

UNIVERSITY STUDENTS BINGE EATING AND ITS IMPACT ON WORK AND SCHOOL PRODUCTIVITY

By Cheri L. Stoffel

The literature suggests that people of all ages engage in risky eating patterns, with some developing eating disorders. The average age for developing eating disorders is adolescence and early adulthood, the age of the traditional university student.

Binge Eating Disorder (BED) is defined as recurrent episodes of overeating accompanied by a sense of loss of control and guilt. If untreated, it may cause serious medical and psychological damage. The literature suggests that many are not aware of BED symptoms, and that university students underutilize treatment for various reasons including embarrassment in seeking treatment and cost of treatment. University students engaging in such behaviors may unknowingly be worsening their current health and increasing risks for additional health conditions in the future. Binge eating is positively associated with obesity; obesity and binge eating are positively associated with short sleep duration and physical inactivity. Additionally, binge eating and obesity have been associated with work productivity and functioning impairment. Prevalence of BED and impairment of students' work and classroom productivity, and regular daily and social activities, may warrant implementation of policies or programs to combat these effects.

In the fall of 2013, all University of Wisconsin Oshkosh undergraduate and graduate students were invited to participate in a survey assessing the prevalence binge eating of clinical significance, and student awareness of symptoms and treatment resources. Further information was gathered to investigate the effects of BED, adjusted for certain health behaviors (i.e., obesity, sleep duration, and physical activity) on work and classroom productivity and activity impairment. Data were collected online using pre-established instruments. Statistical analyses were done, using descriptive statistics, Pearson's chi-squared, Pearson's correlation, and multiple regression analysis.

Results of the statistical analyses indicated that 7.8% of the sample self-reported symptoms consistent with a clinical BED diagnosis. Respondents indicated a lack of awareness of the symptoms and treatment resources for BED. Binge eating was more common among obese students than non-obese students. Moderate binge eating, extreme obesity, physical inactivity, and short sleep may contribute to classroom productivity, daily activity and social activity impairment in students. Future research testing the relationship of university students with BED and the relationship to classroom productivity and regular daily activity impairment is needed to corroborate findings.

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by

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To all who have struggled or are struggling to overcome an eating disorder. Recovery is hard work, but the rewards cannot be numbered. The first step in any recovery is recognizing that there is a problem. May the research in this manuscript highlight the dangers of disordered eating and enlighten the paths of recovery. May a healthy relationship with food, self, mind, and spirit prevail over the deadly drive to be thin.

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Chapter I

Introduction

Eating disorders are psychologically-based illnesses associated with extreme eating behaviors (NIMH, 2014). Eating disorders are complex and often difficult-to-treat illnesses, as they are comprised of biological, psychological, and social factors (Fielder-Jenks, n.d; Hart, Granillo, Jorm, & Paxton, 2011). Left untreated, eating disorders cause functional impairment, serious medical complications, and even death (Le Grange, Swanson, Crow, & Merikangas, 2012; see also: BEDA, n.d.; NEDA, n.d., a, b).

Although development of an eating disorder can happen at any point throughout life, research suggests that these illnesses often start in adolescence or early adulthood (American Psychiatric Association, 2000, 2013; Barker & Galambos, 2007). The transition of entering the university may lead to risky health behaviors, including the development of eating disorders (Barker & Galambos, 2007; Lenz, 2004; Nicoli & Liberator, Jr., 2011). It is estimated that millions of university students have eating disorders, yet most of them receive little or no medical attention or psychological intervention (Smith, 2010).

Statement of Problem

A 2012 study conducted at the University of Michigan found that “27.8% of female undergraduates, 11.8% of male undergraduates, 21.5% of female graduate students, and 10.3% of male graduate students screened positive for an eating disorder”

(Dooley-Hash et al., 2012, p. 4). Further, approximately 35.9% of female students and 31.4% of male students reported binge eating more than once per month (p. 10). The University Study of Habits, Attitudes, and Perceptions around Eating (U-SHAPE) explored the eating habits of all student types, and was considered the first comprehensive study at a university. Prior studies have focused on population subsets; for example: nursing students, athletes, psychology students, freshmen, and others (Dooley-Hash et al., 2012).

Binge Eating Disorder (BED) is estimated to be the most common eating disorder in the United States (BEDA, n.d.). BED is characterized by reoccurring, uncontrollable eating of large amounts of food in a relatively short, discrete period of time, and often is associated with obesity (although a person does not have to be obese to be diagnosed with the condition) (American Psychiatric Association, 2013; Nicoli & Liberatore, Jr., 2011; NIDDKD, 2008; Rosenberger & Dorflinger, 2013). Although the amount of food consumed during a binge may vary from person to person, scientific research has indicated that feeling a loss of control while eating is the most reliable symptom in diagnosing BED (Wolfe, Baker, Smith, & Kelly-Weeder, 2009).

BED is a complex and severe psychological disorder with many symptoms, causes, risk factors, and associated complications (BEDA, n.d.; Le Grange et al., 2012; Trace et al., 2012; Wonderlich, Gordon, Mitchell, Crosby, & Engel, 2009). The longer BED is left untreated, the more likely it is to cause serious psychological or medical complications. The long-term consequences of BED can include: obesity, Type 2 diabetes, high blood pressure, high cholesterol, heart disease, certain types of cancer,

depression, anxiety, insomnia, sleep apnea, gallbladder disease, gastrointestinal problems (e.g., Irritable Bowel Syndrome), and many others (BEDA, n.d; “Binge Eating Can Be Triggered by Trauma,” 2014; Bedrosian, Striegel, Wang, & Schwartz, 2012; Kulakowski, n.d.; NEDA, n.d., a, b; NLM, 2013; Rosenberger & Dorflinger, 2013; Trace et al., 2012). It is for these reasons that BED is a public health concern deserving national attention (Bacon, Stern, Van Loan, & Keim, 2005; Le Grange et al., 2012).

It is important to note that BED is not equivalent to obesity. BED is a psychiatric condition with relentless psychosocial symptoms. Obesity is a medical diagnosis based on Body Mass Index (BMI), a measurement of excess body fat (American Psychiatric Association, 2013; CDC, 2011). The *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) clarifies that obesity is purely a physical condition, not a mental health disorder, and defines obesity as “the long-term excess of energy intake relative to energy expenditure” (American Psychiatric Association, 2013, p. 329¹). Although those with BED are more likely to be obese, they demonstrate pathological eating behaviors that are not universally common to all those who are considered obese (American Psychiatric Association, 2013; Wonderlich et al., 2009).

Neither is BED the same as the socially acceptable over-eating at social gatherings (e.g., holidays and family celebrations) typical in Western culture (Heatherton & Baumeister, 1991). People with BED often hide their binge eating behaviors due to

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intense shame about their behaviors. It is common for binge episodes to happen in seclusion (Saules et al., 2009).

A lack of BED symptom recognition in medical settings, especially in the primary care setting, may reflect why so many go untreated for the eating disorder (Becker, Eddy, & Perloe, 2009; Hart et al., 2011). Because natural remittance of BED is rare, awareness of and screening for the disease is essential to helping more people understand that they have treatment options other than the regularly prescribed calorie-limiting diet. Findings by Striegel, Bedrosian, Wang, & Schwartz (2012) indicate “a dose response”; that is, the more severe the symptoms of binge eating are, the higher the level of dysfunction in various life domains, such as work productivity, and higher incidence of adverse health outcomes. Early intervention has been shown to be more effective for long-term results; awareness, screening, and treatment referrals at universities may be critical to addressing this national concern (Barker & Galambos, 2007).

Purpose of This Study

The purpose of this study is to determine whether associations exist between binge eating disorder (BED) and work and classroom productivity and regular daily activity and social activity impairment. Specifically, this study examines the following questions:

1. How common is BED among University students?
2. What is University students’ awareness of BED: its symptoms and treatment resources?

3. Does BED, adjusted for certain health behaviors (i.e., obesity, sleep duration, and physical activity) impact work and classroom productivity and impair regular daily activity and social activity? and,
4. What implications do these effects, if any, have for universities?

Significance of the Study

There is evidence in the current literature to support that eating disordered behavior, specifically BED, exists on university campuses. Based on the literature review, it is reasonable to suspect that a sub-set of students at any university has disordered eating behaviors. Furthermore, despite focused research on reasons for delays in diagnosis and obtaining appropriate treatment, there still is a gap in the scientific literature to sufficiently explain these delays. To better assist their students, universities may benefit from understanding why those with troublesome eating behaviors do not seek treatment.

This study is important because it provides valuable information about college students' BED risk behaviors and how serious the problem is on the university campus for potential policy actions. Finally, the study contributes to the literature on BED in a university setting. This is the first known study of BED prevalence at the university and its relationships to work and classroom productivity and activity impairment.

Chapter II

Definitions

Binge Eating Disorder (BED) Clinical Definition

BED, as are all other eating disorders, is a complex psychiatric condition. The DSM-5 lists the diagnostic criteria for BED:

- “A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
1. Eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than what most people would eat in a similar period of time under similar circumstances.
 2. A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).
- B. The binge-eating episodes are associated with three (or more) of the following:
1. Eating much more rapidly than normal.
 2. Eating until feeling uncomfortably full.
 3. Eating large amounts of food when not feeling physically hungry.
 4. Eating alone because of feeling embarrassed by how much one is eating.
 5. Feeling disgusted with oneself, depressed, or very guilty afterward.

- C. Marked distress regarding binge eating is present.
- D. The binge eating occurs, on average, at least once a week for 3 months.
- E. The binge eating is not associated with the recurrent use of inappropriate compensatory behavior as in bulimia nervosa [e.g., vomiting or laxative abuse] and does not occur exclusively during the course of bulimia nervosa or anorexia nervosa” (American Psychiatric Association, 2013, p. 350²).

Body Mass Index

Body Mass Index (BMI) is a measure of the ratio of fat tissue to lean tissue; the lower the number, the lower the percentage of body fat. There have been studies showing a relationship between increased BMI and other chronic conditions such as Type 2 diabetes and heart disease. Using weight (W) measured in pounds, and height (H) measured in inches, a BMI is calculated with this formula: $(W/H^2) \times 703$ to convert to the standard unit of measure, kg/m^2 (CDC, 2011). Table 1 explains the classification of BMI from the National Heart, Lung, and Blood Institute (NHLBI, 2000).

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Table 1

Weight Classifications Defined by BMI Ranges

Weight Status	BMI Range
Underweight	$< 18.5 \text{ kg/m}^2$
Normal weight	$18.5 \leq 24.9 \text{ kg/m}^2$
Overweight	$25.0 \leq 29.9 \text{ kg/m}^2$
Obesity	
Class 1	$30.0 \leq 34.9 \text{ kg/m}^2$
Class 2	$35.0 \leq 39.9 \text{ kg/m}^2$
Extreme obesity (Class 3)	$\geq 40 \text{ kg/m}^2$

It is important to note that the CDC (and the NHLBI) caution relying only upon BMI for drawing conclusions regarding a person's health status. Athletes, those who lift weight in particular, may very well have a BMI that falls within an obesity class even though they are physically fit and healthy. The use of BMI is to be used as a general guideline only and within the context of other health measures (CDC, 2011; NHLBI, 2000).

Productivity and Activity Impairment

Work Productivity Impairment.

Work productivity impairment is an estimated ratio of work time lost due to illness compared to the total number of hours expected to be worked. The variables include absenteeism (a measure of time spent out of the job due to illness, versus actual hours worked or paid time off for other purposes such as vacation) and presenteeism (effects of the illness at work; e.g., loss of attention due to the illness, inability to work as

effectively as when well, etc.) (Bedrosian et al., 2012; Reilly Associates, 2013; Reilly, Tanner, & Meltzer, 1996 b; Reilly, Zbrozek, & Dukes, 1993).

Classroom Productivity Impairment.

Class productivity impairment is measured by two variables: class absenteeism (time missed from the classroom due to illness), and class presenteeism (effects of illness on classroom production, e.g., loss of attention due to illness, inability to study while ill, etc.) (Reilly, Tanner, & Meltzer, 1996 a).

Regular Daily Activity Impairment.

Regular daily activity impairment is an estimated measure of the impact of illness on being able to perform activities of daily living (e.g., ability to grocery shop, care for oneself, manage one's household, etc.) (Reilly et al., 1996b; Reilly et al., 1993).

Social Activity Impairment.

Social activity impairment is an estimated measure of the impact of illness on social involvement versus isolation (e.g., posting on social media like Facebook, attending social functions). This variable was created for this study based on research that obesity and Binge Eating Disorder are known correlates to functional impairment and often are comorbidities to depression. Many studies cite time “out of role” as impaired functioning or reduced quality of life, but do not necessarily differentiate the impact on functioning to manage personal care needs (i.e., regular daily activity) versus caring for social needs (i.e., social activity).

Chapter III

Literature Review

The Prevalence of BED

General Population.

BED is prevalent in every age group and is not limited by gender. Hudson, Hiripi, Pope and Kessler (2007) estimate that 3.5% of American women and 2% of American men have BED (NIDDKD, 2008; Wonderlich et al., 2009). Although it is not known exactly how many people have this disease, some estimate that it could be as many as 10 million people in the United States (approximately 3% of overall population, based on data from the US Census Bureau (2014)). Unfortunately, only about 7% of those individuals receive treatment (“Binge Eating Can Be Triggered By Trauma,” 2014). Treatment rates are low overall, but especially for men with eating disorders (Dickerson et al., 2011).

The lifetime prevalence of BED is estimated to be from 1% - 13% in the U.S. population (DeBoer et al., 2012; Fielder-Jenks, n.d.; Napolitano & Himes, 2011). The DSM-5 estimates the 12-month prevalence of eating disorders is 1.68% (1.6% for females and .08% for males) (American Psychiatric Association, 2013, p. 351³). BED is estimated to be the most prevalent eating disorder in the United States; the 12-month prevalence estimate of Anorexia Nervosa (AN) is 0.4% (total population) and Bulimia

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Nervosa (BN) approximately 1.0% - 1.5% (total population) (American Psychiatric Association, 2013, pp. 341, 347⁴).

At the University.

According to Racette, Deusinger, Strube, Highstein, and Deusinger (2005), approximately 12 million college students are enrolled in 3,600 colleges and universities across the United States. The majority of these students, just under seven million, are between the ages of 18 and 24 (Racette et al., 2005). The average age of onset for mental health disorders is before age 24 (Hunt & Eisenberg, 2010). Eating disorders, including BED, typically develop during late adolescence or early adulthood, at the same time young men and women transition out of their childhood homes and become increasingly independent of their own affairs (Barker & Galambos, 2007; Mills, Polivy, McFarlane, & Crosby, 2012; Smith, 2010; Stice, Marti, & Rhode, 2012).

Estimates of illness prevalence within university-based populations vary; however, the ratio of eating disorder pathology in university-specific studies tends to be higher when compared to illness estimates in the national population. For example, according to Napolitano and Himes (2011), approximately 6% of female college students have symptoms severe enough to warrant a BED diagnosis; nearly twice the national rate reported by Hudson et al. (2007). Eisenberg, Nicklett, Roeder and Kirz (2011) reported findings that 9% - 13% of females and 3% - 4% of males screened positive for clinically significant eating disorders symptoms (p. 6). (This report did not include BED-specific

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results.) In a study of 217 students, researchers found 12.9% of the sample tested positively for BED. Of the 217-student sample, 13.64% of females and 9.76% of males tested positively for BED (Nicoli & Liberatore, Jr., 2011, p. 287). Dooley-Hash et al. (2012) reported eating disorder pathology prevalence in graduate and undergraduate students.

The prevalence of BED is more evenly distributed between gender than other eating disorders, such as AN or BN (Barker & Galambos, 2007; Napolitano & Himes, 2011; Spitzer et al., 1993; Striegel, Bedrosian, Wang, & Schwartz, 2012; Striegel-Moore et al., 2009). Literature suggests that BED is not limited to the Caucasian population (Fielder-Jenks, n.d.; Napolitano & Himes, 2011; NEDA, n.d., a; Yamamiya, Schroff, & Thompson, 2008).

Non-traditional students returning to the university are not immune to BED. “BED tends to increase with age, with rates as high as 8% among women 46-55 years old” (DeBoer et al., 2012, p. 194); and some of the literature suggests that men may be more likely to develop BED later in life than women (NIDDKD, 2008).

In summary, the reviewed literature suggests that students of different ages and college status are at risk of developing, or already may have, an eating disorder.

BED Contributing Factors, Symptoms, Treatment Resources, and Student Awareness

BED Contributing Factors.

Although the majority of Americans with BMI in the obese ranges do not have BED, two-thirds of those who are diagnosed with BED are obese (NIDDKD, 2008). Those with undiagnosed and/or untreated BED often are encouraged to diet as the solution to losing excess weight that typically accompanies the uncontrolled eating episodes. “Dieting is often motivated by societal messages that it is undesirable to be overweight...Ample evidence suggests that modern Western society disparages the obese body shape” (Heatherton & Baumeister, 1991, p. 89). According to Carels et al. (2010), binge eating behaviors increase in those who believe negative stereotypes about overweight and obesity. The combination of social and cultural dynamics, chronic dieting, lack of awareness and/or recognition of treatment needs, and psychiatric comorbidities highlight the complexities of developing and maintaining an eating disorder (Davila et al., 2014).

Social and Cultural Dynamics. Some believe the objectification of women in Westernized cultures subverts how women view themselves (Calogero & Thompson, 2009). Women with eating disorders espouse intense desires for thinner bodies, referred to as the “thin ideal.” This internalized unrealistic standard is known to consistently predict increases in disordered eating such as pathological dieting, which often precedes binge episodes (Heatherton & Baumeister, 1991; Juarascio et al., 2011, p. 207; Napolitano & Himes, 2011; Parham, 1999; Saules et al., 2009).

Although body distortion or dissatisfaction is not a diagnostic criterion for BED, there is evidence in the literature to demonstrate a correlation between negative self-image and those with BED, compared to those without BED (Carels et al., 2010; Forney

& Ward, 2013; Juarascio et al., 2011; Nicoli & Liberatore, Jr., 2011; Reslan, 2010; Slevic & Tiggemann, 2011; Striegel-Moore et al., 2009). Regardless of the reasons for distress over body image, women have a greater tendency to overestimate their weight, and within the female college population, the act of over estimating one's weight is associated with greater body dissatisfaction, greater importance on outward appearance, and greater levels of disordered eating. With social and cultural focus on attaining and maintaining a normal BMI and thin body structure (without consideration of genetic influences and limitations), those predisposed to eating disorders develop an excessive and unhealthy concern for their weight (Battle & Brownell, 1996; Giles, Helme, & Krcmar, 2007; Nicoli & Liberatore, Jr., 2011). These expectations create unrealistic standards, and unfortunately are accepted as social and cultural norms (Nicoli & Liberatore, Jr., 2011).

Societal messages encourage men to seek a lean, muscular build, thought to contribute to excessive exercise, which often is used as a purging behavior in men (Olivardia, n.d.), and is a way to compensate for calories consumed without using self-induced vomiting, laxatives, or diuretics. This may contribute to findings that male binge eaters are significantly more likely to classify themselves as overweight, even when controlling for BMI (Carels et al., 2010; Giles et al., 2007; Rosenberger & Dorflinger, 2013).

Simply viewing oneself as “overweight” increases the risk for binge eating. There is evidence that the more severe BED symptoms are, the more inadequate participants feel about their self-image and body size (Carels et al., 2010; Nicoli & Liberatore, Jr.,

2011; Reslan, 2010). Literature implies that eating disorder symptoms may grow in severity when binge eaters experience increased distress about their weight and self-image (Barker & Galambos, 2007; Heatherton & Baumeister, 1991; Napolitano & Himes, 2011; Saules et al. 2009).

Carels et al. (2010) concluded that people with internalized weight bias are more likely to experience increased “eating pathology, psychological distress, and body dissatisfaction” (p. 185). The DSM-5 states that BED sufferers report higher “levels of overvaluation of body weight and shape” than those without the disorder (even others with obesity) (American Psychiatric Association, 2013, pp. 352-353⁵). Nicoli and Liberatore, Jr. (2011) reported on a study that highlighted the relationship between negative body image and severity of BED symptoms. When asked to choose a silhouette participants felt depicted their BMI, only 13.68% of the group chose an appropriate silhouette in relation to their BMI; over 94% of those with moderate or severe BED overestimated their body size (p. 286).

Chronic Dieting. In Westernized culture, not only is dieting socially acceptable, but a national study revealed over half (57%) of U.S. women diet, and all dieters spend nearly \$20 billion dollars per year in the U.S. for diet and weight-loss products (ABC News, 2012; Bacon et al., 2005). Strict diet rules (restrained eating) often are found in combination with binge eating (Heatherton & Baumeister, 1991).

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According to Heatherton and Baumeister (1991), 80% of adolescent girls reported dieting before their 13th birthday (10% of boys reported dieting before age 13) (p. 87). On their website, the National Association of Anorexia Nervosa and Related Disorders (ANAD, n.d.) conveys that 91% of college women reported attempts to control their weight through dieting (with nearly 25% of the group commenting that that they diet “often” or “always”).

There is a growing body of literature that demonstrates that “dieting” does not provide long-term results in attaining and maintaining a healthy, consistent weight (Mathieu, 2009; Parham, 1999). Davila et al. (2014) found a greater use of unhealthy dieting practices in students who were depressed; this was true for all females, overweight males, and obese males. Treatment of obesity in general, and BED in particular, through size acceptance has a greater efficacy with weight stabilization results that last over time (Parham, 1999; Provencher et al., 2009). Some suggest that a non-dieting, size acceptance approach achieves healthier outcomes, even when BMI remains in an obese classification (Bacon et al, 2005). Provencher et al. (2009) concluded that a health-centered rather than weight-centered approach toward eating habits produced sustainable improvements in decreasing bingeing behavior. Others suggest teaching mindful eating as a way to increase binge-eaters’ satisfaction with food and decrease binges and emotional eating (Mathieu, 2009).

Psychiatric Co-Morbidities. BED is associated with a host of psychiatric symptoms, including significant impairment of psychosocial functioning and frequent co-morbidity with depression and/or anxiety (Fielder-Jenks, n.d.; Lent & Swencionis, 2012;

Saules et al., 2009; Stice et al., 2012; Striegel, Bedrosian, & Wang, 2012; Striegel, Bedrosian, Wang, & Schwartz, 2012; Wonderlich et al., 2009). On their website, ANAD (n.d.) asserts that “50% of patients with eating disorders have co-occurring depression.” Additionally, the website declares that eating disorders “have the highest mortality rate of any mental illness.” In addition to deaths due to physical comorbidities, the literature suggests a stronger relationship to suicide attempts and eating disorders than most other psychiatric disorders (ANAD, n.d.; Stice, et al., 2012). Davila et al. (2014) reported findings that students with depression were more likely to develop unhealthy weight loss behaviors, and that relationship was stronger in females.

Symptoms.

Although individuals with BED may be normal weight, most individuals seeking treatment for BED are overweight or obese. Patients with BED “consume more calories in laboratory studies of eating behavior and have greater functional impairment, lower quality of life, more subjective distress, and greater psychiatric comorbidity” (American Psychiatric Association, 2013, p. 351⁶).

Those with BED tend to think of themselves as overweight and addicted to food; that is, the addiction and condition of being overweight is part of their identity, a part of “who they are.” This self-identification as an addict is reinforced during binge episodes, as bingeing is defined by losing control while eating abnormally large amounts of food in

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a short amount of time (Saules et al., 2009). Intense shame frequently results from disordered eating behaviors (Atkinson & Wade, 2013).

BED Treatment.

Treatment Resources. Although early intervention and treatment can lead to complete remission of BED, it's estimated that only 10% of affected individuals receive treatment, and an even smaller percentage receive specialized treatment for eating disorders (Akey, Rentamaki, & Kane, 2013). Often individuals with clinically significant disordered eating behaviors do not realize their symptoms warrant treatment. Atkinson and Wade (2013) attribute the intense shame associated with binge eating as a reason many people refrain from talking about their problem. Additionally, there seems to be low attunement to and recognition of symptoms and signs of eating disorders within the general medical community. Without insight into the disease, primary care practitioners may not ask questions necessary to diagnose these diseases accurately and treat them effectively (Becker et al., 2009; Kessler et al., 2013). These concerns contribute to a substantial delay in the onset of eating disorder behaviors and treatment, with a correct diagnosis and adequate treatment plan often being delayed up to 10 years (and possibly even longer) (Eating Disorder Coalition, 2009; Gilbert et al., 2012; Smith, 2010). Research suggests that without treatment, the disease most often does not resolve on its own, and prolonging the delay decreases treatment effectiveness (Gilbert et al., 2012; Kessler et al., 2013; Mills et al., 2012; Stice et al., 2012).

Because of the high rates of complicating factors (medically and psychologically), clinical intervention is warranted. Eating disorders are bio-psychosocial diseases. To treat

eating disorders effectively, the treatment team includes a psychotherapist (masters level or above), a dietitian who specializes in treating eating disorders, a psychiatrist (to address psychiatric medication needs), and a primary care physician (to monitor medical symptoms) (Fielder-Jenks, n.d.; NEDA, n.d., c; Striegel, Bedrosian, & Wang., 2012).

Targeted treatment for BED can be very efficacious, with many fully recovering from the disease; however, the efficiency of treatment still is low, in that many who have the disease go untreated (Battle & Brownell, 1996; Kessler et al., 2013; Striegel, Bedrosian, Wang, & Schwartz, 2012).

Treatment Options. The intensity of treatment options varies depending upon the level of illness. For those with severe medical and/or psychiatric symptoms (e.g., electrolyte imbalances, low blood pressure, suicidal intentions), inpatient hospitalization is warranted. On the other end of the spectrum, for those who are experiencing symptoms but are not displaying medical complications or severe psychiatric conditions, outpatient counseling and medical monitoring is appropriate. Additional levels of care include: (a) residential care (the patient needs continual monitoring of eating disorder symptoms and/or psychiatric symptoms, but is medically stable); (b) partial hospitalization program (full day programming at a hospital, but the patient goes home at night; appropriate for those who are experiencing unrelenting eating disorder symptoms, but are medically and psychiatrically stable); and (c) intensive outpatient program (part-day programming occurring several times throughout the week; appropriate for those who are having significant symptoms and need more support than outpatient treatment can provide) (NEDA, n.d., c.).

Treatment Methods. Cognitive-Behavioral Therapy (CBT), Dialectical Behavioral Therapy (DBT), and Individual Psychotherapy (IPT) are evidenced-based therapy strategies effective for treating individuals with eating disorders, including BED (Battle & Brownell, 1996; Sulkowski, Dempsey, & Dempsey, 2011). Using CBT and IPT in combination addresses the individual's needs for relearning ways of thinking about self and food (CBT) while reinforcing positive self-esteem and help in mastering skills in IPT. A fourth type of treatment that has been associated with BED is Behavioral Weight Loss Therapy (BWLTL), which addresses only the maladaptive behavior patterns (i.e., there is no counseling addressing cognitive distortions and negative thinking patterns). Evidence suggests that BWLTL is not as effective as CBT, DBT, and/or IPT, especially in the long-term (Flückiger, Meyer, Wampold, Gassmann, Messerli-Bürgy, & Munsch, 2011). In fact, those with BED that receive therapy designed to restructure cognitive and behavioral patterns have better outcomes (Flückiger et al., 2011; Hay & Mond, 2005; Kulakowski, n.d.).

Treatment Costs. In the book, *Introduction to U. S. Health Policy*, Barr (2011) makes the poignant statement: “the U.S. health care system has developed over time in response to our dominant cultural and political institutions. As a consequence, [the U.S.] provides the most expensive care in the world while also excluding the largest number of people from care” (p. 67). Unfortunately this is an all-too-accurate description of eating disorder treatment. According to the Eating Disorders Coalition (2009), “Treatment of an eating disorder in the US ranges from \$500 per day to \$2,000 per day. Outpatient treatment, including therapy and medical monitoring, can cost \$100,000 or more.”

Student Awareness.

As Eisenberg et al. (2011) point out, the scientific literature confirms persistent disordered eating patterns within college populations without corresponding levels of awareness of eating disorders, severity of eating disorder symptoms, or available treatment resources.

Through the University Study of Habits, Attitudes, and Perceptions around Eating (U-SHAPE), an Interdisciplinary Team at the University of Michigan (2013) carried out a University-wide study enveloping a range of factors that are thought to influence eating. The U-SHAPE study instrument included questions regarding lack of treatment for eating and/or body image concerns. The top five reasons for not seeking care were: (a) I don't know what resources are available to me; (b) I prefer to deal with issues on my own; (c) There are financial reasons (too expensive, insurance won't cover what I need); (d) I don't have time; and (e) Issues related to eating and body image are normal in college/graduate school. These reasons align with findings by Akey et al. (2013), Hart et al. (2011), and Hunt and Eisenberg (2010).

One of the more concerning findings was from a study through which university students indicated a lack of understanding that eating disorder symptoms (e.g., self-evaluation of being fat despite evidence to the contrary, losing control over eating, having lost more than 14 pounds in a three-month period) were serious enough or urgent enough to warrant treatment (Eisenberg et al., 2011). Similar results were reported by Gratwick-Sarll, Mond, and Hay (2013). Results reported by Atkinson and Wade (2013) exemplify a

reason for early intervention: the presence of dysfunctional dissatisfaction with body weight and shape becomes more resistant to change the longer it endures.

Education about BED and its risks and treatment is especially important at the university. The median age of onset of eating disorders in general is 18bet-21 years (Forney & Ward, 2013). With mental and physical health care readily available on many campuses, a lack of help-seeking behavior may lead students with BED to experience unnecessary functional impairment (Eisenberg et al., 2011).

BED and Work and Classroom Productivity and Activity Impairment

The Relationship between BED and Work Productivity Impairment.

There is evidence that working while in college is associated with higher levels of grade point average (GPA). Consistent with the scientific literature, Dundes and Marx (2006 - 2007) reported that students in their study who were working 10 - 19 hours per week saw the greater increases in GPA than nonworking students and students working 20 hours or more per week. In a sample of 2,980 U.S. adults aged 18 years and older, 35% of those who reported regular binge eating in the past 12 months also reported that binge eating had disrupted their work/school work at least mildly (Hudson et al., 2007). Although the study did not include self-reported work impairment among non-binge eaters, these results suggest a troubling level of work disruption, especially if work can be a positive factor in a student's college experience.

Loss of productivity due to absenteeism and presenteeism can significantly increase the overall burden of illness cost to a company. Loeppke et al. (2003) clearly

state that “the health and productivity of the workforce is inextricably linked” (Conclusions, para 3). The economic burden of mental illness is \$500 billion per year, which includes mental health disorders and substance abuse disorders. Topping these costs, for adults under age 45, are depression and eating disorders (Kingsbury, 2008). Employers lose about \$4.3 billion each year due to obesity-related absenteeism (Goetzel et al., 2010). Striegel, Bedrosian, and Wang (2012) studied a sample of 117,272 adults to determine whether current binge eating would be associated with elevated work productivity impairment. The results showed that people with BED symptoms reported a lower quality of life and increased difficulty with psychosocial functioning when compared to non-binge eaters. The same study also showed that even low frequency occurrence of binge eating was strongly associated with impairment in work and non-work related activities. Further, in both genders, increasing levels of impairment in work productivity and in non-work activities were observed across the studied groups, with lowest impairments in non-obese individuals who did not report binge eating and highest levels in obese individuals who reported binge eating. However, the researchers could not rule out that the higher levels of impairment reported by individuals with binge eating might be attributable to more general psychiatric symptoms. They recommended that future studies should replicate those findings.

Using data drawn from individuals completing a health risk assessment and the Work Productivity and Activity Impairment questionnaire, Bedrosian et al. (2012) examined associations between binge and productivity impairment, adjusting for demographics, obesity, and health risks. Their findings show that significant associations

were found between binge eating and impairment. Estimated annual productivity loss due to binge eating in a company of 1,000 employees was \$107,965, which suggested that in order to reduce work productivity impairment, binge eating needed to be targeted as a risk behavior. Based on these studies, employers may benefit from including binge eating screening and intervention in wellness activities (Bedrosian et al., 2012). Effective treatment of binge eating also may resolve comorbidities, such as depression, thus saving future costs to the company (Striegel, Bedrosian, Wang, & Schwartz, 2012).

Knowing the strong relationship between BED and obesity, it is not surprising that some suggest addressing BED as a health policy issue based solely on the costs to society that are directly linked to obesity. Bedrosian et al. (2012) report the increased monthly health care expenditures resulting directly from the treatment of obesity-related conditions derived from their analysis of secondary data. These additional costs include both direct costs (i.e., costs identified as increased health care utilization due to obesity or obesity-related conditions) and indirect costs (e.g., costs tied to lost productivity at work). The results ranged from \$392 per month for class 1 obese males to \$1,591 per month for class 3 obese males (costs for class 2 obese males and females, regardless of obesity class, were within that range) (Bedrosian et al., 2012, p. 385). Goetzel et al. (2010) calculated a combined \$644 excess direct and indirect cost per employee; aggregating the sample resulted in an annual \$2.47 million of excess costs linked to obesity (p. S56).

The literature consistently supports relationships between obesity and elevated rates of disability, reduced earnings, and shortened life expectancy; healthcare costs; and diminished quality of life (Bedrosian et al., 2012; Cawley, Rizzo, & Haas, 2007). The

authors also cite literature support for the correlation between BED and physical inactivity, substance abuse, disturbed sleep patterns, and stress. “Binge eaters constitute a particularly high-risk, high-cost subgroup within the obese population” (Bedrosian et al., 2012, p. 386). Most importantly, the authors explain that any level of binge eating (even at a mild level) is associated with greater work productivity impairment.

The Relationship between BED Classroom Productivity Impairment.

Yanover and Thompson (2008) concluded from their study that “higher levels of eating disturbances and body dissatisfaction [were] associated with higher levels of interference in academic achievement” (p. 187). Academic achievement included measures of GPA, hours enrolled in class versus actual number of hours attended, and weekly hours of homework received versus number of hours spent completing homework. Perez and Warren (2012) suggest that BED is associated with cognitive impairment. Yanover and Thompson (2008) suggested future research focus on investigating the relationship between academic performance and eating and body image disturbances.

The Relationship between BED and Regular Daily Activity Impairment.

Mond and Hay (2007) cited a 2003 report by Hay that demonstrated that binge eating (in those with BN) was more likely to predict a poor quality of life than other bulimic behaviors. Mond & Hay (2007) reported that greater levels of binge eating (separated from purging and fasting behaviors) were associated with greater levels of functional impairment. Functional impairment in this study included “work and

household responsibilities” together, so the authors could not delineate how functioning was impaired (p. 393).

The Relationship between BED and Social Activity Impairment.

The literature shows that adults with eating disorders have greater levels of social dysfunction than those without eating disorders (Lent & Swencionis, 2012; Spitzer et al., 1993). Often that dysfunction is classified as social anxiety or social phobia (Levinson & Rodebaugh, 2012). In a study conducted by Perez and Warren (2012), lifetime BED (having met the diagnostic criteria for BED at some point in life) was associated with higher reports of quality of life impairments; in fact, many of the participants in this study had not met the BED diagnostic criteria in more than a year, but still reported impairments, demonstrating potential long-term effects of an eating disorder on overall well being.

Social support is a key aspect of recovering from an eating disorder. The hope and encouragement one can receive through social support can support the improvement of self-image and self-esteem and increase life satisfaction (Akey et al., 2013). Provencher et al. (2009) report an association between eating behavior changes and social support. The difficulty in obtaining adequate support is the social dysfunction associated with eating disorders. For example, the stigmatization and prejudice of eating disorders have been reported as a hindrance to support-seeking behavior (Akey et al., 2013).

Additionally, there is evidence to support a wide-spread prevalence of discrimination within the United States based solely on body size. Obese individuals, in comparison to non-obese peers, are assumed to be: “less intelligent, less often chosen for

friends, ... stereotyped as lonely, shy, greedy for affection, and dependent upon others” (Heatherton & Baumeister, 1991, p. 89). Those with a BMI above the ideal face prejudice in “schools, the workplace, and health institutions” (Nicoli & Liberatore, Jr., 2011, p. 284).

BED and Obesity, Sleep Duration, and Physical Activity

The Relationship between BED and Obesity.

In the United States, it is estimated that nearly two-thirds of the population are overweight (Goetzel et al., 2010), with nearly 34.9% of adults being obese (Ogden, Carroll, Kit, & Flegal, 2014, p. 809). Although not all who are obese binge eat, there is consistency in the literature that binge eaters often are obese (Spitzer et al., 1993; Striegel, Bedrosian, Wang, & Schwartz, 2012). It was estimated that obesity-related healthcare costs totaled over \$75 billion in 2003 (Wang, McPherson, March, Gortmaker, & Brown, 2011). Goetzel et al. (2010) reported annual per employee costs for obesity-related medical treatment was \$2,482 in their study of 10,000 people from four regionally diverse work sites. Healthcare utilization was not associated with obesity.

The years spent in college may affect students’ long-term health (Racette et al., 2005). Gropper et al. (2014) report “...weight gain occurs in over two-thirds of college students, especially among freshmen during their first semester of college...The first year of college also has been suggested as a critical time period for the development of disordered eating” (p. 321). Davila et al. (2014) studied unhealthy weight loss practices among college students, finding that nearly 30% of overweight or obese students engaged

in at least one unhealthy weight loss practice; it is important to note that the study purposefully excluded individuals who screened positive for an eating disorder (p. 273). Webb and Hardin (2012) reported that females with higher BMIs when entering college gained more weight and had higher levels of binge eating over time than underweight or normal weight peers.

Obesity is associated with some of the most common preventable forms of death: heart disease, cancer, stroke, and Type 2 diabetes (Reslan 2010; Wang et al., 2011). Decreased participation in the workforce and disability also are positively associated with the severity of obesity (Klarenbach, Padwal, Chuck, & Jacobs, 2006; NHLBI, 2000; Striegel, Bedrosian, Wang, & Schwartz, 2012; Wang et al., 2011). Impulsive eating such as binge eating has been associated with the development of hypertension, and was a stronger predictor of hypertension than substance abuse disorders, depression, or anxiety (Stein et al., 2014). Literature suggests an existing relationship between obesity, stress, and binge eating (Kulakowski, n.d.; Perez & Warren, 2012; Sulkowski et al., 2011).

A meta-analysis of 31 long-term diet studies evaluated the effectiveness of treating obesity with dieting. Mann et al. (2007) defined dieting as “specific behavior of severely restricting one’s calorie intake in order to lose weight” (p. 221). In general, it was found that 33% - 67% of participants will gain more weight than they lost over the course of follow-up studies up to five years later. It’s also noted that weight gain continues even after the follow-up studies end. Even in controlled studies, weight gain after dieting happened at a greater rate over time than for the control group that did not diet (Mann et al., 2007). Adults with BED often report cyclical dieting and regaining of

weight (Spitzer et al., 1993). See Figure 1 for a depiction of the cycle described by Mann et al. and Spitzer et al.

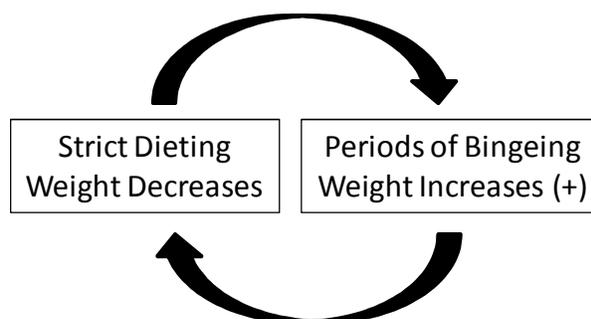


Figure 1: *Interpretative Illustration of the Chronic Dieting Cycle*

As Parham (1999) explains, the risks of obesity cannot be denied; however, it is important for the population to realize that (a) illness is not imminent for everyone with a BMI greater than normal, and (b) even with substantial weight loss, there are people who will not achieve the ideal body size/shape.

The Relationship between BED and Sleep Duration.

In the United States, it is estimated that about one-third of the general population does not get enough sleep, averaging less than six hours sleep per night; in 2006, the overall sleep length had decreased from an average of 8 - 8.9 hours per night to an average of 7 - 7.9 hour per night over the previous 20 years (Resnick, Carter, Aloia, & Phillips, 2006). The trend for rapidly decreasing average amounts of sleep per night corresponds to the exponential increase in overweight and obesity rates over the past 50 years (Trace et al., 2012, p. 695). Self-reported short sleep duration (i.e., sleeping less than six hours per night) is associated with both increased obesity and diabetes (Booth et al., 2012; Resnick et al., 2006). Chronic insufficient sleep is linked to increased physical

and mental health impairments such as abnormalities in the neuroendocrine system and development of depressive symptoms; in the scientific literature, there also are correlations between lack of sleep and increased BMI measures and obesity (Resnick et al., 2006; Trace et al., 2012).

Although associated disease risks are shared by binge eating and problems sleeping (e.g., neuroendocrine abnormalities, obesity, and mood disorders such as depression), scientific literature is sparse regarding whether there is a significant relationship between the two, and if so, how they are related (Milia, Vandelanotte, & Duncan, 2013; Trace et al., 2012).

Trace et al. (2012) reported significant associations between sleep and binge eating through research conducted via web-based questionnaires to collect data from a subset of women from the Swedish Twin Registry. Of the 4,021 study participants, “[those] who reported not getting enough sleep, sleeping poorly, problems falling asleep, feeling sleepy during work or free time, and disturbed sleep were significantly more likely to report lifetime [binge eating] after accounting for age...cohabiting status, and lifetime depression diagnosis” (i.e., had a diagnosis at some point in their lifetime) (p. 699).

In 2013, Liu et al., using data from the 2009 Behavioral Risk Factor Surveillance System, reported that functional mental distress and obesity did not predict chronic disease in respondents with chronic disease. However, their study confirmed significant relationships between chronic diseases, including obesity, and insufficient sleep. In addition to the findings by Liu et al. (2013) and Trace et al. (2012), scientific research

supports the theory that chronic sleep loss results in neuroendocrine changes, such as insulin resistance, and changes in appetite-regulating hormones, such as ghrelin and leptin (Bos et al., 2013; Milia et al., 2013; Patel & Hu, 2008; Resnick et al., 2006). Another theory suggests that fatigue, caused by sleep deprivation, leads to physical inactivity, which leads to weight gain. Although Patel and Hu (2008) found positive relationships in studies of children with obesity and physical inactivity, they were not able to report any significant relationship to sleep deprivation with obesity and physical activity in adults. Other studies have suggested that general daytime sleepiness, however, may “affect brain regions that are critical to the ability to make effective decisions, regulate emotions, and inhibit behavior” (Killgore et al., 2013, p. 222), and that those who report greater physical activity self-report higher levels of energy than those who are more physically inactive, although it is not known why this relationship exists (Resnick et al., 2006). Grandner, Jackson, Gerstner and Knutson (2013) suggest that the relationship between obesity and sleep deprivation may be as subtle as the differences in micronutrients consumed between those who report sleeping less than six hours per night and those who reported higher levels of sleep. Of note, selenium, a nutrient essential for regulating inflammation and immunity, and vitamin C, an antioxidant thought to protect against cardiovascular disease and cancer, were reportedly consumed in lesser amounts by those who reported less than six hours of sleep per night (clinical impact of the differences in dietary intake are unknown).

More recently, researchers started investigating relationships between eating disorders, especially BED, and sleep insufficiency. Kim et al. (2010) reported stronger

than expected relationships between sleep disturbances and eating disorder severity. In fact, Kim et al. (2010) suggest that sleeping disturbances can be used as clinical markers for behavioral disturbances. Similarly, Bos et al. (2013) found that a higher severity of disordered eating was positively related to problems initiating and maintaining sleep, and overall sleep disturbances. Furthermore, they found that the highest predictors of sleep difficulties were bulimic behaviors (including binge eating) and a social pressure to eat. High BMI, shorter sleep duration, and worse binge eating were related to each other in a study by Yeh and Brown (2014). These later studies support the supposition made by Kim et al. (2010) that sleep disturbances may be a clinical marker for patients who are minimizing or concealing their eating disordered behaviors. Compared to non-binge eating obese cohorts, treatment-seeking obese binge eaters were shown to have greater difficulties with sleep quality and sleep latencies (Vardar, Caliyurt, Arıkan, & Tuglu, 2004).

The Relationship between BED and Physical Activity.

Racette et al. (2005) cited CDC data that only “25% of adults in America engage in the recommended levels of physical activity, despite the overwhelming evidence that physical activity and exercise favorably affect weight control, disease prevention, and overall health at all ages” (p. 245).

In eating disorders, the encouragement of exercise can be a double-edged sword. The benefits of physical activity include prevention of diabetes and maintaining achieved weight loss (Booth et al., 2012). However, engaging in elevated rates of exercise can

exponentially increase the severity of eating disorder symptoms (Cook & Hausenblas, 2011).

Binge eaters reported more barriers to exercise, including lack of energy, than did non-binge eaters (Rosenberger & Dorflinger, 2013). In the study, binge eaters named several barriers to increasing physical activity: “lack of time, social support for physical activity, and willpower” (p. 402).

DeBoer et al. (2012) studied the remedial effect of physical exercise on anxiety sensitivity and binge eating, finding a significant relationship between the two for participants reporting low levels of moderate exercise. Anxiety sensitivity is defined as “...an individual difference variable characterized by a fear of anxiety and related sensations... [it] exacerbates preexisting anxiety, and has also been associated with depression and substance use problems” (p. 195). Although the pool of participants was too homogenous to draw generalized conclusions, their research demonstrated that inclusion of moderate physical activity with other treatment interventions (e.g., psychotherapy, medication) may strengthen treatment outcomes for binge eaters. Although Cook and Hausenblas found a “detrimental association of pathological motivation for exercise” (2011, p. 1388), they also found beneficial effects on psychological well-being when exercise was not driven by pathological motivators.

Chapter IV

Hypotheses

The review of literature shows that there are studies (e.g., Barker & Galambos, 2007; Bedrosian, et al., 2012; Bos et al., 2013; Cook & Hausenblas, 2011; Goetzl et al., 2010; Kim et al., 2010; Mond & Hay, 2007; Striegel, Bedrosian, & Wang, 2012; Striegel, Bedrosian, Wang, & Schwartz, 2012; Sulkowski et al., 2011; Trace et al., 2012; Yeh & Brown, 2014) that have examined relationships between BED and obesity, insufficient sleep, and physical inactivity; and between BED and work and classroom productivity and regular daily and social activity impairment. However, no study was found that examined specifically the relationships of BED with work and classroom productivity impairment, regular daily impairment, and social activity impairment in university students as the population.

Based on the literature review, 24 hypotheses were formulated. The first four tested the relationship between BED and the independent variables: obesity, sleep duration, physical activity and socio-demographics. (Socio-demographics were counted as one variable rather than discrete variables in articulating the hypotheses and included: gender, age group, race, university status, marital status, and employment status.) Four regression models were used to analyze the effects of the independent variables on the dependent variables: overall work productivity impairment (OWPI), overall classroom productivity impairment (OCPI), regular daily activity impairment (RDAI), and social activity impairment (SAI).

BED as Dependent Variable

Hypothesis₁: There is a relationship between BED and obesity

Hypothesis₂: There is a relationship between BED and sleep duration.

Hypothesis₃: There is a relationship between BED and physical activity.

Hypothesis₄: There is a relationship between BED and socio-demographics.

Regression Model 1: OWPI as Dependent Variable

Hypothesis₅: There is a relationship between OWPI and BED.

Hypothesis₆: There is a relationship between OWPI and obesity.

Hypothesis₇: There is a relationship between OWPI and sleep duration.

Hypothesis₈: There is a relationship between OWPI and physical activity.

Hypothesis₉: There is a relationship between OWPI and socio-demographics.

Regression Model 2: OCPI as Dependent Variable

Hypothesis₁₀: There is a relationship between OCPI and BED.

Hypothesis₁₁: There is a relationship between OCPI and obesity.

Hypothesis₁₂: There is a relationship between OCPI and sleep duration.

Hypothesis₁₃: There is a relationship between OCPI and physical activity.

Hypothesis₁₄: There is a relationship between OCPI and socio-demographics.

Regression Model 3: RDAI as Dependent Variable

Hypothesis₁₅: There is a relationship between RDAI and BED.

Hypothesis₁₆: There is a relationship between RDAI and obesity.

Hypothesis₁₇: There is a relationship between RDAI and sleep duration.

Hypothesis₁₈: There is a relationship between RDAI and physical activity.

Hypothesis₁₉: There is a relationship between RDAI and socio-demographics.

Regression Model 4: SAI as Dependent Variable

Hypothesis₂₀: There is a relationship between SAI and BED.

Hypothesis₂₁: There is a relationship between SAI and obesity.

Hypothesis₂₂: There is a relationship between SAI and sleep duration.

Hypothesis₂₃: There is a relationship between SAI and physical activity.

Hypothesis₂₄: There is a relationship between SAI and socio-demographics.

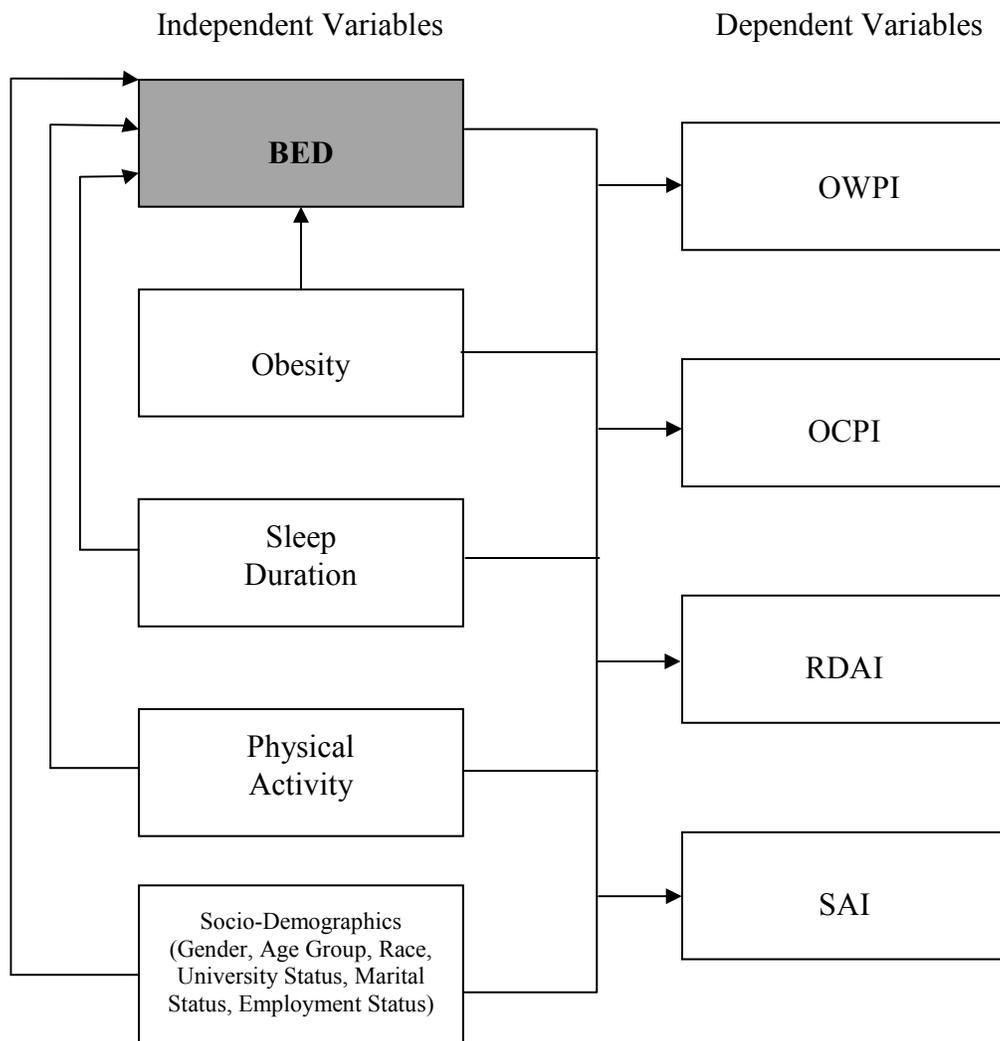


Figure 2: *Illustration of Conceptual Models*

Chapter V

Methodology

Introduction

The preceding literature review explained the rationale for the study and the hypothesized relationships between the dependent variables (OWPI, OCPI, RDAI, SAI) and independent variables (obesity, sleep duration, physical activity, and socio-demographic variables). This section describes the methods and instruments used to gather study data.

Population and Sample

Procedures and Strategies.

The Institutional Review Board (IRB) approved this research. All degree-seeking undergraduate and graduate students were invited to participate in the online survey. Email addresses were provided by the UW Oshkosh Office of Institutional Research to ensure that invitations were being sent to current degree-seeking students (i.e., eliminating non-degree seeking students such as auditors or high-school college preparatory students). Qualtrics software was used to capture survey data.

Dillman's (2007) strategies were used to increase student response rates and increase population size. Students were sent a series of emails. The first email was an announcement with a brief introduction about the study and an explanation that it was being conducted as part of a Master's thesis project. Several days later, a second email

was sent to all students inviting them to participate in the survey by clicking on the link to the internet-based Qualtrics survey. Over the next several weeks two additional emails were sent: an email reminding students of the survey, and the final reminder which also announced the survey would be closing (see Appendices B - E). In Qualtrics, the survey requested acknowledgement of informed consent before students could continue.

The informed consent explained that the survey was completely voluntary, that students could quit at any time, and that the results of the survey were anonymous (i.e., IP addresses were not saved to the Qualtrics platform and no personally identifying information was collected through the survey instrument). It also offered three options: to decline as “not interested” in completing the survey, to acknowledge that they were not eligible to participate, or to participate in the study. Students were not eligible to participate in the survey if they were under age 18, over age 64, currently pregnant, or had given birth within three months prior to completing the survey (see Appendix F).

As an incentive, a chance to win one of eight \$25 gift cards was offered to increase student participation in the study. To assure anonymity, a link to a SurveyMonkey® survey was included in the exit page at the end of the online study instrument. Students who chose to participate in the raffle had to self-disclose an email address in order to be contacted. Entries for the gift card raffle were collected and stored using the Survey Monkey® platform. A total of 1,063 students entered the drawing; using SPSS v.22, ten entries were randomly selected (eight winners and two back-ups in case of invalid entries). All eight winners responded to the email announcing they had

been selected in the drawing. They provided contact information in order for the gift cards to be mailed to them.

Sample Size and Response Rate.

The original sample, all current, degree-seeking University students, was 11,923 students. Of that sample, 584 students responded to the first invitational email. After the two reminder emails, a total of 1,317 surveys had been collected, an 11.1% response rate throughout the six-week collection period. See Table 2 for a complete breakdown of the sample response from beginning to the final sample size used in data analysis.

Table 2

Invitation Responses and Final Sample Size

Total Number of Survey Invitations	11,923
Response Counts	
Invitation Email	584
First Reminder	318
Final Reminder	415
Final Count	1,317
Case Eliminations	
Declined	13
Ineligible	7
Blank/Incomplete	132
Final Sample Size	1,165

Missing Data Analysis

The type of missing data involved in the current research was classified as not ignorable; that is to say, the missing data occurred due to reasons not accounted for in the research design: non-response by the respondents (Hair, Black, Babin, Andeson, & Tatham, 2006). According to Hair et al. (2006), the most direct means of assessing the

extent of missing data is by tabulating (a) the percentage of variables with missing data for each case, and (b) the number of cases with missing data for each variable.

Hair et al. (2006) suggest that before proceeding to the formalized methods of diagnosing randomness, the researcher should consider the simple remedy of deleting offending cases and/or variables with excessive levels of missing data and nonrandom patterns. Rules of thumb suggest that (a) missing data under 10% for an individual case or observation generally can be ignored, and (b) variables or cases with 50% or more missing data should be deleted (Hair et al., 2006, p. 55).

Twenty cases were identified as either ineligible or declined to participate. An additional 132 cases were blank or incomplete (missing 50% or more of data on both metric and non-metric variables) and therefore were deleted.

Further analysis of the number of missing data per case conducted revealed that the extent of missing data was below 10%, and the vast majority of the missing values were 1s and 2s for an individual case or observation. No observable nonrandom patterns were identified by the test of missing data patterns conducted in STATA 12.

Table 3 shows that the missing data for each variable was considerably low, i.e., below 1%, and no variable deletion was necessary.

According to Hair et al. (2006, p. 64), “any of the imputation methods can be applied when missing data are under 10%.” In this research, mean substitution was used as an appropriate imputation method (Hair et al., 2006, p. 63). After analyzing the missing data and cleaning the data as described above, there were 1,165 usable responses (a final response rate of 9.77% of the 11,923 students invited to participate).

Table 3

Percent of Cases Missing Data by Variable

Variable	Cases	Variable	Cases	Variable	Cases
Edds3	1 (0.09)	Edds16	1 (0.09)	Edds17	3 (0.26)
Edds18	2 (0.17)	Edds19	2 (0.17)	Height	2 (0.17)
Sleep	2 (0.17)	Exercise	3 (0.26)	Class	5 (0.43)
Ctotal	1 (0.09)	Caffected	2 (0.17)	Active	2 (0.17)
Social	11 (0.94)	Status	3 (0.26)	Gender	3 (0.26)
Marital	3 (0.26)	Race	4 (0.34)	Age	1 (0.09)
Employ	3 (0.26)	-	-	-	-

Instruments and Measures**Instruments.**

The survey used two previously-developed instruments with established validity and reliability: the Eating Disorder Diagnosis Scale (EDDS) and the Work Productivity and Activity Impairment Questionnaire with Classroom Impairment Questions (WPAI-CIQ).

The survey included additional questions unique to this study: (a) health risks (sleep duration and physical activity); (b) when binge eating was detected, reasons for not seeking treatment for the uncontrolled eating; (c) social activity impairment; and (d) socio-demographics.

One of the questions investigated through this research was whether there was a relationship to binge eating, specifically BED, a condition that increases risks for negative health outcomes, and other health risks: obesity, sleep duration, and physical inactivity. The EDDS gathered the data required to determine BMI and therefore determine obesity rates. Two questions were added to assess sleep duration and physical

activity. An additional question was asked to assess the impact of health conditions on social activity. When participants indicated they had binged in the past three months, they were asked why they had not sought treatment for their uncontrolled eating. Socio-demographic information collected for this study included: gender, age group, race/ethnicity, marital status, employment status, and university status (see Appendix G).

Eating Disorder Diagnostic Scale (EDDS). There are varied ways to measure the clinical severity of disordered eating. The Eating Disorder Examination Questionnaire (EDE-Q) is commonly used in clinical settings. Stice, Telch, and Rizvi (2000) set out to create a brief self-report questionnaire that could be used by researchers in situations where lengthy interviews would be prohibitive. Their tool, the Eating Disorder Diagnostic Scale (EDDS) has been shown reliable ($r = .87$) and internally consistent ($mean \alpha = .89$) (p. 127).

The instrument also has been shown to be valid: "... relevant DSM-IV diagnostic criteria were included on the EDDS and ... no irrelevant information was collected" (p. 127). Additionally, "...agreement between the eating disorder diagnosis from the EDDS and those from the structured interviews was ... 96% for binge eating disorder... [representing] good to excellent concordance" (p. 127).

In 2004, additional reliability and validity studies of the EDDS were conducted. Once again, the reliability and validity were sufficiently robust to conclude that benefits of the EDDS are such "...that it can be completed quickly and easily relative to interview measures of eating pathology" (Stice, Fisher, & Martinez, 2004, p. 69).

In anticipation of proposed changes in the diagnostic standards for eating disorders published in the 2013 DSM-5, Stice et al. (2012) evaluated diagnostic prevalence of eating disorders based on DSM-IV criteria versus proposed DSM-5 criteria. (At the time of their study, the DSM-5 changes had not been solidified.) Using reduced frequency and duration of pathological eating behaviors to determine diagnostic thresholds, their results showed that the lower diagnostic standards provided a clearer classification of eating disorder symptoms while keeping the integrity of functional distress intact. That is, although the duration and frequency of behaviors for BN and BED were decreased, more individuals now met the criteria, yet presented with similar levels of functional impairment as those with the higher levels of frequency and longer periods of symptom duration that were required in the DSM-IV.

DSM-IV versus DSM-5. The American Psychiatric Association released the *Diagnostic and Statistical Manual of Mental Disorders, 5th edition* (DSM-5) in May 2013. Among other editorial changes, Eating Disorders were reclassified and diagnostic criteria amended in an effort to diagnose eating disorders more accurately. In the DSM-IV (4th edition), eating disorders consisted of three main types: Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Eating Disorder Not Otherwise Specified (EDNOS). The third diagnosis was intended to be used as a “last resort” diagnosis when a patient did not meet the AN or BN definitions. However, during the revision process, it was clear that EDNOS was the most commonly-used diagnosis by providers (at least 50% of patients) (Le Grange et al., 2012; Stice et al., 2012).

The DSM-5 was the first edition to include BED as a stand-alone diagnosis. Literature clearly demonstrated that patients with BED have similar psychopathology and distress and psychosocial impairments as those with AN and BN (Kessler et al., 2013). Also, patients with BED differ in clinical course from those who are obese but do not binge eat, and patients with AN or BN, warranting the specific designation as a treatable condition in the DSM-5 (Wonderlich et al., 2009). The DSM-5 also included revisions to the clinical definitions of AN and BN; however, the diseases still are characterized by severe malnutrition with low BMI and bingeing-purging episodes, respectively. In addition to becoming a stand-alone diagnosis, the look-back period for the BED diagnosis was changed from six months to three months. (BED was a sub-category of the EDNOS diagnosis in the DMS-IV.) The instrument used in this study used the newly-established look back period.

Table 4 provides a side-by-side comparison of the changes in diagnostic criteria between the DSM-IV-TR and the DSM-5.

Table 4

Diagnostic Changes From DSM-IV TR to DSM-5

Eating Disorders Not Otherwise Specified (EDNOS) DSM-IV TR	Binge Eating Disorder (BED) DSM-5
<p>Indicators of impaired control include eating very rapidly, eating until feeling uncomfortably full, eating large amounts of food when not hungry, eating alone because of embarrassment over how much one is eating, and feeling disgust, guilt, or depression after overeating. The marked distress required for the diagnosis includes unpleasant feelings during and after the binge episodes, as well as concerns about the long-term effect of the recurrent binge episodes on body weight and shape.</p> <p>Binge episodes must occur, on average, at least 2 days a week for a period of at least 6 months. The duration of a binge-eating episode can vary greatly, and many individuals have difficulty separating eating into discrete episodes. However, they usually have little difficulty recalling whether or not binge eating occurred on a given day. (American Psychiatric Association, 2000, pp. 785-786).⁷</p>	<p>The binge-eating episodes are associated with three (or more) of the following:</p> <ol style="list-style-type: none"> 1. Eating much more rapidly than normal. 2. Eating until feeling uncomfortably full. 3. Eating large amounts of food when not feeling physically hungry. 4. Eating alone because of feeling embarrassed by how much one is eating. 5. Feeling disgusted with oneself, depressed, or very guilty afterward. <p>Marked distress regarding binge eating is present.</p> <p>The binge eating occurs, on average, at least once a week for 3 months. (American Psychiatric Association, 2013, p. 350).⁸</p>

In an effort to reduce potential bias and self-censorship when responding to questions, the word “binge” was replaced with “uncontrolled eating.” The DSM-5 criteria

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require that both a demonstrated a pattern of eating an unusually large amount of food *and* a feeling of loss of control must be present to be diagnosed with BED. To identify students who met those requirements, both of the corresponding survey questions had to be answered “yes.” If participants indicated they displayed both of these behaviors, they were provided additional questions about those uncontrolled eating episodes (i.e., binges):

1. How many days per week the episodes occurred over the past three-month period (measured by a scale of 0 - 7 days per week);
2. How many times per week the episodes occurred over the past three-month period (measured by a scale of 0 - 14 times per week); and,
3. Whether the episodes were accompanied by any of the feature signs of BED (measured by a “yes” or “no” response to at least three of the five questions):
 - a. Eating more rapidly than normal;
 - b. Eating until uncomfortably full;
 - c. Eating large amounts of food despite not feeling hungry;
 - d. Eating alone due to embarrassment; and
 - e. Feeling disgusted, depressed, or guilty after eating.

Measurement of BED. The variable DMS_V_BED was computed to determine the number of participants who met the BED diagnostic criteria based on self-disclosure of symptoms. Cases in which these questions were answered affirmatively were counted positively in the DSM_V_BED variable: (a) engaged in eating unusually large amounts

of food; (b) sensed a lack of control during the episode; (c) reported episodes occurring at least a once per week for the past three months; (d) endorsed at least three feature signs; and (e) distressed by the episodes.

Because a BED diagnosis cannot be made in the course of AN or BN, cases that reported a BMI of less than 18.5 or reported any symptoms of BN (purging, laxative use, fasting, excessive exercise) were considered “non-BED” in the DSM_V_BED variable.

Within the DSM_V_BED variable, cases were classified as: mild, moderate, severe, extreme, or non-BED. The severity of BED was determined by reported number of episodes with uncontrolled eating over the prior three-month period. The breakdown is delineated in Table 5.

Table 5

BED Severity

BED Severity	Binge Episodes Per Week Past 3 Months	DSM_V_BED Subcategory
Mild	1 - 3 weekly episodes	1
Moderate	4 - 7 weekly episodes	2
Severe	8 - 13 weekly episodes	3
Extreme	14 or more weekly episodes	4
Non - BED	Did not meet BED criteria	5

Because menstrual regularity was not associated with the BED diagnostic criteria, two of the EDDS questions were not included on the instrument for this study: missed menstrual periods over the past three months, and use of birth control pills over the past three months. The variables weight, reported in pounds (EDDS_19), and height, reported

in feet and inches, then converted to inches (EDDS_20) were used to calculate BMI using the following formula: $(EDDS_19/2.205)/((EDDS_20/39.37)^2)$.

Work Productivity and Activity Impairment Questionnaire plus Classroom Impairment Questions (WPAI-CIQ:SHP V2.0). The Work Productivity and Activity Impairment Questionnaire: General Health V 2.0 (WPAI:GH) (Reilly et al., 1996 a; Reilly et al., 1993) and the Work Productivity and Activity Impairment Questionnaire plus Classroom Impairment Questions: SHP Version 2 (WPAI-CIQ:SHP V 2.0) (Reilly, et al., 1996 b) are inventories designed to measure the degree of respondents' impairments related to work productivity, classroom productivity, and “regular activities” impairment. (Regular activities represent typical activities of daily life such as shopping, exercising, and maintaining a home.) The inventories were designed to measure the following types of impairments: (a) work absenteeism, i.e., time taken off from work directly attributed to a health problem (including doctor visits, trips to the pharmacy, time off in the form of vacation, holidays, sick time and compensatory time); (b) presenteeism, i.e., how much the health condition effected overall work; (c) overall work productivity impairment (combination of absenteeism and presenteeism); (d) classroom absenteeism, time missed from the classroom due to a health problem; (e) classroom presenteeism, effect a health condition has on overall classroom performance; (f) overall classroom productivity impairment (combination of class absenteeism and class presenteeism); and (g) health condition effects on regular activities (Reilly Associates, 2013; Reilly et al., 1996 a, b; Reilly et al., 1993).

The WPAI has been reviewed by researchers and determined to be the “most well-documented and frequently used instrument” in assessing the impact of health conditions on work productivity and activity impairment (Prasad, Shih, Wahlqvist, & Shikiar, 2002, pp. 535-536.). It is noted also that the WPAI is interchangeable across occupational fields and/or health conditions while being easy to administer (Prasad, et al., 2002; Loeppke et al., 2003). The look-back period for the WPAI is only seven days. Reilly Associates (2013) noted that the shorter recall period may enhance responses, although this has not been tested. The seven-day look back period was used in the studies validating the instrument (Reilly Associates, 2013). Finally, the WPAI has been validated as internal consistent and reliable in test-retest studies comparing an electronic form of the inventories to paper (the original format) (Bushnell et al., 2006). Validity of the overall classroom impairment measure is documented in the Reilly et al., 1996 article.

In the current study, participants were asked whether they currently were employed, i.e., working for pay. A positive response (“yes”) resulted in continuing questions about work; a negative response (“no”) resulted in skipping to the classroom impairment questions. The remaining questions focused on the recall period of the past seven days: (a) how many hours did you miss from work because of your health issues? (variable Q1); (b) how many hours did you miss from work because of any other reason, such as vacation, holidays, time off to participate in this study? (Q2); how many hours did you actually work? (Q3), and (d) how much did your health issues affect your productivity while you were working? (Q4).

Respondents were instructed to count hours missed using sick days, days tardy or days they left early because of their health problems; they were not to include time spent participating in the study. A forced choice response question, with a range of zero hours to 20(+) hours, rising by one hour increments, was used to capture work hours missed due to a health condition.

Participants were asked to rate how their health issue(s) affected their productivity on an 11-point scale, with “0” indicating “health issues had no effect on my work” and “10” indicating that “health issues completely prevented me from working.”

Absenteeism was calculated using the formula: $Q1/(Q1+Q3)$; presenteeism was calculated using the formula: $Q4/10$; and overall work productivity impairment due to health was calculated with the formula: $Q1/(Q1+Q3) + [(1-Q1/Q1-Q3)) \times (Q4/10)]$.

The population of respondents for this study was comprised completely of students, so all cases required data in the fields regarding classroom impairment; however, not all students had attended class during the past seven days. The classroom impairment questions mirrored the work impairment questions: (a) during the past seven days, how many hours did you miss from class or university because of your health issues? (Q5); (b) during the past seven days, how many hours did you actually attend class or university? (Q6); and (c) during the past seven days, how much did your health issues affect your productivity while you were attending classes at the university? (Q7). The responses for these questions mirrored the responses from the work impairment questions. Overall classroom productivity impairment was calculated with the formula: $Q5/(Q5+Q6) + [(1-Q5/(Q5+Q6)) \times (Q7/10)]$.

All participants were asked to rate how their health issues affected their ability to do regular daily activities (other than work at a job or attending classes) based on a scale of 0 - 10 with “0” indicating that “health issues had no effect on daily activities” and “10” indicating that “health issues completely prevented completion of daily activities.” Regular daily activity impairment was calculated using the formula: $Q8/10$, and was expressed as a percentage.

Measures.

Social Activity Impairment. Participants were asked to rate the effect of health conditions on participation in social activities over the prior seven days. Examples of social activities were provided: participating on social network sites, e.g., Facebook; participating in student extracurricular groups, teams, or committees; attending social gatherings; etc. As in the other activity impairment questions, participants were asked to rate the effects of the health condition on social activity on an 11-point scale ranging from 0 - 10; “0” indicated that health issues had no effect on social activities, and “10” indicated that health issues completely prevented participating in social activities. Social activity impairment was calculated using the formula: $Q9/10$, and was expressed as a percentage.

Sleep Duration and Physical Activity. Participants were asked to report how many hours of sleep they usually got within a 24-hour period, responding on a 15-point scale ranging from 0-14 hours per night. Students who reported six hours or less of sleep per night were coded as high risk; all others were coded as low risk (Bedrosian et al., 2012).

Additionally, they were asked to report how many minutes were spent exercising each week, on a 14-point scale ranging from zero to more than 120 minutes per week, increasing by 10 minute increments. High risk classification for physical activity (or physical inactivity) was ≤ 75 -minutes high-intensity activity per week (Bedrosian et al., 2012; ODPHP, 2008).

Reasons for Not Seeking Treatment. Participants who had experienced uncontrolled eating over the prior three months were asked to indicate why they did not seek treatment for their uncontrolled eating. Sixteen pre-defined responses were provided, with an additional free-text box for adding an “other” reason. Participants were asked to check as many answers as applied to them. The pre-defined answers were categorized as: (a) lack of awareness that it could be problematic, (b) prior treatment, (c) concerns about privacy, and (d) lack of awareness of treatment resources.

Data Analytic Techniques

The SPSS v.22 and STATA 12.0 software programs were used to calculate formulas and analyze data. The following analytical tests were performed: Pearson's Chi-Squared tests, Pearson's Correlation Analysis, and Multiple Robust Linear Regression tests. The results of these analyses are discussed in the following chapter.

Chapter VI

Results

Introduction

The previous chapter explained the methodology used in data collecting, including the statistical analysis methods used in this study. This chapter provides the results of the data collection and statistical analyses.

Descriptive Statistical Analysis

Socio-Demographic Characteristics of the Sample.

The majority of study participants ($n=1,165$) were white ($n=1,051$, 90.2%) female ($n=905$, 77.7%) traditionally aged ($n=872$, 74.9%) undergraduates ($n=988$, 84.8%). A majority of participants were employed ($n=873$, 74.9%) and never married ($n=928$, 79.7%). Table 6 provides a complete breakdown of the demographic variables.

Table 6

Participant Socio-Demographics

Variable	N = 1,165 <i>n</i> (%)
Gender	
Men	260 (22.3)
Women	905 (77.7)
Age Group	
18 - 24	872 (74.9)
25 - 34	171 (14.7)
35 - 44	74 (6.4)
45 - 54	34 (2.9)
55 - 64	14 (1.2)

Table 6 (Continued)

Participant Socio-Demographics

Variable	N = 1,165 n (%)
Ethnicity/Race	
White	1,051 (90.2)
African American	19 (1.6)
Native American	10 (0.9)
Hispanic/Latino	19 (1.6)
Asian American	41 (3.5)
Other Ethnicity	25 (2.2)
Marital Status	
Single/Never Married	928 (79.7)
Married/Partnered	203 (17.4)
Separated	4 (0.3)
Divorced	25 (2.2)
Widowed	5 (0.4)
University Status	
Graduate student	177 (15.2)
Senior	395 (33.9)
Junior	270 (23.2)
Sophomore	156 (13.4)
Freshman	167 (14.3)
Employment Status	
Employed	873 (74.9)
Not employed	292 (25.1)

BED Prevalence within the Sample.

As discussed previously, estimates of the number of people who are suffering from BED at any one time, or throughout their lifetime, vary. The rate of BED symptoms by demographic grouping is presented in Table 7. In total, 90 participants (7.8%) reported clinically significant BED symptoms per the DSM-5 diagnostic criteria. The number of female students reporting clinically significant BED symptoms (77) represents 6.7% of the overall sample and 85.6% of those who met the BED criteria ($n = 90$). Thirteen males

reported clinically significant BED symptoms (1.1% of overall sample, and 14.4% of those with BED); this results in a ratio of approximately 6:1 females to males with BED symptoms severe enough to warrant a diagnosis.

Table 7

BED by Socio-Demographic Grouping

Variable	Meet BED Criteria <i>N</i> = 90 <i>n</i> (%)	Sample <i>N</i> = 1,165 (%)
Gender		
Male	13 (14.4)	1.1
Female	77 (85.6)	6.7
University Status		
Graduate	17 (18.8)	1.5
Senior	39 (43.4)	3.3
Junior	16 (17.8)	1.4
Sophomore	6 (6.7)	0.5
Freshman	12 (13.3)	1.0
Marital Status		
Single/Never Married	67 (74.4)	5.8
Married/Partnered	21 (23.4)	1.8
Separated	0 (0.0)	0.0
Divorced	2 (2.2)	0.2
Widowed	0 (0.0)	0.0
Age Group		
18 - 24 years old	64 (71.1)	5.5
25 - 34 years old	16 (17.8)	1.4
35 - 44 years old	7 (7.8)	0.6
45 - 54 years old	2 (2.2)	0.2
55 - 64 years old	1 (1.1)	0.1

Eliminating AN and BN from the Pool. The first question of the survey (see Appendix G) is not used in the direct calculation of determining whether a respondent met the clinical requirements for a BED diagnosis; however, it is used in combination with below normal BMI to eliminate individuals who meet the diagnostic criteria for AN.

(Binge eating is a sub-type of the AN diagnosis, and the BED criteria are not met if an individual meets the AN or BN criteria) (American Psychiatric Association, 2013).

Similarly, because binge eating accompanied by compensatory measures is associated with BN, the questions regarding purging, laxative/diuretic usage, fasting, and compensatory exercise were used to eliminate participants who met the BN diagnostic criteria from the calculation of the BED sub-population.

BED Severity. Questions 2 through 11 gathered the data needed to determine clinical significance and severity of self-reported BED symptoms. Of the 90 participants endorsing symptoms consistent with the clinical criteria necessary for a BED diagnosis, the just over half of the individuals were considered mild BED, experiencing binge eating episodes 1 - 3 times per week. Only two of the participants met the criteria for extreme BED, which is experiencing binge eating 14 times or more per week. Table 8 describes the level of severity reported by those who met the BED diagnostic criteria.

Table 8

Severity of BED Diagnosis

Severity by Bingeing Episodes Per Week	N=90 (%)
Mild (1 - 3)	52 (57.8)
Moderate (4 - 7)	26 (28.9)
Severe (8 - 13)	10 (11.1)
Extreme (14 or more)	2 (2.2)

BED and Treatment Awareness.

In addition to raising awareness on the need for early intervention and proper treatment for eating disorders, advocacy organizations (e.g., the Binge Eating Disorder

Association [BEDA] and the National Eating Disorders Association [NEDA]) emphasize prevention of eating disorders to eradicate the diseases.

In the current study, 88 of the 90 participants meeting the BED diagnostic criteria elected to choose reasons for not seeking treatment from a pre-defined list; a total of 59 participants provided free-format explanations for “other” reasons for not seeking treatment. Twenty of these responses were from respondents meeting BED criteria; however, those responses have not been filtered from the complete list.

The pre-defined reasons for not-seeking treatment were categorized into five related groups. Table 9 provides the responses chosen by the 88 members of those with BED. Results worth noting include five participants indicated that they never experienced uncontrolled eating, even though they met the criteria for a BED diagnosis, 17 expressed concern about being too embarrassed to seek treatment, 31 expressed a lack of interest in seeking treatment, and only three were exposed to professional treatment before taking this survey.

Of the free-format text responses providing “other reasons” for not seeking treatment, 29 provided reasons that were categorized as “non-problematic,” i.e., the respondent did not see his/her binge eating as problematic; seven indicated a desire to manage their uncontrolled eating independently (i.e., without professional help); and 10 indicated they simply didn't have time to contend with their uncontrolled eating (or had uncontrolled eating because they didn't have time to have “normal” meals). An additional six respondents indicated prior treatment, and four respondents indicated they were

unaware that it might be a problem. One respondent simply indicated s/he was “very ashamed.” See Appendix H for the full list of responses.

Table 9

Reasons for Not Seeking Treatment as Reported by Those with BED

Reasons for Not Seeking Treatment	Yes N	N = 90 % BED	N = 1,165 % overall
BED Awareness			
Never experienced uncontrolled eating	5	5.6	0.4
Unsure if really experienced uncontrolled eating	26	28.9	2.2
Only experienced uncontrolled eating a few times	23	25.6	2.0
Don't understand eating problems in general	17	0.2	1.5
Prior Treatment			
Previously received clinical professional support and treatment	2	2.2	0.2
Successfully treated for uncontrolled eating	1	1.1	0.1
Support			
Afraid of what friends will think if seek treatment	11	12.2	0.9
Don't have support from family and/or friends	6	6.7	0.5
Privacy Concerns			
Embarrassed to seek help because others will learn of my issue	17	18.9	1.5
Afraid of lack of privacy and anonymity in seeking help	7	7.8	0.6
Treatment Resources			
Unaware of professional support and treatment on campus	19	21.1	1.6
Unaware of professional support and treatment off campus	12	13.3	1.0
Believe campus lacks on-campus professional support and treatment	4	4.4	0.3
Don't know where professional services available on campus	12	13.3	1.0
Don't want to seek treatment	31	34.4	2.7
Don't have financial resources to seek professional support and treatment	20	22.2	1.7

BED and Work Productivity and Activity Impairment and Classroom

Productivity Impairment.

The average work productivity impairment was 19.1% ($N = 873$, $SD = 33.48$).

The average classroom productivity impairment was 16.6% ($N = 1088$; $SD = 23.13$). The

average regular daily activity impairment was 14.8% ($N = 1165$, $SD = 21.71$). The average social activity impairment was 13.10% ($N = 1165$, $SD = 22.44$).

BED and Obesity, Sleep Duration, and Physical Activity.

Obesity. The about half of the participants, 629 (54.0%), reported a normal weight (BMI between 18.5 - 24.9 kg/m², BMI is Body Mass Index), 493 (42.3%) participants were calculated to be overweight or obese (BMI ≥ 25), and 43 (3.7%) participants had a BMI below normal (<18.5). (Note: a BMI below 18.5 is a significant health risk and is concerning; however, a below-normal BMI is a symptom of AN, and this study is focused strictly on BED and related health risks.) Table 10 displays the exact breakdown of responses by BMI ranges.

Table 10

Sample Distribution by Body Mass Index (BMI) Ranges

BMI Range	Participants (N=1,165)
Underweight, BMI <18.5 kg/m ²	43 (3.7)
Normal weight, BMI 18.5–24.9 kg/m ²	629 (54.0)
Overweight, BMI 25–29.9 kg/m ²	295 (25.3)
Obesity (class 1), BMI 30–34.9 kg/m ²	107 (9.2)
Obesity (class 2), BMI 35–39.9 kg/m ²	61 (5.2)
Extreme obesity (Class 3), BMI ≥ 40 kg/m ²	30 (2.6)

Sleep Duration and Physical Activity. Responses by study participants showed more than half were less physically active than 75 minutes per week (54.6%), with a mean between 60 - 70 minutes per week ($SD = 4.82$). Many participants reported sleeping at least six hours per night (68.6%), with the mean number of hours of sleep at 7 ($SD = 1.21$). A summary of results is presented in Table 11.

Table 11

Sample Distribution of Sleep Duration and Physical Activity

Health Risk Activity		N = 1,165
Sleep Duration		
<6 hours/night		366 (31.4)
≥6 hours/night		799 (68.6)
Physical Activity		
<75 min activity per week		636 (54.6)
≥75 min activity per week		529 (45.4)

Statistical Analyses: Pearson’s Chi-Square, Pearson’s Correlation, and Multiple Regression

Pearson’s Chi-Square Test.

The first hypothesis was analyzed through chi-square testing. Results (displayed in Table 2) showed that among obese individuals, prevalence of mild binge eating disorder (1 - 3 episodes per week) was significantly more common in students with BMIs within the obesity (class 2) range (13.8%) and extreme obesity range (16.7%) than non-obese students (with normal weight and overweight). Non-obese students represented approximately 8% of mild binge eating disorder.

Moderate binge eating disorder (4 - 7 episodes per week) was more likely among students with obesity (class 1) (4.7%) and students with extreme obesity (3.3%). Students with extreme obesity were more likely to report severe binge eating disorder (8 - 13 episodes per week) (3.3%) and extreme binge eating disorder (14 or more episodes per week) (3.3%) than non-obese students (1.6% and 0%, respectively).

The relationships between BED and obesity were statistically significant, but weak, as shown by Cramér's V coefficient ($\chi^2 = 55.85(20)$, $p < .001$, $V = .14$). Chi-square testing did not reveal any statistically significant relationships between BED and sleep duration, BED and physical activity, or BED and any of the socio-demographic variables. The results of the chi-square analyses are illustrated in Table 12.

Pearson's Correlations Analysis.

Pearson's correlations analysis revealed several associations between some of the independent variables and the following dependent variables: overall classroom productivity impairment, regular daily activity impairment, and social activity impairment. Although these associations were statistically significant, they were weak associations, with low Pearson's correlations coefficients ($r < .30$). Additional data evaluation was warranted, and was completed using Multiple Robust Linear Regression Analysis.

Table 12: *Associations of BED and Socio-Demographics, Other Health Risk Factors: Chi-Squared Analysis*

Independent Variables	Binge Eating Disorder Status					χ^2 (df)	<i>p</i>	<i>Cramér's V</i>
	Mild % (N)	Moderate N (%)	Severe N (%)	Extreme N (%)	Non-BED N (%)			
Employment Status								
Employed	41 (4.7)	22 (2.5)	7 (0.8)	1 (0.1)	802 (91.9)	2.57 (4)	0.63	0.05
Not employed	11 (3.8)	4 (1.4)	3 (1.0)	1 (0.3)	273 (93.5)			
Gender								
Male	7 (2.7)	6 (2.3)	0 (0)	0 (0)	247 (95.0)	6.08 (4)	0.19	0.07
Female	45 (5.0)	20 (2.2)	10 (1.1)	2 (0.22)	828 (91.5)			
Age Group								
18 - 24 years old	36 (4.1)	19 (2.2)	8 (0.9)	1 (0.1)	808 (92.7)	11.9 (16)	0.75	0.05
25 - 34 years old	11 (6.4)	4 (2.3)	0 (0.0)	1 (0.6)	155 (90.6)			
35 - 44 years old	3 (4.1)	2 (2.7)	2 (2.7)	0 (0.0)	67 (90.5)			
45 - 54 years old	2 (5.9)	0 (0.0)	0 (0.0)	0 (0.0)	32 (94.1)			
55 - 64 years old	0 (0.0)	1 (7.1)	0 (0.0)	0 (0.0)	13 (92.9)			
Race								
White	49 (4.7)	25 (2.4)	9 (0.9)	2 (0.2)	966 (91.9)	7.75 (20)	0.99	0.04
African American	1 (5.3)	1 (5.3)	0 (0.0)	0 (0.0)	17 (89.5)			
Native American	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	10 (100.0)			
Hispanic/Latino	1 (5.3)	0 (0.0)	0 (0.0)	0 (0.0)	18 (94.7)			
Asian American	0 (0.0)	0 (0.0)	1 (2.4)	0 (0.0)	40 (97.6)			
Other	1 (4.0)	0 (0.0)	0 (0.0)	0 (0.0)	24 (96.0)			
University Status								
Graduate	9 (5.1)	7 (4.0)	0 (0.0)	1 (0.5)	160 (90.4)	19.3 (16)	0.25	0.06
Senior	20 (5.1)	11 (2.8)	7 (1.8)	1 (0.3)	356 (90.1)			
Junior	10 (3.7)	3 (1.1)	3 (1.1)	0 (0.0)	254 (94.1)			
Sophomore	5 (3.2)	1 (0.6)	0 (0.0)	0 (0.0)	150 (96.2)			
Freshman	8 (4.8)	4 (2.4)	0 (0.0)	0 (0.0)	155 (92.8)			

Table 12 (Continued): *Associations of BED and Socio-Demographics, Other Health Risk Factors: Chi-Squared Analysis*

Independent Variables	Binge Eating Disorder Status					χ^2 (df)	<i>p</i>	<i>Cramér's V</i>
	Mild N (%)	Moderate N (%)	Severe N (%)	Extreme N (%)	Non-BED N (%)			
Marital Status								
Single/Never Married	41 (4.4)	18 (1.9)	7 (0.8)	1 (0.1)	861 (92.8)	9.75 (16)	0.88	0.05
Married/Partnered	11 (5.4)	6 (3.0)	3 (1.5)	1 (0.5)	182 (89.6)			
Separated	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (100)			
Divorced	0 (0.0)	2 (8.0)	0 (0.0)	0 (0.0)	23 (92.0)			
Widowed	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (100.0)			
Sleep Duration								
≥ 6 hours per night	34 (4.3)	14 (1.8)	7 (0.9)	2 (0.3)	742 (92.9)	3.89 (4)	0.42	0.06
< 6 hours per night	18 (4.9)	12 (3.3)	3 (0.8)	0 (0.0)	333 (91.0)			
Physical Activity								
≥ 75 minutes activity per week	30 (4.7)	17 (2.7)	6 (0.9)	1 (0.2)	582 (91.5)	1.65 (4)	0.80	0.04
< 75 minutes per week	22 (4.2)	9 (1.7)	4 (0.8)	1 (0.2)	493 (93.2)			
Obesity								
Underweight <18.5 kg/m ²	1 (2.3)	1 (2.3)	0 (0.0)	0 (0.0)	41 (95.4)	55.85 (20)	0.001	.14
Normal weight 18.5–24.9 kg/m ²	20 (3.2)	11 (1.8)	6 (.9)	0 (0.0)	592 (94.12)			
Overweight 25–29.9 kg/m ²	14 (4.8)	7 (2.4)	2 (0.7)	0 (0.0)	272 (92.2)			
Obesity (class 1) 30–34.9 kg/m ²	4 (3.7)	5 (4.7)	0 (0.0)	1 (0.9)	97 (90.7)			
Obesity (class 2) 35–39.9 kg/m ²	8 (13.8)	1 (1.6)	1 (1.6)	0 (0.0)	51 (83.6)			
Extreme obesity (class 3) ≥40 kg/m ²	5 (16.7)	1 (3.3)	1 (3.3)	1 (3.3)	22 (73.3)			

Note: Bold indicates statistical significance.

Multiple Robust Linear Regression Analysis.

Tests were conducted to assess for problems with multicollinearity, outliers, heteroskedasticity, normality, and linear regression model misspecification. Analysis did not reveal any major issues, except for issues with normality, as shown by the Shapiro-Wilk W test ($p < .001$). When there are concerns about normality, Acock (2014) recommends using robust regression analysis. Such analysis is useful when there are a few outliers on the outcome variable, as is the current case. Outliers are weighted less than more central observations. In this way, a few extreme observations have less effect on the regression estimates.

Four models were used for the multiple linear robust regression analyses (see Table 13). All categorical variables were recoded before doing the regressions. The reference (or comparison group) represented that category for which a dummy variable was not included in the regression, and carried a value of “0.” The results obtained from the regression were compared to the following “excluded” groups: 1) female, 2) 18 - 24 age group, 3) white, 4) senior, 5) single, 6) employed, 7) normal weight, 8) non-binge eating, 9) ≥ 6 hours sleep, and 10) < 75 min physical activity. Statistically significant relationships were revealed in each of the four models used in the regression analysis.

Overall Work Productivity Impairment (OWPI). Model 1 in Table 13 tested the effect of the independent variables on the dependent variable OWPI. It was not statistically significant ($R^2 = 0.0339$; Adjusted $R^2 = 0.0007$; $p < 0.44$).

Overall Classroom Productivity Impairment. Model 2 in Table 13 analyzed relationships of the independent variables to the dependent variable OCPI. The overall

model was significant ($R^2 = 0.0708$; Adjusted $R^2 = .0445$; $p < .001$). Females were more likely to experience productivity impairment than males ($p < .01$ and $\beta = -.09$). Middle-aged students (age groups 35 - 44 years old and 45 - 54 years old) were less likely to have classroom productivity impairment than traditionally aged students (age group 18 - 24 years old), with $p < .05$ for both groups and $\beta = -.07$ and $-.06$, respectively. Those who were not employed were more likely than those who were employed to report overall classroom productivity impairment ($p < .01$ and $\beta = .10$). Students who reported moderate binge eating and sleeping less than six hours per night had increased classroom productivity impairment ($p < .05$, $\beta = .06$; $p < .001$, $\beta = .12$, respectively), whereas engaging in physical activity ≥ 75 minutes per week was negatively associated with overall classroom productivity impairment ($p < .01$, $\beta = -.09$).

Regular Daily Activity Impairment (RDAI). Model 3 in Table 13 was the analysis of the effect of the independent variables on the dependent variable RDAI. The overall model was statistically significant ($R^2 = 0.0586$; Adjusted $R^2 = .0337$; $p < .001$). The association of females experiencing greater impairment than males was significant at $p < .001$ and $\beta = -.12$. Once again, those that were not employed were more likely than those that were employed to experience impairment in this domain ($p < .01$); however, the power of the relationship was slightly weaker with $\beta = .08$. Those reporting extreme obesity were more likely than those of normal weight to experience impairment in regular daily activities ($p < .05$, $\beta = .07$), and those with moderate binge eating were more likely than non-binge eaters to experience higher RDAI ($p < .05$, $\beta = .07$). Similarly, sleep

duration (< 6 hours per night) was positively related to RDAI ($p < .01$, $\beta = .09$). On the other hand, vigorous physical activity (≥ 75 minutes per week) was negatively related ($p < .01$, $\beta = -.09$).

Social Activity Impairment (SAI). Model 4 of Table 13, which analyzed the effects of the independent variables on the dependent variable SAI, was statistically significant ($R^2 = 0.0476$; Adjusted $R^2 = .0224$; $p < .01$). SAI was associated with the following independent variables: gender ($p < .01$, $\beta = -.09$), employment status ($p < .05$, $\beta = .07$), extreme obesity ($p < .05$, $\beta = .07$), sleep ($p < .01$, $\beta = .09$), and physical activity ($p < .05$, $\beta = -.07$).

Table 13: *Estimates of Productivity and Activity Impairment, Adjusted for Health Risk and Socio-Demographic Variables: Multiple Robust Linear Regression*

Independent Variables	Dependent Variables											
	Model 1 (OWPI) ($N^1 = 873$)			Model 2 (OCPI) ($N^2 = 1088$)			Model 3 (RDAI) ($N^3 = 1165$)			Model 4 (SAI) ($N^3 = 1165$)		
	B	SE^t	β	B	SE^t	β	B	SE^t	β	B	SE^t	β
Gender (vs. female)												
Male	-6.58	2.78	-.08	-4.91**	1.56	-.09	-6.37***	1.40	-.12	-5.01**	1.51	-.09
Age Group (vs. 18 - 24)												
25 - 34	.99	3.91	.01	-3.50	2.45	-.05	-.81	2.50	-.01	-.06	2.57	-.00
35 - 44	-.37	5.51	-.00	-6.69*	3.54	-.07	.49	3.49	.01	1.07	3.43	.01
45 - 54	.58	7.45	.00	-9.13*	3.79	-.06	-.71	4.44	-.01	-1.50	3.73	-.01
55 - 64	-3.49	11.9	-.01	-10.69	5.21	-.04	-6.63	5.09	-.03	-5.91	4.52	-.03
Race (vs. white)												
African American	3.46	7.99	.01	-3.71	5.43	-.02	-6.95	4.17	-.04	-2.43	5.31	-.01
Native American	14.8	13.5	.05	4.66	7.03	.02	3.70	6.85	.02	3.61	6.66	.01
Hispanic/Latino	4.48	9.09	.02	-4.45	4.04	-.03	-2.95	4.07	-.02	-1.81	3.65	-.01
Asian American	-12.2	3.64	-.06	.30	3.75	.00	1.24	3.36	.01	1.54	4.32	.01
Other Race	4.85	8.25	.02	3.03	5.26	.02	7.11	5.17	.05	3.73	4.37	.02
University Status (vs. senior)												
Graduate	3.43	3.67	.04	-1.83	2.35	-.03	.57	2.50	.01	-1.09	2.29	-.02
Junior	3.31	3.09	.04	1.85	1.94	.03	.76	1.72	.01	1.04	1.83	.02
Sophomore	.13	3.74	-.00	-2.78	2.28	-.04	-.27	2.15	-.00	1.79	2.32	.03
Freshman	-5.51	4.42	-.04	-3.03	2.30	-.05	-3.02	2.14	-.05	.81	2.45	.01
Marital (vs. single)												
Married/partnered	-5.94	4.07	-.07	-1.31	2.57	-.02	-2.49	2.31	-.04	-2.45	2.47	-.04
Separated	-11.86	6.98	-.04	-16.0	3.43	-.04	-9.85	5.11	-.03	-10.32	5.40	-.03
Divorced	-8.13	7.12	-.04	-2.37	3.75	-.01	-2.41	5.41	-.02	-4.80	4.25	-.03
Widowed	-16.22	9.81	-.03	8.16	9.00	.02	16.8	16.53	.05	12.19	13.90	.04
Not employed (vs. employed)				5.06**	1.80	.10	4.17**	1.71	.08	3.48*	1.88	.07

Table 13 (Continued): *Estimates of Productivity and Activity Impairment, Adjusted for Health Risk and Socio-Demographic Variables: Multiple Robust Linear Regression*

Independent Variables	Dependent Variables											
	Model 1 (OWPI) ($N^1 = 873$)			Model 2 (OCPI) ($N^2 = 1088$)			Model 3 (RDAI) ($N^3 = 1165$)			Model 4 (SAI) ($N^3 = 1165$)		
	<i>B</i>	<i>SE[†]</i>	β	<i>B</i>	<i>SE[†]</i>	β	<i>B</i>	<i>SE[†]</i>	β	<i>B</i>	<i>SE[†]</i>	β
Obesity (vs. normal)												
Underweight (≤ 18.5)	-9.49	4.51	-.06	.97	3.88	.01	-3.23	2.94	-.03	-2.36	3.38	-.02
Overweight (18.5-24.9)	1.44	2.87	.02	1.20	1.68	.02	2.84	1.58	.06	2.82	1.62	.05
Obesity 1 (25-29.9)	-.65	4.10	-.01	1.85	2.88	.02	2.37	2.67	.03	3.09	2.76	.04
Obesity 2 (30-34.9)	1.93	5.87	.01	-3.37	2.70	-.03	4.11	3.01	.04	4.39	3.02	.04
Extreme obesity 3 ≥ 40	12.5	3.95	.06	1.10	4.11	.01	7.75*	4.53	.06	9.15*	4.67	.07
Binge eating (vs. non-binge eating)												
Mild (1-3 ep/w)	-4.70	5.27	-.03	1.09	3.06	.01	.50	3.06	.01	-3.45	2.45	-.03
Moderate (4-7 ep/w)	1.13	6.70	.01	8.88*	4.48	.06	9.64*	3.79	.07	2.37	3.39	.02
Severe (8-13 ep/w)	2.04	13.28	.01	-3.36	7.83	-.01	-.37	6.83	-.00	7.99	8.94	.03
Extreme (≥ 14 ep/w)	-7.57	4.85	-.01	-20.7	3.68	-.03	-18.9	3.15	-.04	18.45	4.50	.03
Sleep (vs. >6 h/day)	1.39	2.46	.02	6.13***	1.68	.12	3.68**	1.47	.08	4.54**	1.52	.09
Physical activity (vs. <75 min/week)	-2.17	2.36	-.03	-4.26**	1.43	-.09	-3.89**	1.29	-.09	-3.07*	1.36	-.07
Complete Model R^2		0.0339			0.0708			0.0586			0.0476	
Adjusted R^2		0.0007			0.0445			0.0337			0.0224	
F		$F_{28,843} = 1.02$			$F_{30,1057} = 2.69$			$F_{30,1134} = 7.98$			$F_{30,1134} = 1.86$	
$Prob > F$		$P < 0.4374$			$P < 0.0000***$			$P < 0.0000***$			$P < 0.0033**$	

¹ N is based on the number of students who currently are employed; ² N is based on the number of students who actually have attended classes during the past 7 days; ³ N is based on the entire sample of students; ⁴Robust Standard Error. Abbreviations: OWPI= overall work productivity impairment; RDAI= regular daily activity impairment; SAI = social activity impairment; ep/w = eating episodes per week; h/day= hours per day; min/week=minutes per week; statistical significant findings in bold; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 14: *Summary of Hypotheses Testing*

#	Hypothesis	Test	Result
1	There is a relationship between BED and obesity.	Chi-squared	Supported
2	There is a relationship between BED and sleep duration.	Chi-squared	Not supported
3	There is a relationship between BED and physical activity.	Chi-squared	Not supported
4	There is a relationship between BED and socio-demographics.	Chi-squared	Not supported
5	There is a relationship between work productivity impairment and BED.	M. Regression	Not supported
6	There is a relationship between work productivity impairment and obesity.	M. Regression	Not supported
7	There is a relationship between work productivity impairment and sleep duration.	M. Regression	Not supported
8	There is a relationship between work productivity impairment and physical activity.	M. Regression	Not supported
9	There is a relationship between work productivity impairment and socio-demographics.	M. Regression	Not supported
10	There is a relationship between classroom productivity impairment and BED.	M. Regression	Supported
11	There is a relationship between classroom productivity impairment and obesity.	M. Regression	Not supported
12	There is a relationship between classroom productivity impairment and sleep duration.	M. Regression	Supported
13	There is a relationship between classroom productivity impairment and physical activity.	M. Regression	Supported
14	There is a relationship between classroom productivity impairment and socio-demographics.	M. Regression	Partially Supported
15	There is a relationship between regular daily activity impairment and BED.	M. Regression	Supported
16	There is a relationship between regular daily activity impairment and obesity.	M. Regression	Supported
17	There is a relationship between regular daily activity impairment and sleep duration.	M. Regression	Supported
18	There is a relationship between regular daily activity impairment and physical activity.	M. Regression	Supported
19	There is a relationship between regular daily activity impairment and socio-demographics.	M. Regression	Partially Supported
20	There is a relationship between social activity impairment and BED.	M. Regression	Not supported
21	There is a relationship between social activity impairment and obesity.	M. Regression	Supported
22	There is a relationship between social activity impairment and sleep duration.	M. Regression	Supported
23	There is a relationship between social activity impairment and physical activity.	M. Regression	Supported
24	There is a relationship between social activity impairment and socio-demographics.	M. Regression	Partially Supported

Chapter VII

Discussion

Introduction

The previous chapter explained the results of the data collection and statistical analyses. This chapter includes an interpretation of the findings, limitations of the study, implications of the study, and conclusion.

Prevalence of BED on University Campus

The first research question addressed by this study was to determine how common binge eating was among University students. Bedrosian et al. (2012) report a greater level of self-revealing secretive behaviors, such as binge eating, when completing computer-aided instruments, such as in this study. In total, 578 participants (roughly 50% of the population) reported having had episodes of eating an unusually large amount of food; 220 participants (just under 20%) reported having feelings of losing control while eating an unusually large amount of food; and 90 participants (7.7%) reported clinically significant BED symptoms per the DSM-5 diagnostic criteria.

The number of participants with clinical severity binge eating is well within the range of 2% - 13% reported by DeBoer et al. (2012) and Napolitano and Himes (2011). The number of female students reporting clinically significant BED symptoms (77) represents 6.6% of the overall sample (very similar to the rate reported by Napolitano and Himes (2011)), and 85.6% of those meeting the BED criteria. Thirteen males reported

clinically significant BED symptoms (1.1% of the overall sample, and 14.4% of those with BED); this results in a ratio of approximately 6:1 females to males with BED symptoms severe enough to warrant a diagnosis. The rate of men reporting symptoms severe enough to warrant a clinical BED diagnosis was much lower in this study than previously reported by Nicoli & Liberatore, Jr. (2011).

The second research question addressed University students' awareness of BED: its symptoms and treatment resources. A lack of understanding of BED is one of the reasons for non-help-seeking behavior in that five participants with clinically significant symptoms indicated that they never experienced uncontrolled eating, and four more responded they were not aware that they could seek help for their binge eating (free-text responses to "other"). As with other studies (e.g., Eisenberg et al., 2011), participants were unsure of available resources, indicated a desire to work on their issues independently, and indicated a lack of time. Although not specifically asked in the survey, free-format text responses indicate that cultural influences affect whether the student perceives a problem and whether help is needed to address when the student is willing to acknowledge that a problem exists. Insightful responses included: "not an issue, I'm just fat; very ashamed; don't think I need extreme help; need to find my own motivation; and I believe I am capable of controlling my own eating without seeking help, but I just haven't brought my eating under control."

BED Relationship with Obesity, Sleep Duration, Physical Activity, and Socio-Demographics

The final research question was addressed by 24 hypotheses. First, Table 12 shows there was only one supported association between BED and obesity. The chi-squared tests revealed there were no other statistically significant relationships between BED and sleep duration, physical activity, or socio-demographic variables.

Finding that there was a significant relationship between BED and obesity, and specifically that severe BED or extreme BED was more likely to be reported in those with extreme obesity, is consistent with the literature (Bedrosian et al., 2012).

That BED was not significantly related to short sleep duration is somewhat surprising, as sleep duration is a known risk factor for obesity and may be a biologically driven reason for binge eating. That BED was not significantly related to physical activity also is surprising, as the literature indicates BED often is accompanied with greater functional impairment. The small sample size could explain the lack of significance (e.g., only two participants met the clinical criteria for extreme BED, which is only 0.17% of the total sample). Additional information about whether binge eating alone (the behavior only, without meeting all diagnostic measures) was statistically significant with physical activity; and exploring the reasons for either not engaging in exercise, or engaging in limited amounts/lesser exertion physical activity might have given more insight into the issue and results more consistent with existing literature.

Work Productivity Impairment Relationship with BED, Obesity, Sleep Duration, Physical Activity, and Socio-Demographics

Those hypotheses were not supported by the statistical analysis, as the entire model was not statistically significant.

Classroom Productivity Impairment Relationship with BED, Obesity, Sleep Duration, Physical Activity, and Socio-Demographics

Table 14 shows that of the five hypotheses that tested the relationship between OCPI and the independent variables, only one hypothesis was not supported, namely the association with obesity. Also, the hypothesis with socio-demographics was only partially supported. Females were more likely than males to have classroom productivity impairment. Middle-aged students (age groups 35 - 44 years and 45 - 54 years) were less likely than traditionally aged students to have classroom productivity impairment. This was not investigated in the literature review; it is possible other factors, e.g., motivation to obtain further education to pursue career advancement, may explain why middle-aged students are less likely to experience overall classroom activity. Consistent with the literature (e.g., Dundes & Marx, 2006-2007), unemployed students were more likely than employed students to report overall classroom productivity impairment. Moderate binge eating, sleeping less than six hours per night, and engaging in physical activity also were significantly correlated to overall classroom productivity impairment.

The effects of binge eating and short sleep duration on general functioning, as addressed in the literature, offer plausible reasons for impairment in overall classroom

productivity impairment. That intense physical activity is associated with better psychological outcomes, including the ability to tolerate anxiety, may explain the significant relationship between physical activity and overall classroom productivity, with those engaging in at least 75 minutes per week of vigorous exercise having less impairment.

Regular Daily Activity Impairment Relationship with BED, Obesity, Sleep Duration, Physical Activity, and Socio-Demographics

This model was the only model to have statistically significant findings to support or partially support all five variables. Regular daily activity impairment was related to moderate binge eating, extreme obesity, sleep duration, and physical activity. The only socio-demographic factors related to RDAI were gender and employment. Females once again were more likely to experience impairment in this domain; in fact, with $\beta = 0.12$, gender was the strongest predictor of regular daily activity impairment. Unemployed students also had greater impairment in regular daily activity. It is not clear what unaccounted-for factors (e.g., depression, anxiety, physical illnesses) may influence these relationships.

Social Activity Impairment Relationship with BED, Obesity, Sleep Duration, Physical Activity, and Socio-Demographics

Social activity impairment was found to be associated with gender, employment status, extreme obesity, sleep, and physical activity. Some of these findings align with the

literature: females were known to have higher levels of functional impairment (e.g., Cawley et al., 2007), and extreme obesity was associated with social impairment and even overt discrimination (Carels et al., 2010). Relationships between social activity impairment and employment status, sleep duration, and physical activity were not included in the scope of this study. Therefore, the literature does not provide adequate insight into why these relationships were significant.

Study Limitations

This study was a correlational study only, hence causal relationships are difficult to establish. Despite multiple requests for participation and a raffle-style incentive to increase participation, the usable response rate was low (less than 10%), and not representative of the University's student body. This study was conducted at a medium-sized Midwest university. The sample was mostly white, female students; therefore, the results may be different in other regions of the U.S. and different-sized campuses. BED is believed to be fairly distributed among gender, race, and socio-economic status in the general population; a lack of statistical significance between BED and the socio-demographic variables may be related to sample size and characteristics.

The data from this study were based on self-report and self-selection; and therefore, is subject to bias and recall error, and over or under reporting of symptoms. For example, one participant may consider eating an entire pint of ice cream a binge based on what that person considers “normal,” and another person might consider that “normal” behavior. Due to study limitations, it is not clear whether mood disorders, obesity status,

BED, or another illness is responsible for the increased rates of impairment; further studies isolating these factors may be warranted.

Although there were statistically significant findings, the regression models had low *R*-square values. Because the associations in the individual models were weak, the results might not be replicable in other studies.

Productivity and activity impairment should be interpreted as relative impairment, not the actual number of hours worked that were impaired.

Direct comparisons of binge eating and obesity prevalence estimates with those observed in other epidemiological studies may not be possible due to differences in sampling, population, and criteria used to measure binge eating disorder.

Implications

The university setting can play a key role in helping students understand why body weights and shapes are so diverse. It is imperative for society to understand and accept that healthy bodies are not relegated to certain sizes and shapes. Universities may choose to increase student awareness of BED and the harmful effects of chronic dieting.

This study provides a snapshot of BED symptoms signifying untreated illness on the university campus. Replicating this study to explore whether similar results can be duplicated is advisable in order to determine a clearer picture of the true severity of BED, as well as other eating disorders, on campus. In addition to the factors studied in the current research, future research also should include additional high health risk variables, such as depression, stress, alcohol, and tobacco use (Ferriter & Ray, 2011; Kelly-Weeder,

2011; Lenz, 2004; Saules et al., 2009). Future research could include a multi-method approach for gathering data; e.g., asking participants who test positive for BED to voluntarily participate in a structured interview could provide greater insight into current University eating disorder programs and policies for screening students for BED. Also, future researchers should consider how to design the study to be more representative of the population (e.g., increasing participation by males).

For the University of Wisconsin Oshkosh specifically, administrators may want to evaluate existing eating disorder awareness programs to assure that the programs address body and size acceptance and focus on negative outcomes of chronic dieting, challenging assumptions that dieting is a societal normative behavior.

The University also could evaluate how eating disorder awareness and screening is conducted on campus. Although the Counseling Center is an obvious target, only a percentage of students is served by the Center each academic year. The University can utilize Resident Life, athletics, faculty, and student organizations collaboratively to raise awareness of the dangers of disordered eating, raise awareness of treatment resources, and teach students how to be supportive of those who have eating disorders. Simple measures, such as screening for disordered eating patterns at student health clinics and wellness centers, or during special promotions, such as National Eating Disorder Awareness Week, may raise student awareness of disordered eating and appropriate treatment resources. Teaching faculty, staff, and students how to recognize disordered eating symptoms in others, and how to address concerns supportively may alleviate shame and embarrassment that might keep someone from seeking help.

Before implementing any such strategies, it is important for the university to assess readiness for providing services, such as treatment referrals and/or direct treatment. It is important that any interventions be fully planned out for full effectiveness. A concern is that if symptoms and negative outcomes are compounded the longer treatment is delayed, costs compile and are shifted to employers as health-related costs due to sick time and lack of productivity at work.

Finally, the university may choose to evaluate the extent that current student wellness programs have on students' overall classroom productivity, and regular daily and social activity impairment; and whether treating binge eating in the context of an integrated student wellness program would improve the efficacy of intervention.

Conclusion

Eating disorders are a national public health concern. Binge Eating Disorder is experienced by university students and does have a relationship to decreased classroom productivity and regular and social activities impairments. Future research of the relationships between eating disorders and classroom productivity and activity impairment need to be conducted to determine consistency of results at different university settings. Future longitudinal research on the impacts of BED treatment and work/classroom productivity and activity impairment after graduation might provide administrators with insight into the benefits to alumni participation and support resulting from the early prevention and treatment of eating disorders at universities.

APPENDIX A

Variables Used to Calculate BED Diagnosis

Variable	BED DMS-5 Diagnostic Criterion	Calculation Formula
DSM_V_BED	Calculated value that includes cases with positive Edds5 and Edds6; positive values in Feature and Edds14; and null value in Compen	DMS_V_BED categorized by severity = (1) Mild: binge episodes occur 1-3 times per week (2) Moderate: binge episodes occur 4-7 times per week; (3) Severe: binge episodes occur 8-13 times per week; (4) Extreme: 14 or more binge episodes per week
Edds5	Eating in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than what most people would eat in a similar period of time under similar circumstances.	Yes/no question; Yes = 1, No = 2
Edds6	A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).	Yes/no question; Yes = 1, No = 2
Feature	Calculated variable that includes cases with positive values in 3 of the 5 variables Edds9-Edds13	
Edds9	Eating much more rapidly than normal.	Yes/no question; Yes = 1, No = 2
Edds10	Eating until feeling uncomfortably full.	Yes/no question; Yes = 1, No = 2
Edds11	Eating large amounts of food when not feeling physically hungry.	Yes/no question; Yes = 1, No = 2
Edds12	Eating alone because of feeling embarrassed by how much one is eating.	Yes/no question; Yes = 1, No = 2
Edds13	Feeling disgusted with oneself, depressed, or very guilty afterward.	Yes/no question; Yes = 1, No = 2
Edds14	Marked distress regarding binge eating is present.	Yes/no question; Yes = 1, No = 2
Compen	Calculated variable that filters out cases that meet binge eating criteria, but also have positive values in variables assessing compensatory behaviors associated with BN	compen = 0

APPENDIX B

Pre-Notice Email

Dear Fellow Students,

My name is Cheri Stoffel, and I am a graduate student in the Master of Public Administration Program at the University of Wisconsin Oshkosh (UWO). I am conducting a master's thesis research as part of my degree program. It focuses on assessing eating habits among university students. The study will also determine if eating patterns are associated with the ability to work, attend school, and perform regular and social activities. Scientists know very little about the range of student eating habits. This research is important in identifying areas for developing effective strategies to promote student health, education, and fitness on campus and beyond.

A few days from now you will receive an email request to complete an anonymous survey online. As a token of appreciation for your participation, you can enter a drawing to win one of eight \$25 gift cards to University Books and More. You can also request a final summary of the survey results. The study has been approved by the Institutional Review Board at UWO.

If you have any questions about this research, please email me at stoffc72@uwosh.edu. You can also contact my faculty supervisor, Dr. Anna Filipova, at filipova@uwosh.edu, or 920-424-0037.

Thank you for your time and consideration to participate in this research!

APPENDIX C

E-mail Invitation to Participate in Survey

Dear Fellow Students,

You are cordially invited to participate in a research study that investigates eating habits among university students. The study will also determine if eating habits are associated with the ability to work, attend school and perform regular and social activities. Scientists know very little about the range of student eating habits. This research is important in identifying areas for developing effective strategies to promote student health, education, and fitness on campus and beyond.

I need your help to make this study successful!

You can read the full informed consent and access the survey by clicking here:

[Survey Link].

It should take no more than 15 - 20 minutes to complete the survey online. This research has been approved by the UWO Institutional Review Board. All replies are anonymous and confidential. As a token of appreciation for your participation, you will be able to enter a separate online site at the end of the survey to submit your email address to enter a raffle for one of eight \$25 gift cards to University Books and More. All winners will receive the cards once the survey is closed.

If you have any questions about this research, please email me at stoffc72@uwosh.edu. You can also contact my faculty supervisor, Dr. Anna Filipova, at filipova@uwosh.edu, or 920-424-0037.

Thank you for your time and consideration to participate in this research!

APPENDIX D

First Reminder E-mail

Dear Fellow Students,

Last week I invited you to participate in an online survey study. It assesses eating habits among university students, and also determines if they are associated with the ability to work, attend school and perform regular and social activities. I hope you chose to accept my invitation to participate in the anonymous, online survey.

If you have already completed the survey, please accept my sincere gratitude! If you have not yet completed the survey, please take a few moments to read the full informed consent and access the survey at: [Survey Link]. It would be very much appreciated!

I will be happy to answer any questions you have about the study. You may contact me at stoffc72@uwosh.edu, or contact my faculty supervisor, Dr. Anna Filipova, at filipova@uwosh.edu, or 920-424-0037.

APPENDIX E

Final Reminder E-mail

Dear Fellow Students,

My research investigating eating habits among university students is drawing to a close, and this is the last email that I am sending to you.

If you have already completed the survey, please accept my sincere gratitude! If you have not yet completed the survey, please take a few moments to read the full informed consent and access the survey at: [Survey Link]. It would be very much appreciated!

Once the survey is closed, I will send separate email messages to the 8 randomly selected students who agreed to participate in the study, and submitted their email addresses to enter a raffle for one of eight \$25 gift cards to University Books and More. The gift cards will be sent by the following week to the address designated by the winner.

If you have questions or would like to receive a summary of the results upon the completion of the project you may contact me at stoffc72@uwosh.edu. You may also contact my faculty supervisor, Dr. Anna Filipova, at filipova@uwosh.edu, or 920-424-0037.

APPENDIX F

Informed Consent

My name is Cheri Stoffel, and I am a graduate student in the Master of Public Administration Program at the University of Wisconsin Oshkosh (UWO). I am conducting a master's thesis research as part of my degree program. It focuses on assessing eating habits among university students. The study will also determine if eating habits are associated with the ability to work, attend school and perform regular and social activities. Scientists know very little about the range of student eating habits. This research is important in identifying areas for developing effective strategies to promote student health, education, and fitness on campus and beyond.

I need your help to make this study successful!

As an undergraduate/graduate student at UWO, you are eligible to participate if you are 18 to 64 years old, not currently pregnant, and not having given birth in the last three months. The survey should take approximately 15-20 minutes to complete, and the information you provide will be kept strictly confidential! Please be frank; the survey is completely anonymous, and all results will be reported in the aggregate only!

Your participation in the study is entirely voluntary. There are no obvious physical or psychological risks associated with completing the survey. However, some questions about eating patterns may make you feel uncomfortable or may cause stress/distress in you. If this happens you may refuse to answer any questions and you are free to withdraw from participation at any time. If you felt uneasy you might also want to contact UWO Counseling Center, at 920-424-2061.

As a token of appreciation for your participation, you will be able to enter a separate online site at the end of the survey to submit your email address to enter a raffle

for one of eight \$25 gift cards to University Books and More. Please be assured that there is no way for the researcher to connect your contact information to your answers on the survey. I will send separate email messages to the 8 winners once the survey is closed. The gift cards will be sent by the following week to the address designated by the winner.

If you have questions or would like to receive a summary of the results upon the completion of the project you may contact me at stoffc72@uwosh.edu. You may also contact my faculty supervisor, Dr. Anna Filipova, at filipova@uwosh.edu, or 920-424-0037.

The UWO Institutional Review Board (IRB) for Protection of Human Participants has approved this consent document for use for one year only. Please contact the IRB Chair, Dr. Anca Miron, at mirona@uwosh.edu, or 920-424-2328, for any questions about your rights as a research subject, to discuss issues, concerns, or suggestions related to the research, or to obtain information or offer input about the research.

By clicking the YES button below, you are certifying that you have read the informed consent and understand and agree to all of the stated terms, and that you would like to be a volunteer participant in this study. Thank you!

- Yes, I am eligible to participate in the study and accept the terms of the invitation.
- No, I decline to participate.
- No, I am not eligible to participate (under age 18; older than 64; currently pregnant; have given birth in the last three months)

APPENDIX G

Survey Instrument

These questions assess eating habits among university students. *Please fill in the blanks or choose a number, as indicated.*

1. Please indicate to what extent you have experienced the following over the **past 3 months...**

Question	Not at all	Low	Slightly	Neutral	Moderately	Very	Extremely
a. Have you felt fat?	1	2	3	4	5	6	7
b. Have you had a definite fear that you might gain weight or become fat?	1	2	3	4	5	6	7
c. Has your weight influenced how you think about (judge) yourself as a person?	1	2	3	4	5	6	7
d. Has your shape influenced how you think about (judge) yourself as a person?	1	2	3	4	5	6	7

2. During the **past 3 months** have there been times when you felt you have eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances?

 YES

 NO

If NO, skip to question 12.

3. During the times when you ate an unusually large amount of food, did you experience a loss of control (feel you couldn't stop eating or control what or how much you were eating)?

 YES

 NO

If NO, skip to question 12.

4. How many **DAYS per week** on average over the **past 3 months** have you eaten an unusually large amount of food and experienced a loss of control?

5.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

6. How many **TIMES per week** on average over the **past 3 months** have you eaten an unusually large amount of food and experienced a loss of control?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

During these episodes of overeating and loss of control did you...

7. Eat much more rapidly than normal?
 YES
 NO
7. Eat until you felt uncomfortably full?
 YES
 NO
8. Eat large amounts of food when you didn't feel physically hungry?
 YES
 NO
9. Eat alone because you were embarrassed by how much you were eating?
 YES
 NO
10. Feel disgusted with yourself, depressed, or very guilty after overeating?
 YES
 NO
11. Feel very upset about your uncontrolled eating or resulting weight gain?
 YES
 NO
12. How many **times per week** on average over the **past 3 months** have you made yourself vomit to prevent weight gain or counteract the effects of eating?
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
13. How many **times per week** on average over the **past 3 months** have you used laxatives or diuretics to prevent weight gain or counteract the effects of eating?
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
14. How many **times per week** on average over the **past 3 months** have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating?
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

15. How many **times per week** on average over the **past 3 months** have you engaged in excessive exercise specifically to counteract the effects of overeating episodes?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

16. How much do you weigh? If uncertain, please give your best estimate: _____LB

17. How tall are you? _____FT _____IN

18. How many **hours of sleep** do you usually get in a **24-hour period**?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

19. How many **minutes** do you exercise **each week**?

0 10 20 30 40 50 60 70 80 90 100 110 120 More than 120

20. If you experienced uncontrolled eating over the **past 3 months**, but did not seek any help, what were some of the reasons? Please check all that apply or list your own reasons.

- a. I have never experienced uncontrolled eating.
- b. I'm not sure if I really had uncontrolled eating.
- c. I've experienced uncontrolled eating only a few times.
- d. I don't want to seek treatment.
- e. I've previously received clinical/professional treatment.
- f. I'm not aware of professional support and treatment on campus.
- g. I'm not aware of professional support and treatment off campus.
- h. I believe the campus lacks on-campus professional support and treatment.
- i. I'm embarrassed to seek help because others will learn about my issue.
- j. I don't know where professional services are located on campus.
- k. I'm afraid what my friends will think if I seek treatment.
- l. I don't have support from family and/or friends to seek help.
- m. I don't understand eating problems in general.
- n. I don't have financial resources to seek professional support and treatment.
- o. I'm afraid of a lack of privacy and anonymity in seeking help.
- p. I was successfully treated for uncontrolled eating.
- q. Other (please specify):

The following questions ask about the extent to which health issues, in general, affect your ability to work, attend school and perform regular activities. By health issues we mean any physical or emotional issues. *Please fill in the blanks or circle a number, as indicated.*

21. Are you currently employed (working for pay)?

_____ YES

_____ NO

If NO, skip to question 26.

The next questions are about the **past 7 days**, not including today.

22. During the **past 7 days**, how many **hours** did you miss from work because of your health issues? *Include hours you missed on sick days, times you went in late, left early, etc., because of your health problems. Do not include time you missed to participate in this study.*

_____ HOURS

23. During the **past 7 days**, how many **hours** did you miss from work because of any other reason, such as vacation, holidays, time off to participate in this study?

_____ HOURS

24. During the **past 7 days**, how many hours did you actually work?

_____ HOURS

25. During the **past 7 days**, how much did your health issues affect your productivity while you were working?

Think about days you were limited in the amount or kind of work you could do, days you accomplished less than you would like, or days you could not do your work as carefully as usual. If health issues affected your work only a little, choose a low number. Choose a high number if health issues affected your work a great deal.

Consider only how much health issues affected
productivity while you were working.

Health issues had no effect on my work	0 1 2 3 4 5 6 7 8 9 10	Health issues completely prevented me from working
--	--	---

26. During the **past 7 days**, how many **hours** did you miss from class or university because of your health issues? *Do not include time you missed to participate in this study.*

_____ HOURS

27. During the **past 7 days**, how many **hours** did you actually attend class or university?

_____ HOURS

If "0", skip to question 29.

28. During the **past 7 days**, how much did your health issues affect your productivity while you were attending classes at the university?

Think about days your attention span was limited, you had trouble with comprehension or days in which you could not take tests as effectively as usual. If health issues affected your productivity in class only a little, choose a low number. Choose a high number if health issues affected your productivity in class a great deal.

Consider only how much health issues affected productivity while you were attending classes.

Health issues
had no effect on
my class work

0 1 2 3 4 5 6 7 8 9 10

Health issues
completely
prevented me from
doing my
class work

29. During the **past 7 days**, how much did your health issues affect your ability to do your regular daily activities, other than work at a job or attending classes?

By regular activities, we mean the usual activities you do, such as work around the house, shopping, childcare, exercising, studying, etc. Think about times you were limited in the amount or kind of activities you could do and times you accomplished less than you would like. If health issues affected your activities only a little, choose a low number. Choose a high number if health issues affected your activities a great deal.

Consider only how much health issues affected your ability to do your regular daily activities, other than work at a job.

Health issues had												Health issues
no effect on my	0	1	2	3	4	5	6	7	8	9	10	completely
daily activities												prevented me
												from doing my
												daily activities

30. During the **past 7 days**, how much did your health issues affect your ability to participate in social activities, other than work at a job, attending classes, or regular activities?

By social activities, we mean the leisure activities you participate in with other people (e.g., participating on social network sites like Facebook, participating in student extracurricular groups/teams/committees, attending social gatherings, etc.). Think about times you were limited in the amount or kind of social activities you could do and times you accomplished less than you would like. If health issues affected your social activities only a little, choose a low number. Choose a high number if health issues affected your social activities a great deal.

Consider only how much health issues affected your ability to participate in social activities, other than work at a job, attending classes, or regular activities.

Health issues had												Health issues
no effect on my	0	1	2	3	4	5	6	7	8	9	10	completely
daily activities												prevented me
												from doing my
												daily activities

Please select the response that most closely reflects your answer.

31. Please select your student status:
 1. Graduate Student
 2. Senior
 3. Junior
 4. Sophomore
 5. Freshman

32. What is your gender?
 1. Male
 2. Female

33. What is your marital status?
 1. Single/Never Married
 2. Married/Partnered
 3. Separated
 4. Divorced
 5. Widowed

34. Please specify your race:
 1. White
 2. African American
 3. Native American
 4. Hispanic/Latino
 5. Asian American
 6. Other

35. What is your age?
 1. 18 - 24 years old
 2. 25 - 34 years old
 3. 35 - 44 years old
 4. 45 - 54 years old
 5. 55 - 64 years old

36. If you are employed, please describe your work.
 1. For-profit organization
 2. Not-for-profit organization
 3. Government (local, state, federal)
 4. Public organization (university, police, hospital, etc.)
 5. Self-employed
 6. Not employed

APPENDIX H

Other Reasons for Not Seeking Care

Category	Reason Provided for Not Seeking Treatment *
Can Handle Independently	<ol style="list-style-type: none"> 1. Would rather handle on own without interference from others, would rather work without others contradicting or impeding my plans, just don't trust many people to help with actual needs rather than try to have you do what they want. 2. I'd rather deal with it myself or with friends/family 3. I feel it's a problem of self control and feel I can do conquer it 4. I need to find my own motivation to lose weight before doing anything else. 5. I want to control my eating habits myself 6. I can lose weight by myself 7. I believe that I am capable of controlling my own eating without seeking help, but I just haven't brought my eating under control!
Lack of info re: resources	<ol style="list-style-type: none"> 1. Nontraditonal student off campus. What can we do?
Not a problem	<ol style="list-style-type: none"> 1. I don't think I need help. 2. I just watch what i eat 3. I generally need to gain weight. Excessive eating is a welcome thing. 4. After contest prep. very normal in body building world 5. Eating due to stress 6. I like to eat, but I don't have uncontrolled eating. 7. I've been successful in healthier lifestyle choices without professional help. 8. Uncontrolled cravings around menstral [sic] cycles 9. I am on the swim team so I eat a lot of food because I burn so many calories during a practice and swim about 14 hours a week. I have had problems with weight as a child but there are sometimes where I just can't stop eating but it doesn't make me guilty. 10. I am experiencing menopause and my oldest son is experiencing puberty. 11. I was on drugs. 12. I'm not overweight or even near it so it doesn't seem to be a problem I can't fix on my own. 13. I learned to control it myself by changing habits. 14. I barely had time in my schedule. 15. Was just super hungry for a large amount of ice cream a couple times cuz [sic] I love it and it didn't bother me at all! 16. Occasional and makes me feel temporarily happy

Category	Reason Provided for Not Seeking Treatment *
Not a problem (continued)	<ol style="list-style-type: none"> 17. Just "felt" hungry and empty due to staying up late even though I eat about 5 times a day 18. While pregnant I had severe hyperemesis [sic] and had to be interveniously [sic] fed for 6 months. My digestive system had to learn to eat again after from the digestive problems. I do over eat sometimes because I missed foods. I starve all day because I am busy and then at night I eat for 2 hrs straight it seems. I am maintaining my habits better. I also wieghed [sic] 117 prepregancy [sic] and 217 post from water retention and I now am reaching my goal weight after 2 years. Excersize [sic] is challenging because I withstained [sic] 2 spinal fractured from a shoulder distortion during delivery. 19. Didn't experience uncontrolled overeating 20. I just really like food and only eat one meal a day so i [sic] make it huge 21. Not a major concern 22. I eat a lot on my period. 23. I don't have problems 24. I know it's ultimately controllable - I just sometimes give in to temptation - I love to eat 25. I am on a weight loss plan that includes nutritional guideance [sic], and a fitness trainer 26. Don't think I need extreme help 27. I know it is an indirect symptom of my ADD medication. 28. It's not an issue, I'm just fat. 29. Don't feel it necessary
Prior treatment	<ol style="list-style-type: none"> 1. Recovering bulimic 2. I was helped by the dietician with anorexia 3. I am currtyly [sic] getting treated for my disorder 4. I am currently seeing someone off campus for my eating problems 5. I am currently in treatment 6. I previously received proffessional [sic] treatment for addiction and see many similarities [sic] with my eating habits as with substance use patterns
Shame	<ol style="list-style-type: none"> 1. Very ashamed

Category	Reason Provided for Not Seeking Treatment *
Time	<ol style="list-style-type: none"> 1. I believe I can do it on my own/don't have time 2. I don't have time, I have other things to worry about 3. I have so much to do--work, internship, class--will I have time for treatment? 4. Class schedule makes it so I only have a real meal about three times during the week, and only regularly on the weekend. So I eat when I can and by that time I am starving. My meal plan also denotes when I can eat, since I have only 100 block meals and feel stressed when I spend money (titan dollars or otherwise) so I have been eating less than normal. 5. No time 6. I'm aware that my eating habits are the result of other life stressors that have not been solved, and so identifying and changing eating habits are secondary to other things right now. 7. Lack of time 8. I don't have time 9. No time to. 10. NO TIME
Unaware of problem	<ol style="list-style-type: none"> 1. I guess I never thought it was a problem 2. I didn't know it was a treatable thing 3. I didn't see my few instances of uncontrollable eating as a problem 4. I never thought to seek help. But I would like to now.
Unsure what is uncontrolled eating	<ol style="list-style-type: none"> 1. Is needing to drink mochas every day considered over eating?

* Text is direct copy of entries from free-format entries by survey participants.

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