate whether there were differences related to gender and reduce the potential confound of BMI. As such, repeated measures ANCOVA's (univariate) were conducted with time as the within subjects variable, gender as the between subjects factor, and BMI was included as a covariate.

Repeated Measures assessment

Further assessing Hypothesis 1 (that SC would improve from Time 1 to Time 2), which was supported by the *t*-test, a repeated measures ANCOVA was run. Time was the within subjects variable, gender – the between subjects variable, and BMI was entered as a covariate. There were no significant interactions between BMI and SCS, $F(1,74) = .008$, $p = .931$, $\eta^2_p <$ .000, or Gender and SCS, $F(1,74) = 0.984$, $p = .324$, $\eta^2_p = .013$. There was no between subjects effect of gender, $F(1,74) = 0.447$, $p = .506$, $\eta^2_p = .006$. There was a significant main effect for time, $F(1,73) = 6.426$, $p = .013$, $\eta^2_p = .081$ supporting *t*-test analyses since self-compassion was higher at Time 2 than Time 1. See Table 16.

To assess Hypothesis 2, one-way repeated measures ANCOVA were run to assess changes in BAS-2 over time with BMI as a covariate and gender as the between subjects factor. There were no significant interactions effects between BMI and BAS-2, $F(1,73) = 0.088$, $p = .768$, $\eta^2_p = .001$ nor gender and BAS-2, $F(1,73) = 2.865$, $p = .095$, $\eta^2_p = .038$. There was not a main effect for gender on BAS-2, $F(1,73) = 3.416$, $p = .069$, $\eta^2_p = .045$, although the p-value was marginal. There was a main effect for time confirming the t-test analyses, $F(1,73) = 14.979$, $p < .001$, $\eta^2_p = .170$ such that participants reported higher BAS-2 at Time 2 than Time 1. Confirming the significant t-test and hypothesis 3.

To further assess Hypothesis 3 (Mindfulness), which was not supported during the t-test analysis, Repeated Measures ANCOVA were run with gender as the between-subjects factor and BMI as a covariate. Interactions between BMI and FFMQ, $F(1,72) = 0.145$, $p = .705$, $\eta^2_p = .002$ or gender and FFMQ, $F(1,72) = 1.606$, $p = .209$, $\eta^2_p = .022$ were not significant. There was also no main between subject effect for gender, $F(1,72) = 0.358$, $p = .358$, $\eta^2_p = .012$, or main effect for time, $F(1,72) = 0.901$, $p = .346$, $\eta^2_p = .012$ which supported the t-test analyses.

To assess Hypothesis 4, one-way repeated measures ANCOVA were run to assess changes in YSES over time with BMI as a covariate and gender as the between subject factor. There were no significant interactions between BMI and YSES, $F(1,65) = 0.109$, $p = .742$, $\eta^2_p = .002$ or Gender and YSES, $F(1,65) = 0.193$, $p = .662$, $\eta^2_p = .003$. There was not a significant main effect for gender on YSES, $F(1,65) = 0.966$, $p = .329$, $\eta^2_p = .015$. There was a main effect of time, $F(1,65) = 8.450$, $p = .005$, $\eta^2_p = .115$; participants reported higher YSES at Time 2 than Time 1.

In assessing Hypothesis 5, one-way repeated measures ANCOVA were run to assess changes in body dissatisfaction over time with BMI as a covariate and gender as the between subjects factor. First, Appearance Evaluation (AE) was assessed. There was not a significant interaction between BMI and AE, $F(1,73) = 0.141$, $p = .709$, $\eta^2_p = .002$. However, there was a main effect for Gender and AE, $F(1,73) = 11.045$, $p = .001$, $\eta^2_p = .131$. There was also a main effect for gender on AE, $F(1,73) = 4.431$, $p = .039$, $\eta^2_p = .057$. Women participants reported lower AE, worse body image ($M = 3.40$, $SE = .089$) than men ($M = 3.76$, $SE = .160$). T-tests were calculated to assess changes based on gender. Women did not report a significant change in AE over time, $t(57) = -0.387$, $p = .700$, Time 1 ($M = 3.39$, $SD = 0.75$) versus Time 2 ($M = 3.36$, $SD = 0.79$) while men did, $t(17) = 3.579$, $p = .002$, Time 1 ($M = 3.59$, $SD = 0.70$) versus Time 2 ($M = 3.90$, $SD = 0.34$).

Similar analyses were conducted looking at AO with gender as the between subject factor and BMI as a covariate. There was not a significant interaction between AO and Gender, $F(1,73) = 0.242$, $p = .624$, $\eta^2_p = .003$, nor BMI and AO $F(1,73) = 0.001$, $p = .977$, $\eta^2_p < .001$. Furthermore, there was not a significant main effect for gender (between subjects effect) on AO, $F(1,73) = 2.543$, $p = .115$, $\eta^2_p = .115$. There was a significant main effect of time, $F(1,73) = 7.573$, $p = .007$, $\eta^2_p = .094$. Participants reported improvements in AO from Time 1 to Time 2 confirming the t-test analyses.

Next, repeated measures ANCOVA were run assessing overweight preoccupation (OP) with gender as a between subject factor and BMI as a covariate. While there was not a significant interaction between BMI and OP, $F(1,73) = 0.460$, $p = .500$, $\eta^2_p = .006$, there was a significant interaction between gender and OP $F(1,73) = 4.090$, $p = .047$, $\eta^2_p = .053$ even though the

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between subjects effect of gender was not significant, $F(1,73) = 3.199$, $p = .078$, $\eta^2_p = .042$. In further assessing the interaction of gender and OP, it appears that overweight preoccupation decreased significantly from Time 1 ($M = 2.46$, $SD = 0.61$) to Time 2 ($M = 2.13$, $SD = 0.62$), $t(17) = -3.599$. $p = .002$ among men, while there was no significant change over time among women, $t(57) = -1.066$, $p = .291$ with Time 1 ($M = 2.75$, $SD = 0.98$) not significantly different from Time 2 ($M = 2.69$, $SD = 0.97$).

To assess Hypothesis 6, one-way-repeated measures ANCOVA were run to assess changes in Global EDE-Q over time with BMI as a covariate and gender as the between subjects factor. In completing this analyses there were no significant interactions noted between EDE-Q and gender, $F(1.66) = 0.140$, $p = .309$, $\eta^2_p = .016$ nor EDE-Q and BMI, $F(1,66) = 1.052$, $p = .608$, $\eta^2_p = .004$. There was not a significant effect of time, $F(1,66) = 0.404$, $p = .527$, $\eta^2_p = .006$, however there was a significant main effect for gender, $F(1,66) = 9.277$, $p = .003$, $\eta^2_p = .123$. Men reported lower Global EDE-Q scores ($M = 0.649$, $SE = 0.285$) than women ($M = 1.646$, $SE = 0.154$). This counters the significant findings noted in the t-test. While there could be significant changes in the subscales of the EDE-Q, further analyses were not conducted given the many analyses performed to protect against Type II error.

As such the individual factors of the EDE-Q were assessed to address specific changes that could have occurred over time. First changes over time in Restraint were assessed with time as the within subjects variable, gender as the between subjects factor and BMI as a covariate. There was not a significant interaction between BMI and Restraint, $F(1,72) = 0.114$, $p = .738$, $\eta^2_p = .002$. However there was a significant interaction between gender and Restraint, $F(1,72) = 4.125$, $p = .046$, $\eta^2_p = .055$ while there was not an overall between subjects effect of gender,

$F(1,72) = 1.207$, $p = .276$, $\eta^2_p = .017$. In conducting further *t*-tests looking at changes separately

for gender, while the interaction was significant, there were no significant changes in restraint for

women at Time 1 ($M = 1.22$, $SD = 1.30$) to Time 2 ($M = 1.25$, $SD = 1.36$), $t(57)$ -0.358, $p = .722$

or men from Time 1 ($M = 1.07$, $SD = 0.85$) to Time 2 ($M = 0.66$, $SD = 0.67$), $t(17) = 1.53$, $p = $

.145.

Changes over time with gender as a between subjects factor and BMI as covariate were

also assessed using ANCOVA evaluating eating concern, another factor of the EDE-Q. There

were no significant interactions between gender and eating concern, $F(1,68) = 0.025$, $p = .676$,

$\eta^2_p = .003$ or BMI and eating concern, $F(1,68) = 0.654$, $p = .421$, $\eta^2_p = .010$, nor was there a

main effect for time, $F(1,68) = 0.574$, $p = .451$, $\eta^2_p = .008$. There was also not a significant

between subjects effect overall, $F(1,68) = 1.956$, $p = .168$, $\eta^2_p = .028$.

Next changes in shape concern from Time 1 to Time 2 (within subjects) was assessed

with BMI as a covariate and gender as a between subjects factor. There were no interactions

effects noted between gender and shape concern, $F(1,68) = 0.001$, $p = .974$, $\eta^2_p < .001$ or BMI

and shape concern, $F(1,68) = 0.197$, $p = .659$, $\eta^2_p = .003$. There was also no significant main

effect for time, $F(1,68) = 0.488$, $p = .487$, $\eta^2_p = .007$. However, there was a significant between

subjects effect, $F(1,68) = 13.696$, $p < .0001$, $\eta^2_p = .168$ with men reporting less shape concern at

Time 1 ($M = 1.13$, $SD = 1.04$) and Time 2 ($M = 0.93$, $SD = 0.69$) compared to women at Time

1($M = 2.44$, $SD = 1.79$) and Time 2 ($M = 2.22$, $SD = 1.86$).

Lastly, changes in weight concern from Time 1 and Time 2 were assessed with BMI as a

covariate and gender as a between subjects factor. There were no interaction effects for gender

and weight concern, $F(1,69) = 0.00$, $p = .993$, $\eta^2_p < .001$ or BMI and weight concern, $F(1,69) = $

0.213, $p = .646$, $\eta^2_p = .003$. There was also a between subject effect of gender, $F(1,69) = 9.412$, $p = .003$, $\eta^2_p = .120$ where men reported less weight concern at both time points, then women. However, there was a significant main effect of time, $F(1,69) = 4.548$, $p = .037$, $\eta^2_p = .062$ suggesting that there was a significant change in weight concern from Time 1 to Time 2. Participants reported less shape concern at Time 2 than at Time 1.

To assess Hypothesis 7, one-way-repeated measures ANCOVA were run to assess changes in AAQ-II over time with BMI as a covariate and gender as the between subject factor. It was expected that there would be not significant main effects or interactions. Indeed, there were no interaction effects between gender and AAQ-II, $F(1,71) = 0.001$, $p = .970$, $\eta^2_p < .001$ nor AAQ-II and BMI, $F(1,71) = 0.969$, $p = .328$, $\eta^2_p = .013$. There were also no main effects for gender, $F(1,68) = 1.859$, $p = .177$, $\eta^2_p = .026$ nor time, $F(1,68) = 0.00$, $p = .999$, $\eta^2_p < .001$ which supports the *t*-test analyses.

CHAPTER IX

STUDY TWO DISCUSSION

Study Two was designed as a quasi-experimental study evaluating changes in body dissatisfaction, disordered eating, self-compassion, mindfulness, body appreciation, and experiential avoidance over an 8-week period of regular and frequent yoga practice (50-minute classes, three times a week). Participants from a Midwestern university completed measures at two time points. The first time point, Time 1, occurred on the first day of class. The second time point, Time 2, occurred on either the last day of class or the second to last day of class (2 days apart) eight weeks after Time 1. While participants completed different courses, both instructors focused on teaching yoga philosophy, poses, and breath-work.

To assess change over time, two sets of analyses were run. The primary analyses that were conducted were paired samples *t*-tests to assess change in variables over time. However, given the correlation between BMI and many of the independent variables and research indicating that BMI predicts eating disorder pathology and body dissatisfaction (Striegel-Moore et al., 2007), and that there are significant gender differences in reported eating disorder symptomology and body dissatisfaction, further evaluation including BMI and gender was warranted. To address this, repeated measures ANCOVAs were also run to evaluate changes over time controlling for BMI while assessing gender differences. Prior to assessing whether there were significant changes over time in all variables, analyses comparing instructors and level of enjoyment of the courses were conducted to assess how such variables might impact

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change. In all, minimal differences in yoga engagement, missed classes, yoga knowledge, or

enjoyment were reported between individuals taking courses with either of the two instructors. A

majority of the participants reported they enjoyed the class, would recommend it to a friend, and

would consider taking yoga further in the future. The number of missed courses reported did not

predict differences in enjoyment of the courses or yoga knowledge. Of note, only about half of

the sample reported trying yoga prior to the yoga course. Similar to Study One, there were no

significant differences noted between individuals who have practiced yoga prior to the course or

were trying yoga for the first time although yoga frequency was considered to be much more

infrequent than among participants in other studies reporting less body dissatisfaction

(Daubenmeier, 2005; Mahlo & Tiggerman, 2016).

Overlapping findings from Study Two (*t*-test and repeated measures ANCOVA) indicate

support for Hypothesis 1, 2, 4, and partially for hypothesis 5. For instance, even when including

gender as a between subject factor, both genders reported increases in self-compassion,

regardless of BMI. Additionally, all participants reported improvements in body appreciation

over the course of 8 weeks. Most importantly, participants regardless of the yoga course that they

took or BMI status reported improvements in their yoga knowledge and skills (Hypothesis 4).

Finally, both *t*-tests and repeated measures ANCOVA supported that participants reported less

focus on body image from Time 1 to Time 2 (Appearance Orientation).

However, there were significant interactions noted between gender and time, specifically

for overweight preoccupation and appearance evaluation. While women did not report any

significant changes in overweight preoccupation over time, men in Study Two (n = 17) reported

significant improvements (a decrease) in overweight preoccupation from Time 1 to Time 2 while

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women did not report significant change. Additionally, men reported improvements in appearance evaluation, the tendency to report satisfaction with one's body image from Time 1 to Time 2, while results suggest that there was not a reported change over time reported by women from Time 1 to Time 2. Thus, males in the study reported improvements in fear of being overweight and less concern about their body appearance supporting the one previous research study evaluating differences in body dissatisfaction among male yoga practitioners (Flaherty, 2014).

Men in general reported lower overweight preoccupation than women in Study Two, supporting previous research that males report lower body dissatisfaction then women (Furnham & Calnam, 1998). The original *t*-test indicating significant decreases in eating disorder symptoms over time was not supported by the repeated measures ANCOVA. When controlling for BMI and evaluating gender differences, there was no longer a significant change noted in disordered eating over time among either gender. However, there was a significant difference in eating disorder symptoms reported between men and women. Men reported significantly less eating disorder symptoms than women – also corroborating previous research findings (Lavender, De Young, & Anderson, 2010). After further evaluating the subscales of the EDE-Q, it appears that participants did report less shape concern over time, while men generally reported lower shape concern overall.

Intriguingly, there were no significant changes over time reported for mindfulness or experiential avoidance. Such findings were supported by the *t*-test and repeated measures ANCOVA. This is intriguing since experiential avoidance was negatively correlated with yoga self-efficacy at Time 1 and Time 2, body appreciation, and self-compassion and positively

related to eating disorder symptoms. Mindfulness was also significantly correlated with self-compassion, yoga self-efficacy, and body appreciation at both time points. However, it may be that mindfulness is a trait that requires greater practice which is often why DBT mindfulness skills are repeated twice during the DBT skills course (Welch, Rizvi, & Dimidjian, 2006) or that the yoga courses focused less on improvements in mindfulness and more on improving body appreciation and self-compassion (asanas). This study did not assess which part of yoga participants focused on the most throughout the eight-week period, making conclusions about lack of change in mindfulness complicated.

Participants also did not report significant changes in experiential avoidance from Time 1 and Time 2. However, experiential avoidance was significantly lower in this sample than in eating disorder samples (Juarascio et al., 2013) which may suggest a floor effect. Additionally, the Acceptance and Action Questionnaire-II (AAQ-II, Bond et al., 2010) is assigned to address general avoidance of aversive stimuli rather than evaluating specific avoidance behaviors, e.g. body sensations, body image, and eating behavior. Thus it may be that yoga is only beneficial in decreasing specific avoidance behaviors. It is also likely that yoga (or eight weeks of regular yoga) does not improve the general tendency to avoid aversive stimuli but rather body-related sensations, awareness, etc.

Overall, it appears that participants reported changes in self-compassion and yoga skills from Time 1 to Time 2. Participants also reported improvements in body appreciation such that participants reported feeling greater confidence in their bodies' abilities and appreciation for what their body can do. Yoga also lead to changes in the degree of focus participants reported they placed on their bodily appearance (appearance orientation). These quasi-experimental

results corroborate correlational findings suggesting that frequency of yoga practice relates to improved body awareness, body appreciation, and self-compassion (Daubenmeir, 2005; Gard et al., 2012; Mahlo & Tiggerman, 2016). While research suggests that yoga relates to improvements in eating disorder symptoms during inpatient treatment (Carei et al., 2010; Pacanowski et al., 2017) and outpatient treatment (Hall et al., 2016), the college sample did not report significant changes in disordered eating over time, with the exception of body dissatisfaction, specifically shape concern and appearance orientation. This partially contradicts previous findings that yoga does not lead to changes in body dissatisfaction (Mitchell et al., 2017). Participants in Mitchell and colleagues' study (2007) only participated in six weeks of yoga, which may suggest that frequency of yoga predicts greater body dissatisfaction changes, even among samples at risk for eating disorder symptomology versus clinical samples (Klein & Cook-Cottone, 2013; Pacanowski et al., 2017). Men appeared to report more changes in overweight preoccupation and body dissatisfaction which provides further support for the assessment of yoga as an intervention among males to target body dissatisfaction more specifically.

Also, Study Two participants reported similar eating disorder pathology to community samples and lower eating disorder pathology than individuals seeking eating disorder treatment who report EDE-Q global scores around 4 (Mond et al., 2004). It may be that there was a floor effect and that changes in eating disorder pathology are unlikely in the community sample. While there was no comparison to eating disorder samples, researchers have noted significant reductions in body dissatisfaction and eating disorder features among participants practicing yoga during formal eating disorder treatment (Carei et al., 2010; Hall et al., 2016; McIver et al.,

2009; Pacanowski et al., 2017). This may also suggest that individuals who are reporting greater body dissatisfaction and disordered eating would benefit more from yoga as an intervention than individuals who are reported lower levels of distress related to body image and disordered eating behaviors.

CHAPTER X

DISCUSSION

This dissertation had many aims and utilized a two-study design to assess potential relationships among variables related to eating disorder pathology, yoga, and body image and to address changes in these variables due to regular yoga practice. Study One consisted of 150 undergraduate women who completed self-report measures evaluating eating disorder pathology, body dissatisfaction and appreciation, self-compassion, mindfulness, experiential avoidance, and perceived yoga knowledge and skill. Study Two was a quasi-experimental study that recruited participants from yoga courses meeting three times a week for 50-minutes over eight weeks. Changes in eating disorder pathology, body dissatisfaction and appreciation, self-compassion, mindfulness, experiential avoidance, and perceived yoga skill and knowledge were assessed from Time 1 to Time 2 (first and last days of class) while controlling for BMI and assessing for gender differences.

Study One provided further support for the relationship between body dissatisfaction and eating disorder pathology. Strong positive correlations and regression results indicated that participants reporting higher body dissatisfaction, particularly a preoccupation with being overweight, body dissatisfaction, and focus on one's body image, reported greater eating disorder pathology (Stice & Shaw, 2002; Fairbun & Beglin, 2008). Body dissatisfaction and disordered eating were also related to experiential avoidance, which is a relationship previously established in the literature (Della Longa & De Young, 2018; Hayaki, 2009). The tendency

avoid aversive stimuli (negative emotions, thoughts, or uncomfortable physical sensations)

significantly predicted body dissatisfaction and eating disorder pathology (Heatherton &

Baumeister, 1991; Lavender et al., 2009; Jurascio et al., 2013). BMI was also supported as a

factor that positively relates to eating disorder symptoms (including body dissatisfaction),

avoidance of aversive stimuli and negatively with self-compassion, and mindfulness. Higher

BMI was associated with higher reports of eating disorder symptoms, body dissatisfaction, and

avoidance of aversive stimuli and lower self-acceptance and mindfulness (Kelly et al., 2014).

Self-compassion was negatively related to disordered eating behaviors and body

dissatisfaction (Albertson et al., 2014; Breines et al., 2014; Pidgeon & Appleby, 2013; Prowse et

al., 2013). Participants who reported higher self-compassion reported lower eating disorder

symptoms including dietary restraint and concern with what they are eating. Participants who

reported higher self-compassion also reported lower concern and fear of being overweight, less

focus on the appearance of their body and higher levels of body appreciation. This further

supported research findings that individuals who report greater self-acceptance report lower body

image disturbance and eating disorder pathology (Breines et al., 2015; Webb & Forman, 2013).

Furthermore, individuals who reported greater self- reported less engagement in avoidance of

difficult or unpleasant feelings, thoughts, and physical sensations, which is a promising and

novel contribution to the extent literature.

Mindfulness has been associated with lower eating disordered symptoms, particularly

binge eating and purging behavior (Lavender et at., 2010). Mindfulness-based treatments have

also been associated with significant improvements in eating disorder symptoms (Kristeller et al.,

2006) specifically binges. Study One results indicated that mindfulness was positively related

with body appreciation and self-compassion supporting previous research suggesting that individuals higher in trait mindfulness report less body image perseveration (Pidgeon & Appleby, 2014) and negatively related to body dissatisfaction and eating disorder behaviors. Mindfulness was also correlated negatively with experiential avoidance which was also expected as mindfulness is considered to enable individuals to observe without becoming fused or ruminative about the thought, feeling, sensation etc. (Alberts et al., 2012; Baer et al., 2005). However, when mindfulness was added to regression analyses with self-compassion included (given significant correlation between the variables) self-compassion and not mindfulness explained unique variance in explaining eating disorder pathology and body dissatisfaction.

Study One also suggested a positive relationship between yoga skills, self-compassion, and mindfulness such that as one reports higher degrees of mindfulness and self-compassion the participants also reported higher yoga self-efficacy. Higher yoga self-efficacy was also related to higher body appreciation and negatively related to experiential avoidance. Participants who reported greater yoga knowledge and skill reported lower levels of avoidance of aversive stimuli. Reported yoga knowledge and skills was also associated with lower eating disorder pathology, particularly body image disturbance supporting previous research suggesting that yoga practice relates to lower body dissatisfaction and disordered eating (Daubenmeir, 2005; Delaney & Anthis, 2010; Gard et al., 2012; Impett et al., 2006; Mahlo & Tiggerman, 2016).

More specifically, Study One provided support that self-compassion may relate and even explain the relationship between body dissatisfaction, specifically overweight preoccupation, and eating disorder pathology. Body dissatisfaction often results in significant perseveration about one's body weight and shape and has been associated with depressed mood (Wierdman & Pryer,

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1999) and disordered eating (Stice & Shaw, 2002). Individuals reporting greater self-compassion often report less body shame and fear of loss of control while eating (Breines et al., 2014) and less exercise because they are worried about their weight and shape (Magnus et al., 2010) which are typically factors exhibited in individuals with eating disorder diagnoses (APA, 2013). Self-compassion has moderated the relationship between BMI and disordered eating (Kelly et al., 2014) such that even among individuals with higher BMIs (at greater risk for eating disorder symptoms) self-compassion may act as a buffer against this established relationships. Individuals with greater self-compassion are less likely to engage in eating disorder behavior, even if they are further from the thin idea and reporting body dissatisfaction. This was also noted in Study One. Even when BMI explained significant variance in disordered eating and body dissatisfaction, self-compassion still contributed significantly in explaining body dissatisfaction and disordered eating among the sample of college women. It appears that individuals reporting greater overweight preoccupation likely report lower self-compassion and then greater eating disorder symptoms as a result.

Self-compassion may reduce the impact of individuals' perseveration on weight or shape, perfectionism, and self-criticalness and lead to decreases in eating disorder pathology. Indeed, early changes in self-compassion have been found to relate to significant decreases in shame and more rapid decreases in disordered eating behaviors during eating disorder treatment (Kelly et al, 2014). Conversely, in the same study, individuals who reported a fear of being self-compassionate reported significantly greater eating disorder symptoms (Kelly et al., 2014). Gale and colleagues (2014) have demonstrated that adding Compassion focused therapy (CFT), a therapy that targets self-compassion, to the "gold standard" of eating disorder treatment,

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Cognitive Behavioral Therapy-Enhanced (CBT-E) relates to significantly improved treatment outcomes (Gale et al., 2014).

Study One also provided further support that experiential avoidance predicts both eating disorder symptoms and body dissatisfaction even when accounting for BMI. As such, it supports the idea that individuals who are more prone to avoiding aversive stimuli (in the form of thoughts, emotions, physical sensations) may be more likely to engage in disordered eating or experience body dissatisfaction (Della Longa & De Young, 2018; Hayaki, 2009; Serpell et al., 1999). Research supports that patient's diagnosed with eating disorders exhibit extreme avoidance behaviors in the form of body avoidance (Shafran et al., 2004), restriction and compensatory behaviors because they fear weight gain and experiencing fullness (APA, 2013). These behaviors help to maintain the eating disorder through negative reinforcement (Heatherton & Baumeister, 1991). Indeed, many researchers have aimed to assess whether exposure to interoceptive cues, and other features that patients have avoided (e.g. their body image and fear foods) relates to improvements in treatment (Fairburn, 2008; Waller et al., 2007). Self-compassion also explained the relationship between experiential avoidance and eating disorder pathology and disordered eating. Individuals who report greater experiential avoidance will likely report less self-acceptance, which contributes to higher levels of eating disorder pathology.

Given that self-compassion has also been associated with goal-driven behavior, less avoidance, and anxiety-related behavior and less rumination and conversely greater body image flexibility (Breines et al., 2014; Neff & Vonk, 2009; Tylka et al., 2015; Schoenefeld & Webb, 2013), it was also assumed that self-compassion may explain the relationship between experiential avoidance and disordered eating and/or body dissatisfaction. Even with BMI as a

significant predictor in the relationship, self-compassion was a significant causal factor (mediator) noted in the relationship between experiential avoidance and overweight preoccupation, experiential avoidance and appearance orientation (body dissatisfaction), and experiential avoidance and disordered eating.

As such, in evaluating how self-compassion may explain the relationship between maintenance factors in the transdiagnostic, affect and escape models of eating disorder pathology, self-compassion was noted to explain the relationship between the major contributing factors in all models (Fairburn, Cooper, & Shaw, 2003; Heatherton & Baumeister, 1991; Schmidt & Treasure, 2006; Wildes et al., 2010). This provides further support that designing interventions that enhance self-compassion may engender ameliorations in disordered eating and body dissatisfaction regardless of whether a CBT, transdiagnostic, or emotion and behaviorally focused treatment (DBT) is utilized. Researchers have begun to evaluate this. Kelly and colleagues (2014) noted that early changes in self-compassion related to greater reductions in shame and eating disorder symptoms during treatment. Furthermore, CFT added to CBT-E lead to greater reductions in eating disorder symptoms during treatment than for participants in TAU (CBT-E) alone (Gale et al., 2014). Yoga, a mind-body practice that involves listening to one's body, accepting what one's body can do, and mindfulness may be another approach that may be beneficial. Yoga has already been implemented frequently in eating disorder treatment (Frisch et al., 2006) and as a prevention method for eating disorder pathology, including body dissatisfaction (Cook-Cottone et al., 2008; Mitchell et al., 2007).

While yoga may be a promising method to decrease body dissatisfaction and disordered eating (eating disorder pathology), to date there are only a few empirical studies evaluating yoga

as a treatment and prevention method (Carei et al., 2010; Cook-Cottone et al. 2008; Hall et al., 2016; Impett et al., 2006; McIver et al., 2009; Mitchell et al., 2007; Pacanowski et al. 2017). While these studies provided promising results, they did not assess changes in mindfulness, self-compassion, or experiential avoidance but merely eating disorder symptoms and related psychopathology (e.g. depression and anxiety).

As such, Study Two was designed to attempt to examine not only if yoga improves body dissatisfaction or eating disorder symptoms, but factors that may be the active ingredient in facilitating such changes. It was hypothesized that self-compassion, mindfulness, and experiential avoidance may be major contributing factors in explaining why yoga main relate to changes in body dissatisfaction and eating disorder symptoms during treatment. Study Two because it was not an RCT or comparative study was designed not to draw conclusions about which variables explained change, but initially just to evaluate which factors change over 8-weeks of 50-minute yoga courses where participants attended three times a week. Similar to one other study assessing changes in self-compassion over time (Gard et al., 2012), Study Two provided support that men and women reported significant improvements in self-compassion after 8 weeks of regular yoga practice, although the effect was small.

All participants also reported improvements in body appreciation from Time 1 and Time 2 suggesting that after eight weeks of yoga participation, individuals reported greater esteem and admiration for what their bodies can do. This improvement is promising in that researchers have noted that greater appreciation of bodily functions are protective and related to lower body dissatisfaction and disordered eating (Frederickson & Roberts; Mahlo & Tiggerman, 2016; Tylka et al., 2015).

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It was important in this study to also ensure participation in the yoga class resulted in actual perceived improvement of knowledge and practice of yoga poses. At best, researchers have evaluated perceived skill level where participates indicate if they are novice practitioners versus experts (Neumark-Sztainer et al., 2011), while most researchers have only assessed the frequency or period of time that participants have practiced yoga (Daubenmeir, 2005; Impett et al., 2006). This makes drawing conclusions about the benefits of yoga on body dissatisfaction and disordered eating difficult. Study One and Study Two included participants who did not report very frequent yoga practice which makes assessing whether yoga practice generally predicts body dissatisfaction of disordered eating (negatively) difficult. One factor that might explain this is that yoga is not a common exercise course offered at gyms in the area and there were no yoga studios in the area until 2016 with the first studio opening in East Grand Forks, MN. However, Study Two provided evidence that yoga skills and self-efficacy increased from Time 1 and Time 2.

Changes in body dissatisfaction and eating disorder symptoms upon completion of the 8-week yoga study were variable and not consistent with research conducted in clinical samples. For instance, Carei and colleagues (2010) and Hall and colleagues (2016) noted that individuals in inpatient and outpatient treatment reported reductions in eating disorder symptoms using the same scale as the current dissertation (EDE-Q). While paired samples t-tests were promising, when a repeated measures ANOVA was conducted controlling for BMI and including gender as a between factors variable, only appearance orientation changed significantly from Time 1 to Time 2 in the current sample. In evaluating changes in the specific factors of the EDE-Q, it

appears that shape concern reduced after 8 weeks of yoga in Study Two corroborating findings from out outpatient eating disorder sample over a longer period of time (Hall et al., 2016).

However, women did not report amelioration of overweight preoccupation and appearance evaluation over 8 weeks, while the male participants did. There were no significant changes in restrictive food intake (restraint), eating concern, and weight concern over the course of the 8-week yoga course, although men generally endorsed less eating disorder symptoms – a relationship clearly established in previous research (Striegel-Moore et al., 2009; Lavender, De Young, Anderson, 2010). Flaherty (2014) reported that men participating in yoga more frequently reported lower body dissatisfaction than individuals who were engaging in other physical activities or just starting yoga practice. Therefore, further research could evaluate the impact of yoga participation and body dissatisfaction and eating disorder behaviors among men.

Participants did not report any changes in experiential avoidance over the course of yoga practice, nor did they report changes in mindfulness. Only one other study has evaluated changes in experiential avoidance due to yoga practice in a sample of women veterans seeking treatment for PTSD (Dick et al., 2014). Their results also indicated that there were not significant changes in experiential avoidance over time. This is intriguing in that yoga is a practice that emphasizing a focus on one's body while engaging in yoga poses in addition to pairing movement with one's breath. However, it is important to note that participants reported lower experiential avoidance than clinical patients (Juarascio et al., 2013), which may suggest there was a floor effect. Furthermore, it may be that yoga does not improve experiential avoidance generally, but may improve specific avoidance behaviors related to body image or eating disorder symptoms not assessed by the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011). For

instance, Rani and Rao (1994) provide support that yoga practice leads to greater body awareness and attunement. Regardless, the results suggest that experiential avoidance did not significantly improve over the eight weeks of yoga practice.

The fact that there were no significant changes in mindfulness over time was more surprising given that yoga was expected to improve mindfulness as well and is a practice that is associated with improvements in yoga in many studies (Field, 2011; Rani & Rao, 1994; Salmon et al., 2009). Indeed, other interventions incorporating yoga for 8 weeks have indicated changes in mindfulness using the same measure (Curtis, Osadchuk, & Katz, 2011) in clinical and non-clinical samples (Saucer-Zavala, Walsh, Eisenhohr-Moul, & Lyskins, 2013). It may be that these yoga courses focused more on asana practice versus mindfulness or that participants enrolled were less focused on learning mindfulness versus the physical components of yoga practice. However, participants did report greater yoga self-efficacy on the Yoga Self-Efficacy Scale (YSES; Birdee et al., 2015), which assesses changes in breath, ability to focus one's mind, and meditate.

Men and women equally reported significant improvements in self-compassion and body appreciation from Time 1 to Time 2. Participants reported that they were more accepting of perceived flaws and reported a greater tendency to be kind towards themselves, acknowledge that others may experience similar distress, and respond without judgment while trying to remain present and connected with the current moment. Additionally, participants reported significant improvements in perceived yoga skills and knowledge. These results are promising since they provide some support that participants were engaged, participated in courses, and contribute to

some confidence that participation may relate to other changes in variables such as self-compassion, body appreciation, and appearance orientation.

Given the lack of changes from Time 1 to Time 2 in experiential avoidance, eating disorder behaviors, and some body dissatisfaction factors that related to Study One, further mediation analyses were not addressed at Study Two to address longitudinal causal explanations. The only significant changes over time in body dissatisfaction that were noted for both genders was appearance orientation, which was the one mediation analysis that was not significant. As such, it is unclear whether improvements following 8 weeks of yoga in self-compassion and body appreciation will eventually causally lead to changes in disordered eating or other body image factors through a reduction in experiential avoidance in a college (at risk) sample.

Regardless, the results of Study Two suggest that yoga is not detrimental as there were no changes towards greater eating disorder pathology noted over time. Study Two results somewhat contradict the findings by Mitchell and colleagues (2009) who also used a college sample. In comparing a dissonance-based body image group to a yoga group, Mitchell and colleagues (2009) only noted significant changes in body image disturbance in the dissonance-based body image group and not the yoga or control group. Researchers (Klein & Cook-Cottone, 2013; Pacanowski et al., 2017) claim that the lack of changes may have resulted from a dosage effect since the study had participants practice yoga only once a week for six weeks. In Study Two, participants practiced yoga three times a week for eight weeks. While there were no significant changes in disordered eating, participants reported greater body appreciation and improvements in shape concern. Individuals also reported decreased focus and attention on looks over time (appearance orientation). However, only male participants reported decreases in overweight

preoccupation and appearance evaluation from Time 1 to Time 2. Therefore, results are mixed but support claims that minimal findings in amelioration of body dissatisfaction in Mitchell and colleague's research (2009) may have resulted from a dosage effect (Klien & Cook-Cottone, 2013; Pacanowski et al., 2017).

Study Two is one of the first studies to assess change in positive or protective factors of body dissatisfaction and disordered eating (self-compassion, mindfulness, and experiential avoidance) and the first to include males in the repeated measures design. Furthermore, it is also one of the first few studies to assess participants' perceptions of changes in yoga skills and knowledge over time. Many of the studies assumed that changes (even when conducting RCTs) were related to the yoga condition without addressing perceived competence or understanding of yoga (Carei et al., 2010; Hall et al., 2016; Mitchell et al., 2006; Pacanowski et al., 2017). In sum, Study Two provided some support for the use of yoga as a method of improving body image related factors as a preventative method among college students. Yoga practice over eight weeks was associated with amelioration in body appreciation and self-compassion as well as perceived yoga skills and knowledge self-compassion and body appreciation, which are both factors associated with eating disorder pathology and body dissatisfaction (Breines et al., 2014; Kelly et al., 2014; Wasylkiw et al., 2012). Additionally participants reported lower concern with their body shape (shape concern) and focus on body image (appearance orientation) supporting previous findings among patients in treatment for eating disorders attending yoga courses once a week (Hall et al., 2016). However, participants did not report changes in eating related factors associated with eating disorder pathology (restraint or eating concern). Intriguingly male participants reported significant changes in overweight preoccupation and body dissatisfaction

from Time 1 to Time 2 (although the sample was small) suggesting that yoga may be particularly beneficial as a preventative method in college males.

Limitations

While, there was an emphasis on statistically sound analyses, study design, and planned recruitment, there were several limitations that impacted the interpretability, generalizability, and overall quality of the current dissertation. For one, there was an uneven number of men and women in each study making it difficult to assess gender differences in Study One (89.9% were women) and Study Two (75.9%). This resulted in the exclusion of men in Study One which makes it difficult to conclude that the mediations noted in Study One are applicable among males. As such, it is only possible to conclude that self-compassion explains the relationship between body dissatisfaction and disordered eating or experiential avoidance and eating disorder pathology in women. It is only possible to conjecture that improving self-compassion would be beneficial for women.

An additional limitation to Study One is that mindfulness was not included as concurrent or independent mediator in the model. While a preliminary analysis indicated that mindfulness and self-compassion predict each other, and that only self-compassion was a significant predictor of eating disorder symptoms or body dissatisfaction with mindfulness also included in the regression, it may have been beneficial to run separate mediations evaluating mindfulness as a mediator excluding self-compassion. However, correlations in Study One also suggested that there was a stronger relation between self-compassion, body dissatisfaction and eating disorder symptoms than mindfulness with each dependent variable in the mediation analyses.

In Study Two, there were more limitations in terms of the complications related recruitment and due to the repeated measures design. Some of these limitations relate to lost data. Some participants (n = 3) did not appear to remember the "password" identifiers they chose at Time 1 to Time 2. For these three participants, matches were made when comparing handwriting and noting at least one matching password. Two research assistants and the researcher agreed on all three matches (100%). Furthermore, some participants were absent on participation days making it more difficult to obtain full participation. As noted in Table 11, 83 participants fully completed Time 1 and Time 2 while 20 participants (27%) of the total sample (n = 103) only completed one Time point. Eighteen participants (16%) only completed Time 1 and twelve participants (11%) only completed Time 2. While there were minimal differences between individuals who did not complete the study, there were some missing demographics data making it impossible to fully conclude that there were not group differences between completers and non-completers.

BMI was a significant variable relating to self-compassion, body dissatisfaction, eating disorder symptoms, experiential avoidance, mindfulness, and body appreciation. In Study Two, participants only completed information about their weight and height at Time 1. This may make drawing conclusions based on changes over time less clear as some of the changes may have also related to changes in BMI. However, it is unlikely that participants' BMI changed drastically between the 8-week period from Time 1 to Time 2.

Furthermore, two instructors taught the yoga courses as it was difficult to recruit the required number of participants from just one instructor (and only one course). As such analyses

comparing differences between instructor were necessary and fortunately led to no statistically different results ($ps > .05$) in any of the dependent or independent variables.

Additionally, change was established through a within factor design. It is difficult to establish whether such changes were related to the yoga course or time since a control condition was not included in the sample. Future studies should include a control sample or a treatment group engaged in a different activity (dissonance based body image group) or different Kinesiology course meeting at the same frequency.

Furthermore, the research was done in a non-clinical sample. While this research is imperative to understanding whether yoga is potentially beneficial as a preventative measure, participants self-selected to take yoga courses and were willing to practice yoga. While there are many reports that individuals in eating disorder treatment enjoy yoga (Braun, Siegel, & Lazar, 2016) the comparison between clients seeking treatment for eating disorders and at risk sample may not be equivalent. However, yoga practice is continuously increasing and individuals reporting body dissatisfaction and disordered eating are often interested in exercise, which may support similar level of interest (Neumark-Sztainer et al., 2011). Furthermore, Study One and Two utilized non-clinical samples who reported lower body dissatisfaction, disordered eating, experiential avoidance than clinical samples (Lavender, De Young, & Anderson, 2010; Mond et al., 2010; Juarascio et al., 2013). Floor effects may have impacted why there were not significant changes in disordered eating or some aspects of negative body image. It may be that yoga is most beneficial in improving eating disorder pathology when it is run conjointly with treatment, with individuals reporting greater eating disorder pathology and distress, or with individuals who are comrades and supportive of one another. However, in the study by Hall and colleagues (2016),

participants went to courses of their choosing and with many yoga participants not seeking treatment for eating disorders.

Future Directions

Future research should compare yoga courses with other athletic courses to assess whether changes in body appreciation, self-compassion, etc. occurred because of yoga versus exercise alone. Deconstructive studies should assess which factors of yoga are most essential to engendering change (e.g. breathing, mindfulness, instructor's discussion on self-acceptance, yoga poses) or whether the combination of all of such factors is essential, similar to research conducted assessing CBT and behavioral activation.

It would be beneficial to standardize yoga protocol in order to control for external factors as did Pacanowski et al., (2017) although Hall et al. (2016) noted changes with participants engaging in different yoga courses without standardized format. Other beneficial research would include assessing body image, self-compassion, mindfulness in instructors versus students to assess whether teaching yoga and being more skilled relates to the established differences in self-compassion, body appreciation, etc. It may be important to understand the body image and eating patterns of instructors as they often lead the classes and can impact students with their oral discussions during the course. Conducting a treatment acceptability studies would also be beneficial in evaluating whether to include yoga as a method for preventing eating disorders and body dissatisfaction or as an adjunct to eating disorder treatment. There is minimal data about how individuals seeking eating disorder treatment or in prevention groups perceive yoga. While research suggests that there are many eating disorder facilities that offer yoga, it would also be advantageous to resurvey treatment centers about the amount of yoga offered in programs given

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that the last research study documenting the use of yoga as an adjunct to treatment was published in 2006 (Frisch et al., 2006).

While Pacanowski and colleagues (2017) and Carei et al. (2010) noted that there were state changes in mood and observed anxiety, the current research study assessed changes in trait-based behaviors and self-perception. Participants did not participant in yoga on days that the assessments were provided (Time 1 and Time 2). It may be beneficial to assess state based changes in non-clinical samples as well to obtain a broader understanding of the benefits of yoga, especially given the increase in yoga practice in the United States (.

Conclusions

In sum, this research provides support that self-compassion and body appreciation are factors that are negatively related to eating disorder pathology and positively related to yoga skills and mindfulness. The research also provides support that experiential avoidance predicts eating disorder pathology and body dissatisfaction and likely explains lower self-compassion which in turn may increase body dissatisfaction and disordered eating. This study provides some support for the inclusion and focus on self-compassion as a factor contributing to improvements in eating disorder pathology, particularly with body dissatisfaction and preoccupation with weight, although the generalizability of the findings from this study may be limited to college students. Making conclusions that yoga is a beneficial adjunct to eating disorder treatment is not feasible given the non-clinical sample. However, participants did report significant amelioration in self-compassion, body appreciation, yoga self-efficacy, less perseveration over body image (appearance orientation) and shape concern over 8 weeks of yoga, although effect sizes were small. Regardless, this study provides further support for research on the benefits of yoga

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practice as a prevention measure or adjunct to eating disorder treatment. No detrimental changes were noted as a result of yoga practice (e.g. increased body dissatisfaction or disordered eating). Additionally, participants reported some promising improvements in body appreciation, self-compassion, perceived skills and knowledge of yoga, and decreases in shape concern from the first to last day of yoga.

APPENDICES

APPENDIX A
Demographics Questionnaire

1. What is your date of birth?_____(MO/DAY/YEAR)
2. What is your current age? _____
3. What is your gender? _____
4. What is your ethnicity? _____
5. What is your sexual orientation? _____
6. What year are you considered in school? (Please circle one)
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
    e. graduate student
    f. other
7. Have you ever been diagnosed with an eating disorder? (Please circle): YES NO
    a. If yes, which disorder?
    b. What was the duration of your eating disorder?
8. Are you currently diagnosed with an eating disorder?
    a. If yes, which disorder?
    b. What was the duration of your eating disorder?
9. What is your current height?_____feet_____inches
10. What is your current weight?_____pounds
11. Have you ever practiced yoga before? (Please circle): YES NO

If you circled "YES," please answer questions12-20. If you circled, "NO," please answer 21-23. Everyone will complete questions 24-31.

If Yes:

12. For how many years have you been practicing? _____
13. What kind of yoga have you practiced? _____
14. How many hours a week during the past month have you been practicing yoga? _____
15. What do you like best about yoga _____
    _____.
16. What do you like least about yoga _____
    _____.

17. How many days do you engage in yoga a week on average (in the past month? (Please circle): 1 2 3 4 5 6 7

18. In the past month, how many hours a week did you practice yoga (on average)? _____ hours

19. What types of yoga do you participate in? (Circle all that apply)

Ashtanga	Flow	Jivamukti	Prenatal	Viniyoga	Pilates
Anusara	Forrest	Kripalu	Restorative	Vinyasa/Power	Other: _____
Bikram	Iyengar	Kundalini	Sivananda	Yin	

20. On a scale from 0 to 10, 0= not at all, 10= a lot, how much do you enjoy the practice of yoga? _____.

If NO:

21. Why haven't you practiced/tried yoga? _____
_____.

22. How likely are you to try yoga if someone offered to pay for a class on campus (0 = not at all, 10 = definitely likely)?___.

EVERYONE: Please respond to all questions below.

23. How many days do you engage in physical activities a week on average? (Please circle): 1　2　3　4　5　6　7

24. In the past month, how many hours a week did you exercise (on average)? hours

25. Please circie: This is:
    a. Much more than usual
    b. More than usual
    c. About the same
    d. Less than usual
    e. Much less than usual

26. What forms of exercise do you participate in?
_____.

27. What medication are you taking? _____

28. What is your major in school?_____.

29. On a scale from 0 to 10, how would you rate your general level of anxiety? (0 = none at all, 10 = the most you could have)._____.

30. On a scale from 0 to 10, how would you rate your general mood from 0 being really depressed and poor motivation to 10, being rarely upset and usually content___.

31. On a scale from 0 to 10, (0=none at all, 10=teacher level), how would you rate your knowledge about yoga currently?___.

Post-Yoga Questionnaire

1. How many days do you engage in physical activities (exercise) a week on average (over the past 8 weeks)? (**Please circle**): 1 2 3 4 5 6 7

2. In the pasts eight weeks, **how many hours a week** did you exercise (on average)? _____

3. What forms of exercise did you participate in over the past 8 weeks? (List all)

4. What medications are you taking?

5. After completing the yoga course, how likely are you to continue to practice yoga?
   a. Definitely not going to practice
   b. Most likely not going to practice
   c. Probably not going to practice
   d. Neutral
   e. Probably will practice
   f. Most likely will practice
   g. Definitely will Practice

6. How would you rate your professor's knowledge of yoga (0 = no knowledge at all, 10 = most knowledge)? _____.

7. How much did you enjoy class (0 = not at all, 10 = the most possible)? _____

8. What did you sign up to take yoga at the University of North Dakota (e.g. it worked with your schedule, recommendation from a friend, curious about yoga?) _____
   _____.

9. Who was your teacher? _____

10. How often would you seek out information about yoga outside of class?
    a. Not at all
    b. Seldom/Rarely
    c. Sometimes
    d. Often
    e. A lot

11. What were some things that you gained from practicing yoga? (Please be as detailed as possible).

12. What did you not enjoy about yoga? (Please be as detailed as possible).

13. How likely are you to recommend this course to a friend/peer? (0 = not at all, 10 = definitely)? _____

14. How many classes did you miss? _____

15. What grade do you expect to get for the class? _____

16. On a scale from 0 to 10, how would you rate your general level of anxiety over the past month (0 = none at all, 10 = the most you could have). _____

17. On a scale from 0 to 10, how would you rate your general mood over the past month (0 = really depressed, 10 = rarely/never upset). _____

PARTICIPANT PASSWORD/IDENTIFIES

TIME 1:

This study is a 2-part study. Agreeing to participate in one part does not require you to participate in the other. However, in order to track participants and make your responses as confidential as possible you will respond to 3 "Security questions" that will be used as a way to identify your responses. Please mark one answer for each question below that you will remember for both parts. Please try to remember these since you will be asked these questions again at the end of the study.

1. The name of the street that I grew up on _____

2. Favorite Pet's name_____.

3. Favorite teacher in school_____.

TIME 2:

This is part 2 of the study. You may have participated in part 1, in which you answered these three questions before. Please fill in the answers you used for part 1. This helps us identify your previous responses without identifying your identity. If this is the first time you are seeing this, please answer these questions.

1. The name of the street that I grew up on _____

2. Favorite Pet's name _____.

3. Favorite teacher in school _____

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