

AN EXAMINATION OF THE INTERRELATIONSHIPS AMONG IMPULSIVITY,
STRESS, DISORDERED EATING, AND OBESITY

by

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A thesis is submitted to the Department of Psychology
Usha Kundu, MD College of Health
The University of West Florida
In partial fulfillment of the requirements for the degree of
Master of Arts

2020

THESIS CERTIFICATION

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The University of West Florida Graduate School verifies the names of the committee members and certifies that the thesis has been approved in accordance with University requirements.

ACKNOWLEDGMENTS

The inspiration for my thesis came from Carolyn E. Pritchett, Ph.D., and I would be remiss were I to fail to mention her invaluable contributions in laying the foundation for this original piece of research. As such, I owe her an enormous debt of gratitude for inspiring me to pursue this line of inquiry, and for the countless hours spent mentoring, supporting, and guiding me throughout the early months of my journey down the proverbial rabbit hole that inspired and ultimately resulted in production of this succinct tome of scientific research.

Critical to the continued development and completion of my thesis was my thesis Chair, Susan E. Walch, Ph.D., who has been singularly instrumental in me successfully completing this thesis. Under her skilled and steady tutelage—and her drafted Behaviorist-influenced coaching style—I made consistent progress and found myself being guided through what was to feel at times an iterative and labyrinthine research experience. I am unspeakably grateful for her stalwart leadership, her love of research, and especially for her patience (so much patience!).

Additionally, I would like to acknowledge and thank each member of my cohort: Arielle S. Ramey, Scott Boatright, Kristen DeAngelo, Ernest Drinkwater, Heather M. Lutkins, and last—but by no means least—Daniel B. Vickers. Together we began a journey where a successful outcome was far from assured, and while our individual exits from the program all came at different times, we were able to form a cohesive unit and bond over the challenges inherent in wending our way through this academically rigorous program.

To all those mentioned here, words cannot adequately express my appreciation for each of you. In ways large and small, I know with certainty that my journey through graduate school now culminating in the production of this thesis would not have been possible without you.

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ABSTRACT

AN EXAMINATION OF THE INTERRELATIONSHIPS AMONG IMPULSIVITY, STRESS, DISORDERED EATING, AND OBESITY

Timothy Peter Jorgenson

Obesity, disordered eating, impulsivity, and stress represent distinct conditions, each with its own etiology and course and the potential to create profound ill-health in an individual. This study examined the interrelationship among these four health phenomena. Over a hundred college student participants completed an online health questionnaire including measures of impulsivity, perceived stress, and eating behavior. Negative urgency impulsivity was positively correlated with uncontrolled, emotional, and binge eating while positive urgency impulsivity was positively correlated with uncontrolled eating. I hypothesized that five bivariate associations would be moderated by one or more variables. Nine two-way, between-subjects ANOVAs were conducted using median-splits to test the moderating effects of BMI, perceived stress, and impulsivity on disordered eating. Main effects for BMI level indicated that overweight/obese participants scored higher on emotional eating and uncontrolled eating than normal weight/underweight participants. An interaction between motor impulsivity and perceived stress explained variations in uncontrolled eating while an interaction between total impulsivity and perceived stress explained variations in binge eating. Limitations included a small educated, predominantly female, convenience sample. More men need to be included in future studies.

INTRODUCTION

Obesity, disordered eating, impulsivity, and stress represent distinct health-related phenomena, each with its own etiological basis, manifestations, and consequences. Separately, the presence of any one of these is likely to have an adverse effect on the well-being of an individual, presenting significant challenges to either physical or psychological health if left unchecked. Collectively, then, the presence of two or more of these in the same person carries the potential for profound ill-health over the course of a lifetime, particularly in relation to weight status. Sadly, as many people experience comorbidity of these conditions in one combination or another, this scenario has proven not to be merely theoretical (APA, 2016; Bénard et al., 2017; Nagata et al., 2018). What's more, gender has been found to play an important role in the course and severity of symptomatology as men and women differ to some degree in how these health conditions present. This, in combination with the differences and interrelationships between and among the various other factors exert great influence on one of our most vital physiological functions: eating (Atalayer, 2018; Cotter & Kelly, 2018; Ward & Mann, 2000).

To consume food for sustenance is, of course, a biological imperative. Our bodies need access to the caloric energy found in edible foodstuffs in order to survive. However, the overconsumption of food generally, but in particular the inexpensive, high-calorie, nutritionally-limited foods produced in the quick-serve venues that have become so ubiquitous in our country and, increasingly, in other wealthy nations around the world, is as problematic from a health standpoint as it is unnecessary. To add to this, most of us live in close proximity to a few—if not several—restaurants, especially those of the fast-food variety whose billboards, brightly lit signs, and colorfully appointed buildings signal to passersby that a quick, delicious, and frequently inexpensive meal is within easy reach. Turns out, this has had a measurable effect on our way of

life here in America. The proportion of meals eaten outside of the home has risen steadily over the past several decades, coming at a cost to our health, especially considering that many such "take out," convenience meals are those of the fatty, sugary, and salty variety so notoriously linked to negative health outcomes such as unwanted weight gain, cardiovascular disease, and adult-onset diabetes (Garza et al., 2016). Making the situation all the worse is the sobering reality that in the same population over the same period of time, such changes to dietary habits and overall health have coincided with an increase in living a predominantly sedentary lifestyle (Owen et al., 2010). For those people, then, who are overweight or obese, to also have one or more of the other behavioral, physiological, or psychological conditions previously mentioned (i.e., disordered eating, impulsivity, or stress) represents a significant rise in risk for long-term health consequences (Kärkkäinen et al., 2018).

Obesity and Eating Behavior

Obesity, defined as having a mean body mass index (BMI) greater than 30 kg/m², represents a major health concern for those classified as such (CDC, 2020). A multitude of sources exist documenting an association between obesity and a number of chronic conditions that impact both morbidity and mortality, including diabetes mellitus, cardiovascular disease, coronary heart disease, osteoarthritis, hypertension, dyslipidemia, and certain cancers (Annagur et al., 2015; Cha et al., 2015; Sturm & Wells, 2001; Yu, 2016). Further, obesity is also linked to higher incidences of acquired, acute disorders and conditions as well, including sprains, strains, dislocations, and broken bones resulting from trips and falls, and even injury from car accidents, the latter resulting not from an increase in the rate of motor vehicle accidents by obese persons, but rather due to the increased severity of injury sustained by people of higher body mass (Finkelstein et al., 2007).

Despite the growing body of empirical data on the negative ramifications of obesity on health and wellness, the rate of obesity has risen steadily since the latter third of the 20th century, particularly here in the U.S., whose citizens have the greatest average body mass index (BMI) of all wealthy nations (Sturm & Hattori, 2013). The proportion of people who are obese has more than doubled in recent decades, growing from 15% in the 1970s to greater than 42% in 2018 (Yu, 2016). Similarly, the rates of morbid obesity (BMI >40 kg/m²) and extreme morbid obesity (BMI >50 kg/m²) have more than quadrupled and quintupled over that same period, respectively (Sturm & Hattori, 2013). Sadly, there appears to be no immediate end in sight to the increase in obesity rates, as young people seem just as vulnerable to this rise in mean body mass as are adults (Cha et al., 2015). Statistical data support this claim. Between 1974 and 2014, the rates of obesity in children ages 6-19 increased from an average of 5.5% to an alarming 19% (Fryar et al., 2016). However, there appears to be some encouraging news. Data gathered over the past two decades suggest that childhood obesity rates, while still rising overall, are doing so at a lower rate than adults over the same time period and have leveled off at times here in the United States (Hales et al., 2017; Kristensen et al., 2014).

On an individual level, people do make efforts to alter the course of unwanted weight gain. Dieting, or intentional restriction of caloric consumption, is highly prevalent in our society. Ward and Mann (2000) reported that at any one time, 40% of women and 25% of men are on a diet with the intent of losing weight (referred to in the literature as “restrained eating”). However, dieting by itself appears to be ineffective considering the high rate of failure. Ward and Mann (2000) reported that fully 95% of dieters are initially unsuccessful in their attempts to maintain a restricted caloric intake, and although the authors offered no indication of the percentage of dieters who ultimately succeed, both empirical and anecdotal evidence suggest that subsequent attempts to diet aren’t much more successful (Jeffery et al. 2000; Ward & Mann,

2000). Complicating matters is the fact that, while interventions directed at producing weight loss and maintenance have shown promise in the short-term, long-term weight loss success in adults has thus far proved elusive, despite findings that lengthening the period of intervention and increasing the amount of strenuous exercise have at least proven effective in delaying the backward slide on progress (Jeffery et al., 2000). It has been suggested that the role of self-regulation in the individual dieter is complex, and that the cognitive effort required to maintain a dietary regimen places a person so inclined at a distinct disadvantage as even so much as a momentary lapse in attention can lead to a sudden bout of disinhibition, making overeating or even a binge eating episode more likely (Ward & Mann, 2000).

Research findings from Davis et al. (2008) suggest that eating patterns among obese people are distinct from their non-obese counterparts in a few notable ways. Specifically, obese people tend to eat sweeter snacks, consume more unplanned meals, engage in emotion-influenced eating, and possess a higher sensitivity to environmental food cues than their non-obese counterparts (Davis et al., 2008). These findings suggest that important differences in eating behaviors between obese and non-obese people are influenced by a variety of forces, both internal and external.

Throughout the literature on obesity, a trio of related terms is used with noticeable regularity. These are disordered eating, disinhibited eating behavior, and binge eating disorder. These terms represent varied levels of unhealthy, disturbed, or pathological eating behavior. The first term, disordered eating, appears to be an umbrella term used to describe unhealthy eating patterns that do not otherwise meet the criteria for any particular clinically recognized eating disorder, such as binge eating disorder, for example (Yu & Tan, 2016). Generally speaking, disordered eating is represented by unhealthy eating patterns and habits—such as food-related anxiety, guilt, or shame; yo-yo dieting and rollercoaster weight loss; using compensatory

behaviors to counteract "bad" eating behavior, etc.—that can be construed as inappropriate or maladaptive but that, in the aggregate, fail to meet the diagnostic criteria for any one clinical eating disorder (Anderson, 2018; Yu & Tan, 2016). Essentially, disordered eating refers to nonclinical or subclinical levels of inappropriate or maladaptive eating patterns. The second term, disinhibited eating behavior, defined as "the tendency to overeat in response to different stimuli, can occur in a variety of circumstances such as when an individual is presented with an array of palatable foods or is under emotional distress," and has been found to be positively correlated with gradual weight gain in adults, frequently resulting in obesity (Hays & Roberts, 2008, p. 2). The third term, binge eating disorder, is a diagnosable condition, characterized by the periodic, uncontrolled ingestion of abnormally large quantities of food. The American Psychiatric Association's (2013) *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5) defines binge eating disorder as a condition characterized by recurring discrete episodes of binge eating that involve eating a quantity of food within a two-hour period that's decidedly greater than what most would typically ingest along with a subjective sense that one has lost control of one's eating during the episode. According to Annagur et al. (2015), while the prevalence of binge eating disorder is relatively low in the general population (~0.3-7%), its prevalence rate is noticeably higher among obese clinical samples (9-30%).

Exacerbating matters is that external, environmental cues exert a not-so-insignificant influence on the appetites of people. According to Atalayer (2018), smells, sights, sounds, and imagery, among other cues, can all exert sway over our appetites, and therefore, our eating behavior. Our world has become replete with these external eating cues. We are routinely bombarded with fast-food signs, advertisements, smells, and imagery of foods from restaurants. For many people, such an abundance of external stimuli poses no problem. In such people, internal hunger cues exert greater influence on behavior than do external, environmentally

derived cues. However, in obese populations, the stage is set up a little differently. Obesity is linked to hedonic eating, which in turn is associated with hypersensitivity to such food-related environmental cues (Atalayer, 2018).

Atalayer (2018) also pointed out that, in obese people, such external eating cues are possibly linked to impulsivity, and impulsivity might raise reactivity to these cues, leading to higher rates of externalized, environmentally-sourced eating behavior, and on and on, creating a vicious cycle. Complicating matters further is the growing body of evidence linking a host of eating disorders, along with obesity, to traits of impulsivity (Annagur et al. 2015; Atalayer, 2018; Legenbauer et al. 2017; Lundahl et al., 2015; Waxman, 2009).

Impulsivity

Broadly defined, impulsivity is a multi-faceted cluster of behaviors commonly characterized by "a general tendency towards quick, unplanned reactions to internal or external stimuli without [due] consideration of the consequences...[including] rapid decision-making, inattention, lack of perseverance, acting without thinking, lack of planning, sensation seeking, and risk-taking" (Jasinska et al., 2012, p. 739). Included, too, is the concept of "positive urgency [defined as] the tendency to act rashly in response to extreme positive emotions [and] negative urgency [which is] the tendency to act rashly in response to extreme negative emotions" (Cyders et al., 2012, p. 121). Impulsivity is an important topic of research due to the potential for profound and lasting ill-effects on the people who possess these behavioral traits—ill-effects often related to the possession of one or more impulse control disorders (e.g., binge eating disorder, compulsive sexual behavior disorder, and intermittent explosive disorder) due in no small part to a reduced propensity towards quality decision-making (Chamberlain & Grant, 2019). In fact, according to the American Psychiatric Association's (1994) *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; DSM-IV), fully 18 distinct psychiatric disorders

either include or are associated with impulsivity (Whiteside et al., 2005). The research literature on the subject clearly pointed to an adverse relationship between life outcomes and impulsivity traits. Exacerbating matters is the influence that impulsiveness and disinhibition may have on eating behavior. The research on eating behavior indicates an inclination towards unhealthy eating behavior for people who possess one or more impulsive traits (Mason et al., 2018). So, while being obese is problematic all by itself in relation to outcomes of morbidity and mortality, the presence of impulsivity may present as an aggravating factor, potentially making the situation worse.

Significantly, impulsivity is implicated in the emergence, symptomatology, and continuance of overeating, and by extension, obesity (Atalayer, 2018). One notable study of a large sample of obese European people ($n = 488$) found that disinhibited eating partially mediated the relationship between impulsivity and BMI, demonstrating a link between the three variables (Legenbauer et al., 2017). Further, in a metaanalysis, Emery and Levine (2017) reaffirmed the existence of a positive relationship between impulsivity and BMI but found that the association was dependent upon the type of measure assessing impulsivity and the particular domain of impulsiveness being assessed. Certain traits of impulsivity—specifically, motor impulsivity and attentional impulsivity—have correlated moderately ($r = .32$, and $r = .40$, respectively) with disinhibited eating (Lundahl et al., 2015; Lyke & Spinella, 2004). The results of a study conducted by Yeomans and colleagues (2008) suggested that impulsivity generally—but also specifically, non-planning and motor trait impulsiveness—was associated with overeating and may predict binge eating behavior and difficulty in dieting. Further, Mason and Lewis (2015) found that impulsiveness is related to body shame, negative affect, and food-related cognitions, suggesting clinical implications. Supporting this notion, Waxman found that impulsivity is generally what makes those with eating disorders distinct from those without

eating disorders. What's more, "higher impulsivity in individuals with EDs [eating disorders] also has been associated with severity of ED symptoms...decreased psychological and personality functioning, distorted biochemical functioning, less effective coping strategies," and binge-eating (Waxman, 2009, p. 408-409). More specifically, Lundahl et al. (2015) suggested that impulsivity can be seen in clinical populations with eating disorders and pointed to other research that has found impulsiveness traits in all eating disorder subtypes, suggesting impulsivity is a major supporting factor in clinically significant eating disorders of all types.

Jasinska et al. (2012) examined the relationship between impulsivity and eating behavior in a study comprised of 204 undergraduate men and women (ages 17-22, mean age = 19.0) from the University of Michigan who were given a battery of self-report, behavioral, computerized, and physiological assessments of impulsivity, eating, and BMI. Using structural equation modeling, the study's authors concluded that impulsiveness and disinhibition (as distinct behavioral constructs) are both risk factors for unhealthy food consumption. In another study, Mason et al. (2018) examined a sizable sample ($N = 556$) of racially diverse American undergraduate women (mean age = 22.4, mean BMI = 25.0). These authors found that impulsivity was a risk-factor for binge eating and that the combination of attentional impulsivity, dieting, and negative affect influenced binge eating behavior, at least among women. The elevated presence of these traits in an individual of either gender is positively correlated with overeating when confronted with outside environmental cues, unpleasant emotions, and more palatable food options (Jasinska et al., 2012). These findings point to emotional states—particularly those affective states that are negative in nature, such as stress—as having an influence on the relationship between impulsivity and eating behavior.

Stress

The academic thinking on stress has changed significantly over time. According to Butler (1993) it was historically defined either in *stimulus*-based (i.e., *exogenic* in nature) or *response*-based (i.e., *endogenic* in nature) terms. However, the conceptual framework of stress began to be reexamined in the late 1970s, most notably by Lazarus and Folkman, whose 1984 definition of stress proved to be a watershed moment on the scientific thinking of stress. Their work changed some of the basic assumptions surrounding the concept as a relatively rigid, either/or form to one that is more dynamic in nature, thereby allowing for a theoretical definition of stress that simultaneously allows for an etiology that's both internally- and externally-based (Butler, 1993). Stress has been subsequently defined, therefore, as what a person experiences when an internal assessment of a situation leads him or her to believe that it is taxing, or that he or she lacks the personal or environmental resources necessary to adequately manage a circumstance perceived as having the potential to be either physically or emotionally harmful (Butler, 1993). Inherent in Butler's (1993) definition of stress is the recognition and emphasis of one's own internal, subjective analysis of external, objective situations and circumstances that contribute to the individual's experience of stress. A large body of research has demonstrated that the experience of stress is associated with a host of cognitive, affective, behavioral, and physiological outcomes (Schneiderman et al., 2005). The mechanics of the prefrontal cortex, the brain structure responsible for self-regulation and restraint, have been shown to be negatively affected by both immediate and prolonged stress, potentially impairing our decision-making in relation to eating (Cotter & Kelly, 2018). This, of course, carries strong implications for the course of weight management for an individual who is highly impulsive.

In prior research, greater stress has been found to be associated with more weight gain in young women and in those people who are already overweight (Cotter & Kelly, 2018).

Behaviorally, stress and hassles are related to obesity through overconsumption of foods high in fats and sugars (dubbed “stress eating”), and the consumption itself is believed to act essentially as a coping mechanism (Bennett et al., 2013). Hassles are a type of stressor defined as those stressful events that bring about unpleasant feelings like perturbation, irritation, vexation, etc., which when experienced suggest a given goal or objective is likely to be more challenging to surmount (O'Connor et al., 2008). O'Connor and colleagues stated that hassle-type stressors are strongly associated with between-meal snacking. The effects of daily hassles can be powerful, capable of interrupting normal consumption patterns for men and women, directly affecting snack food consumption (O'Connor et al., 2008). Snacking abnormally is not at all uncommon, either: the literature suggests that 40% of adults have eaten more when stressed, with such reported behavior more common among women than men, and among obese populations than normal-weight subjects (Cotter & Kelly, 2018; Harrington et al., 2006; O'Connor et al., 2008). Research suggests that stress affects eating behavior among obese and non-obese individuals. However, the empirical findings on the effects of stress on food intake are inconsistent. While some studies have found that stress induces an increase in food consumption, some others actually found the opposite to be true (O'Connor et al., 2008).

Curiously, stress and emotional lability can influence the course of eating behavior and disorders. Stress has been linked to the onset and continuance of disordered eating, as well as to specific symptomatology, such as binge eating. For example, Harrington and colleagues examined a sample of 231 predominantly college-affiliated women ranging in age (ages 18-59, mean = 21.5, *SD* = 6.5) and weight classification (i.e., BMI) and found that women with eating disorders reported having both higher perceived life stress and lower tolerance for stress than women without eating disorders (Harrington et al., 2006). In another study, it was determined that a person's emotional state can have an effect on eating behavior. Specifically, Patel and

Schlundt (2001) found that obese women tended to eat larger portions during times of heightened emotion. It may be noted that much of the research on disordered eating behavior is conducted with samples of women and that, when research examines women and men, differences between women and men are not uncommon in the results.

Sex and Gender

Notably, there is a paucity of studies examining the interrelationships between obesity, eating behavior, impulsivity, and stress-eating on men. However, in the existing research literature in this area, those studies that do include men have uncovered some distinct patterns when gender is factored into the equation. In both men and women, negative emotion correlated with adverse, unhealthy, and disordered eating behavior (Bennett et al., 2012; Edman et al., 2005). Not surprisingly, the literature also suggests a positive association between unhealthy and disordered eating and certain food-related cognitions, particularly negative ones like body shame. In turn, body shame is related to more dieting, which is then related to more negative food-related cognitions, thus creating and perpetuating a vicious cycle of shame, dietary restraint, and disordered eating for both sexes (Mason & Lewis, 2015).

However, the data on gender then begins to diverge. Bennett et al. (2012) found that women ate to distract during times of heightened emotion, and some experienced feelings of guilt after such periods of affective eating. Conversely, although men also reported eating to distract, there was the additional element of eating in an effort to evade unpleasant emotions and lower levels of guilt felt after doing so. These gender-dependent findings reported by Bennett and colleagues piggyback on findings by Edman et al. (2005), who reported some sobering eating-related behavioral tendencies among women, including greater feelings of body dissatisfaction, more disordered eating patterns, and a propensity to engage in more restrained eating than men, who tend to exercise more in response to increased feelings of body

dissatisfaction. Significantly, body dissatisfaction was found to be associated with perfectionism and media influences for both men and women, with an additional factor, low self-esteem, providing further influence on women's feelings of body dissatisfaction (Gadalla, 2009). The research findings indicate that women are more frequently susceptible to patterns of disordered eating behavior than are men (Lundahl et al., 2015) and, by extension, to obesity. Exacerbating matters, Patel and Schlundt (2001) found that obese women tend to eat larger portions during times of heightened emotion.

In summary, existing research suggests that obesity-relevant eating behavior patterns are influenced by many factors, including impulsivity and stress for both men and women. Although theoretical and empirical work to date suggests that these factors may interact with each other to impact eating behavior among men and women, few studies examine the interaction of impulsivity and stress on eating behaviors. Existing research also suggests that these variables may operate differently for men and women, suggesting value in the use of mixed samples that allow for comparisons of men and women.

Hypotheses

My aim in conducting this research was to examine the interrelationships among several health phenomena, namely impulsivity, stress, disordered eating, and obesity, as well as any major differences in gender with respect to these. Given evidence gleaned from a review of relevant literature on these five topics, I predict that each of six following expected bivariate associations will be moderated by one or more variables:

1. Attentional impulsivity and uncontrolled eating will be positively correlated.
 - a. The relationship between attentional impulsivity and uncontrolled eating will be moderated by BMI, with greater effects of attentional impulsivity on uncontrolled

- eating seen among overweight and obese participants than normal-weight participants.
- b. The relationship between attentional impulsivity and uncontrolled eating will be moderated by perceived stress, with greater effects of attentional impulsivity on uncontrolled eating among participants with high perceived stress.
2. Motor impulsivity and uncontrolled eating will be positively correlated.
 - a. The relationship between motor impulsivity and uncontrolled eating will be moderated by BMI, with greater effects of motor impulsivity on uncontrolled eating seen among overweight and obese participants than normal-weight participants.
 - b. The relationship between motor impulsivity and uncontrolled eating will be moderated by perceived stress, with greater effects of motor impulsivity on uncontrolled eating seen among participants with high perceived stress.
 3. Perceived stress and emotional eating will be positively correlated.
 - a. The relationship between perceived stress and emotional eating will be moderated by negative urgency impulsivity, with greater effects of perceived stress on emotional eating among participants with high negative urgency trait impulsivity.
 4. Negative urgency impulsivity and emotional eating will be positively correlated.
 - a. The relationship between negative urgency impulsivity and emotional eating will be moderated by perceived stress, with greater effects of negative urgency impulsivity on emotional eating among participants with high perceived stress.
 - b. The relationship between negative urgency impulsivity and emotional eating will be moderated by BMI, with greater effects of negative urgency on emotional eating among overweight and obese participants than normal-weight participants.

5. Perceived stress and uncontrolled eating will be positively correlated.
 - a. The relationship between perceived stress and uncontrolled eating will be moderated by emotional eating, with greater effects of perceived stress on uncontrolled eating among participants with high emotional eating.
6. Perceived stress and binge eating will be positively correlated.
 - a. The relationship between perceived stress and binge eating will be moderated by total impulsivity, with greater effects of perceived stress on binge eating among participants with high total impulsivity.

METHOD

Participants

A total of 112 undergraduate students logged onto The University of West Florida's psychology research pool and signed up to participate in an online "health survey." The responses from eight participants were removed from the data set for various reasons (i.e., two participants took the survey twice each and therefore gave redundant answers, one gave conflicting intra-scale answers across multiple scales, and five—including one who explicitly declined to participate—did not participate in the study beyond the informed consent page). The final sample was comprised of 104 participants (83 female, 21 male), each of whom received extra credit in a course for their participation. Participants ranged in age from 18 to over 50 years old, with the mean age being 23.65 years ($SD = 6.72$). Although more than 70% of participants self-identified as White/Caucasian, more than 25% identified as Black/African American, Hispanic/Latino, Asian, or multiracial, and the sample roughly reflects the racial and ethnic diversity of the region of the country from which it was drawn. More than two thirds of participants (69.2%) indicated they worked at least part-time. Roughly 62% of respondents were romantically attached in some capacity and the majority, almost 90%, self-reported heterosexual/straight sexual orientation. Additional information about the distribution of demographic characteristics of the sample is presented in Table 1.

Table 1*Participant Demographic Characteristics*

Characteristic	Female		Male		Total	
	<i>(n = 83)</i>		<i>(n = 21)</i>		<i>(N = 104)</i>	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%
Race/ethnicity						
White/Caucasian	60	72.3	16	76.2	76	73.1
Black/African American	9	10.8	4	19.0	13	12.5
Hispanic/Latino	10	12.0	1	4.8	11	10.6
Asian	1	1.2	0	0	1	1.0
Multiracial	3	3.6	0	0	3	2.9
Employment status						
Unemployed	25	30.1	7	33.3	32	30.8
Part-time	40	48.2	11	52.4	51	49.0
Full-time	18	21.7	3	14.3	21	20.2
Educational attainment						
< High school	1	1.2	0	0	1	1.2
High school/GED	4	4.8	4	19.0	8	7.7
Some college	22	26.5	9	42.9	31	29.8
Associate degree	47	56.6	8	38.1	55	52.9
Bachelor's degree	9	10.8	0	0	9	10.8
Relationship status						
Single	22	26.5	14	66.7	36	34.6
Dating/looking	27	32.5	3	14.3	30	28.8
Attached	12	14.5	3	14.3	15	14.4
Engaged	3	3.6	1	4.8	4	3.8
Married	15	18.1	0	0	15	14.4
Divorced	4	4.8	0	0	4	3.8
Sexual orientation						
Heterosexual/Straight	73	88.0	18	85.7	91	87.5
Bisexual	8	9.6	2	9.5	10	9.6
Questioning/unsure	2	2.4	1	4.8	3	2.9

Procedure

Participants provided informed consent prior to participating in the investigation (consent form and measures may be found in Appendix A). The present investigation was approved by the

appropriate Institutional Review Board (IRB approval letter may be found in Appendix B). This was a self-report questionnaire study that assessed participants' BMI, eating behavior, impulsivity level, and subjective levels of stress. Students wishing to participate logged onto the website for the research participant pool in the Psychology department at The University of West Florida and read and signed a consent form for a "health survey." They were notified that by signing the consent form, they were agreeing to having their information kept confidential, but not anonymous. After consent was obtained, participants were then asked to complete a host of online questions from which an array of personal background data was gathered, including participants' demographic information such as age, race, sex, educational attainment, employment status, marital status, and sexual orientation; personal health information such as height, weight, cholesterol levels, diabetes status, whether the individual was hypertensive, his or her level of physical exercise, and perception of overall health. Participants were also asked to report any family history of diabetes, high cholesterol, stroke, myocardial infarction, hypertension, eating disorders, and/or obesity. In addition, questions about dietary history and current dietary restrictions were also asked, including questions about food allergies and adherence to calorie-restrictive, or a strict vegan or vegetarian diet at any time during the last 30 days.

In addition to locally created questions assessing demographic and social characteristics, health status, height, weight, diet, exercise, substance use, and personal and family health history as described above, participants completed four standardized, self-report questionnaires. These included the short version of the Urgency, Premeditation, Perseverance, Sensation-Seeking Impulsive Behavior Scale (SUPPS-P; Cyders et.al., 2014), the 10-item version of the Perceived Stress Scale (PSS-10; Cohen & Williamson, 1988), the Binge Eating Scale (BES; Gormally,

1982), and the Three Factor Eating Questionnaire – Revised (TFEQ-R18; Karlsson et al., 2000), as found in Appendix A and described below.

Measures

Impulsivity - SUPPS-P

Impulsivity was measured using the short version of the UPPS-P impulsive behavior scale (Cyders et al., 2014). This measure consists of 20 questions across five subscales. It is designed to test for the presence of negative urgency impulsivity, meaning to act rashly when experiencing negative emotions; (lack of) premeditation or motor impulsivity, meaning to behave without forethought and necessary consideration; (lack of) perseverance or attentional impulsivity, such as quickly giving up on a task and failing to follow through; sensation seeking behavior, or engaging in exciting but risky activities; and positive urgency impulsivity, which means acting rashly when experiencing positive emotions. Responses are given on a four-point, Likert-type scale as follows: agree strongly (1), agree some (2), disagree some (3), and disagree strongly (4). Example item statements include “I quite enjoy taking risks,” and “When I am upset, I often act without thinking.” These two example items are associated with sensation seeking and negative urgency, respectively. Internal reliability is .74 or higher across the five subscales of impulsiveness. Specifically, $\alpha = .78$ for Negative Urgency; $\alpha = .79$ for Lack of Perseverance; $\alpha = .85$ for Lack of Premeditation; $\alpha = .74$ for Sensation Seeking; and $\alpha = .85$ for Positive Urgency (Cyders et al., 2014).

Perceived Stress - PSS-10

The PSS (Cohen & Williamson, 1988) is a short, 10-item self-report questionnaire that was used to determine perceived stress levels in participants. This scale is designed to assess the participant’s own subjective stress levels over the past month with a single score. The PSS has been found to have adequate reliability and validity and has been found to be applicable to the

general population (Cohen & Williamson, 1988; Roberti, Harrington, & Storch, 2006).

Responses are given on a five-point, Likert-type scale as follows: 0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, and 4 = very often. Example questions include, "In the last month, how often have you been upset because of something that happened unexpectedly?" and, "In the last month, how often have you felt confident about your ability to handle your personal problems?" Internal reliability for the PSS-10 is moderately high ($\alpha = .78$) (Cohen & Williamson, 1988).

Binge Eating - BES

The BES (Gormally et al., 1982) is a scale consisting of 16 items, each one offering a "cluster" of three or four related statements about eating behaviors and cognitions from which the person taking the questionnaire selects the most apt statement. The sixteen statement groupings of which the BES consists are split evenly between statements relating to feelings and cognitions (eight), and behaviors (eight). An example of one such statement grouping is as follows: "1. I don't feel any guilt or self-hate after I overeat. 2. After I overeat, occasionally I feel guilt or self-hate. 3. Almost all the time I experience strong guilt or self-hate after I overeat." (Gormally et al., 1982). Evidence supports the internal consistency of the BES (Gormally et al., 1982).

Uncontrolled Eating and Emotional Eating - TFEQ-R18

The TFEQ-R18 (Karlsson et al, 2000) is an 18-question self-report scale that measures three major factors of eating behavior: cognitive restraint, uncontrolled eating, and emotional eating. Of the 18 statements, six relate to cognitive restraint, nine to uncontrolled eating, and the remaining three to emotional eating. Response format is a four-point, Likert-type scale (e.g., definitely true, mostly true, mostly false, definitely false). Example statements include, "When I smell a sizzling steak or a juicy piece of meat, I find it very difficult to keep from eating, even if

I have just finished a meal”; “I deliberately take small helpings as a means of controlling my weight”; and, “When I feel blue, I often overeat.” These three statements are associated with uncontrolled eating, cognitive restraint, and emotional eating, respectively. Internal reliability across the three factors is estimated to be above .70 for each; specifically, they are $\alpha = .76$ (cognitive restraint), $\alpha = .83$ (uncontrolled eating), and $\alpha = .85$ (emotional eating). This questionnaire has been found to work well in determining distinct eating patterns within the general population (Anglé et al., 2009).

Design and Analysis

The present study used a retrospective, cross-sectional, and correlational design. Participants completed a series of questions inquiring about their health status, health-related behaviors, and eating and weight-related behaviors, in addition to scales measuring eating behavior, impulsivity, and stress. Prorated scores were computed for scales with 75% or greater completion. Descriptive statistics were computed for critical items (i.e., frequencies, percentages) and scale scores (i.e., means, standard deviations). Pearson product moment correlations were conducted to examine bivariate relationships among the variables and nine two-way, between-subjects analyses of variance (ANOVAs) were performed to examine interactions representing moderation effects, with one-way ANOVA used to specify the interaction effects. Alpha was set at $p < .05$, one-tailed.

RESULTS

Health Status, Substance Use, and Diet/Exercise Behavior

In terms of health indices, as shown in Table 2, the majority of participants reported their health to be either good (47.1%) or very good (33.7%). Approximately one in six participants (17.3%) reported being under care for a chronic medical condition; 8.7% reported elevated blood pressure; almost 5% reported either the presence of Type 2 diabetes or pre-diabetes; elevated cholesterol levels were reported by approximately 4%; and nearly 3% reported a thyroid disorder.

Table 2

Participant Health Characteristics

Characteristic	Female		Male		Total	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%
Self-rated health status						
Excellent	9	10.8	1	4.8	10	9.6
Very good	26	31.3	9	42.9	35	33.7
Good	38	45.8	11	52.4	49	47.1
Fair	7	8.4	0	0	1	1.0
Poor	3	3.6	0	0	3	2.9

Although nearly a quarter of participants (23.1%) reported ever using tobacco products, close to 90% reported that they were currently tobacco-free. Nearly half of participants (46.2%) reported having abstained from alcohol in the previous month entirely while less than one in ten (8.7%) reported alcohol consumption on eight or more days per month. More than one quarter (27.8%) reported binge drinking (consuming five or more drinks in one sitting) in the past month. Table 3 displays data related to participant reports of alcohol, tobacco, and other drug use. Although almost one third (31.7%) of participants reported a history of recreational drug

use, 78.8% reported no recreational drug use during the previous month, with 6.7% reporting daily or near daily use.

Table 3

Participant Substance Use

Characteristic	Female		Male		Total	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%
Tobacco use in past month						
Yes, but not currently	11	13.3	2	9.5	13	12.5
Yes, current use	9	10.8	2	9.5	11	10.6
Alcohol consumption (number of days in past month)						
0	33	39.8	15	71.4	48	46.2
1-3	30	36.1	2	9.5	32	30.8
4-7	12	14.5	3	14.3	15	14.4
8-15	6	7.2	1	4.8	7	6.7
16-23	1	1.2	0	0.0	1	1.0
24-31	1	1.2	0	0.0	1	1.0
≥5 drinks consumed per sitting (number of days in past month)						
0	59	71.1	16	76.2	75	72.1
1-3	19	22.9	4	19.0	23	22.1
4-7	3	3.6	1	4.8	4	3.8
8-15	2	2.4	0	0.0	2	1.9
Recreational drug use						
Yes, but not currently	28	33.7	5	23.8	33	31.7
Yes, current use	8	9.6	2	9.5	10	9.6
Drug use (number of days in past month)						
0	67	80.7	15	71.4	82	78.8
1-3	7	8.4	2	9.5	9	8.7
4-7	3	3.6	2	9.5	5	4.8
8-15	1	1.2	0	0.0	1	1.0
24-31	5	6.0	2	9.5	7	6.7

Participants' calculated BMI scores ranged from 17.8 to 42.5, with a mean of 25.75 (*SD* = 5.65). The average BMI score for female participants was 26.15 (*SD* = 5.84) and the average BMI score for male participants was 24.21 (*SD* = 4.56). As shown in Table 4, a full 50% of participants were overweight (28.8%) or obese (21.2%) and 44.2% reported struggling with

weight either continuously (26.9%) or frequently (17.3%). Almost two thirds (62.9%) of participants reported having dieted during the past quarter-year and 69.3% reported multiple dieting attempts across their lifetime while nearly one third (31.7%) reported never dieting in their lifetime. Almost a third of respondents (32.7%) reported little to no daily exercise. A total of eight respondents (7.7%) indicated that they do not eat meat.

Table 4

Participant BMI and Dieting Behavior

Characteristic	Female		Male		Total	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%
Body mass index						
Underweight	2	2.4	2	9.5	4	3.8
Normal weight	35	42.2	11	52.4	46	44.2
Overweight (not obese)	25	30.1	5	23.8	30	28.8
Obese	20	24.1	2	9.5	22	21.2
Missing	1	1.2	1	4.8	2	1.9
Struggles with desired/ideal weight						
Continuously	23	27.7	5	23.8	28	26.9
Frequently	16	19.3	2	9.5	18	17.3
Occasionally	20	24.1	4	19.0	24	23.1
Rarely	16	19.3	7	33.3	23	22.1
Not at all	8	9.6	3	14.3	11	10.6
Dieted in past 30 days						
Yes	21	25.3	3	14.3	24	23.1
Number of months since last diet						
< 3	38	62.3	6	66.7	44	62.9
3-6	5	8.2	0	0.0	5	7.1
6-12	8	13.1	1	11.1	9	12.9
12-24	2	3.3	1	11.1	3	4.3
>24	8	13.1	1	11.1	9	12.9
Number of times dieted in lifetime						
Never	20	24.1	12	57.1	32	30.8
1-2	23	27.7	4	19.0	27	26.0
3-5	22	26.5	4	19.0	26	25.0
> 6	18	21.7	1	4.8	19	18.3

Table 4 continued

Age first dieted to lose weight						
Never dieted	21	25.3	12	57.1	33	31.7
Under 12	4	4.8	1	4.8	5	4.8
12-17	32	38.6	5	23.8	37	35.6
18-22	20	24.1	2	9.5	22	21.2
23-30	5	6.0	1	4.8	6	5.8
Older than 30	1	1.2	0	0.0	1	1.0
Average number of minutes of exercise per week						
< 30	30	36.1	4	19.0	34	32.7
31-60	12	14.5	6	28.6	18	17.3
61-90	8	9.6	4	19.0	12	11.5
91-120	12	14.5	4	19.0	16	15.4
121-150	7	8.4	1	4.8	8	7.7
> 150	14	16.9	2	9.5	16	15.4

Descriptive Statistics for Impulsivity, Stress, and Eating Behavior

Descriptive statistics for participant's scores on measures of impulsivity, stress, and eating behavior, shown in Table 5, were tabulated and examined by sex/gender. Although mean scores were not compared using inferential statistics due to the small number of male participants, most of the mean scores for men and women appeared to be similar (i.e., differences between mean scores that were less than half of a SD) while differences were possible (i.e., differences between mean scores that were more than half of a SD). The mean sensation seeking score for men was slightly more than half a SD greater than the mean sensation seeking score for women, while the means of the other impulsivity subscales appeared to be similar for men and women. The mean perceived stress score for women was slightly more than half a SD greater than the mean perceived stress score for men. The mean emotional eating score for women was half a SD greater than the mean emotional eating score for men while the two other eating scores were similar for men and women.

Table 5*Participant Descriptive Statistics for Impulsivity, Stress, and Eating Behavior*

Variable	Female				Male				Total			
	<i>(n = 83)</i>				<i>(n = 21)</i>				<i>(N = 104)</i>			
	<i>M</i>	<i>SD</i>	Min	Max	<i>M</i>	<i>SD</i>	Min	Max	<i>M</i>	<i>SD</i>	Min	Max
Attentional impulsivity	6.71	2.45	4	15	6.90	3.29	4	16	6.75	2.62	4	16
Motor impulsivity	6.83	2.23	4	15	7.05	3.23	4	16	6.88	2.45	4	16
Negative urgency	9.02	2.97	4	16	8.24	3.24	4	16	8.86	3.03	4	16
Positive urgency	7.58	3.17	4	16	7.81	3.61	4	16	7.62	3.25	4	16
Sensation seeking	9.49	3.32	4	16	11.57	3.70	4	16	9.91	3.48	4	16
Perceived stress	21.25	6.88	4	34	16.43	7.04	2	29	20.28	7.14	2	34
Uncontrolled eating	19.09	6.39	9	35	18.18	6.02	10	34	18.90	6.30	9	35
Emotional eating	6.98	3.15	3	12	5.38	2.73	3	12	6.65	3.12	3	12
Binge eating	9.04	8.39	0	34	7.00	6.34	0	22	8.62	8.03	0	34

Correlations Among Impulsivity, Stress, and Eating Behavior

Pearson's r correlation coefficients (1-tailed) were computed to assess the strength of bivariate associations among measures of trait impulsivity, perceived stress, and eating behavior. These values are reported along with the mean score and standard deviation for each variable in Table 5. Not surprisingly, measures of the various types of impulsivity were often (but not always) correlated. Attentional and motor impulsivity ($r = .61, p < .01$), negative and positive urgency ($r = .61, p < .01$), and sensation seeking and positive urgency ($r = .35, p < .01$) were moderately to strongly positively correlated while attentional impulsivity was inversely related to both negative urgency ($r = -.25, p < .01$) and sensation seeking ($r = -.21, p < .05$). Likewise, all three measures of disturbed eating behavior were significantly and strongly correlated with each other, with bivariate correlations ranging in magnitude from $r = .68$ to $.71, p < .01$.

Uncontrolled eating was moderately correlated with both negative urgency impulsivity ($r = .40, p < .01$) and positive urgency impulsivity ($r = .37, p < .01$), as well as perceived stress ($r = .22, p < .05$). The last finding lends support for hypothesis 5. Relationships to other impulsivity scores were non-significant.

Emotional eating was weakly correlated with negative urgency impulsivity ($r = .20, p < .05$), supporting hypothesis 4, and strongly correlated with uncontrolled eating ($r = .71, p < .01$), providing partial support for the third and fourth hypotheses. Relationships to other impulsivity scores and perceived stress were non-significant.

Binge eating was moderately correlated with negative urgency impulsivity ($r = .29, p < .01$), and strongly correlated to uncontrolled eating ($r = .70, p < .01$), and emotional eating ($r = .68, p < .01$). Relationships with the other impulsivity scores and perceived stress were found to be statistically nonsignificant.

Table 6*Correlations Among Impulsivity, Eating, and Stress Measures*

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Attentional impulsivity	103	6.75	2.62	–							
2. Motor impulsivity	101	6.84	2.46	.61**	–						
3. Negative urgency	103	8.86	3.03	-.25**	.04	–					
4. Positive urgency	102	7.61	3.26	-.12	.14	.61**	–				
5. Sensation seeking	103	9.91	3.48	-.21*	-.06	.13	.35**	–			
6. Perceived stress	104	20.28	7.14	.01	.17*	.48**	.29**	-.04	–		
7. Uncontrolled eating	101	24.12	4.54	.13	.11	.40**	.37**	.01	.22*	–	
8. Emotional eating	104	8.35	3.12	-.01	-.13	.20*	.15	-.13	.16	.71**	–
9. Binge eating	102	8.68	8.05	.08	.11	.29**	.16	-.12	.16	.70**	.68**

Note. * $p < .05$. ** $p < .01$. (1-tailed)

Interactions Among Impulsivity, Stress, and Eating Behavior

Nine two-way, 2 x 2 ANOVAs were conducted to examine interaction or moderation effects. BMI was split into two levels (i.e., normal or overweight/obese) and median splits were used to create two levels for each of the other independent variables (i.e., attentional impulsivity, motor impulsivity, negative urgency, perceived stress) to examine their individual and interactive effects on a continuous dependent variable (i.e., uncontrolled eating, emotional eating, or binge eating) for each two-way ANOVA.

The 2 x 2 ANOVA examining the effects of the level of attentional impulsivity and perceived stress score level on uncontrolled eating revealed no significant main effects or interaction effects (hypothesis 1b not supported). The 2 x 2 ANOVA examining the effects of the level of motor impulsivity and BMI score level on uncontrolled eating revealed no significant main effects or interaction effects (hypothesis 2a not supported). The 2 x 2 ANOVA examining the effects of the level of negative urgency impulsivity and perceived stress score level on emotional eating revealed no significant main effects or interaction effects (hypotheses 3a and 4a not supported).

The 2 x 2 ANOVA examining the effects of the level of attentional impulsivity and BMI level on uncontrolled eating revealed a significant main effect for BMI, $F(1,97) = 4.20, p < .05$, partial $\eta^2 = .04$, but no significant main effect for attentional impulsivity or interaction effect (hypothesis 1a partially supported). The main effect for BMI indicated that overweight/obese participants had higher mean scores on uncontrolled eating ($M = 20.14, SD = 6.38$) than underweight/normal weight participants ($M = 17.40, SD = 5.97$). The 2 x 2 ANOVA examining the effects of the level of negative urgency impulsivity and BMI level on emotional eating also revealed a significant main effect for BMI, $F(1,97) = 9.20, p < .01$, partial $\eta^2 = .09$, but no significant main effect for negative urgency impulsivity or interaction effect (hypothesis 4b

partially supported). The main effect for BMI indicated that overweight/obese participants had higher mean scores on emotional eating ($M = 7.53$, $SD = 3.22$) than underweight/normal weight participants ($M = 5.62$, $SD = 2.75$).

The 2 x 2 ANOVA examining the effects of the level of perceived stress and emotional eating level on uncontrolled eating revealed a significant main effect for emotional eating, $F(1,100) = 44.28$, $p < .01$, partial $\eta^2 = .31$, but no significant main effect for perceived stress or interaction effect (hypothesis 5a partially supported). The main effect for emotional eating indicated that participants scoring low in emotional eating had higher mean scores on uncontrolled eating ($M = 22.03$, $SD = 5.76$) than participants scoring high in emotional eating ($M = 14.96$, $SD = 4.50$).

The 2 x 2 ANOVA examining the effects of the level of motor impulsivity and perceived stress level on uncontrolled eating revealed a significant interaction effect, $F(1,99) = 4.97$, $p < .05$, partial $\eta^2 = .05$, but no significant main effect for motor impulsivity or perceived stress (hypothesis 2b supported).

Table 7

Analysis of Variance in Uncontrolled Eating as a Function of Motor Impulsivity and Perceived Stress

Variable	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Motor impulsivity	6.59	1	6.59	.18	.68
Perceived stress	10.84	1	10.84	.29	.59
Motor impulsivity x perceived stress	187.33	1	187.33	4.97	.03
Error	3729.83	99	37.68		
Total	40411.63	103			

Note. SS = sum of squares; df = degree of freedom; MS = mean square.

A one-way ANOVA comparing four groups (i.e., low stress/low motor impulsivity; low stress/high motor impulsivity; high stress/low motor impulsivity; high stress/high motor impulsivity) indicated a marginally significant difference between groups on uncontrolled eating, $F(3,102) = 2.56, p >.05$. Post hoc comparisons of the means (displayed in Table 7 and Figure 1) using Least Significant Difference test indicated that uncontrolled eating scores for participants with low motor impulsivity differed significantly as a function of perceived stress, with higher uncontrolled eating scores among those with high perceived stress ($M = 21.00, SD = 5.81$) compared to those with low perceived stress ($M = 17.42, SD = 5.72$). Uncontrolled eating scores did not differ as a function of perceived stress among participants with high motor impulsivity.

Table 8

Means and Standard Deviations for Motor Impulsivity and Perceived Stress on Uncontrolled Eating

Condition	<i>M</i>	<i>SD</i>	<i>n</i>
low stress/low motor impulsivity	17.42	5.72	41
low stress/high motor impulsivity	19.76	7.40	17
high stress/low motor impulsivity	21.00	5.81	28
high stress/high motor impulsivity	17.57	6.29	17

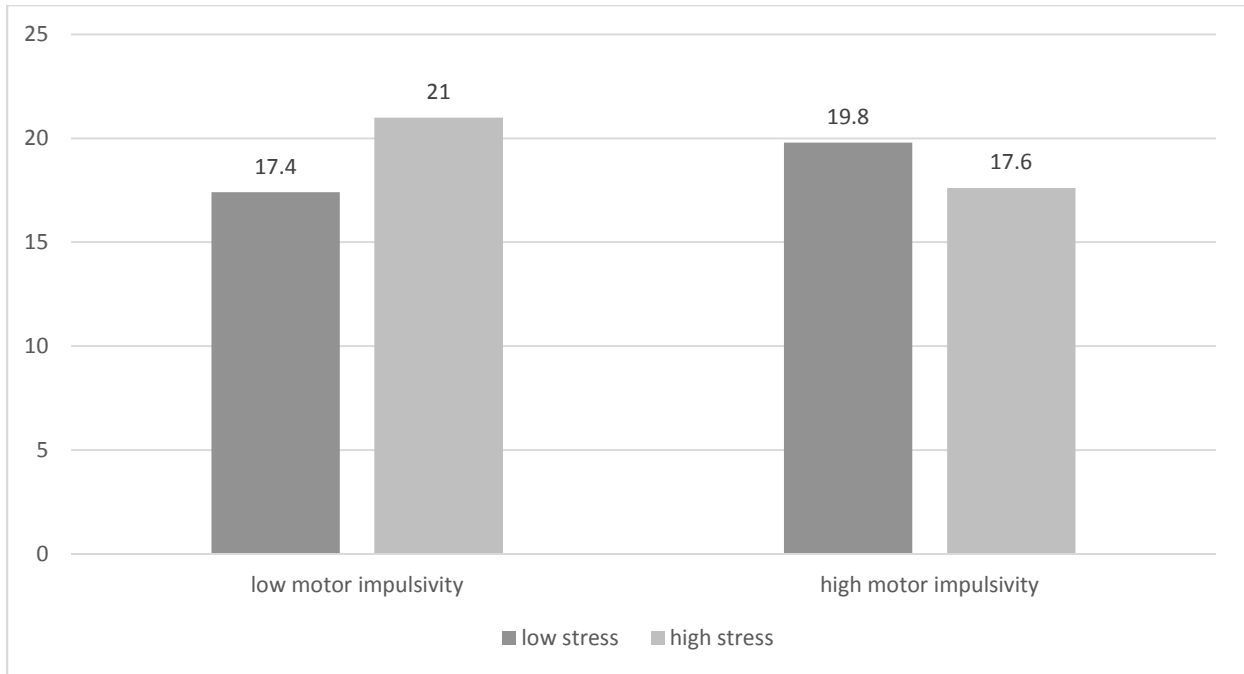


Figure 1: Uncontrolled eating as a function of motor impulsivity and perceived stress.

The 2 x 2 ANOVA examining the effects of the level of total impulsivity and perceived stress level on binge eating revealed a significant interaction effect, $F(1,99) = 7.31, p < .01$, partial $\eta^2 = .07$, but no significant main effect for total impulsivity or perceived stress (hypothesis 6b supported).

Table 9

Analysis of Variance in Binge Eating as a Function of Total Impulsivity and Perceived Stress

Variable	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Total impulsivity	.31	1	.31	.01	.94
Perceived stress	222.27	1	222.27	3.74	.06
Total impulsivity x perceived stress	434.15	1	434.15	7.31	.01
Error	5881.20	99	59.41		
Total	14237.24	103			

Note. SS = sum of squares; df = degree of freedom; MS = mean square.

A one-way ANOVA comparing four groups (i.e., low stress/low total impulsivity; low stress/high total impulsivity; high stress/low total impulsivity, high stress/high total impulsivity) indicated a significant difference between groups on binge eating, $F(3,102) = 3.91, p = .01$. Post hoc comparisons of the means (displayed in Table 8 and Figure 2) using the Least Significant Difference test indicated that binge eating scores for participants with low total impulsivity differed significantly as a function of perceived stress, with higher binge eating scores among those with high perceived stress ($M = 13.00, SD = 8.80$) compared to those with low perceived stress ($M = 5.65, SD = 5.13$). Binge eating scores did not differ as a function of perceived stress among participants with high total impulsivity. Binge eating scores for participants with low perceived stress differed significantly as a function of total impulsivity, with higher binge eating scores among those with high total impulsivity ($M = 10.05, SD = 7.82$) compared to those with low total impulsivity ($M = 5.65, SD = 5.13$). Binge eating scores did not differ as a function of total impulsivity among participants with high perceived stress.

Table 10

Means and Standard Deviations for Total Impulsivity and Perceived Stress on Binge Eating

Condition	<i>M</i>	<i>SD</i>	<i>n</i>
low stress/low total impulsivity	5.65	5.13	37
low stress/high total impulsivity	10.05	7.82	21
high stress/low total impulsivity	13.00	8.80	17
high stress/high total impulsivity	8.83	9.57	28

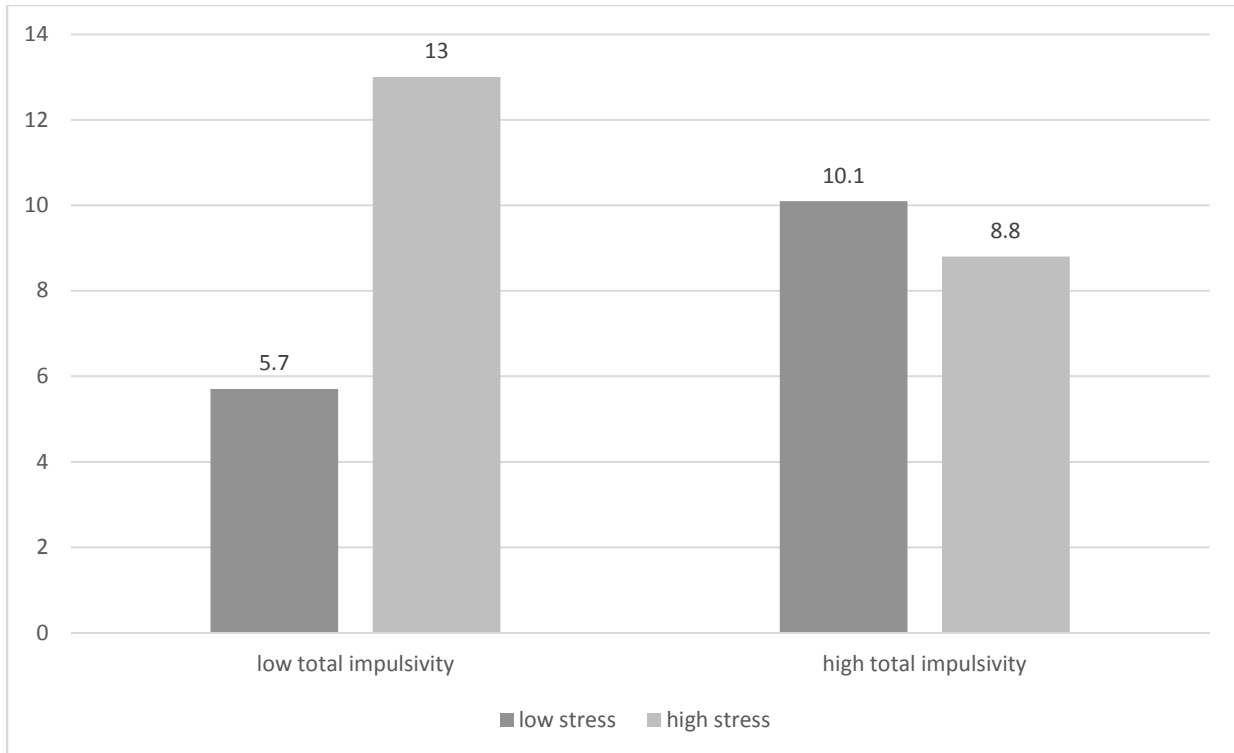


Figure 2. Binge eating as a function of total impulsivity and perceived stress.

DISCUSSION

A couple of major findings came from this study. The first major finding concerns the effect that stress had on binge eating behavior when total impulsivity was factored into the equation. Specifically, it was discovered that high perceived stress exerted significant influence on binge eating behavior, but only among participants who rated low in total impulsivity. Among participants rated higher in total impulsivity, however, stress appears to have a much-reduced, non-significant effect. Second, the same pattern was found on examination of the interaction motor impulsivity and perceived stress on uncontrolled eating; high perceived stress was associated with more uncontrolled eating, but only among participants who rated low in motor impulsivity. Together, these findings suggest that in order to fully understand the impact that stress and impulsiveness have on eating behavior, these two factors need to be examined together when researching disordered eating.

Because of the small number of male participants, statistical comparisons between men and women could not be conducted. However, non-statistical examination of the mean scores suggests the possibility of differences between men and women on some of the study variables. In particular, it appears that mean sensation seeking scores for men and, alternately, mean perceived stress scores and emotional eating scores for women were each slightly more than half a SD above the means scores of the same subscales of the opposite sex. Comparisons of other mean scores by gender suggest little difference between the sexes, although it should be noted that, generally speaking, mean scores for traits of impulsivity appear to be slightly elevated among men, whereas mean scores for disordered eating behavior appear slightly elevated among women, but not enough in either case to suggest measurable differences exist.

Therefore, beyond the significant interaction between total impulsivity and perceived stress on binge eating behavior, the significant interaction between motor impulsivity and

perceived stress on uncontrolled eating, and the suggestion that measurable sex-difference among impulsiveness and eating indices might exist, this study's findings proved to be relatively unremarkable on the balance. This was surprising. Results from the existing, interconnecting literature on stress, obesity, impulsiveness, and eating behavior were suggestive of a variegated mosaic, a kaleidoscope of interrelatedness that hinted at the promise of the *eureka!*

Unfortunately, many an expected relationship between two or more of these variables just did not materialize. More specifically, I predicted a number of correlations, main effects, and moderating relationships that failed to show up in the data in substantial ways where eating behavior and stress were concerned. The literature on stress eating suggested a clear and consistent pattern of eating both greater quantities and less healthy foods during periods of emotional stress—as was demonstrated in this study with the positive correlation between perceived stress and uncontrolled eating and the interaction of perceived stress and total impulsivity on binge eating. However, the numerous ANOVAs found no other significant main effects between stress and either uncontrolled or emotional eating, and only one predicted correlation between stress and eating behavior—perceived stress and uncontrolled eating—proved significant.

What's more, I also expected to see significant positive correlations between the various measures of trait impulsivity and eating behaviors, especially when examining the kind of frenetic, uncareful eating patterns one might expect to see in those who engage in disordered eating. Instead, more often than not the findings suggested both tepid and weak relationships—at best—between and among the different variables of these two main behavioral categories. Of the various forms of impulsivity measured, only negative urgency impulsivity showed a consistent pattern of significant positive association with the disordered eating behaviors examined in this study. Positive urgency impulsivity was moderately associated with uncontrolled eating, but not

to binge eating nor emotional eating, and none of the other impulsivity scores were associated with any of the eating behavior scores.

Other unexpected results include two sets of interactions. That is not to say the results themselves were unexpected, merely that other interactions had been anticipated based on an examination of the literature—interactions that never came to fruition. Of the two significant interactions found, the first indicated a marginally significant difference between groups on uncontrolled eating. Post hoc comparisons of the means (displayed in Table 8 and Figure 1) indicated that uncontrolled eating scores for participants with low motor impulsivity differed significantly as a function of perceived stress, with higher uncontrolled eating scores among those with high perceived stress compared to those with low perceived stress. Uncontrolled eating scores did not differ as a function of perceived stress among participants with high motor impulsivity.

The second interaction, which was written about previously at the outset of this section, indicated a significant difference between groups on binge eating. Post hoc comparisons of the means (displayed in Table 9 and Figure 2) indicated that binge eating scores for participants with low total impulsivity differed significantly as a function of perceived stress, with higher binge eating scores among those with high perceived stress compared to those with low perceived stress, but binge eating scores did not differ as a function of perceived stress for those with high total impulsivity.

Not all results were unexpected, however. In fact, a few came through in very clear and expected directions. Specifically, the study found that the relationship between emotional eating and binge eating was both strong and significant, as was the relationship (perhaps not surprisingly) between binge eating and uncontrolled eating. Stronger still was the correlation between uncontrolled eating and emotional eating. Expected, too, was the relationship between

attentional and motor impulsivity, which was demonstrably strong. The same was true of negative urgency and positive urgency. That said, although these were expected, it cannot be said that these were momentous findings.

The resulting analysis provided more than a couple surprises, too. For example, uncontrolled eating proved to be more strongly correlated to urgency, both positive and negative, than binge eating was to either type of urgency, despite uncontrolled eating and binge eating being conceptually related. This was definitely a curious finding. Another oddity found in the data was the correlation between the two types of urgency and perceived stress.

Limitations

This study has a number of limitations. To begin with, the study design was retrospective and cross-sectional, prohibiting causal interpretations of the relationships observed. Likewise, all data were self-reported and subject to the limitations of self-report data, including "the obvious potential for self-serving bias [of the rater] or for distortions of self-perception" (Meltzoff, 1998, p. 107). Furthermore, the study consisted of a relatively small, self-selected convenience sample ($N = 104$) of students drawn from the University of West Florida's psychology research pool. Beyond the serious limitation of the small sample size limiting statistical power to detect small effects, the sample may suffer from selection bias and volunteer bias that limits external validity. This necessarily presupposes certain sample characteristics and related limitations, in particular that the sample will disproportionately be composed of participants who are interested in psychology, and who are young, healthy, Caucasian, female, well-educated, and of middle class or higher socioeconomic status—assumptions which were more or less supported by the actual sample obtained: The sample was young (average age of 24), disproportionately female (4:1 female to male ratio), mostly Caucasian (73%), well-educated, and more than 80% worked either part-time or not at all, suggesting most had access to substantial financial support. Because of

these apparent limitations, generalizing the results obtained in this study to the general population with significant confidence would not be possible. In particular, the relative paucity of male participants in the sample limited the ability to examine differences between groups and weakens confidence in the conclusions, particularly when comparing male results to those found among females. Taken together, these limitations inspire a need for this study to be replicated, with special effort taken to increasing the overall number of participants in the sample, and especially, males.

Future Directions

In order to have improved overall generalizability, several hundred more participants—especially males, and people of racial or ethnic minority status—would need to have been included in the study. For this reason alone, this study should be replicated in the future. Other things to consider including in future studies are self-report scales designed to assess both participants' sensitivity to punishment and to reward, as well as one that measures general emotional affect to determine participants' mood. Such scales would be useful in investigating in greater detail the relationship between emotional states and eating behaviors—a relationship the importance of which has already been highlighted by existing literature (Berg et al, 2013; Mobbs et al., 2010; Waxman, 2009).

Another future study ought to investigate the relationship between impulsivity and eating behaviors among men alone. To date, men are significantly underrepresented in the research literature on disordered eating. To that end, the study of disordered eating behavior—and contributing factors such as stress and impulsiveness—in men is necessary to increase our understanding of the effects of disordered eating behavior on the long-term health and well-being of adults overall. Future study in this area is necessary to fill in current gaps in the body of scientific knowledge surrounding the role that psychological characteristics such as

impulsiveness and stress play on the relationship with eating behavior among overweight and obese men.

Despite mounting evidence connecting the traits of impulsivity and states of stress to eating behaviors that contribute to obesity, and the subsequent outcomes of obesity on health, wellness, and longevity, there are still gaps in the research literature surrounding these three phenomena that warrant exploration. O'Connor et al. (2008) point out the relative shortage of research conducted on disinhibition, and its moderating role on the stress-eating relationship. Additionally, given what is now known about the longitudinal effects of obesity and associated disturbed eating patterns on morbidity and mortality, the statements made by Lundahl et al. (2015) that disordered eating is common among college-age people are, to put it mildly, disconcerting. Lundahl and colleagues (2015) also pointed out, in light of the strong evidence connecting impulsivity with clinically-significant disturbed eating behaviors, how important it is to identify and study those people whose disturbed eating behaviors have not yet reached clinical significance, and to prevent eating patterns of such individuals from reaching the clinical threshold.

Conclusion

Major findings were that disordered eating behavior (i.e., binge eating and uncontrolled eating) is influenced significantly by stress, but only when participant impulsivity (total impulsivity and motor impulsivity, respectively) is low. Given the possibility of differences between men and women in impulsivity, stress, and eating behavior suggested by the mean scores for the sample, these findings may be more readily applied to women than to men. Even so, these findings may not generalize beyond college student populations. Future research should examine these relationships in separate samples of men and women, or large mixed samples that allow for comparisons of men and women.

REFERENCES

- Anderson, M. (2018, October 26). *What is Disordered Eating?* Eat Right: Academy of Nutrition and Dietetics. <https://www.eatright.org/health/diseases-and-conditions/eating-disorders/what-is-disordered-eating>
- Annagur, B., Orhan, O., Ozer, A., Yalcin, N., & Tamam, L. (2015). The effects of depression and impulsivity on obesity and binge eating disorder. *Bulletin of Clinical Psychopharmacology*, 25(2), 162-170. <https://doi.org/10.5455/bcp.20130408021434>
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Publisher.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425596>
- Anglé, S., Engblom, J., Eriksson, T., Kautiainen, S., Saha, M. T., Lindfors, P., Lehtinen, M., & Rimpelä, A. (2009). Three factor eating questionnaire-R18 as a measure of cognitive restraint, uncontrolled eating and emotional eating in a sample of young Finnish females. *The International Journal of Behavioral Nutrition and Physical Activity*, 6(41). <https://doi.org/10.1186/1479-5868-6-41>
- Atalayer, D. (2018). Link between impulsivity and overeating: Biological and neurobiological perspectives. *Current Approaches in Psychiatry*, 10(2), 121-137. <https://doi.org/10.18863/pgy.358090>
- Bénard, M., Camilleri, G. M., Etilé, F., Méjean, C., Bellisle, F., Reach, G., Hercberg, S., & Péneau, S. (2017). Association Between Impulsivity and Weight Status in a General Population. *Nutrients*, 9(3), 217. <https://doi.org/10.3390/nu9030217>

- Bennett, J., Greene, G., & Schwartz-Barcott. (2013). Perceptions of emotional eating behavior. A qualitative study of college students. *Appetite*, *60*, 187-192.
<https://doi.org/10.1016/j.appet.2012.09.023>
- Berg, K. C., Peterson, C. B., Crosby, R. D., Cao, L., Crow, S. J., Engel, S. G., & Wonderlich, S. A. (2014). Relationship between daily affect and overeating-only, loss of control eating-only, and binge eating episodes in obese adults. *Psychiatry Research*, *215*(1), 185-191.
<http://dx.doi.org/10.1016/j.psychres.2013.08.023>
- Butler, G. (1993). Definitions of stress. *Occasional Paper (Royal College of General Practitioners)*, (61), 1–5.
- Centers for Disease Control and Prevention. (2020, April 3). *Defining Adult Overweight and Obesity*. <https://www.cdc.gov/obesity/adult/defining.html>
- Cha, E., Akazawa, M. K., Kim, K. H., Dawkins, C. R., Lerner, H. M., Umpierrez, G., & Dundar, S. B. (2015). Lifestyle habits and obesity progression in overweight and obese American young adults: Lessons for promoting cardiometabolic health. *Nursing and Health Sciences*, *17*, 467-475. <https://doi.org/10.1111/nhs.12218>
- Chamberlain, S. R., & Grant, J. E. (2019). Relationship between quality of life in young adults and impulsivity/compulsivity. *Psychiatry Research*, *271*, 253–258.
<https://doi.org/10.1016/j.psychres.2018.11.059>
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*, 386-396.
- Cotter, E. W., & Kelly, N. R. (2018). Stress-related eating, mindfulness, and obesity. *Health Psychology*, *37*(6), 516-525. <https://doi.org/10.1037/hea0000614>

- Cyders, M. A. & Coskunpinar, A. (2012). The relationship between self-report and lab task conceptualizations of impulsivity. *Journal of Research in Personality, 46*(1), 121-124. <https://doi.org/10.1016/j.jrp.2011.11.005>
- Cyders, M. A., Littlefield, A. K., Coffey, S., & Karyadi, K. A. (2014). Examination of a short English version of the UPPS-P Impulsive Behavior Scale. *Addictive Behaviors, 39*(9), 1372-1376. <https://doi.org/10.1016/j.addbeh.2014.02.013>
- Davis, C., Levitan, R. D., Carter, J., Kaplan, A. S., Reid, C., Curtis, C., Patte, K., & Kennedy, J. L. (2008). Personality and eating behaviors: A case-control study of binge eating disorder. *International Journal of Eating Disorders, 41*(3), 243-250. <https://doi.org/10.1002/eat.20499>
- Edman, J. L., Yates, A., Aruguete, M. S., & DeBord, K. A. (2005). Negative emotion and disordered eating among obese college students. *Eating Behaviors, 6*(4), 308-317. <https://doi.org/10.1016/j.eatbeh.2005.05.004>
- Emery, R. L., & Levine, M. D. (2017). Questionnaire and behavioral task measures of impulsivity are differentially associated with body mass index: A comprehensive meta-analysis. *Psychological Bulletin, 143*(8), 868-902. <https://doi.org/10.1037/bul0000105>
- Finkelstein, E. A., Chen, H., Prabhu, M., Trogon, J. G., & Corso, P. S. (2007). The relationship between obesity and injuries among U.S. adults. *American Journal of Health Promotion, 21*(5), 460-468.
- Fryar, C. D., Carroll, M. D., & Ogden, C. L. (2016). Prevalence of overweight and obesity among children and adolescents aged 2-19 years: United States, 1963-1965 through 2013-2014. *National Center for Health Statistics: Health E-Stats, 89*, 1-5.
- Gadalla, T. M. (2009). Eating disorders in men: A community-based study. *International Journal of Men's Health, 8*(1), 72-81. <https://doi.org/10.3149/jmh.0801.72>

- Garza, K. B., Ding, M., Owensby, J. K., & Zizza, C. A. (2016). Impulsivity and fast-food consumption: A cross-sectional study among working adults. *Journal of the Academy of Nutrition and Dietetics*, 116(1), 61-68. <https://doi.org/10.1016/j.jand.2015.05.003>
- Gormally, J., Black, S., Daston, S., & Rardin, D. (1982). The assessment of binge eating severity among obese persons. *Addictive Behaviors*, 7, 47-55.
- Hales, C. M., Carroll, M. D., Fryar, C. D., & Ogden, C. L. (2017). Prevalence of obesity among adults and youth: United States, 2015-2016. *NCHS Data Brief*, (288), 1-8.
- Harrington, E. F., Crowther, J., H., Payne Henrickson, H. C., & Mickelson, K. D. (2006). The relationships among trauma, stress, ethnicity, and binge eating. *Cultural Diversity and Ethnic Minority Psychology*, 12(2), 212-229. <https://doi.org/10.1037/1099-9809.12.2.212>
- Hays, N. P., & Roberts, S. B. (2008). Aspects of eating behaviors "disinhibition" and "restraint" are related to weight gain and BMI in women. *Obesity*, 16(1), 52-58. <https://doi.org/10.1038/oby.2007.12>
- Jasinska, A. J., Yasuda, M., Burant, C. F., Gregor, N., Khatri, S., Sweet, M., & Falk, E. B. (2012). Impulsivity and inhibitory control deficits are associated with unhealthy eating in young adults. *Appetite*, 59, 738-747. <https://doi.org/10.1016/j.appet.2012.08.001>
- Jeffery, R. W., Drewnowski, A., Epstein, L. H., Stunkard, A. J., Wilson, G. T., Wing, R. R., & Hill, D. R. (2000). Long-term maintenance of weight loss: Current status. *Health Psychology*, 19(1S), 5-16. <https://doi.org/10.1037/0278-6133.19.suppl1.5>
- Kärkkäinen, U., Mustelin, L., Raevuori, A., Kaprio, J., & Keski, R. A. (2018). Do disordered eating behaviours have long-term health-related consequences? *European Eating Disorders Review*, 26(1), 22-28. <https://doi.org/10.1002/erv.2568>
- Karlsson, J., Persson, L. -O., Sjöström, L., & Sullivan, M. (2000). Psychometric properties and factor structure of the three-factor eating questionnaire (TFEQ) in obese men and women.

- Results from the Swedish obese subjects (SOS) study. *International Journal of Obesity*, 24(12), 1715-1725.
- Kristensen, A. H., Flottemesch, T. J., Maciosek, M. V., Jensen, J., Barclay, G., Ashe, M., Sanchez, E. J., Story, M., Teutsch, S. M., & Brownson, R. C. (2014). Reducing childhood obesity through U.S. federal policy: A microsimulation analysis. *American Journal of Preventative Medicine*, 47(5), 604-612. <https://doi.org/10.1016/j.amepre.2014.07.011>
- Legenbauer, T., Müller, A., de Zwaan, M., Fischer, C., Burgmer, R., & Herpertz, S., (2018). The impact of self-reported impulsivity on the course of weight is mediated by disinhibited eating. *European Eating Disorders Review*, 26, 38-45. <https://doi.org/10.1002/erv.2563>
- Lundahl, A., Wahlstrom, L. C., Christ, C. C., & Stoltenberg, S. F. (2015). Gender differences in the relationship between impulsivity and disordered eating behaviors and attitudes. *Eating Behaviors*, 18, 120-124. <https://doi.org/10.1016/j.eatbeh.2015.05.004>
- Lyke, J. A., & Spinella, M. (2004). Associations among aspects of impulsivity and eating factors in a nonclinical sample. *International Journal of Eating Disorders*, 36(2), 229-233. <https://doi.org/10.1002/eat.20025>
- Mason, T. B., & Lewis, R. J. (2015). Assessing the role of impulsivity, food-related cognitions, BMI, and demographics in the dual pathway model of binge eating among men and women. *Eating Behaviors*, 18, 151-155. <https://doi.org/10.1016/j.eatbeh.2015.05.015>
- Mason, T. B., Smith, K. E., Lavender, J. M., & Lewis, R. J. (2018). Independent and interactive associations of negative affect, restraint, and impulsivity in relation to binge eating among women. *Appetite*, 121, 147-153. <https://doi.org/10.1016/j.appet.2017.11.099>
- Meltzoff, J. (1998). *Critical thinking about research: Psychology and related fields*. American Psychological Association.

- Mobbs, O., Crépin, C., Thiéry, C., Golay, A., & Van der Linden, M. (2010). Obesity and the four facets of impulsivity. *Patient Education & Counseling*, 79(3), 372–377. <https://doi.org/10.1016/j.pec.2010.03.003>
- Nagata, J. M., Garber, A. K., Tabler, J. L., Murray, S. B., & Bibbins-Domingo, K. (2018). Prevalence and correlates of disordered eating behaviors among young adults with overweight or obesity. *Journal of General Internal Medicine*, 33(8), 1337–1343. <https://doi.org/10.1007/s11606-018-4465-z>
- O'Connor, D. B., Jones, F., Connor, M., McMillan, B., & Ferguson, E. (2008). Effects of daily hassles and eating style on eating behavior. *Health Psychology*, 27(1, Suppl), S20-S31. <https://doi.org/10.1037/0278-6133.27.1.S20>
- Owen, N., Sparling, P. B., Healy, G. N., Dunstan, D. W., & Matthews, C. E. (2010). Sedentary behavior: emerging evidence for a new health risk. *Mayo Clinic proceedings*, 85(12), 1138–1141. <https://doi.org/10.4065/mcp.2010.0444>
- Patel, K. A., & Schlundt, D. G. (2001). Impact of moods and social context on eating behavior. *Appetite*, 36, 111-118. <https://doi.org/10.1006/appe.2000.0385>
- Roberti, J. W., Harrington, L. N., & Storch, E. A. (2006). Further psychometric support for the 10-item version of the perceived stress scale. *Journal of College Counseling*, 9(2), 135–147. <https://doi.org/10.1002/j.2161-1882.2006.tb00100.x>
- Schneiderman, N., Ironson, G., & Siegel, S. D. (2005). Stress and health: Psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology*, 1, 607–628. <https://doi.org/10.1146/annurev.clinpsy.1.102803.144141>
- Sturm, R., & Hattori, A. (2013). Morbid obesity rates continue to rise in the United States. *International Journal of Obesity*, 37(6), 887-891. <https://doi.org/10.1038/ijo.2012.159>

- Sturm, R., & Wells, K. B. (2001). Does obesity contribute as much to mortality as poverty or smoking? *Public Health, 115*, 229-235.
- Ward, A., & Mann, T. (2000). Don't mind if I do: Disinhibited eating under cognitive load. *Journal of Personality and Social Psychology, 78*(4), 753-763.
<https://doi.org/10.1037/0022-3514.78.4.753>
- Waxman, S. (2009). A systematic review of impulsivity in eating disorders. *European Eating Disorders Review, 17*, 408-425. <https://doi.org/10.1002/erv.952>
- Whiteside, S. P., Lynam, D. R., Miller, J. D., Reynolds, S. K. (2005). Validation of the UPPS Impulsive Behaviour Scale: A four-factor model of impulsivity. *European Journal of Personality, 19*(7), 559-574. <https://doi.org/10.1002/per.556>
- Yeomans, M. R., Leitch, M., & Mobini, S. (2008). Impulsivity is associated with the disinhibition but not restraint factor from the three-factor eating questionnaire. *Appetite, 50*, 469-476. <https://doi.org/10.1016/j.appet.2007.10.002>
- Yu, Y. (2016). Four decades of obesity trends among non-Hispanic whites and blacks in the United States: Analyzing the influences of educational inequalities in obesity and population improvements in education. *PloS one, 11*(11), e0167193.
<https://doi.org/10.1371/journal.pone.0167193>
- Yu, Z., & Tan, M. (2016). Disordered eating behaviors and food addiction among nutrition major college students. *Nutrients, 8*(11), 673. <https://doi.org/10.3390/nu8110673>

APPENDICES

Appendix A
Health Questionnaire

Health Questionnaire Informed Consent

The purpose of this graduate student research is to examine relationships among behaviors and personal characteristics, such as diet and exercise, stress, and health status. I am asking students of the University of West Florida to complete this electronic health survey. Specifically, you will be asked to complete several health- and behavior-related questionnaires on the survey site, Qualtrics.

The potential benefits of this study are that you will help to contribute to science related to health and psychology, and that you can earn Argo points for participating or completing an alternative assignment. Although your family and personal health information will be collected, this information will be kept strictly confidential. It may take up to 30 minutes to complete the various questionnaires. Your responses will be kept in a password-protected electronic format inside a lock-and-key protected room, accessible only by the researcher and his advisor. Also, your personally identifiable responses and information will be kept confidential. The results of this study will be used for scholarly purposes only and may be published. Based on your responses, you may be contacted by email and invited to participate in another study.

By clicking YES below, you acknowledge that you have read this information, certify that you are aged 18 years or older, and voluntarily agree to participate in this research. You are free to discontinue your participation at any time without penalty. If you have any questions, feel free to contact me, Tim Jorgenson, at tj31@students.uwf.edu.

Yes No

Please provide your first and last name, and your UWF email address in the text boxes provided below:

First Name: _____

Last Name: _____

Email Address: _____

What is your current age?

Under 18	24	31	38	45
18	25	32	39	46
19	26	33	40	47
20	27	34	41	48
21	28	35	42	49
22	29	36	43	50
23	30	37	44	Over 50

What is your race/ethnicity?

White/Caucasian	Hispanic/Latino	Pacific Islander/Native Hawaiian
Black/African American	Native American/American Indian	Multiracial
Asian	Native Alaskan/Inuit	Other _____

What is your current employment status?

Full Time (32+ hours/week) Part Time (Fewer than 32 hours/week) Unemployed

What is your highest current educational attainment?

Less than High School Graduate	Four Year/Bachelor's Degree
High School/GED	Some Graduate Coursework
Vocational/Technical School	Master's Degree
Some College	Doctoral/Professional Degree
Associate Degree	Doctoral/Professional Degree+

What is your current relational/marital status?

Single	Engaged	Widowed/Widower
Dating/Looking Attached	Married	
	Divorced	

What is your sex/gender?

Male	Transgender: Female to Male	Gender Fluid/Nonbinary
Female	Transgender: Male to Female	

What is your sexual orientation?

Heterosexual (Straight)	Bisexual
Homosexual (Gay/Lesbian)	Questioning/Unsure

How tall are you?

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

Feet:

Inches:

How much do you weight (in pounds)? _____

How would you rate your overall health?

Excellent Very Good	Good Fair	Poor
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Are you currently under the care of a medical professional for any chronic medical conditions?

No Yes

On average, how much vigorous exercise (with sweating, heavy breathing, elevated heartrate) do you get in a typical week?

Less than 30 mins/week	91-120 mins/week
31-60 mins/week	121-150 mins/week
61-90 mins/week	More than 150 mins/week

Do you now or have you ever used tobacco products on a daily basis for longer than one month?

No, I have never used tobacco products on a daily basis

Yes, I used tobacco products on a daily basis in the past but no longer

Yes, I currently use tobacco products on a daily basis

On how many days in the past month did you consume any alcoholic beverages?

0 Days	4-7 Days	16-23 Days
1-3 Days	8-15 Days	24-31 Days

On how many days in the past month did you consume 5 or more alcoholic beverages in one sitting?

0 Days	4-7 Days	16-23 Days
1-3 Days	8-15 Days	24-31 Days

Do you now or have you ever used drugs, either legally prescribed or illicitly obtained, for recreational purposes?

No, I have never used any drug for recreational purposes

Yes, I have used drugs for recreational purposes in the past but not currently

Yes, I currently use drugs for recreational purposes (i.e., in the past month)

On how many days in the past month did you use 1 or more drug(s), either legally prescribed or illicitly obtained, for recreational purposes?

0 Days 4-7 Days 16-23 Days

1-3 Days 8-15 Days 24-31 Days

Do you know what your cholesterol level is?

No Yes - It's within normal range

Yes - It's low Yes - It's high

Do you now have, or have you ever been told you have, high blood pressure (hypertension)?

No Yes

Do you now have, or have you ever been told you have, a thyroid condition (hyper-/hypothyroidism)?

No Yes - Hypothyroidism (Low values) Yes - Hyperthyroidism (High values)

Do you have diabetes?

No Maybe - I've been diagnosed as Pre-Diabetic

Yes - Since birth (Type 1) Yes - Acquired later/"adult onset" (Type 2)

What, if any, food allergies do you have? (Check all that apply)

I don't have any food allergies	Cow's milk	Wheat	Other
Tree nuts	Eggs	Soy	
Peanuts	Fish	Shellfish	

Have been on a reduced-calorie diet at any time during the last 30 days?

No Yes

How long has it been since your most recent attempt at dieting?

Have never dieted 3-6 months ago 12-24 months ago

< 3 months ago 6-12 months ago More than 2 years ago

To what degree have you struggled throughout your life to maintain a desired/ideal weight?

Continuously Occasionally Not at all

Frequently Rarely

How many times throughout your life have you gone on a diet for the purpose of losing weight?

Never 3-5 times

1-2 times More than 6 times

How old were you the first time you dieted with the intent to lose weight?

Have never dieted 12-17 years old 23-30 years old

Under 12 years of age 18-22 years old Older than 30 years of age

Do you identify as a strict vegetarian or vegan?

No Yes

Is there a known history of any of the following medical conditions occurring in your biological family? (Check all family members that apply for each condition)

	Mother/ Father	Brother/Sister	Grandmother/Grand father	Aunt/Uncle	N/A; No Family Member
Type 1 Diabetes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Type 2 Diabetes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High cholesterol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stroke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hypertension/Hig h Blood Pressure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Heart Attack	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Obesity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eating Disorder	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Substance Abuse/ Alcoholism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hypo- /Hyperthyroidism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The fourth block of questions concern your perception of your own internal stress levels:

Your Perceived Stress

The statements in this section ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by selecting how often you felt or thought a certain way

In the LAST MONTH, how often have you...

	Never	Almost Never	Sometimes	Fairly Often	Very Often
...been upset because of something that happened unexpectedly?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...felt that you were unable to control the important things in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...felt nervous and “stressed”?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...felt confident about your ability to handle your personal problems?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...felt that things were going your way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...found that you could not cope with all the things that you had to do?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...been able to control irritations in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...felt that you were on top of things?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...been angered because of things that were outside of your control?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...felt difficulties were piling up so high that you could not overcome them?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The fifth block of questions concern your own relationship to food and appetite:
Please read each statement and select from the multiple choice options the answer that indicates the frequency with which you find yourself feeling or experiencing what is being described in the statements below.

	Definitely True	Mostly True	Mostly False	Definitely False
When I smell delicious food, I find it very difficult to keep from eating, even if I have just finished a meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I deliberately take small helpings as a means of controlling my weight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I feel anxious, I find myself eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes when I start eating, I just can't seem to stop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being with someone who is eating often makes me hungry enough to eat also	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I feel blue, I often overeat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I see a real delicacy, I often get so hungry that I have to eat right away	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get so hungry that my stomach often seems like a bottomless pit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am always hungry, so it is hard for me to stop eating before I finish the food on my plate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I feel lonely, I console myself by eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consciously hold back at meals in order not to weight gain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not eat some foods because they make me fat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am always hungry enough to eat at any time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How often do you feel hungry?

- | | |
|-----------------------------|-------------------------|
| (1) Only at mealtimes | (3) Often between meals |
| (2) Sometimes between meals | (4) Almost always |

How frequently do you avoid “stocking up” on tempting foods?

- | | |
|------------------|-----------------------|
| (1) Almost Never | (3) Moderately Likely |
| (2) Seldom | (4) Almost Always |

How likely are you to consciously eat less than you want?

- | | |
|---------------------|-----------------------|
| (1) Unlikely | (3) Moderately Likely |
| (2) Slightly Likely | (4) Very Likely |

Do you go on eating binges though you are not hungry?

- | | |
|------------|--------------------------|
| (1) Never | (3) Sometimes |
| (2) Rarely | (4) At least once a week |

On a scale of 1 to 8, where 1 means NO RESTRAINT in eating (eating whatever you want, whenever you want it) and 8 means TOTAL RESTRAINT (constantly limiting food intake and never “giving in”), what number would you give yourself? _____

The sixth block of questions assesses your own tendencies toward impulsiveness.

Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement. Be sure to indicate your agreement or disagreement for every statement below.

	Agree Strongly (1)	Agree Some (2)	Disagree Some (3)	Disagree Strongly (4)
I generally like to see things through to the end	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My thinking is usually careful and purposeful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am in a great mood, I tend to get into situations that could cause me problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfinished tasks really bother me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to stop and think things over before I do them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I feel bad, I will often do things I later regret in order to make myself feel better now	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Once I get going on something I hate to stop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I quite enjoy taking risks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend to lose control when I am in a great mood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I finish what I start	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend to value and follow a rational, "sensible" approach to things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am upset I often act without thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

When I feel rejected, I will often say things that I later regret

I would like to learn to fly an airplane

Others are shocked or worried about the things I do when I am feeling very excited

I would enjoy the sensation of skiing very fast down a high mountain slope

I usually think carefully before doing anything

I tend to act without thinking when I am really excited

The following block of statements concern body image. Thinking about your feelings about your appearance over the PAST FOUR WEEKS, please answer the following questions:

	Never	Rarely	Sometimes	Often	Very Often	Always
Has feeling bored made you brood about your shape?						
Have you been so worried about your shape that you have been feeling that you ought to diet?						
Have you thought that your thighs, hips or bottom are too large for the rest of you?						
Have you been afraid that you might become fat (or fatter)?						
Have you worried about your flesh not being firm enough?						
Has feeling full (e.g., after eating a large meal) made you feel fat?						
Have you felt so bad about your shape that you have cried?						
Have you avoided running because your flesh might wobble?						
Has being with thin women made you feel self-conscious about your shape?						

Have you worried about your thighs spreading out when sitting down?						
Has eating even a small amount of food made you feel fat?						
Have you noticed the shape of other women and felt that your own shape compared unfavorably?						
Has thinking about your shape interfered with your ability to concentrate (e.g., while watching television, reading, or listening to conversations)?						
Has being naked, such as when taking a bath, made you feel fat?						
Have you avoided wearing clothes which make you particularly aware of the shape of your body?						
Have you imagined cutting off fleshy areas of your body?						
Has eating sweets, cakes, or other high-calorie food made you feel fat?						
Have you not gone out to social occasions (e.g., parties) because you have felt bad about your shape?						
Have you felt excessively large and rounded?						
Have you felt ashamed of your body?						
Has worry about your shape made you diet?						
Have you felt happiest about your shape when your stomach has been empty (e.g., in the morning)?						
Have you thought that you are the shape you are because you lack self-control?						
Have you worried about other people seeing rolls of flesh around your waist or stomach?						
Have you felt that it is unfair that other women are thinner than you?						
Have you vomited in order to feel thinner?						
When in company have you worried about taking up too much room (e.g., sitting on a sofa or a bus seat)?						
Have you worried about your flesh being dimply?						

Has seeing your reflection (e.g., in a mirror or shop window) made you feel bad about your shape?						
Have you pinched areas of your body to see how much fat there is?						
Have you avoided situations where people could see your body (e.g., communal changing rooms or swimming baths)?						
Have you taken laxatives in order to feel thinner?						
Have you been particularly self-conscious about your shape when in the company of other people?						
Has worry about your shape made you feel you ought to exercise?						

The following statements concern your behavior, thoughts, and feelings toward eating. Please select the response for each group that best describes your experience.

Group 1:

- A. I don't feel self-conscious about my weight or body size when I'm with others.
- B. I feel concerned about how I look to others, but it normally does not make me feel disappointed with myself.
- C. I do get self-conscious about my appearance and weight which makes me feel disappointed in myself.
- D. I feel very self-conscious about my weight and frequently, I feel intense shame and disgust for myself. I try to avoid social contacts because of my self-consciousness.

Group 2:

- A. I don't have any difficulty eating slowly in the proper manner.
- B. Although I seem to "gobble down" foods, I don't end up feeling stuffed because of eating too much.
- C. At times, I tend to eat quickly and then, I feel uncomfortably full afterwards.
- D. I have the habit of bolting down my food, without really chewing it. When this happens I usually feel uncomfortably stuffed because I've eaten too much.

Group 3:

- A. I feel capable to control my eating urges when I want to.
- B. I feel like I have failed to control my eating more than the average person.
- C. I feel utterly helpless when it comes to feeling in control of my eating urges.

D. Because I feel so helpless about controlling my eating I have become very desperate about trying to get in control.

Group 4:

- A. I don't have the habit of eating when I'm bored.
- B. I sometimes eat when I'm bored, but often I'm able to "get busy" and get my mind off food.
- C. I have a regular habit of eating when I'm bored, but occasionally, I can use some other activity to get my mind off eating.
- D. I have a strong habit of eating when I'm bored. Nothing seems to help me break the habit.

Group 5:

- A. I'm usually physically hungry when I eat something.
- B. Occasionally, I eat something on impulse even though I really am not hungry.
- C. I have the regular habit of eating foods, that I might not really enjoy, to satisfy a hungry feeling even though physically, I don't need the food.
- D. Even though I'm not physically hungry, I get a hungry feeling in my mouth that only seems to be satisfied when I eat a food, like a sandwich, that fills my mouth. Sometimes, when I eat the food to satisfy my mouth hunger, I then spit the food out so I won't gain weight.

Group 6:

- A. I don't feel any guilt or self-hate after I overeat.
- B. After I overeat, occasionally I feel guilt or self-hate.
- C. Almost all the time I experience strong guilt or self-hate after I overeat.

Group 7:

- A. I don't lose total control of my eating when dieting even after periods when I overeat.
- B. Sometimes when I eat a "forbidden food" on a diet, I feel like I "blew it" and eat even more.
- C. Frequently, I have the habit of saying to myself, "I've blown it now, why not go all the way" when I overeat on a diet. When that happens I eat even more.
- D. I have a regular habit of starting strict diets for myself, but I break the diets by going on an eating binge. My life seems to be either a "feast" or "famine."

Group 8:

- A. I rarely eat so much food that I feel uncomfortably stuffed afterwards.
- B. Usually about once a month, I eat such a quantity of food, I end up feeling very stuffed.
- C. I have regular periods during the month when I eat large amounts of food, either at mealtime or at snacks.
- D. I eat so much food that I regularly feel quite uncomfortable after eating and sometimes a bit nauseated.

Group 9:

- A. My level of calorie intake does not go up very high or go down very low on a regular basis.
- B. Sometimes after I overeat, I will try to reduce my caloric intake to almost nothing to compensate for the excess calories I've eaten.
- C. I have a regular habit of overeating during the night. It seems that my routine is not to be hungry in the morning but overeat in the evening.
- D. In my adult years, I have had week-long periods where I practically starve myself. This follows periods when I overeat. It seems I live a life of either "feast or famine."

Group 10:

- A. I usually am able to stop eating when I want to. I know when "enough is enough."
- B. Every so often, I experience a compulsion to eat which I can't seem to control.
- C. Frequently, I experience strong urges to eat which I seem unable to control, but at other times I can control my eating urges.
- D. I feel incapable of controlling urges to eat. I have a fear of not being able to stop eating voluntarily.

Group 11:

- A. I don't have any problem stopping eating when I feel full.
- B. I usually can stop eating when I feel full but occasionally overeat leaving me feeling uncomfortably stuffed.
- C. I have a problem stopping eating once I start and usually I feel uncomfortably stuffed after I eat a meal.
- D. Because I have a problem not being able to stop eating when I want, I sometimes have to induce vomiting to relieve my stuffed feeling.

Group 12:

- A. I seem to eat just as much when I'm with others (family, social gatherings) as when I'm by myself.
- B. Sometimes, when I'm with other persons, I don't eat as much as I want to eat because I'm self-conscious about my eating.
- C. Frequently, I eat only a small amount of food when others are present, because I'm very embarrassed about my eating.
- D. I feel so ashamed about overeating that I pick times to overeat when I know no one will see me. I feel like a "closet eater."

Group 13:

- A. I eat three meals a day with only an occasional between meal snack.
- B. I eat 3 meals a day, but I also normally snack between meals.
- C. When I am snacking heavily, I get in the habit of skipping regular meals.
- D. There are regular periods when I seem to be continually eating, with no planned meals.

Group 14:

- A. I don't think much about trying to control unwanted eating urges.

- B. At least some of the time, I feel my thoughts are pre-occupied with trying to control my eating urges.
- C. I feel that frequently I spend much time thinking about how much I ate or about trying not to eat anymore.
- D. It seems to me that most of my waking hours are pre-occupied by thoughts about eating or not eating. I feel like I'm constantly struggling not to eat.

Group 15:

- A. I don't think about food a great deal.
- B. I have strong cravings for food but they last only for brief periods of time.
- C. I have days when I can't seem to think about anything else but food.
- D. Most of my days seem to be preoccupied with thoughts about food. I feel like I live to eat.

Group 16:

- A. I usually know whether or not I'm physically hungry. I take the right portion of food to satisfy me.
- B. Occasionally, I feel uncertain about knowing whether or not I'm physically hungry. At these times it's hard to know how much food I should take to satisfy me.
- C. Even though I might know how many calories I should eat, I don't have any idea what is a "normal" amount of food for me.

Debrief Form

Thank you for participating in this study. The purpose of this graduate student research was to examine relationships among personal characteristics, health status, and health behaviors, such as diet, exercise, and stress.

Remember, the data we have gathered from you, including your personally identifiable responses and information, will be kept strictly confidential, and will be held in a password-protected, electronic format, accessible only by the researcher and his advisor.

You may be eligible to participate in one related, laboratory study of stress and stress-recovery. If you are eligible to participate in this (one) other study, we will send an invitation to participate via your campus email unless you choose to opt out from further participation by indicating below. Under no circumstances would your participation in this study result in any other email communication beyond this one invitation to participate in one other study.

Check the box below if you do NOT wish to be invited to participate in the next study.

NO, I do NOT wish to be invited to participate in a related study

Appendix B

Institutional Review Board Approval

Mr. Tim Jorgenson

December 17, 2019

Dear Mr. Jorgenson:

The Institutional Review Board (IRB) for Human Research Participants Protection has completed its review of your proposal number IRB 2020-107 titled, "Stress x Impulsiveness x Unrestrained eating," as it relates to the protection of human participants used in research, and granted approval for you to proceed with your study on 11-20-2019. As a research investigator, please be aware of the following:

- * You will immediately report to the IRB any injuries or other unanticipated problems involving risks to human participants.
- * You acknowledge and accept your responsibility for protecting the rights and welfare of human research participants and for complying with all parts of 45 CFR Part 46, the UWF IRB Policy and Procedures, and the decisions of the IRB. You may view these documents on the Research and Sponsored Programs web page at <http://research.uwf.edu>. You acknowledge completion of the IRB ethical training requirements for researchers as attested in the IRB application.
- * You will ensure that legally effective informed consent is obtained and documented. If written consent is required, the consent form must be signed by the participant or the participant's legally authorized representative. A copy is to be given to the person signing the form and a copy kept for your file.
- * You will promptly report any proposed changes in previously approved human participant research activities to Research and Sponsored Programs. The proposed changes will not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the participants.
- * **You are responsible for reporting progress of approved research to Research and Sponsored Programs at the end of the project period 09-30-2020. If the data phase of your project continues beyond the approved end date, you must receive an extension approval from the IRB.**
- * If using electronic communication for your study, you will first obtain approval from the authority listed on the following web page:
<https://uwf.edu/offices/institutional-communications/resources/broadcast-distribution-standards/>.

Good luck in your research endeavors. If you have any questions or need assistance, please contact Research and Sponsored Programs at 850-857-6203 or irb@uwf.edu.

Sincerely,



Dr. Matthew Schwartz, Assistant Vice President
Research Administration



Dr. Carla Thompson, Chair, IRB for
Human Research Participant Protection

