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Mindful Eating and Eating Pathology: Correlation between the Mindful Eating Questionnaire and the Eating Disorder Inventory-3rd Edition

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MINDFUL EATING AND EATING PATHOLOGY: CORRELATION BETWEEN THE MINDFUL EATING QUESTIONNAIRE AND THE EATING DISORDER INVENTORY-3RD EDITION

A Thesis Proposal
Presented to
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Masters of Arts

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MINDFUL EATING AND EATING PATHOLOGY: CORRELATION BETWEEN THE MINDFUL EATING QUESTIONNAIRE AND THE EATING DISORDER INVENTORY-3RD EDITION

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The purpose of this study is to examine the relationship between mindful eating and eating pathology. This was accomplished by using two measures, the Eating Disorder Inventory, Third Edition (EDI-3), and the Mindful Eating Questionnaire (MEQ). Participants included in this study were 134 students from a midsized mid-south university who were asked to complete a demographics measure, EDI-3, and MEQ. Only three scales from the EDI-3 were considered; Drive for Thinness, Bulimia, and Body Dissatisfaction. Combined they provide an Eating Disorder Risk Composite (EDRC) score. Results indicated that there was no significant relationship between the MEQ overall score and the EDRC score, which implies that there is no relationship between mindful eating and eating pathology, specifically eating disorder risk. Additional analyses revealed significant negative correlations between the Awareness, Disinhibition, and Emotional Response subscales of the MEQ and the EDRC score. This study contributes to the limited research on the relationship between mindful eating and eating pathology. Results from this study indicate that the specific aforementioned factors have a greater impact on eating pathology when compared to the overall concept of mindfulness.
**Literature Review**

In the recent times, various mindfulness-based interventions have been created and tested to treat eating disorders, psychological problems associated with eating, and to aid in weight loss (L. Hulbert-Williams, Nicholls, Joy, & N. Hulbert-Williams, 2013). However, there is limited research on the relationship between mindful eating and eating pathology. Mindful eating is defined as having increased objective awareness of both the physical and emotional components involved with eating (Framson et al., 2009). Previous studies have focused on the relationship between mindful eating and weight-related issues and the development and validation of the Mindful Eating Questionnaire. The present study seeks to examine the relationship between mindful eating and eating pathology (eating disorder symptomology).

**Eating Disorders**

According to the National Eating Disorder Association, on average, 20 million females and 10 million males experience an eating disorder at some point during their lifetimes (Wade, Keski-Rahkonen, & Hudson, 2011). The *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (5th ed.; DSM-5; American Psychiatric Association, 2013) states that the lifetime prevalence of Anorexia Nervosa (AN) is approximately 0.4%, Bulimia Nervosa (BN) is approximately 1% to 1.5%, and Binge Eating Disorder (BED) is 1.6% (American Psychiatric Association, 2013). Furthermore, AN has the highest mortality rate among mental disorders (Arcelus, Mitchell, Wales, & Nielsen, 2011). Individuals with AN experience an increased suicide risk, with approximately 12 suicides per 100,000 cases of AN per year (APA, 2013). Additionally, associated symptoms, such as disordered eating and distorted body image, affect many
individuals, specifically young females (Mantinolli et al., 2016). AN and BN share characteristics such as avoiding weight gain and having a strong urge to control eating behaviors, thoughts, and feelings (Butryn et al., 2013). BED is characterized by having regular episodes of binge eating occurring once a week for at least three months, decreased control over eating during an episode, severe distress during an episode, and feelings of aversion, depression, or shame after an episode (APA, 2013). Additionally, all eating disorders are related to experiencing intense emotions, attitudes, and behaviors; thus, they can result in many psychological and medical consequences (Fan et al., 2010).

**Anorexia Nervosa.** According to the DSM-5, there are three diagnostic criteria for Anorexia Nervosa (AN). The first criterion states that an individual’s caloric intake is significantly below the daily caloric requirement, leading to a considerably low body weight based on age, gender, development, and physical health condition (American Psychiatric Association, 2013). A body mass index (BMI) below 18.5 kg/m² is considered a low body weight (APA, 2013). The second criterion states that an individual must experience extreme fear of gaining weight and must engage in behaviors that help him or her avoid weight gain, despite being dangerously underweight. Additionally, weight loss in these individuals does not decrease the intense fear of weight gain; instead it may increase it. The third criterion involves an individual’s indifference to his or her significantly low body weight and distortion of how he or she views and understands body weight or shape. These individuals believe they are overweight and can be worried about specific body parts such as the abdomen, buttocks and thighs. They engage in behaviors such as repetitively weighing themselves, frequently looking in mirrors or measuring different body parts, and excessively worrying about feeling fat. Their self-
self-esteem is significantly dependent on their perceptions of their bodies. These individuals perceive weight loss as a great achievement and indicative of self-control. These criteria must be met for an individual to be diagnosed with AN.

In addition, there are two subtypes within the diagnosis of AN, Restricting type and Binge-Eating/Purging type (APA, 2013). Individuals with Restricting type do not engage in binge eating or purging behaviors. Their weight loss is through dieting, starving, and/or extreme exercise. Binge eating occurs when an individual consumes an amount of food that exceeds what most individuals consider normal in a given period of time, such as two hours. Purging behavior includes self-induced vomiting, or abuse of laxatives, diuretics, or enemas. Individuals with Binge-Eating/Purging type engage in repeated episodes of binge eating or purging behaviors. The distinction between AN Binge-Eating/Purging subtype and Bulimia Nervosa is that individuals within this subtype of AN are significantly below the normal body weight.

**Bulimia Nervosa.** Individuals with Bulimia Nervosa (BN) commonly fall within the normal or overweight range (BMI ≥ 18.5 and < 30 in adults; APA, 2013). According to the DSM-5, there are five diagnostic criteria for BN. The first criterion states that an individual must have repeated episodes of binge eating (APA, 2013). An episode of binge eating is not limited to one setting. An individual may begin a binge in a public place and continue eating upon going home. During episodes, individuals believe that they lack control in their eating and cannot avoid or stop eating once they begin. The second criterion states that an individual engages in reoccurring negative compensatory behaviors to avoid weight gain, including self-induced vomiting; mistreatment of laxatives, diuretics, or medications; fasting; or extreme exercise. The third criterion states
that the binge eating and compensatory behaviors must occur at least once a week for a period of three months. The fourth criterion states that the individual’s self-esteem is negatively influenced by the perception of his or her body. Finally, the fifth criterion states that the aforementioned behaviors do not only occur during episodes of AN; this is because individuals with BN are similar to individuals with AN in that they fear weight gain, want to lose weight, and are dissatisfied with their bodies.

**Binge Eating Disorder.** Individuals with Binge-Eating Disorder (BED) fall within the normal-weight, overweight, and obese ranges BMI (≥ 18.5, < 30 and > 30 in adults; APA, 2013). According to the DSM-5, there are five diagnostic criteria for BED. The first criterion states that an individual must experience reoccurring episodes of binge eating and a loss of control in eating during these episodes. The second criterion states that the binge-eating episodes must fall within three or more of the following categories: eating significantly faster than normal; eating even when feeling full; eating large amounts of food despite not feeling hungry; eating alone to avoid the feeling of shame by the amount of food eaten; and feeling repulsed, depressed, or extremely guilty with oneself after eating. The third criterion states that the individual must experience noticeable distress regarding binge eating. The fourth criterion states an individual must experience binge eating at least once a week for a period of three months. Lastly, the fifth criterion states that the binge eating must not be associated with the repeated use of improper compensatory behaviors as seen in BN, and does not only occur during a period of BN or AN.
**Eating Disorder Not Otherwise Specified.** This category includes individuals who experience symptoms of eating disorders that cause clinically substantial distress in social, professional, or other essential aspects of functioning; however, they do not meet the complete criteria for any of the specific eating disorders (APA, 2013). The DSM-5 provides five types of the otherwise specified category. The first type is Atypical Anorexia Nervosa (AN), in which individuals meet full criteria for AN; however, despite losing substantial amounts of weight, they are within the normal or above weight range. The second type is Bulimia Nervosa (of low frequency and/or limited duration), in which individuals meet full criteria for BN, with the exception that binge eating and negative compensatory behaviors occur less than once a week and/or three months. The third type is Binge-Eating Disorder (of low frequency and/or limited duration), in which individuals meet full criteria for BED, with the exception that binge eating occurs less than once a week and/or three months. The fourth type is Purging disorder, in which individuals engage in frequent purging behaviors such as self-induced vomiting and abuse of laxatives, diuretics, or medications to impact weight or shape without binge eating. The fifth type is Night Eating Syndrome, which involves recurring episodes of eating at night. Individuals with this disorder consume large amounts of food after their last meal or eat after waking from sleep throughout the night. Individuals are aware of and can recollect eating. The night eating is not better alternatively explained by extraneous variables such as sleep-wake cycle or social norms. Also, the night eating must cause substantial distress in the functioning of the individual. Additionally, the negative eating patterns are not better explained by BED or other psychological disorders, medical disorders, or effects of medication.
Problems Associated with Eating Disorders

There are several medical and psychological problems associated with eating disorders. Some of the known medical consequences include, but are not limited to, amenorrhea, loss of bone mineral density, hypertrophy (enlargement) of salivary glands, dental erosion, scabs or bumps on the hand, malnourishment, abdominal pain, esophageal tears, gastric rupture, lanugo (soft, downy hair), hypotension, and hypertension (APA, 2013). Psychological problems include, but are not limited to, depressed mood, social withdrawal, irritability, insomnia, and anxiety (APA, 2013). Additionally, eating disorders cause significant impairments in cognitive functioning, judgment, emotion regulation, and ability to engage in daily tasks (Wagner et al., 2016). Approximately one third of previous patients relapse or develop an additional eating disorder (Nyman-Carlsson, Engstrom, Norring, & Nevonen, 2014). These individuals experience a high level of co-morbidity of both psychological and physical problems, such as depression and anxiety disorders, and sleep deprivation, cardiac and digestive problems (Nyman-Carlsson et al., 2014).

Mindfulness

Mindfulness is defined as the unbiased awareness that results from being in the present moment and purposefully paying attention to current surroundings (Kabat-Zinn., 2003). In other words, the general emphasis of mindfulness is focusing on the present moment, and recognizing and accepting one’s feelings, thoughts, and physical senses (Khan & Zadeh, 2014). Furthermore, mindfulness is associated with positive health outcomes, such as decreasing depression and anxiety, which are components of eating disorders (APA, 2013).
Research on Mindfulness and Eating Disorders

What is the connection between eating disorders and mindfulness? Research has shown that individuals with eating disorders have low emotion recognition and emotional awareness, two concepts that have been associated with mindfulness (Butryn et al., 2013). As a result, mindfulness-based treatments can be useful in treating eating disorders. Mindfulness-based treatments for eating disorders have been developed using cognitive-behavioral, dialectical behavior, and acceptance and commitment orientations (Kristeller, Baer & Quillian-Wolever, 2006).

Research has examined the relationship between mindfulness and eating pathology. A study by Butryn, Juarascio, Shaw, Kerrigan, Clark, O’Planick, and Forman (2013) examined this relationship in females in residential treatment facilities. The sample consisted of 105 patients who were diagnosed with Bulimia Nervosa, Anorexia Nervosa, or Eating Disorder Not Otherwise Specified according to the DSM-5. The patients completed the Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994), the Eating Disorders Inventory-3rd edition (EDI-3; Garner, 2004), the Body Image Acceptance and Awareness Questionnaire (BI-AAQ; Sandoz, 2010), the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008), the Emotional Avoidance Questionnaire (EAQ; Taylor, Laposa, & Alden, 2004), and The Eating Attitudes Thoughts and Defusion Scale (EATDS; Shaw, Butryn, Juarasico, Kerrigan, & Matteucci, unpublished manuscript). Participant responses to the measures were assessed at pre-treatment and post-treatment. Treatment focused on regulating eating behaviors, increasing weight, and reducing compensatory behaviors. Treatment also included individual, family, and group therapy facilitated by a multi-
disciplinary team. The researchers found that eating pathology was associated with decreased awareness, decreased acceptance, decreased cognitive defusion, and higher emotional avoidance. The researchers concluded that decreased endorsements of the aforementioned variables were related to improvements in eating pathology (Butryn et al., 2013). This study provides evidence that mindfulness-based skills can be helpful for patients with eating disorders.

A systematic review by Olson and Emery (2015) examined the effectiveness of mindfulness interventions in weight loss programs. Their systematic review consisted of 19 studies, of which 12 were published in peer-reviewed journals and seven were unpublished dissertations. The review included 13 randomized controlled trials and six observational studies. Eight randomized controlled trials were published in peer-reviewed journals, of which six showed significant weight loss in individuals who were assigned to the mindfulness condition. Effect sizes for weight loss varied from 0.01 to 0.68. Three observational studies showed significant weight loss in individuals in the mindfulness condition. Effect sizes for weight loss varied from 0.04 to 0.42. Overall when evaluating all 19 studies, 13 showed a relationship between substantial weight loss and mindfulness interventions. However, there was no clarity regarding the impact mindfulness had on weight loss. The researchers stated that a possible explanation for this is that out of the 12 published articles; only 7 articles utilized a direct mindfulness measure. Therefore, the researchers concluded that further research is needed to determine the relationship between mindfulness and weight loss (Olson et al., 2015).
Therapeutic Interventions Using Mindfulness

Mindfulness-based interventions are commonly used to address different disorders, such as anxiety, depression, and various addictions (Kristeller, Wolever & Sheets, 2013). A variety of approaches incorporated with mindfulness have been used to treat eating disorders. These approaches include Dialectical Behavior Therapy (DBT) to treat BED and BN (Linehan, 1993), Mindfulness-Based Cognitive Therapy (MBCT) to treat BED (Segal, Williams, & Teasdale, 2002), Acceptance and Commitment Therapy (ACT) to treat AN (Hayes, Strosahl & Wilson, 1999), and Mindfulness-Based Eating Awareness Training (MB-EAT) to treat BED (Kristeller & Hallett, 1999). Mindfulness-based interventions are believed to improve eating pathology by training individuals to learn how to respond to distress more effectively instead of engaging in negative eating behaviors or avoiding eating (Prowse, Bore & Dyer, 2013).

Dialectical Behavior Therapy. Despite its origin in treating personality disorders, DBT has recently been used to treat individuals with BED and BN. Both BED and BN are associated with emotion regulation; therefore, DBT is a good option because it focuses on improving an individuals’ ability to regulate negative emotions by using skill modules that focus on mindfulness, improving emotion regulation, and increasing distress tolerance (Kristeller et al., 2006). The mindfulness skills, in particular, are used to increase unbiased awareness of one’s emotions in the present without responding to them (Kristeller et al., 2006). This promotes emotion regulation because it teaches individuals with eating disorders to identify their emotions without changing or criticizing them or engaging in impulsive behaviors (Kristeller et al., 2006).
Mindful-Based Cognitive Therapy. MBCT can be used to treat individuals with BED. These individuals typically avoid self-awareness and experience frequent negative thoughts and emotions due to not meeting their own personal standards (Kristeller et al., 2006). The focus of MBCT is to help individuals learn to objectively observe, recognize, and accept their emotions, thoughts, opinions, and physical sensations (Kristeller et al., 2006). There are four key purposes of this training in treating BED: 1) to improve an individuals’ ability to identify hunger and satiety (feeling full) cues; 2) to increase their inclination to experience negative emotions related to the triggers of binge eating; 3) to decrease focus on negative thoughts; and 4) to train individuals to engage in positive behaviors in stressful situations (Kristeller et al., 2006). Two of the four key purposes of MBCT, identifying hunger and satiety cues and eating in response to emotions, are investigated in the present study through the Mindful Eating Questionnaire (MEQ; Framson et al., 2009).

Acceptance and Commitment Therapy. ACT can be used to treat individuals with AN. ACT is focused on mindfulness and acceptance-based techniques, and can be used to help individuals with AN address weight-related issues, body image concerns, and preoccupation of being overweight (Kristeller et al., 2006). ACT uses various analogies to help individuals visualize their thoughts and feelings as physical objects they can see and manipulate. One analogy used is called “thought parade” which teaches individuals to observe thoughts objectively and accept them, rather than acting on them by engaging in negative eating behaviors (Kristeller et al., 2006). In this analogy, individuals are asked to visualize their negative thoughts printed on notecards and carried by participants in a parade. Their goal is to observe the thoughts without believing or
reacting to them (Kristeller et al., 2006). Another strategy used is called “bus driver” which teaches individuals to experience negative thoughts in the present without reacting to them, and work towards their important life goals (Kristeller et al., 2006). In “bus driver” individuals are asked to imagine that they are bus drivers driving towards their most important life goals while their thoughts behave as the passengers (Kristeller et al., 2006). In this case, their goal is to experience these thoughts and continue driving towards their life goals, instead of changing directions as a result of their thoughts (Kristeller et al., 2006). The overall purpose of ACT relates to mindful eating, which emphasizes the importance of unbiased awareness of thoughts and emotions related to eating.

A study by Wallace (2017) examined the effectiveness of a combined intervention which incorporated methods from ACT and tasks from The Body Project to decrease negative body image and increase mindfulness skills in undergraduate females. The Body Project is a program that was developed for teenage females. It incorporates dissonance-based tasks and discussions to help decrease eating pathology and avoid the development of future pathology. Interventions used from ACT focused on training individuals how to separate their core beliefs from their maladaptive thoughts. Participants completed The Body Assessment Scale (BAS; Lorenzen, Grieve, & Thomas, 2004) and The Five Facet Mindfulness Questionnaire Short Form (FFMQ-SF; Bohlmeijer, Klooster, Flederus, Veehof, & Baer, 2011) both before and after receiving the combined intervention (ACT and The Body Project). Results from this study showed that there was a significant difference in body image in participants after receiving the combined intervention. The researcher concluded that implementing the combined
intervention may help decrease negative body image, which is commonly seen in both Anorexia Nervosa and Bulimia Nervosa. Similarly, the present study seeks to investigate the mindfulness component in relation to eating disorders.

**Mindfulness-Based Eating Awareness Training.** MB-EAT was specifically developed to treat BED (Kristeller et al., 2006). MB-EAT includes traditional mindfulness meditation interventions and guided meditation. Guided meditation focuses on precise issues related to body shape, weight, and regulatory processes associated with eating (Kristeller et al., 2006). MB-EAT sessions encourage individuals to use eating-related meditations, with the goal of helping individuals develop impartial attention to physical sensations, cognitions, and feelings associated with binge eating (Kristeller et al., 2006). The overall goal is to improve psychological and physiological regulation (Kristeller et al., 2006). Aspects of MB-EAT are incorporated in the concept of mindful eating, where the focus is not on eating, rather it is on the process of eating.

**Mindful Eating**

Mindful eating was originally introduced for weight management; however, the focus of mindful eating is not on the food being eaten. Instead the focus is on the process of eating (Khan & Zadeh, 2014). According to Albers (2008), the first step of mindful eating is to observe the taste, smell, and texture of the food being consumed. The second step is to identify daily habits such as multitasking during meals or eating unconsciously (Albers, 2008). The third step is to recognize triggers that both initiate and stop hunger (Albers, 2008). Mindful eating may help individuals use mindfulness-based interventions to identify and react to hunger and satiety (Clementi, Casu & Gremigni, 2017). Mindful eating-based interventions have been effective in decreasing behaviors related to obesity.
such as, increasing weight loss, and decreasing psychological distress (Clementi et al., 2017).

Results from a recent study by Prowse et al. (2013) on mindfulness and eating pathology indicated that observing, a mindfulness skill, was associated with increased levels of eating pathology. However, results indicated that the mindfulness skills such as unbiased acceptance and responding with awareness were associated with lower levels of eating pathology (Prowse et al., 2013). These results were consistent with previous research findings that increased levels of psychopathology are related to decreased levels of mindfulness skills, excluding observing skills (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Additionally, there is evidence that skills related to responding with awareness and unbiased acceptance may be related to increased resiliency against eating pathology. Another study by Khan and Zadeh (2014) indicated that mindful eating was positively correlated with general psychological well-being.

Furthermore, when studying the relationship between mindful eating and eating disorders, there are many factors to consider. As discussed in the previous sections, individuals with AN are preoccupied with the fear of weight gain and engage in behaviors that help them avoid weight gain (APA, 2013). Individuals with BN lack control over their eating and engage in dangerous compensatory behaviors (APA, 2013). Individuals with BED also have a loss of control over eating and they are unaware of hunger or satiety cues (APA, 2013). With this, it is presumed that these individuals are not focused on the process of eating, which is the essential feature of Mindful Eating.
Mindful Eating Questionnaire

Previous studies have investigated both the development and validation of the Mindful Eating Questionnaire (MEQ; Framson et al., 2009). The MEQ has five indices, which are Disinhibition, Awareness, External Cues, Emotional Response, and Distraction (Framson et al., 2009). The Disinhibition index examines an individual’s ability to avoid eating when full (Framson et al., 2009). The Awareness index examines an individuals’ ability to observe the texture, taste, and smell of food (Framson et al., 2009). The External Cues index evaluates an individuals’ tendency to engage in eating in response to external cues (Framson et al., 2009). The Emotional Response index examines an individuals’ likelihood of eating in response to negative emotions (Framson et al., 2009). The Distraction index examines an individuals’ ability to focus on just eating while avoiding any distractions (Framson et al., 2009).

The MEQ was developed and validated by Framson et al. (2009). The researchers selected a list of items for the MEQ by examining previously published studies on eating behaviors and mindfulness. Based on an exploratory factor analysis, they selected the Disinhibition index, Awareness index, External Cues index, Emotional Response index, and Distraction index. The final questionnaire consisted of 28 items and five subscales. The researchers utilized a convenience sample of 303 participants from community facilities, such as a yoga studio, a university fitness facility, a weight-loss program, a women’s fitness facility, a software development program, a non-profit company, and a preparatory school. Participants were also required to report their weight, height, age, gender, race/ethnicity, highest level of education completed, whether they practiced yoga, walked for exercise or transportation, and whether they engaged in moderate to vigorous
exercise. The subscales of the MEQ had satisfactory internal consistency reliability, ranging from $r = .64$ to $r = .83$. The reliability of the MEQ summary score (mean of 5 subscale scores) was $r = .64$. The correlations among all the subscales ranged from $r = .14$ to $r = .47$. The correlations between subscales and the MEQ summary scores ranged from $r = .57$ to $r = .71$.

A recent study by Clementi et al. (2017) in Italy assessed the psychometric properties of the MEQ in relation to the Italian population. In this study, 15 researchers examined the 28 items and the five indices of the MEQ. The sample consisted of 1,067 Italian adults, of which 61.4% were women. The participants completed the MEQ (20 items) and the Freiburg Mindfulness Inventory (FMI; Walach, Buchheld, Buttenmüller, Kleinknecht, & Schmidt, 2006), and reported their gender, age, education, height and weight. Additionally, 62 participants participated in a four-week test-retest. The researchers found satisfactory internal consistency ($r = .30 – .72$), and test-retest reliability ($r = .73$); (Clementi et al., 2017). The researchers concluded that there is satisfactory validity and reliability for the 20-item MEQ, and that this questionnaire can be used for evaluating concerns related to eating. This study and the previously discussed study both provide some support for the MEQ as a valid measure to examine eating-related issues such as negative eating behaviors and eating pathology.

**Eating Disorder Inventory, Third Edition**

The Eating Disorder Inventory, Third Edition (EDI-3; Garner, 2004) is a well-known measure, which examines various eating disorder behaviors and traits (Garner, 2004). The EDI-3 is divided into 12 primary scales. Three scales, Drive for Thinness (DT), Bulimia (B), and Body Dissatisfaction (BD), assess eating disorder symptomology.
The three scales combined provide an Eating Disorder Risk Composite (EDRC) score, which assesses eating/weight-related concerns, particularly eating disorder risk (Garner, 2004). The DT scale assesses an individual’s desire to be thin, worry with dieting, obsession with weight, and extreme fear regarding weight gain. The B scale assesses an individual’s likelihood to ponder about or engage in overeating. The BD scale assesses an individual’s dissatisfaction with shape and size of various areas of the body (i.e., stomach, hips, and thighs). The remaining nine scales are: Low Self-Esteem (LSE), Personal Alienation (PA), Interpersonal Insecurity (II), Interpersonal Alienation (IA), Interoceptive Deficits (ID), Emotional Dysregulation (ED), Perfectionism (P), Asceticism (A), and Maturity Fears (MT). These scales assess the common psychological traits that seen among individuals with eating disorders. For the purposes of the present study, only the EDRC will be considered.

A study by Stanford and Lemberg (2012) investigated the generalizability of the EDI-3 across males and females by comparing the EDI-3 and the Eating Disorder Assessment for Men (EDAM). In particular, they sought to examine the gender differences and the predictableness of the two measures. The EDAM was developed by the researchers by incorporating five areas of concern associated with males suffering from eating disorders. The five areas of concern included food-related issues, weight issues, exercise issues, body-image issues, and disordered eating behaviors. The researchers reported that the EDAM had a Cronbach’s alpha of .91, which indicates excellent internal consistency. They concluded that the EDAM was a valid measure for identifying eating disorder symptomology among men. For the comparison of the EDI-3 and EDAM, the researchers utilized 108 patients (78 men and 30 women) who were
receiving residential treatment for various eating disorders and addictions. Participants were volunteers who were randomly selected from residential facilities. Participants completed a demographics questionnaire, the EDI-3, and the EDAM. For analysis, the researchers included the EDAM total score and the EDRC score from the EDI-3. The researchers used a logistical regression analysis which revealed that both the EDI-3 and the EDAM can predict eating disorder risk. Based on the results from a One-Way Analysis of Variance, they also found that there were significant differences in EDRC scores between males ($M = 36.70, SD = 10.14$) and females ($M = 45.53, SD = 9.78$), $F = (1, 62) = 12.35, p = .001$. They indicated that males scored substantially lower in the three scales of EDRC (BD, DT, and B). Additionally, they stated that there should be further research on creating a measure to better assess eating disorder symptomology among men. This study indicates that the EDRC score is a good predictor of eating disorder risk.

A recent study from Italy compared the ability of the Eating Disorder Inventory, second edition (EDI-2; Garner, 1991) and EDI-3 to identify eating disorder risk (Segura-Garcia, Rania, Ciambrone, Palmieri, Pugliese &... De Fazio., 2015). The purpose of the study was to examine whether the EDI-3 is able to decrease the number of incorrect diagnoses among patients with eating disorders. Additionally, they also wanted to test whether the EDI-3 was a better measure than the EDI-2 when assessing individuals for eating disorders from the general population. They conducted two studies; the first compared the ability of EDI-2 and EDI-3 to identify eating disorders among patients, the second study looked at eating disorders in at-risk population. The first study consisted of 92 patients diagnosed with eating disorders. The second study included 265 Italian
students. All participants completed the EDI-2 and EDI-3. They concluded that, when compared to the EDI-2 (48%), the EDI-3 is better able to recognize patients with eating disorders (99%). Both measures were able to identify those at risk for eating disorders, but the EDI-3 was a better predictor. The researchers stated that the EDI-3 is a more accurate measure because it was successful in identifying patients with all types of eating disorders. This study and the study by Stanford and Lemberg (2012) indicate that the EDI-3 is an excellent measure to use when assessing for eating disorder risk.

**Limitations of Existing Research**

Two studies (Framson et al, 2009; Clementi et al., 2017) evaluated the psychometric properties of the Mindful Eating Questionnaire (MEQ). Research has shown that there is a relationship between mindfulness and eating disorder symptoms. For example, Butryn et al. (2013) found that eating pathology was negatively correlated with various aspects of mindfulness, such as awareness, acceptance, and cognitive defusion. However, there is limited research on the relationship between mindful eating and eating pathology. The present study investigated the relationship between mindful eating and eating disorder risk by utilizing the MEQ and EDI-3. Studying this relationship may help to improve clinicians’ ability to identify those at risk for eating disorders which would allow them to recognize and address negative eating behaviors before the full development of an eating disorder.
The Current Study

The purpose of the current study was to examine the relationship between mindful eating and eating pathology. This was accomplished by investigating whether the MEQ, which incorporates the concept of mindful eating, is a good predictor for eating disorder symptomology and disordered eating behavior similar to the EDI-3. The current study examined the correlations between the MEQ (MEQ; Framson et al., 2009) and the EDI, Third Edition (EDI-3; Garner, 2004). The study specifically assessed the correlations between the overall MEQ score and the Eating Disorder Risk Composite (EDRC) score. The primary hypothesis for the current study was:

1. There will be a negative correlation between the MEQ overall score and the EDRC score.

The secondary hypotheses for the current study were:

2. There will be a negative correlation between the MEQ overall score and the Drive for Thinness scale.

3. There will be a negative correlation between the MEQ overall score and the Bulimia scale.

4. There will be a negative correlation between the MEQ overall score and the Body Dissatisfaction scale.
**Method**

**Participants**

Participants for this study consisted of 134 individuals recruited from a midsized mid-south university. Some participants were excluded due to incomplete responses (N = 17). The age of the participants ranged from 18 to 28 (\( M = 20.49, \ SD = 2.09 \)). The Body Mass Index (BMI) of the participants ranged from 11.22 to 43.64 (\( M = 25.93, \ SD = 5.77 \)). There were 42 males (31.3%), 91 females (67.9%), and one person identifying as other gender (0.7%). There were 19 African American (14.2%), 3 Asian American (2.2%), 91 white, non-Hispanic (67.9%), 13 white, Hispanic (9.7%), and 8 Other (6.0%) participants. Additionally, there were 49 first-year college students (36.6%), 24 second-year college students (17.9%), 21 third-year college students (15.7%), 15 fourth-year college students (11.2%), and 25 fifth (or higher)-year college students (18.7%).
Table 1

Age, Gender, and Race/Ethnicity in Sample

<table>
<thead>
<tr>
<th></th>
<th>Current Study</th>
<th>2016 Census Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Percentage</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 – 24</td>
<td>124</td>
<td>92.5</td>
</tr>
<tr>
<td>24 – 29</td>
<td>10</td>
<td>.07</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>42</td>
<td>31.3</td>
</tr>
<tr>
<td>Female</td>
<td>91</td>
<td>67.9</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African-American</td>
<td>19</td>
<td>14.2</td>
</tr>
<tr>
<td>Asian American</td>
<td>3</td>
<td>2.2</td>
</tr>
<tr>
<td>White, Non-Hispanic</td>
<td>91</td>
<td>67.9</td>
</tr>
<tr>
<td>White, Hispanic</td>
<td>13</td>
<td>9.7</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Note: The Other gender percentage was not available from the U.S. Census Bureau.

Measures

**Demographics:** Participants were asked to report their age, gender, race/ethnicity, and year in college. Participants’ height and weight were measured upon arrival to the lab. The height and weight were used to calculate the participant’s body mass index (BMI). (see appendix A).

**Mindful Eating Questionnaire** (MEQ; Framson et al., 2009): The MEQ consists of 28 items that assess Mindful Eating. The 28 items are divided into five subscales. Each subscale has three to eight questions. The five subscales evaluate an individual’s ability to avoid eating when full (Disinhibition); awareness of texture, smell, and taste of food (Awareness); inclination to eat in response to external cues (External Cues); tendency to eat in response to negative emotions (Emotional Response); and level of distraction while
eating (Distraction) (Framson et al., 2009). A sample item consists of, “I eat so quickly that I don’t taste what I’m eating.” The 28 items are rated on a four-point Likert-type scale ranging from 1 (never/rarely) to 4 (usually/always). Specific items are reversed before scoring (1, 2, 5, 6, 7, 9, 11, 13, 17, 19, 27, 28). Scores from each subscale are determined by dividing the sum of the response value by the number of questions answered. The MEQ overall score is determined by calculating the mean of the five subscale scores. Low MEQ overall scores range from 0 to 2.48, medium MEQ overall scores range from 2.49 to 2.60, and high MEQ overall scores range from 2.61 and above. Higher scores indicate more mindful eating. The MEQ has moderate reliability. Each subscale has acceptable internal consistency reliability: Disinhibition (.83), Awareness (.74), External cues (.70), Emotional response (.71), and Distraction (.64) (Framson et al., 2009). (see Appendix B).

**Eating Disorder Inventory 3rd Edition** (EDI-3; Garner, 2004): The EDI-3 evaluates psychological traits commonly seen in individuals with Bulimia Nervosa, Anorexia Nervosa, Other Specified Feeding and Eating Disorder, and Binge Eating Disorder. The EDI-3 includes 91 items divided into 12 primary scales, which are as follows: Drive for Thinness (DT), Bulimia (B), Body Dissatisfaction (BD), Low Self-Esteem (LSE), Personal Alienation (PA), Interpersonal Insecurity (II), Interpersonal Alienation (IA), Interoceptive Deficits (ID), Emotional Dysregulation (ED), Perfectionism (P), Asceticism (A), and Maturity Fears (MT). A sample item says “I exaggerate or magnify the importance of weight.” The items are rated on a six-point Likert-type scale from *Always* to *Never*. While the participants will complete the entire EDI-3, for the purposes of the current study, only the DT, B, and BD scales will be
considered. Scores for these three scales are calculated by summing the response value for the questions on that scale. The three scores summed will provide an Eating Disorder Risk Composite (EDRC) score. Low EDRC scores range from 0 to 17, medium EDRC scores range from 18 to 31, and high EDRC scores range from 32 and above. Higher scores indicate higher levels of eating disorder symptomology and higher risks of developing an eating disorder. The EDI-3 has good internal consistency reliability ranging from .80 to .90 and test-retest reliability ranging from .93 to .98 (Garner, 2004). (see Appendix C).

**Procedure**

After receiving Institutional Review Board approval (see Appendix E), participants were recruited from a midsized mid-south university through the Department of Psychology Study Board system and through campus clubs and organizations. The Study Board is an online program that allows participants to participate in active research studies. The recruiting message informed participants that they must be at least 18 years old to participate. Upon arrival at the lab, participants were given an informed consent form (see Appendix D) to complete, which notified them of the confidentiality of their results and their right to discontinue their participation at any time. Participants received a brief description of the study. Participants were also made aware of any potential benefits or harms in this study, and in this case, there is minimal harm. Additionally, participants were given a list of mental health resources available to help them in the event that they should experience any difficulties after the study.

The participants completed the MEQ, the EDI-3, and the demographics questionnaire. The first two measures were counterbalanced to avoid order effects. The
study took approximately 45 minutes to complete. After completing the study, the participants were debriefed and thanked for their participation.
Results

Preliminary Analyses

Data was analyzed and interpreted using IBM’s SPSS software. To calculate the MEQ overall scores, it was necessary to calculate the MEQ subscale scores by summing the response value for questions answered in each subscale and computing the averages. The MEQ overall scores were determined by calculating the average of the five subscale scores ($M = 2.55$, $SD = .16$, range = 2.18 to 3.00). To calculate the EDRC scores, it was necessary to calculate the DT, B, and BD scale scores. The three scale scores were determined by summing the response value for the questions answered in each subscale. The DT scale had a mean of 9.75 ($SD = 7.54$), the B scale had a mean of 4.06 ($SD = 5.14$), and the BD scale had a mean of 13.75 ($SD = 8.80$). The EDRC scores were determined by summing the three scales scores ($M = 27.56$, $SD = 18.32$, range = 0 to 78).

Cronbach’s alpha was calculated to test the reliability of both measures. The MEQ had a Cronbach’s alpha of .72, which indicates acceptable internal consistency. The EDRC is comprised of three scales, which are DT, B, and BD. The DT scale had a Cronbach’s alpha of .88, the B scale had a Cronbach’s alpha of .83, and the BD scale had a Cronbach’s alpha of .86, which all indicate good internal consistency. The EDRC had a Cronbach’s alpha of .92, which indicates excellent internal consistency.
A Tertiary Split was conducted to determine the MEQ overall scores and the EDRC scores grouping cutoffs. The low MEQ overall scores had a mean of 2.38 (SD = .07). The medium MEQ overall scores had a mean of 2.54 (SD = .03). The high MEQ overall scores had a mean of 2.73 (SD = .09). A One-Way Analysis of Variance (ANOVA) showed that MEQ groupings were significantly different from each other, $F(2,133) = 258.30, p < .001$. The low EDRC scores had a mean of 9.51 (SD = 5.20). The medium EDRC scores had a mean of 25.73 (SD = 4.40). The high EDRC scores had a mean of 49.16 (SD = 12.97). A One-Way ANOVA showed that EDRC groupings were significantly different from each other, $F(2,133) = 254.47, p < .001$.

**Hypothesis Testing**

The primary hypothesis predicted a negative correlation between the overall MEQ score and the Eating Disorder Risk Composite (EDRC) score. To test this hypothesis, a correlation analysis was conducted. The bivariate Pearson correlation coefficient ($r$) reveals the strength of the linear relationship between the two questionnaires used in the study. Results of the Pearson correlations indicated that there was no correlation between the MEQ overall score and the EDRC score, $r(134) = -.07, p = .41$.

There were three secondary hypotheses. The first hypothesis predicted a negative correlation between MEQ overall scores and Drive for Thinness scale scores. A Pearson correlation indicated that there was no correlation between the MEQ overall score and the DT subscale score, $r(134) = .02, p = .81$. The second hypothesis predicted a negative correlation between MEQ overall scores and Bulimia (B) scale scores. A Pearson correlation indicated that there was no correlation between the MEQ overall score and the B scale score $r(134) = -.13, p = .13$. The third hypothesis predicted a negative
correlation between MEQ overall scores and Body Dissatisfaction (BD) scale scores. A Pearson correlation indicated that there was no correlation between the MEQ overall score and the BD scale score, \( r(134) = -.09, p = .31 \).

**Post-Hoc Tests**

After testing the hypotheses, additional statistical analyses were conducted to further examine the data. A One-Way ANOVA was conducted to evaluate whether there were any statistically significant differences in the MEQ overall scores between participants who have low, medium, and high EDRC scores. MEQ overall scores among individuals with low EDRC scores \((n = 47, M = 2.58, SD = .16)\) did not differ significantly from individuals with medium EDRC scores \((n = 44, M = 2.53, SD = .17)\) or high EDRC scores \((n = 43, M = 2.55, SD = .16)\), \( F(2,133) = 1.07, p = .35 \).

A One-Way ANOVA was conducted to evaluate whether there were any statistically significant differences in the EDRC scores between participants who have high, medium, and low MEQ overall scores. EDRC overall scores among individuals with low \((n = 47, M = 30.09, SD = 19.31)\) MEQ overall scores did not differ significantly from individuals with medium \((n = 44, M = 26.15, SD = 18.27)\) MEQ overall scores or high \((n = 46, M = 26.24, SD = 17.45)\) MEQ overall scores, \( F(2,133) = .68, p = .51 \).

The MEQ is comprised of five subscales, which are Disinhibition, Awareness, External Cues, Emotional Response and Distraction. Cronbach’s alpha was calculated for each subscale. The Disinhibition subscale had a Cronbach’s alpha of .78, which indicates acceptable internal consistency. The Awareness subscale had a Cronbach’s alpha of .64, which indicates questionable internal consistency. The External Cues subscale had a Cronbach’s alpha of .49, which indicates questionable internal consistency. The
Emotional Response subscale had a Cronbach’s alpha of .68, which indicates questionable internal consistency. The Distraction subscale had a Cronbach’s alpha of .39, which indicates questionable internal consistency.

Correlation analyses were conducted to evaluate the relationship between the five subscale scores of the MEQ and the EDRC score. A Pearson correlation indicated that there was a negative correlation between the Disinhibition subscale score and the EDRC score, \( r(134) = -.21, p = .02 \). A Pearson correlation indicated that there was a negative correlation between the Awareness subscale score and the EDRC score, \( r(134) = -.18, p = .03 \). A Pearson correlation indicated that there was no correlation between the External Cues subscale score and the EDRC score, \( r(134) = .18, p = .07 \). A Pearson correlation indicated that there was a negative correlation between the Emotional Response subscale score and the EDRC score, \( r(134) = -.30, p = .00 \). A Pearson correlation indicated that there was no correlation between the Distraction subscale score and the EDRC score, \( r(134) = -.16, p = .06 \).

Table 2

<table>
<thead>
<tr>
<th>MEQ Subscales</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
<th>alpha</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disinhibition</td>
<td>1.50</td>
<td>4.13</td>
<td>3.03</td>
<td>.58</td>
<td>.78</td>
<td>-.21</td>
<td>.02</td>
</tr>
<tr>
<td>Awareness</td>
<td>1.29</td>
<td>4.00</td>
<td>2.53</td>
<td>.53</td>
<td>.64</td>
<td>-.18</td>
<td>.03</td>
</tr>
<tr>
<td>External Cues</td>
<td>1.33</td>
<td>3.50</td>
<td>2.56</td>
<td>.51</td>
<td>.49</td>
<td>-.18</td>
<td>.07</td>
</tr>
<tr>
<td>Emotional Response</td>
<td>1.00</td>
<td>4.75</td>
<td>3.23</td>
<td>.66</td>
<td>.68</td>
<td>-.30</td>
<td>.00</td>
</tr>
<tr>
<td>Distraction</td>
<td>1.67</td>
<td>4.33</td>
<td>2.92</td>
<td>.59</td>
<td>.39</td>
<td>-.16</td>
<td>.06</td>
</tr>
</tbody>
</table>

Note: \( r = \text{correlation with EDRC} \)
Discussion

Mindfulness is a well-researched area, and recently mindfulness-based interventions have been implemented to treat eating disorders, eating-disorder related psychological issues, and to increase weight loss (Hulbert-Williams et al., 2013). Therapeutic interventions using mindfulness include Dialectical Behavior Therapy (Linehan, 1993), Mindfulness-Based Cognitive Therapy (Segal, Williams, & Teasdale, 2002), Acceptance and Commitment Therapy (Hayes, Strosahl & Wilson, 1999), and Mindfulness-Based Eating Awareness Training (Kristeller & Hallett, 1999). All of these interventions are assumed to help improve eating disorder symptomology (Prowse et al., 2013).

Two studies (Butryn et al., 2013; Prowse et al., 2013) have shown that there is a relationship between mindfulness and eating pathology. However, despite the popularity of research on mindfulness and eating disorders, there has been limited research in the area of mindful eating and eating pathology. The concept of mindful eating incorporates mindfulness-based approaches to aid individuals to learn how to identify and respond to hunger and satiety (Clementi et al., 2017). The present study sought to investigate the relationship between mindful eating and eating pathology, particularly on the relationship between mindful eating and eating disorder risk. This was accomplished by utilizing the MEQ and the EDI-3. The study was designed to examine the correlations between the MEQ overall score and the EDRC score from the EDI-3.

First, it is important to examine the current MEQ overall scores and EDRC scores in relation to previous literature. The current findings revealed that the mean of the MEQ overall score was 2.55 ($SD = .16$) and the mean of the EDRC score was 27.56 ($SD = \)
The current MEQ overall score is lower than previous studies. Three studies have reported a mean MEQ overall score of 2.02 (Framson et al., 2009), 2.86 (Taylor, Daiss & Krietsch, 2015), and 2.6 pre and 2.8 post intervention (Mason et al., 2015). The current EDRC score is consistent with past research. Two studies reported a mean of 21.37 (Nyman-Clarlsson et al., 2014) and 45.53 for females and 36.70 for males (Stanford & Lemberg, 2012). This shows the current mean EDRC falls within the previous literature.

The primary hypothesis stated that there would be a negative correlation between the MEQ overall score and the EDRC score. However, no relationship was found, so the primary hypothesis was not supported. There were three secondary hypotheses, which were: there would be a negative correlation between MEQ overall score and the Drive for Thinness scale, a negative correlation between MEQ overall score and the Bulimia scale, and a negative correlation between MEQ overall score and the Body Dissatisfaction scale. The three secondary hypotheses were not supported. Overall, these results indicated that there was no significant relationship between mindful eating and eating pathology.

A possible reason for finding no significant difference between mindful eating and eating pathology may be that mindful eating is predominantly used for weight-management. Mindful-eating based interventions have had an impact on mainly decreasing behaviors related to obesity (Clementi et al., 2017). As discussed in the literature review, mindful eating is described as having increased unbiased awareness of physical and emotional aspects related to eating (Framson et al., 2009). Therefore, mindful eating may not address all disordered eating behaviors and psychological effects.
seen among different types of eating disorders such as, various negative compensatory behaviors, low body dissatisfaction, and low self-esteem.

Additionally, Post Hoc tests revealed that there were no statistically significant differences in EDRC scores among participants with low, medium, or high MEQ overall scores. There were also no statistically significant differences in MEQ overall scores between participants with low, medium, or high EDRC scores. A possible reason for this is that the current sample is not representative of an eating disorder population. To determine this, it is important to examine the three scale scores of the EDRC, which are DT, B, and BD. The DT scale had a mean of 9.75, which falls in the low clinical range (Garner, 2004). The B scale had a mean of 4.06, which falls in the low clinical range. The BD scale had a mean of 13.75, which falls in the low clinical range. The means of all three scales fall in the low clinical range, which indicates that the sample in the present study does not provide an accurate representation of eating disorder risk. Therefore, there was low variability within the current sample which may have had an impact on differences between the low, medium, and high EDRC scores.

Furthermore, Post Hoc tests on the MEQ revealed that the four of the five subscales had questionable internal consistencies. The Disinhibition subscale had a Cronbach’s alpha of .78, which indicates acceptable internal consistency. However, the Awareness subscale had a Cronbach’s alpha of .64, the External Cues subscale had a Cronbach’s alpha of .49, the Emotional Response subscale had a Cronbach’s alpha of .68, and the Distraction subscale had a Cronbach’s alpha of .39, which all indicate questionable internal consistency. This indicates that the items within each subscale do
not correlate with each other. However, the MEQ overall score had a Cronbach’s alpha of .72, which indicates overall acceptable internal consistency.

Additionally, correlation analyses were conducted to examine the relationship between the five MEQ subscale scores and the EDRC score. Pearson correlations indicated significant relationships between the Awareness, the Disinhibition, and the Emotional awareness subscales, and the EDRC score. This indicates that these specific factors have an impact on eating pathology. In the current study, mindful eating seemed to have no relationship with other factors, such as drive for thinness, body dissatisfaction, and features of bulimia. This raises questions about the relationship between mindfulness and eating pathology. Previous studies have provided evidence that specific factors such as low emotion recognition, low acceptance, decreased cognitive defusion, low emotion regulation, and low awareness are associated with eating pathology (Butryn et al., 2013; Prowse et al., 2013). The current study has also provided evidence that low awareness, low disinhibition, and low emotional awareness have an effect on eating pathology. This indicates that, while mindfulness focuses on being in the present moment, it does not incorporate the specific factors discussed above. Therefore, it is possible that the aforementioned specific factors have a more direct impact in eating disorders when compared to the general concept of mindfulness.

There are some limitations of the current study that need to be addressed in future research. One limitation is that the EDI-3 is commonly used to assess eating disorder characteristics in males and females; however, a study by Stanford and Lemberg (2012) examined the gender differences of the EDI-3 and the Eating Disorder Assessment for Men (EDAM), which revealed that males scored significantly lower on the EDRC than
females. They stated that there is a need for more research on developing a measure to more accurately assess eating disorders among males. This may pose as a limitation to the present study because the EDI-3 was used for both male and female participants. Using the EDI-3 with male participants, may not have provided an accurate measure of their eating disorder risk. Future studies should use a measure such as the EDAM to provide a more accurate representation of eating disorder risk among males.

Furthermore, as with other self-report measures, social desirability may have played a role in how participants approached answering the questionnaires. Future research should include a social desirability questionnaire to account for biased answers. Also, the MEQ is the only questionnaire available to measure mindful eating. This indicates that there is a need for additional measures of mindful eating. Lastly, the present research did not ask participants about their previous or current diagnoses of eating disorders. This means that there was no distinction between clinical and non-clinical populations. This may have also impacted participants’ answers on both questionnaires. Future researchers should pre-screen participants to identify whether they have a history of eating disorders, to ensure that there is a distinction of mindful eating between clinical and non-clinical populations. This would provide more information regarding the variability of mindful eating in clinical and non-clinical populations.

The findings of this study contribute to the limited literature on mindful eating and eating pathology. The results of this study indicate that mindful eating is not predictive of eating disorder risk. This suggest that there is still a need for further research in the area to explain the lack of this relationship. Future research should further
examine whether focusing on specific factors such as low awareness and emotion regulation result in an improvement in eating pathology.

In conclusion, the results of the current study show that there is not a statistically significant relationship between mindful eating and eating disorder risk. Additionally, there were no statistically significant differences on the EDRC score between low, medium, and high MEQ overall scores and vice-versa. Implications of the current study are seen when assessing the relationship between mindful eating and eating disorder risk. The current study also questions the effectiveness of mindfulness-based interventions in eating disorder treatment. The current results provide evidence that it is more efficient to focus on subcomponents such as awareness, disinhibition, and emotion regulation when addressing eating pathology. Implications for clinicians is to consider these subcomponents and not assume that the general concept of mindfulness can address all eating pathology. Overall, further exploration in this area of research will provide a more comprehensive picture of whether there is a relationship between mindful eating and eating pathology, and whether specific components of mindful eating have an effect on eating pathology.
References


doi: 10.1093/clipsy.bpg016


https://doi.org/10.1016/j.sbspro.2014.12.330


http://dx.doi.org.libsrv.wku.edu/10.1016/B978-012088519-0/50005-8


doi: 10.1016/j.eatbeh.2015.06.010


doi:10.1037/tps0000035


Appendix A: Demographics

1. Age: ______________

2. Race/Ethnicity:
   a. African American
   b. Asian American
   c. White, non-Hispanic
   d. White, Hispanic
   e. Middle Eastern
   f. Other: ______________

3. Current Academic Status:
   a. First-year college student
   b. Second-year college student
   c. Third-year college student
   d. Fourth-year college student
   e. Fifth (or higher)-year college student

4. Weight: __________

5. Height: __________

6. Gender:
   a. Male
   b. Female
   c. Other: ______________
Appendix B: The Mindful Eating Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>N/A</th>
<th>Never/ Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Usually/ Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I eat so quickly that I don’t taste what I’m eating.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. When I eat at “all you can eat” buffets, I tend to overeat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. At a party where there is a lot of good food, I notice when it makes me want to eat more food than I should.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I recognize when food advertisements make me want to eat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. When a restaurant portion is too large, I stop eating when I’m full.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. My thoughts tend to wander while I am eating.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. When I’m eating one of my favorite foods, I don’t recognize when I’ve had enough.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I notice when just going into a movie theater makes me want to eat candy or popcorn.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. If it doesn’t cost much more, I get the larger size food or drink regardless of how hungry I feel.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I notice when there are subtle flavors in the foods I eat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I there are leftovers that I like, I take a second helping even though I’m full.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. When eating a pleasant meal, I notice if it makes me feel relaxed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I snack without noticing that I am eating.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. When I eat a big meal, I notice if it makes me feel heavy or sluggish.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: The Mindful Eating Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>N/A</th>
<th>Never/Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Usually/Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. I stop eating when I'm full...even when eating something I love.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>16. I appreciate the way my food looks on my plate.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>17. When I'm feeling stressed at work, I'll go find something to eat.</td>
<td>☐ I don't work.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>18. If there's good food at a party, I'll continue eating even after I'm full.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>19. When I'm sad, I eat to feel better.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>20. I notice when foods and drinks are too sweet.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>21. Before I eat I take a moment to appreciate the colors and smells of my food.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>22. I taste every bite of food that I eat.</td>
<td>☐ I never eat when I'm not hungry.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>23. I recognize when I'm eating and not hungry.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>24. I notice when I'm eating from a dish of candy just because it's there.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>25. When I'm at a restaurant, I can tell when the portion I've been served is too large for me.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>26. I notice when the food I eat affects my emotional state.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>27. I have trouble not eating ice cream, cookies, or chips if they're around the house.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>28. I think about things I need to do while I am eating.</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Appendix B: The Mindful Eating Questionnaire

Scoring the Mindful Eating Questionnaire

Higher scores on the mindful eating questionnaire overall—and on each of the categories—has been associated with a lower body mass index (BMI), which suggests that mindful eating may play an important role in long-term weight maintenance.

Look at your responses to questions 1-28 and match each question to its appropriate category.

- Assign each response a corresponding point value (see below).
- Total those points and divide by the number of questions answered to calculate the individual category score.
- Add category scores together and divide by 5 to get your overall score.

<table>
<thead>
<tr>
<th>Category</th>
<th>Question #</th>
<th>Response Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness—being aware of how food looks, tastes and smells</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Distraction—focusing on other things while eating</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Inhibition—eating even when full</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Emotional Response—eating in response to sadness or stress</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
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<td></td>
<td>14</td>
<td></td>
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<tr>
<td></td>
<td>23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Questions in a white shaded box at left.</th>
<th>Never/Rarely</th>
<th>4 pts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sometimes</td>
<td>3 pts.</td>
<td></td>
</tr>
<tr>
<td>Often</td>
<td>2 pts.</td>
<td></td>
</tr>
<tr>
<td>Usually/Always</td>
<td>1 pt.</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>0 pts.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Questions in a gray shaded box at left.</th>
<th>Never/Rarely</th>
<th>1 pt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sometimes</td>
<td>2 pts.</td>
<td></td>
</tr>
<tr>
<td>Often</td>
<td>3 pts.</td>
<td></td>
</tr>
<tr>
<td>Usually/Always</td>
<td>4 pts.</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>0 pts.</td>
<td></td>
</tr>
</tbody>
</table>

1 Do not count N/A questions when totaling the number of questions answered within each category.

Total Score

44
Appendix C: Eating Disorder Inventory 3rd Edition

The Eating Disorder Inventory-3 (EDI-3) is not attached to this document due to copyright issues. The publishing company states that the EDI-3 may not be reproduced in whole or in part in any form.
Appendix D: Informed Consent Form

INFORMED CONSENT DOCUMENT

Project Title: Eating Behaviors and Patterns in College Students
Investigator: Soujanya Cheleturu, B.A.; WKU Psychology Department
soujanya.cheleturu002@topper.wku.edu

You are being asked to participate in a project conducted through Western Kentucky University. The University requires that you give your signed agreement to participate in this project.

You must be 18 years old or older to participate in this research study.

The investigator will explain to you in detail the purpose of the project, the procedures to be used, and the potential benefits and possible risks of participation. You may ask any questions you have to help you understand the project. A basic explanation of the project is written below. Please read this explanation and discuss with the researcher any questions you may have. You should keep a copy of this form for your records.

1. Nature and Purpose of the Project: The purpose of the current study is to examine the eating patterns in college students.

2. Explanation of Procedures: Following the consent for participation, you will be asked to complete a survey which will consist of a demographics questionnaire and two additional questionnaires that assess mindful eating and eating behaviors. The survey will take approximately 30 to 45 minutes to complete.

3. Discomfort and Risks: This study has minimal discomfort or risk. However, if you experience any discomfort or risk, the researcher can provide you with additional resources and information to ease your discomfort.

Western Kentucky University Counseling
Phone: 270-745-3159
The WKU counseling center is staffed with full-time clinicians, pre-doctoral students, and graduate students. They provide a range of counseling services and offer presentations for off and on-campus organizations for a variety of topics, including depression, stress management, sexual assault awareness, and psychological wellness.

4. Benefits: As a participant you will assist in providing information to the literature on mindful eating and eating pathology.

5. Confidentiality: This survey does not require you to share any identifiable information.

6. Refusal/Withdrawal: Refusal to participate in this study will have no effect on any future services you may be entitled to from the University. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

You understand also that it is not possible to identify all potential risks in an experimental procedure, and you believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks.

Your continued cooperation with the following research implies your consent.

THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY
THE WESTERN KENTUCKY UNIVERSITY INSTITUTIONAL REVIEW BOARD
Paul Mooney, Human Protections Administrator
TELEPHONE: (270) 745-2129
Appendix E: Institutional Review Board Approval Form

INSTITUTIONAL REVIEW BOARD
OFFICE OF RESEARCH INTEGRITY

DATE: November 2, 2017
TO: Soujanya Chelluru, Ph.D.
FROM: Western Kentucky University (WKU) IRB
PROJECT TITLE: [1151119-1] Mindful Eating and Eating Pathology: Correlation Between the Mindful Eating Questionnaires and the Eating Disorder Inventory-3rd Edition
REFERENCE #: IRB 16-153
SUBMISSION TYPE: New Project
ACTION: APPROVED
APPROVAL DATE: November 2, 2017
REVIEW TYPE: Exempt from Full Board Review

Thank you for your submission of New Project materials for this project. The Western Kentucky University (WKU) IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Exempt from Full Board Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by an signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

This project has been determined to be a Minimal Risk project.

Please note that all research records must be retained for a minimum of three years after the completion of the project.

If you have any questions, please contact Paul Mounsey at (270) 745-2129 or irb@wklu.edu. Please include your project title and reference number in all correspondence with this committee.
Appendix E: Institutional Review Board Approval Form

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained with Western Kentucky University (WKU) IRB files.