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Biopsychosocial Markers of Impulsive Eating and Emotional Eating

Lucia Foster-Engen
Walden University

Walden University

College of Psychology and Community Services

This is to certify that the doctoral dissertation by

Lucia Foster-Engen

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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Review Committee
Dr. Ethel Perry, Committee Chairperson, Psychology Faculty
Dr. Jesus Tanguma, Committee Member, Psychology Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2023

Abstract

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MA, Alliant International University, 2014

BS, Chapman University, 2010

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Ph.D. in Psychology

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Abstract

The purpose of this study was to investigate the interactions between biological, psychological, and social factors on impulsive and emotional eating behaviors. A quantitative correlational approach was used to examine the predictive roles of anxiety, stress, mindful attention, and disregard for future consequences on impulsive and emotional eating, as well as the relationships between mindful attention, impulsive eating, emotional awareness, and emotional eating. Additionally, moderation effects were explored, including the influence of stress on the association between emotional and impulsive eating, and the moderating role of emotional awareness in the relationship between mindful attention and emotional eating. The analysis was conducted using multiple linear regression and the Hayes Process in SPSS, with archival data from 2017, comprising an N=96. Findings reveal that stress moderated the relationship between emotional and impulsive eating, emphasizing its critical role in these behaviors. Furthermore, emotional awareness was identified as a predictor of emotional eating, while mindful attention was a key predictor of impulsive eating. Factors such as disregard for future consequences, anxiety, and stress were found to be significant predictors of emotional and impulsive eating. These findings hold implications for positive social change by promoting a more empathetic understanding of obesity and emotional eating, both at individual and societal levels if used as guidance for the development of comprehensive treatment plans within families and influence policymakers to consider a broader range of factors in public health initiatives.

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Dedication

To my daughter Paula and my husband Darel. You picked me up when I felt discouraged and cheered me on when I was fighting. I could not have done this without your unconditional love and support. I love you with all my heart. To my stepsons Kenji and Tai, you make the job of being a stepmom the easiest in the world! I love you both so much, and I am looking forward to all the free time I will now have to spend together as a family!

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Chapter 1: Introduction to the Study

The World Health Organization (WHO; 2021) states that obesity is the fifth leading cause of death globally. To improve patients' health, healthcare and mental health practitioners often suggest weight-loss interventions centered around exercise and portion control (Lacroix et al., 2019). However, emotional and impulsive eating stem from poor emotion regulation skills and inhibition control (Lacroix et al., 2019; Thayer & Lane, 2000). Therefore, the findings from this study could foster positive societal change by informing the development or refinement of weight loss interventions, potentially improving quality of life and reducing mortality. Furthermore, the findings of specific factors contributing to emotional and impulsive eating provide new insights into the medical community's perception of obese individuals. In addition, the results revealed the interplay between physiology, emotion, and behavior, which can potentially reduce the stigma that overweight patients are unwilling to put personal efforts into losing weight (Pedersen et al., 2018).

This chapter is organized as follows: It begins with an introduction to obesity as a disease, followed by an overview of the challenges obesity poses for individuals, health insurance companies, and society as a whole. I then outline the study objectives, detailing the key variables I will explore (i.e., impulsive eating, emotional eating, stress, anxiety, emotion regulation, emotional awareness, disregard for future consequence, and mindful attention), as well as identifying the moderators or predictors (e.g., independent variables) and outcome (e.g., dependent variables) variables. Chapter 1 includes the research questions and hypotheses, and the biopsychosocial model (BPSM) is introduced

as the conceptual framework underpinning this study. The chapter includes a discussion of the study's nature in which I justify my use of a quantitative design and a correlational multiple linear regression model for the study. Additionally, this chapter includes comprehensive definitions of all relevant terms and discusses the assumptions, scope, delimitations, and limitations of the study. Lastly, the chapter includes a discussion of the significance of the study, highlighting the potential contributions and implications for the field of research.

Background

Obesity is a major public health concern, as it is linked to various health problems, including diabetes, high blood pressure, and heart attacks (Pedersen et al., 2018). While many healthcare providers have focused on weight loss treatments, such as reducing portion sizes and increasing physical activity, research shows that focusing on the consequence of behavior, rather than the cause, is unlikely to result in long-term success (Pedersen et al., 2018). Therefore, it was essential to identify predictors of emotional eating behavior, such as poor emotion awareness skills, stress, and poor mindful attention skills, to address the root causes of emotional eating (Wehling & Lusher, 2019). Identifying predictors and moderators of emotional eating will also result in the development interventions that use a biopsychosocial approach, which addresses both physiological imbalances and psychosocial stressors. By taking a comprehensive approach to addressing the causes of emotional eating, more effective and sustainable interventions to prevent and treat obesity can be created.

Previous researchers have explored various features of emotional eating, including the relationship between food addiction and impulsivity (Lacroix et al., 2019) and the role of emotional and dysfunctional thoughts related to food (Wehling & Lusher, 2019). However, to the best of my knowledge, no studies have investigated the relationship between emotional eating and the variables of interest in this study, including stress, anxiety, disregard for future consequences, emotion regulation, impulsive eating, mindful attention, and emotional awareness. Although some researchers have examined the relationship between emotional eating and a subset of these variables, none have investigated all of them together. In this study, I identified the strongest predictor of emotional eating and impulsive eating by examining the relationships between these variables. In this study, I developed a deeper understanding of the factors that contribute to impulsive eating and emotional eating and inform the development of interventions that promote healthier eating behaviors while decreasing episodes of unhealthy/unwanted eating behavior.

Problem Statement

I explored the connections between emotional eating, stress, anxiety, disregard for future outcomes, emotion regulation, impulsive eating, mindful attention, and emotional awareness. Emotional eating, which contributes to obesity, is characterized by eating in response to strong emotions or when not hungry (Annesi & Johnson, 2020). The purpose of emotional eating is to manage emotional discomfort by using food as a coping strategy (Annesi & Johnson, 2020). Individuals with limited emotion regulation abilities, challenges in staying present-focused (Feingold & Zerach, 2021), and poor understanding

of the impact of their emotions on eating habits (Donofry et al., 2019) tend to overlook the negative consequences of impulsive eating (Bénard et al., 2018; Maier et al., 2021) on their health (Braden et al., 2018). When emotional eating becomes the sole strategy for managing negative emotions, it can lead to a cycle of impulsive eating, weight gain, and deteriorating overall health (Frayn et al., 2018). Furthermore, emotional eating can generate emotional distress when it spirals out of control (Bénard et al., 2018).

Typical interventions for emotional eating concentrate on pointing out mistakes and suggesting behavioral changes for weight loss (Frayn et al., 2018). However, these interventions often neglect the biopsychosocial aspects influencing impulsive and emotional eating behaviors and their impact on weight gain (Wehling & Lusher, 2019). Obesity has been linked to health issues such as diabetes, hypertension, and heart attacks (Pedersen et al., 2018), leading many healthcare providers to focus on weight loss treatments, including reducing food portions and increasing physical activity (Pedersen et al., 2018). Nevertheless, treatments targeting behavioral consequences rather than the root causes may not yield long-term success, as evidenced by weight regain within one to five years after weight loss plans (Pedersen et al., 2018). By identifying the factors that contribute to emotional eating (e.g., inadequate emotional awareness, stress, and poor mindfulness) healthcare providers may be able to address the underlying causes rather than the consequences (e.g., obesity; Wehling & Lusher, 2019). Ultimately, pinpointing these predictors could result in devising interventions that employ a biopsychosocial approach to tackle physiological imbalances and reduce psychosocial stressors.

Purpose of the Study

In this study, I investigated the complex relationship between emotional eating, stress, anxiety, disregard for future consequences, emotion regulation, impulsive eating, mindful attention, and emotional awareness. Emotional eating is a behavior that has been linked to obesity and is characterized by eating when not hungry or in response to intense emotions (Annesi & Johnson, 2020). During episodes of emotional eating, individuals attempt to regulate their emotions by using food to alleviate emotional discomfort (Annesi & Johnson, 2020). However, individuals with low emotion regulation skills, difficulty focusing their attention in the present moment (Feingold & Zerach, 2021), and poor awareness of how emotions impact their eating behavior (Donofry et al., 2019) may overlook the harmful consequences of impulsive eating (Bénard et al., 2018; Maier et al., 2021) on their health (Braden et al., 2018). This may lead to a vicious cycle of emotional and impulsive eating, potentially resulting in weight gain and poor overall health (Frayn et al., 2018). By investigating the multifaceted relationship between these variables, I developed a more comprehensive understanding of the factors contributing to emotional and impulsive eating behaviors, and to inform the development of more effective interventions.

Using a quantitative, correlational design, I expanded the knowledge in the literature by exploring the extent to which anxiety, stress, mindful attention and disregard for future consequence predicted impulsive eating, and to what extent mindful attention, impulsive eating, emotional awareness, and disregard for future consequences predicted emotional eating. Additionally, I examined whether stress moderated the relationship

between emotional eating and impulsive eating, whether emotional awareness moderated the relationship mindful attention and between emotional eating, and whether inability to regulate emotion moderated the relationship between mindful attention and emotional eating. I used a multiple linear regression to analyze the predictor/outcome model, and the model one in the Hayes Process in SPSS to test for moderator effects. I used archival data that I collected in 2017.

Research Question and Hypotheses

Research Question 1 (RQ1): To what extent does stress [moderator, ratio variable measured by the stress subscale in the depression, anxiety, and stress scale (DASS) moderate the relationship between emotional eating [independent, ratio variable measured by the emotional eating subscale on the Dutch eating behavior questionnaire (DEBQ; Appendix A)] and impulsive eating (dependent, ratio variable measured by the external eating subscale in the DEBQ; Appendix A)?

Null Hypothesis ($H_0$1): Stress is not a significant moderator in the relationship between emotional eating and impulsive eating.

Alternative Hypothesis ($H_1$1): Stress is a significant moderator in the relationship between emotional eating and impulsive eating.

Research Question 2 (RQ2): To what extent does emotional awareness [moderator, ratio variable measured by the lack of emotional awareness subscale in the difficulty in emotion regulation scale (DERS), and the diffused emotions subscale in the DEBQ; Appendix A) moderate the relationship between mindful attention [independent,

ratio variable measured by the attention and motor subscales of the Barratt impulsivity scale (BIS-11)]?

Null Hypothesis ($H_0$2): Emotional awareness is not a significant moderator in the relationship between mindful attention and emotional eating.

Alternative Hypothesis ($H_1$2): Emotional awareness is a significant moderator in the relationship between mindful attention and emotional eating.

Research Question 3 (RQ3): To what extent does inability to regulate emotion (moderator, ration variable measured by the limited access to emotion regulation strategies on the DERS) moderates the relationship between mindful attention (independent, ratio variable measured by the attention-attention and motor-motor subscales of the BIS-11) and impulsive eating (dependent, ratio variable measured by the external eating subscale in the DEBQ; Appendix A)?

Null Hypothesis ($H_0$3): Inability to regulate emotion is not a significant moderator in the relationship between mindful attention and impulsive eating.

Alternative Hypothesis ($H_1$3): Inability to regulate emotion is a significant moderator in the relationship between mindful attention and impulsive eating.

Research Question 4 (RQ4): To what extent are mindful attention (predictor, ratio variable measured by the attention-attention and motor-motor subscales of the BIS-11), impulsive eating (predictor, ratio variable measured by the external eating subscale of the DEBQ Appendix A), emotional awareness (predictor, ratio variable measured by the diffused emotion subscale of the DEBQ (Appendix A) and the lack of emotional clarity subscales in the DERS, and disregard of future consequences (predictor, ratio variable

measured by the no planning subscales of the BIS-11) predictive of emotional eating (outcome, ratio variable measured by the motional eating subscale in the DEBQ; Appendix A)?

Null Hypothesis ($H_0$4): Mindful attention, impulsive eating, emotional awareness, and disregard of future consequences are not significant predictors of emotional eating.

Alternative Hypothesis ($H_1$4): Mindful attention, impulsive eating, emotional awareness, and disregard of future consequences are significant predictors of emotional eating.

Research Question 5 (RQ5): : To what extent do anxiety (predictor, ratio variable measured by the anxiety subscale in the DASS), Stress (predictor, ratio variable measured by the stress subscale in the DASS), mindful attention (predictor, ratio variable measured by the attention-attention and motor-motor subscales of the BIS-11), and disregard of future consequences (predictor, ratio variable measured by the nonplan subscales of the BIS-11) predict impulsive eating (outcome, ratio variable measured by the external eating subscale in the DEBQ; Appendix A)?

Null Hypothesis ($H_0$5): Anxiety, stress, mindful attention, and disregard of future consequences are not significant predictors of impulsive eating.

Alternative Hypothesis ($H_1$5): Anxiety, stress, mindful attention, and disregard of future consequences are significant predictors of impulsive eating.

Theoretical Framework

George Libman Engel (1913-1999), an influential American psychiatrist and medical doctor, significantly changed how medicine approached the causes of medical

symptoms (Smith et al., 2018). At a psychiatric education conference, participants expressed an interest in reintegrating a medical model of disease into psychiatry (Engel, 1977). Engel argued that while the medical model's robust biological basis was valuable, it frequently disregarded or minimized symptoms to conform to the biomedical model's definition of what is considered disease. He was concerned that this approach might harm patients and called for a more comprehensive perspective that accounted for the individual's biological, psychological, and sociological aspects. It was then that Engel (1977) introduced the BPSM as an alternative to the biomedical model. The BPSM adopts a more holistic approach to understanding individuals, considering the interrelationships between biological, psychological, and social factors when diagnosing, treating, and managing health conditions (Kusnanto et al., 2018).

To fully comprehend the BPSM and its value to the medical and psychiatric fields, it is essential to recognize the intricate relationships among biological, psychological, and social factors within an individual's well-being and lifestyle context. The model's biological component centers on the physiological processes and mechanisms related to disease and physical health, such as high blood pressure or cholesterol. If not addressed, these conditions can evolve into severe health problems that require immediate medical intervention and cause significant disruptions to an individual's daily life (Kusnanto et al., 2018). The BPSM's psychological aspect refers to mental and emotional well-being and the interplay between emotions and behaviors. For example, individuals struggling with anxiety or stress might resort to emotional eating as

a coping mechanism, which can aggravate existing health conditions or contribute to new ones, such as weight gain or deteriorating cardiovascular health (Bolton & Gillet, 2019). The social aspect of the BPSM refers to interpersonal factors and community activities that can impact psychological well-being and, in turn, influence biological health. For example, in high-stress work situations, individuals may experience increased stress levels, leading to anxiety and emotional distress. This psychological turmoil can trigger maladaptive coping strategies, such as overeating calorie-dense foods, negatively affecting overall health by increasing blood pressure and cholesterol levels.

Although empirical evidence supports the BPSM's efficacy in enhancing treatment outcomes, its implementation in the medical field remains limited due to financial constraints (Kusnanto et al., 2018). Engel's (1977) BPSM is used as a valuable framework for studies in which researchers explore the factors contributing to health conditions and psychological disorders, as well as predictors, risk factors, and protective factors of obesity (McCabe et al., 2023; Nürnberger et al., 2022; Dams et al., 2021; Peña-Vargas et al., 2021).

In this study, I investigated numerous potential predictors and moderators of emotional and impulsive eating, including stress, anxiety, emotion regulation, emotional awareness, mindful attention, and disregard for future consequences. These variables represent biological, psychological, and social markers of impulsive and emotional eating, and using the BPSM as this proposed study’s framework provides a comprehensive understanding of the complex interplay between these factors.

Nature of the Study

I conducted a quantitative, correlational study design for this study. I explored the role of stress in moderating the connection between emotional and impulsive eating, and how emotional awareness affects the link between emotional eating and mindful attention. Furthermore, I examined how the ability to regulate emotions influenced the relationship between mindful attention and impulsive eating. Additionally, I investigated the predictive power of mindful attention, impulsive eating, future consequences disregard, and emotional awareness on emotional eating. Lastly, I assessed the extent to which anxiety, stress, mindful attention, and disregard for future consequences predicted impulsive eating.

The findings may contribute to the creation of biopsychosocial interventions that address impulsive emotional eating effectively. I selected this design to examine the relationships among the variables of interest. I used SPSS to analyze the multiple linear regression and identify the predictors of emotional eating and impulsive eating, while the Hayes Process enabled the examination of moderation effects. I used archival data that I collected in 2017. I directed participants who were interested in participating in the original study to my website, where they were given access to an online informed consent form. Upon completion of the form, participants received an online ID that would anonymously identify their entries in the study. Participants were then instructed to complete the DEBQ (Appendix A), DERS, BIS-11, and DASS online. A total of 96 participants completed all the questionnaires, and I used their scores in this study. My use of archival data in this study has both strengths and limitations. On the one hand, using

archival data can save time and resources, as the data has already been collected and is readily available (Martin-Holgado et al., 2022) Additionally, this approach can provide access to a larger and more diverse sample than might be possible with a new data collection effort (Martin-Holgado et al., 2022).

Definitions of Terms

The variables that I used in this study included anxiety, stress, emotional eating, impulsive eating, emotional awareness, mindful attention, and disregard for future consequences. In the following sections, I provide the definitions for each variable, and they are classified into categories such as independent, dependent, moderator, predictors, and outcomes, as specified in each research question.

Anxiety is a psychological state characterized by persistent worry, nervousness, or unease about uncertain outcomes (Lim et al., 2021). It often involves physical symptoms such as increased heart rate, muscle tension, and rapid breathing (Thayer & Lane, 2000). Anxiety can naturally respond to stressors or manifest as a chronic condition, significantly impacting an individual's daily functioning and well-being (Lim et al., 2021).

BPSM is an interdisciplinary approach to understanding health and illness that integrates biological, psychological, and social factors (Bolton & Gillett, 2019). Developed by psychiatrist George L. Engel in the 1970s, this model posits that an individual's health and well-being are influenced by the complex interplay of these three domains: (a) biological factors, which include genetics, biochemical imbalances, and the overall functioning of an individual's body systems; (b) psychological factors, which

encompass cognitive processes, emotions, coping mechanisms, and personality traits that influence how individuals perceive and respond to health-related issues; and (c) social factors, which involve the impact of family, relationships, culture, socio-economic status, and environmental conditions on an individual's health and well-being (Buckner et al., 2021). In medicine and mental health, the biopsychosocial model provides a more comprehensive understanding of a patient's condition by considering all relevant factors that might contribute to their illness or impact their recovery (Bolton & Gillett, 2019). This approach is used by healthcare professionals to develop holistic treatment plans that address each patient's unique needs and circumstances, resulting in more effective and personalized care (Jokinen & Hartshorne, 2022). By considering the interdependence of biological, psychological and social factors, the biopsychosocial model helps to bridge the gap between physical and mental health, promoting a more integrated approach to healthcare.

Disregard for future consequences refers to a cognitive and behavioral tendency where individuals prioritize immediate rewards or gratification over potential long-term outcomes (Pozolotina & Olsen, 2019). This pattern of decision-making often involves neglecting or underestimating the potential negative consequences of one's actions, which may result in impulsive, risky, or shortsighted choices (Macaskill et al., 2019). Disregarding future consequences can have significant implications for various aspects of life, including health, finances, relationships, and overall well-being. It may lead to poor planning and decision-making, jeopardizing long-term goals and stability (Pozolotina & Olsen, 2019).

Emotional awareness, also referred to as emotional intelligence or emotional literacy, is the ability to recognize, understand, and manage one's and those of others (Waltmann et al., 2021). This skill entails being in tune with one's emotional states and cues and those of others, accurately identifying and labeling emotions, and adapting behavior and responses accordingly (Baer et al., 2018). Emotional awareness can improve emotional regulation, stress management, empathy, and social and problem-solving skills. Emotional awareness can significantly impact emotional eating and impulsive eating behaviors (Baer et al., 2018). When individuals possess greater emotional awareness, they are more likely to recognize the triggers and underlying emotional factors contributing to these behaviors (Lattimore, 2019).

Emotional eating (EE) refers to consuming food as a means to cope with emotions rather than satisfy genuine hunger. This behavior is often triggered by stress, sadness, or boredom and typically involves indulging in comfort foods high in calories, sugar, or fat (van den Tol et al., 2018). Emotional eating can contribute to poor dietary choices, overeating, weight gain, and unhealthy food relationships. It focuses on using food as temporary relief rather than addressing the underlying emotional issues (van den Tol et al., 2018).

Emotion regulation is the ability to effectively manage and control one's emotions, adjusting their intensity and expression to suit various situations or accomplish specific goals (Andrei et al., 2018). This process encompasses a range of tactics and skills that help people to alter their emotional experiences, such as identifying and interpreting emotions, changing thoughts or beliefs, using problem-solving methods, and

implementing coping strategies (Annesi, 2018). Regulating emotions is essential for maintaining psychological well-being, cultivating healthy social connections, and navigating life's challenges. On the other hand, poor emotion regulation can lead to emotional instability, which is linked to several mental health disorders, including Anxiety, depression, and borderline personality disorder (Favieri et al., 2021),

Impulsivity is characterized by a propensity to act spontaneously without contemplating the possible ramifications of one's actions (Hudiburgh et al., 2021). This trait has been associated with various detrimental outcomes, such as substance abuse, gambling, hazardous sexual behavior, impulsive purchasing, and poor food choices (Waltmann et al., 2021). In addition, individuals with high impulsivity may exhibit difficulty in delaying gratification, making hasty decisions, and engaging in risky behaviors (Bénard et al., 2018; Andrei et al., 2018).

Impulsive eating, also called external or compulsive eating, is a pattern of consuming food based on sudden, strong urges or cravings, often without considering the consequences or one's actual hunger level (Andrei et al., 2018). This behavior is typically driven by emotional factors, stress, or environmental cues rather than physiological needs and may result in the overconsumption of unhealthy, calorie-dense foods (Maier et al., 2020). Impulsive eating can contribute to poor nutrition, weight gain, and obesity and negatively impact an individual's overall mental and physical health (Bénard et al., 2018).

Inhibition control is also known as inhibitory control, which involves the ability to suppress or override automatic, dominant responses in favor of more appropriate, goal-directed actions (Derrek et al., 2018). Inhibition control is a key component of executive

functions and is essential for self-regulation, decision-making, and adaptive behavior (Thayer et al., 2009). Inhibition control is crucial in regulating emotions, thoughts, and behaviors and is linked to various aspects of psychological well-being and health (Thayer et al., 2009).

Mindful attention refers to deliberately focusing one's awareness on the present moment while maintaining an open, non-judgmental, and accepting attitude toward one's thoughts, feelings, and bodily sensations (Verrier & Day, 2022). It is a key component of mindfulness, a mental state that promotes self-regulation, emotional well-being, and stress reduction (Kennedy et al., 2018). Practicing mindful attention helps individuals cultivate greater self-awareness, improve concentration, and develop healthier coping mechanisms to navigate life's challenges more effectively (Verrier & Day, 2022). By fostering a non-reactive and compassionate approach to one's internal experiences, mindful attention can enhance emotional regulation, interpersonal relationships, and overall psychological well-being (Kennedy et al., 2018).

Obesity is a long-lasting health condition with numerous contributing factors that negatively impact various organs and physiological processes (Dhurandhar et al., 2021).

Clinically, obesity is diagnosed by calculating the individual's BMI. When the individual's BMI is 30 or higher, they are considered obese. Obesity is a complex multifactorial disease characterized by an excessive accumulation of body fat (Dhurandhar et al., 2021)

Stress is physiological and psychological response to challenging or demanding situations, often resulting from perceived pressure or threats (Lim et al., 2021). It

involves a complex interaction between the mind and body, prompting the release of hormones like cortisol and adrenaline to help cope with the situation (Knapp & Sweeny, 2022). While short-term stress can be adaptive and beneficial, chronic stress can negatively impact an individual's overall health and well-being, contributing to various mental and physical health issues (Knapp & Sweeny, 2022).

For this study, I used archival data collected in 2017 with the purpose of determining if stress (moderator, ratio variable measured by the stress subscale in the DASS) moderated the relationship between emotional eating [independent, ratio variable measured by the emotional eating subscale on the DEBQ,(Appendix A)] and impulsive eating (dependent, ratio variable measured by the external eating subscale in the DEBQ, Appendix A). Moreover, I wanted to determine to what extent emotional awareness [moderator, ratio variable measured by the lack of emotional awareness subscale in the DERS, and the diffused emotions subscale in the DEBQ, Appendix A)] moderated the relationship between mindful attention (independent, ratio variable measured by the attention and motor subscales of BIS-11 and the difficulty engaging in goal-directed behavior subscale in the DERS) and emotional eating (dependent, ratio variable measured by the emotional eating subscale in the DEBQ, Appendix A).

In addition, I wanted to determine to what extend inability to regulate emotion (moderator, ration variable measured by the limited access to emotion regulation strategies on the DERS) moderated the relationship between mindful attention (independent, ratio variable measured by the attention-attention and motor-motor subscales of the BIS-11) and impulsive eating (dependent, ratio variable measured by the

external eating subscale in the DEBQ, Appendix A). I also wanted to determine, to what extend were mindful attention (predictor, ratio variable measured by the attention and motor subscales of the BIS-11), impulsive eating (predictor, ratio variable measured by the external eating subscale of the DEBQ, Appendix A), emotional awareness [(predictor, ratio variable measured by the diffused emotion subscale of the DEBQ (Appendix A) and the emotional awareness and lack of emotional clarity subscales in the DERS], and disregard of future consequences (predictor, ratio variable measured by the non-planning subscales of the BIS-11) predictive of emotional eating (outcome, ratio variable measured by the motional eating subscale in the DEBQ, Appendix A). Finally, I wanted to determine the extent to which, anxiety (predictor, ratio variable measured by the anxiety subscale in the DASS), stress (predictor, ratio variable measured by the stress subscale in the DASS), mindful attention (predictor, ratio variable measured by the attention and motor subscales of the BIS-11), and disregard of future consequences (predictor, ratio variable measured by the non-planning subscales of the BIS-11) predicted impulsive eating (outcome, ratio variable measured by the external eating subscale in the DEBQ, Appendix A).

Assumptions

In this study, I made a number of essential assumptions to ensure the validity and reliability of the research findings. These assumptions were crucial for maintaining the integrity of the study. First and foremost, I presumed that all participants were well-informed about the study's importance, its objectives, and its potential implications. This includes understanding the relevance of the research within the broader scientific context

and recognizing the potential benefits that the findings may bring to the field. To achieve this level of understanding, I provided comprehensive information to the participants, via the website, outlining the study's purpose, methodology, and expected outcomes.

Second, I assumed that participants had a clear understanding of the terms and conditions outlined in the confidentiality agreement. This was vital in ensuring that participants were aware of their rights and the measures taken by the researcher to protect their privacy. Additionally, participants should be able to trust that their data will be handled securely and responsibly, in accordance with ethical guidelines and regulations.

The third assumption was that participants provided honest and truthful responses to the questionnaires and surveys accessed via the website. To facilitate genuine participation, anonymity was maintained for all participants throughout the study via the use of a participant’s research ID that was used during all stages of the study. This measure was designed to create a safe and comfortable environment in which participants could freely express their thoughts and feelings without fear of judgment or reprisal.

Furthermore, I assumed that participants had a good grasp of the study's implications and willingly volunteered for the research. This implied that they were motivated to contribute to the advancement of knowledge in the field and were prepared to invest time and effort in the study. The fourth assumption pertained to the participants' compliance with the eligibility criteria and their adherence to the requirements for participation in the study. By reviewing and acknowledging the criteria, participants declared their agreement and commitment to abide by the established guidelines. I also assumed that participants were being truthful about their reading comprehension abilities.

This ensured that the study's sample was representative and suitable for addressing the research questions. Finally, I assumed that the questionnaires and surveys employed in the research effectively measured the constructs under examination. This is a fundamental assumption, as the accuracy and reliability of the data collected are directly linked to the validity of the instruments used. To this end, I employed well-established and validated questionnaires, and continuously monitored the data collection process to ensure its consistency and adherence to the study's protocol. By addressing these assumptions and maintaining a high level of rigor throughout the research process, I wanted to obtain valid and reliable findings that contribute to the understanding of the topic and the advancement of the field.

Scope and Delimitations

The scope of this quantitative study was to use a correlational design to explore the complex association among impulsive eating, emotional eating, stress, anxiety, emotion regulation, emotional awareness, disregard for future consequences, and mindful attention. I wanted to examine the moderating role of stress in the connection between emotional and impulsive eating and investigate how emotional awareness affected the relationship between emotional eating and mindful attention. Additionally, I analyzed how the ability to regulate emotions influenced the relationship between mindful attention and emotional eating, assessed the predictive power of mindful attention, impulsive eating, future consequences disregard, and emotional awareness of emotional eating, and evaluated the extent to which anxiety, stress, mindful attention, and disregard for future consequences *predicted* impulsive eating. Finally, I used multiple linear

regression to identify potential emotional and impulsive eating predictors and the model one of the Hayes' Process in SPSS to test for moderator effects. The findings will help inform the development of biopsychosocial interventions addressing impulsive and emotional eating. However, several delimitations existed in the study.

I used archival data I collected in 2017, which may have presented limitations in data quality and relevance to current trends. Nevertheless, this approach was cost-effective and efficient in investigating the research questions. The sample in the archival data comprised participants who expressed interest in voluntarily participating in the study. Participants aged 18 to 65 were English speakers with a reading level equal to or higher than a 6th-grade student. Participants were not required to self-identify as emotional eaters to participate in this study, in which data will be used for the current study. A total of 96 participants completed the DEBQ (Appendix A), DERS, BIS-11, and DASS questionnaires.

The sample size and its characteristics may have limited the generalizability of the findings. Data was collected online via a website I created in 2017, which may have introduced biases or self-selection issues. However, this approach allowed for a diverse sample and efficient data collection. Lastly, the correlational design in the current study limited the ability to conclude causality or changes over time. Despite these delimitations, this study provides valuable insights into the relationships among the variables of interest, contributing to a better understanding of emotional and impulsive eating and informing the development of targeted interventions.

First, my primary focus was on the specific variables mentioned above, which may limit exploring other potential factors that could influence emotional and impulsive eating behaviors. Second, the research methodology relied on using established instruments like DEBQ (Appendix A), DASS, BIS-11, and DERS, which may have constrained the investigation to the dimensions these questionnaires cover. Third, using Likert scales in some questionnaires may have limited the participants' responses to predefined options and restrict the exploration of additional insights or alternative conclusions. Fourth, the generalizability of the study's findings may be limited, as it focused on individuals experiencing specific levels of stress, anxiety, emotion regulation, emotional awareness, emotional attention, and disregard for future consequences. The results may not be directly applicable to other psychological issues or disorders. Lastly, the study relied on self-report questionnaires, which may be subject to response bias, social desirability bias, or inaccuracies in participants' recall and self-perception.

Limitations

In this study, I investigated emotion regulation, emotional awareness, mindful attention, disregard for future consequences, stress, and anxiety as potential predictors of emotional eating and impulsive eating. The research was based on archival data collected in 2017 from San Diego County, California. While the sample displayed diversity in age, gender, and ethnicity, it's essential to recognize that the results may not fully represent emotional and impulsive eaters across the broader United States population.

The use of archival data raised concerns about data quality, although these concerns were mitigated since I collected and managed the data myself. However, the

study relied on existing questionnaires and scales, and questions arose about their adequacy for addressing the study's hypotheses. For instance, mindful attention was assessed using subscales from the BIS-11, which may not fully capture this construct, highlighting the potential for different results with a dedicated scale like the Mindful Attention Awareness Scale (MAAS).

The correlational design employed in the study limited our ability to establish causation. Some questions remained unanswered about why mindful attention and disregard for future consequences influenced emotional and impulsive eating differently. Additionally, the absence of physiological measures restricted our ability to categorize variables as purely biological factors. The study also lacked demographic information from participants, which could have provided valuable insights.

Significance

This study's findings hold significance for mental health professionals and academic settings. Mental health practitioners could develop treatment plans that target unwanted behaviors and cognitive distortions and provide interventions to enhance the body's resilience to physiological distress (Braden et al., 2018). Slow-paced breathing exercises, for example, can improve inhibitory control and help patients manage adverse physiological responses to stress and anxiety, such as rapid heart rate, prefrontal cortex impairment, and muscle tension (Meyer et al., 2018). In addition, psychophysiological techniques can make patients more receptive to healthier habits for managing negative emotions (Bénard et al., 2018). Moreover, this research contributes to the broader knowledge base surrounding obesity and eating disorders, shedding light on the role of

biology in behavior and emotion. Finally, researchers interested in obesity, weight loss, or psychophysiology can now utilize the findings from this study to design follow-up investigations that encompass investigating not only behavior and emotion but also psychosocial characteristics (e.g., stress, anxiety) affected by biological factors (e.g., difficulties with impulse control and emotion regulation), which collectively influence behaviors such as emotional eating and impulsive eating. In this chapter, I present the primary focus of my research.

Summary

This study was introduced in Chapter 1 by reviewing the background information, addressing concerns related to the obesity epidemic, and examining the physical and emotional health challenges faced by individuals caught in a cycle of impulsive and emotional eating. In this study I wanted to identify the biopsychosocial markers of impulsive and emotional eating, using the BPSM as a framework to gain a holistic understanding of these behaviors rather than focusing solely on a set of symptoms that seemingly do not regress. In this chapter I discussed the research questions and categorized the key variables as independent, dependent, moderator, predictor, or outcome variables. I introduced the key variables and assessment tools that will enable an accurate evaluation of the constructs of interest. The scope, delimitations, assumptions, and limitations of the study were addressed, as well as potential biases that could impact the results. Upon completing Chapter 1, the reader will have a deeper understanding of the current study. In the next chapter, I will provide an in-depth review of the key variables and the theoretical framework (i.e., BPSM) and examine studies investigating

some of the variables of interest. Additionally, I will offer an honest evaluation of their findings and their relevance to this study.

Chapter 2: Literature Review

Introduction

In this study, I examined the complex relationship between emotional eating, stress, anxiety, disregard for future consequences, emotion regulation, impulsive eating, mindful attention, and emotional awareness. Emotional eating is a behavior linked to obesity where individuals eat in response to emotions rather than hunger. This behavior is often used as a coping mechanism to regulate emotions. However, individuals with low emotion regulation skills, difficulty focusing, and poor awareness of how emotions impact eating may not consider the harmful consequences of impulsive eating on their health. Using food as an emotional regulation tool can lead to a cycle of emotional and impulsive eating and potential weight gain, and poor health. Existing interventions for emotional eating mainly focus on behavior change for weight loss. However, in this study I examined a more comprehensive understanding of the biopsychosocial influences underlying emotional eating and inform the development of more effective interventions.

In this chapter I outlined the literature research strategy employed to find relevant research that sheds light to understanding the biopsychosocial facets of impulsive and emotional eating. I also discussed the origins of the BPSM and explained why I believe the model was the most suitable framework for this study. Next, I examined all variables involved in the study and reviewed the costs of obesity while I also identified emotional eating and impulsive eating as two primary contributors to the growing obesity rates worldwide. Next, I offer a detailed examination of impulsive and emotional eating, delving into the tolls that stress, anxiety, emotion regulation, emotional awareness,

mindful attention, and disregard for future consequences play in these behaviors. Next, I offer a detailed examination of impulsive and Emotional eating as complex phenomena that encompasses a range of factors. In this literature review I explored the roles that stress, anxiety, emotion regulation, emotional awareness, mindful attention, and disregard for future consequences play in these behaviors. Lastly, I presented a comprehensive synthesis of the reviewed literature, emphasizing the significance and rationale underpinning the study. This rigorous examination of the existing body of research serves to establish a robust foundation for the investigation and provides a scholarly context for understanding the intricacies of emotional eating.

Literature Search Strategy

I initiated a comprehensive literature review for this study by searching the Thoreau database from the Walden University Library, as well as various other scholarly sources, including Google Scholar, Sage journals, PubMed, ProQuest Central, nutrition journals, psychophysiology journals, and journals related to eating disorders, eating, and health psychology. Through the Walden library I used Psycharticles, PsychINFO, and EBSCO host. To ensure the most current information, I focused on peer-reviewed articles published between 2018 and 2023. In my search, I used key terms in the search engines: *obesity, emotional eating, biopsychosocial model, anxiety, stress, emotional awareness, mindfulness, neuroscience, disregard for future consequences, weight gain, BMI,* and *emotion*. To broaden my search, I also entered the names of authors who had published articles relevant to my topic of interest, such as George Engel, Julian Thayer, and Tajana Van Strien. In addition, I consulted websites such as the WHO and CDC for current

information on obesity. Finally, if I encountered articles published before 2018, I searched for newer publications on the same topic by entering the author's name and the topic of their previous publication in the Walden University Library search bar.

Theoretical Foundation

Biopsychosocial Model

George Libman Engel (1913–1999) was an American psychiatrist who revolutionized how the field of medicine interprets the causes of medical symptoms (Smith et al., 2018). During a conference on psychiatric education, attendants expressed the desire to return to a medical model of disease within the psychiatric field (Engel, 1977). He argued that even though the solid biological foundation of the medical model is critical in assisting the medical field, he believed the medical model either excluded or reduced symptoms in order to adhere to the requirements of what the biomedical model deemed necessary to define disease. Engel (1977) believed that the biomedical model could be harmful to patients and declared that the psychiatric field needed to adopt a model that offered a broader view of the individual where the physician would consider the biological, psychological, and sociological aspects of the patient. By incorporating a BPSM Engel (1977) hoped the fields of medicine and psychiatry could better respond to the multifaceted nature of diseases and work together to provide more comprehensive and holistic patient care. Engel's (1977) BSPM model was proposed as an alternative to the biomedical model, which primarily focuses on the biological aspects of disease. Instead, the BPSM model takes a more holistic approach to understanding the individual as a whole and considers the interplay of biological, psychological, and social facets of one's

life to draw inferences about what is affecting their health and might be the root/cause of the illness (Kusnanto et al., 2018). In addition, the BPSM emphasizes the need to consider all these factors when diagnosing, treating, and managing health conditions (Kusnanto et al., 2018).

A comprehensive analysis of the BPSM must include the intricate connections among biological, psychological, and social factors in the context of an individual's well-being and lifestyle. This holistic approach emphasizes the interdependence of these three propositions and their impact on overall health outcomes. The biological aspect of the BPSM focuses on the physiological processes and mechanisms underlying disease and bodily health. Conditions such as high blood pressure or high cholesterol are good examples of less severe conditions, but yet, if persistent have the probability of creating chronic health problems over time that can eventually create the need for medical intervention by a physician. For example, untreated high blood pressure and high cholesterol can lead to acute and severe health problems requiring immediate medical attention and resulting in significant disruption to an individual's daily life (Kusnanto et al., 2018). The psychological component of the BPSM relates to mental and emotional well-being and the interplay between emotions and behavior. For example, an individual struggling with anxiety or stress (i.e., emotion) may engage in emotional eating (i.e., behavior) as a coping mechanism to reduce unwanted negative emotions. However, emotional eating then becomes a maladaptive behavior that can potentially exacerbate existing health conditions or contribute to developing new ones, such as weight gain or worsening cardiovascular health (Bolton & Gillet, 2019). The social dimension of the

BPSM encompasses interpersonal factors and community activities that may influence psychological well-being and, in turn, impact biological health. For example, in a high-stress work environment, an individual may experience increased stress levels, leading to anxious thoughts and emotions. This psychological distress can prompt maladaptive coping strategies, such as overeating high-calorie foods, which can adversely affect overall health by raising blood pressure and cholesterol levels, to name a few.

Kusnanto et al. (2018) reviewed the BPSM and its contribution to clinical outcomes. The authors conducted a hermeneutic cycle literature review of research and how the BPSM has been used in primary care settings. They stated that Engel believed that interpreting patients' symptoms solely through the context of biological factors, such as disease pathophysiology and dysfunction of tissues or organs (i.e., biomedical model), was an oversimplified and unscientific approach, and therefore developed the BPSM as an alternative, more inclusive way of viewing the individual as a whole, and not only a set of symptoms (Kusnanto et al., 2018). Based on this premise, Kusnanto et al. (2018) explored opportunities for incorporating the BPSM into a clinical setting, to develop an approach that can enhance the quality of patient care and improve clinical outcomes. They argued that to implement BPSM successfully, it is vital to incorporate a multidisciplinary approach while improving physician/patient interaction. According to Kusnanto et al. (2018), seemingly minor changes, such as being more empathetic and compassionate, can enhance communication between physician and patient and significantly impact biopsychosocial outcomes. Kusnanto et al. (2018) found that 40 years after Engel (1977) first proposed the BPSM, the medical field still heavily relies on

the biomedical model. They argued that the challenges in implementing the BPSM stem from the time-consuming nature of comprehensive assessments and the need for improved proficiency among medical professionals. Despite this impediment, the BPSM can still enhance clinical outcomes and empower patients to manage their conditions through meaningful doctor-patient relationships and a multidisciplinary approach to patient care (Kusnanto et al., 2018). The authors conclude their analysis by stating that the model is particularly valuable for addressing chronic illnesses and complex, poorly defined conditions that elicit individual patient responses.

Despite the underuse of the BPSM in medicine, the BPSM has been applied across various areas of research, offering a comprehensive perspective on patient well-being. Peña-Vargas et al. (2021) investigated the use of the BPSM approach to explore grief's impact on psychopathophysiology. The authors stated that cultural beliefs, family values, and life stages could influence how grief is understood and manifested in one's life (Peña-Vargas et al., 2021). They argued that while one individual might experience grief after living through a loved one's death, or job loss, a second individual might experience grief and depression after a romantic breakup or social status change and add that social support plays a crucial role in the grieving process and can act as a protective factor against depression (Peña-Vargas et al., 2021). Moreover, they argued that individuals with little to no social attachments were more prone to developing chronic psychological disorders after experiencing loss and grief. Peña-Vargas et al. (2021) shared the results of a study where the authors found that bereaved subjects have higher levels of inflammatory biomarkers, and the number of recent bereavements is associated

with higher inflammatory levels. Moreover, they argued that spousal bereavement, loss of social connections, and lack of social support can also influence inflammatory dysregulation, increasing psychosocial distress (Peña-Vargas et al., 2021). They emphasized the importance of social bonds and their connection to physical health. They also suggested that lack of social interaction is a risk factor that must be considered when evaluating patients' health outcomes.

In a qualitative study, Kanwal et al. (2020) explored risk and protective factors that affect obesity and its consequences among adolescents. Researchers conducted in-depth interviews with 18 Pakistanis adolescents with obesity aged 13 to 17 years, using purposive sampling. The authors developed a semi structured interview guide consisting of 24 exploratory questions that included 18 probing questions and six broader questions that examined family reactions to eating habits, engagement in physical activities, and the impact of weight on daily activities (Kanwal et al., 2020). After conducting a thematic analysis, Kanwal et al. (2020) identified risk factors, protective factors, and consequences of obesity. Risk factors included biological, psychological, social, and personal factors, and protective factors included psychological, social, and personal factors. The consequences of obesity involve biological and psycho-social factors, as well as weight control plans. The authors (2020) posited that while the mechanisms of obesity are not fully understood, the BPSM serves as a valuable framework for examining the interplay between biological, psychological, social, and personal factors.

Dams et al. (2021) conducted a prospective cohort study to investigate the predictive value of pre-and post-operative biopsychosocial functioning on long-term pain

intensity and pain-related disability and women one year after surgery for breast cancer. Researchers recruited 166 women undergoing unilateral breast cancer surgery at a university hospital in Belgium. The dependent variables were pain intensity and pain-related disability at 12 months postsurgery. Independent variables were perioperative pain-related outcomes, somatosensory functioning, and psychosocial functioning. The authors used a Visual Analog Scale (VAS) to evaluate pain intensity and the Pain Disability Index (PDI) to measure pain-related disability. In addition, two questionnaires and extensive Quantitative Sensory Testing (QST) assessed somatosensory functioning. Participants were evaluated 1 week before and after surgery and again 12 months after. The authors found that increased symptoms of altered central somatosensory functioning, psychological symptoms, and social support were the most consistent risk factors for higher pain intensity and pain-related disability. According to Dams et al. (2021), disturbed local somatosensory functioning (i.e., biological) affects the sensory nervous system's response to stimuli and pain perception. In addition, depressive symptoms, worrying about one's health, and anxiety about the outcome (i.e., psychological) altered central somatosensory functioning and pain-related catastrophizing. Lastly, pain intensity and pain-related disability have also been found to be influenced by one's social support (Dams et al., 2021). The use of BPSM framework in this study helped the authors better understand pain and disability, and understand the needs of patients who underwent breast cancer surgery , and needed a long-term after care plan.

The biopsychosocial factors that might exacerbate fear of COVID-19 were investigated by Nürnberger et al. (2022) investigated. The authors attempted to establish

a biopsychosocial model of severe fear of the disease. They argued that a biopsychosocial approach might be advantageous in understanding the severe fear of COVID-19. Furthermore, they could aid in identifying significant biopsychosocial predictors that may intensify severe fear of COVID-19 and establish a BPSM of COVID-19 fear. The authors categorized individual preexisting somatic risk factors as biological factors, pre-existing anxiety (e.g., state/trait anxiety, physical symptoms of anxiety, severe health anxiety), specific phobias, and indicators of depression as psychological factors, and general social support, financial losses due the COVID-19 pandemic, social contact with COVID-19 infected individuals, and social media usage as social factors.

A total of 368 Austrian and German individuals participated in this study. They provided sociodemographic data, social media usage, financial or job loss due to COVID-19, and somatic risk factors. Participants completed the Severity Measure for Specific Phobia (SMSP) adapted for COVID-19, the Beck's Anxiety Inventory (BAI), State-Trait Anxiety Inventory (STAI), Specific Phobia Questionnaire (SPQ), Whiteley-Index and Illness Scales (WI-IAS), WHO-5 well-being Index (WWI), and Social Support Survey (SSS). Nürnberger et al. (2022) found that preexisting somatic risk factors did not impact fear levels, but psychological and psychosocial factors did. Individuals with higher state and trait anxiety, physical anxiety symptoms, severe health anxiety, and specific phobias had higher fear of COVID-19. Financial losses during the pandemic were associated with higher fear levels, while social support and social media did not show significant differences. The authors also found gender-specific results; females experienced less fear with increased contact, while males had the opposite reaction. Lastly, the authors

identified the female gender, severe health anxiety, state anxiety, and trait anxiety as significant predictors that might aggravate the fear of COVID-19. They conclude that fear of COVID-19 impacts mental health, and mental health as people with severe fear may avoid seeking medical help due to fear of infections. Identifying these risk factors might help health care and mental health providers develop better support and preventive measures to improve health-related quality of life.

McCabe et al. (2023) evaluated the utility of the BPSM in predicting BMI and disordered eating in young adults. The authors conducted a longitudinal evaluation where they recruited 838 adults from Europe, North America, Australia, and Japan. The authors hypothesized that BMI and disordered eating would be predicted by demographic, biological, sociocultural, psychological, and behavioral factors during a 12-month period. The participants completed an online survey that collected their demographic and background information and BMI. Eating pathology was measured by the Eating Disorder Examination Questionnaire (EDE-Q), the drive for muscularity was measured by the Drive for Muscularity Scale (DMS), and the drive for leanness was measured by the Drive for Leanness Scale (DLS). Information on biological predictors such as pubertal timing, childhood weight status, previous history of eating disorders, medical conditions influencing weight, mother weight, father weight, and family history of obesity was collected. Use of social media and use of online dating platforms were used as sociocultural predictors. The following were included as psychological predictors: body satisfaction was [measured by the 9-item Multidimensional Body Self Relations Questionnaire (MBSRQ)], weight and shape concern [measured by the Eating Disorder

Examination Questionnaire (EDEQ)], body appreciation [measured by the Body Appreciation Scele-2 (BAS-2)], internalization of the thin and muscular ideal (measured by the Sociocultural Attitudes Toward Appearance Questionnaire), internalization of weight bias (measured by the 11-item Modified Weight Bias Internalization Scale), physical appearance comparison (measured by the 5-item Physical Appearance Comparison Scale), impulsivity (measured by the 4-item Negative Urgency subscale of the Impulsive Behavior Scale), perfectionism (measured by the shortened form of the Hewitt and Flett Multidimensional Perfectionism Scale,) self-esteem[(measured by a short form of the Rosenberg Self-Esteem Scale (RSES)], depressive symptoms (measured by the Patient health Questionnaire-2), social anxiety symptoms [measured by the 6-item shortened form of the Social Interaction Anxiety Scale (SIAS-6)], and experience of trauma [measured by the Post-Traumatic Stress Disorder Checklist for DMS-5 (PCL)].

Behavioral predictors were identified as eating and drinking behaviors (single item used to assess the frequency of consumption of food and beverages), substance use behavior [measured by the Alcohol Use Disorders Identification Test (AUDIT)], sleep quality (measured by the Pittsburgh Sleep Quality Index), physical activity (16-item Global Physical Activity Questionnaire), body change strategies [measured by the Body Change Inventory (BCI)], intuitive eating [measured by the 6-item Reliance on Hunger and Satiety Cues (RHSC)], and emotional eating (measured by the Emotional Eating subscale of the Three Factor Eating Questionnaire). The key predictors of disordered eating and weight changes over time were focusing on binge eating, BMI, compensatory

behaviors, dietary restraint, and drive for leanness. There were region-specific differences among the participants. For binge eating, sociocultural influences like pressure from fathers to lose weight were significant predictors in North America and Australia. Trauma symptoms were associated with increased binge eating in Europe, while a range of factors influenced binge eating in Japan. Regarding BMI, baseline BMI was a strong predictor of BMI at follow-up for all regions. Other predictors varied by region, including gender, lifetime diagnosis of an eating disorder, social anxiety, and medical conditions. Compensatory behaviors were influenced by factors like the father's weight, family history of higher weight, perceived pressure from fathers to gain muscle, media pressure, and personal engagement in strategies to decrease body size. The specific predictors varied across regions. For dietary restraint, factors like perceived pressure from peers, self-oriented perfectionism, internalization of weight bias, physical appearance comparisons, and sugary drink consumption played a role in North America. In other regions, different combinations of factors were significant predictors. Lastly, drive for leanness was predicted by self-oriented perfectionism in North America and Australia, trauma symptoms in Europe, and factors like heterosexual sexual orientation and engagement in appearance comparisons in Japan.

In conclusion, during this review of the BPSM as a theoretical framework for the proposed study I found that Engel's (1977) BPSM has been successfully implemented in studies exploring factors contributing to the onset and perpetuation of health conditions and psychological disorders, as well as predictors, risk factors, and protective factors of obesity (McCabe et al., 2023; Nürnberger et al., 2022; Dams et al., 2021; Peña-Vargas et

al., 2021). Kusnanto et al., (2018) found that despite empirical evidence supporting the efficacy of the BPSM as a holistic approach to improve treatment outcomes, its adoption in the medical field remains limited due to financial barriers. Nevertheless, Engel's (1977) groundbreaking BPSM provides an invaluable framework for understanding health and well-being, considering the complex interactions between biological, psychological, and social factors. Therefore, the BPSM, developed by Engel (1977), has served as an ideal framework for this study, as it considers the intricate interplay between genetic predisposition (e.g., impulsivity), psychological traits (e.g., emotional regulation and awareness, mindful attention, and anxiety), and social factors (e.g., stress). This study intended to investigate multiple potential predictors and moderators of emotional eating and impulsive eating, such as stress, anxiety, emotion regulation, emotional awareness, mindful attention, and disregard for future consequences. These variables represent biological markers of impulsive eating and emotional eating (i.e., ability or inability to regulate emotions and maintain emotional awareness), as well as psychological markers of impulsive and emotional eating (i.e., the capacity to engage in mindful attention, regard for future consequences, and anxiety), and the social markers of impulsive and emotional eating (i.e., stress).

Literature Review Related to Key Variables and/or Concepts

Costs of Obesity

Obesity has been associated with great financial and personal costs. While the financial costs of the obesity epidemic are a concern for the general population, the health and emotional costs of the epidemic affect the individual on a much deeper and more

personal level. Obesity is operationalized using BMI, a calculation based on the individual's weight in kilograms divided by his or her height in meters squared (Sarmadi et al., 2021). The individual is classified as overweight when the calculation results in a value between 25 and 29.9 kg/m2. If the calculation results in a value equal to or greater than 30 kg/m2, the individual is classified as obese (Sarmadi et al., 2021).

As weight increases, so does the challenge of living a normal life. When an individual's BMI calculation is above 40 kg/m2, he or she is classified as extremely obese or morbidly obese (Sarmadi et al., 2021). Many individuals in this category face extreme challenges to live their daily lives. For example, they might have difficulty fitting in a booth at a restaurant or on an airplane seat, dealing with personal hygiene (e.g., taking a shower, using the toilet), or even putting on socks and shoes since their size might prevent them from performing these activities (Blue et al., 2021). The perpetuation of this struggle can precipitate emotional distress that can put the individual at risk for depression, suicidal ideation, and suicide attempts (Duarte-Guerra et al., 2022; Blue et al., 2021).

While some weight discrimination exists for underweight males, the most common type is related to individuals of both genders who are considered overweight or obese (Busetta et al., (2020). From a very young age, obese youth have negative experiences regarding their weight. Obese individuals are more likely to experience shame, worthlessness, hopelessness, loneliness, depression, and social anxiety (Kapoor et al., 2021). Youth with obesity may experience negative attitudes towards their weight early on and are more likely to face feelings of shame, worthlessness, loneliness, and

depression. They are also more likely to experience stigma and discrimination and are a vulnerable target for bullying (Zu et al., 2022). Zu et al. (2022) investigated the relationship between BMI, body weight perception, and suicidal behaviors among Chinese adolescents. The authors used data from 10,110 Chinese students from grades 7 to 11 who completed a survey from China's National High Technology Research and Development Program. The authors revealed that self-perception of being obese was significantly associated with suicidal ideation, suicidal plan, and suicidal attempt.

Obesity has also been found to negatively affect multiple physiological and metabolic systems in the body. The Global Burden of Disease (GBD) 2015 obesity collaborators ("Health effects of overweight and obesity in 195 countries over 25 years," 2017) analyzed data from 68.5 million individuals to assess trends in overweight and obesity prevalence among children and adults between 1980 and 2015. The GBD study data and methods were used to quantify the burden of disease related to high BMI across 195 countries. According to the collaborators, in 2015, circa 107.7 million children and 603.7 million adults worldwide were considered obese. Obesity prevalence has doubled in over 70 countries since 1980 and has consistently risen in most others. Childhood obesity rates have increased more rapidly than adult rates in many countries. High BMI contributed to 4 million deaths globally, nearly 40% occurring in non-obese individuals. Over two-thirds of high BMI-related deaths were due to cardiovascular disease. The disease burden associated with high BMI has grown since 1990, but the rate of increase has slowed due to decreasing death rates from cardiovascular disease. The authors emphasized the need for ongoing BMI surveillance and evidence-based interventions to

address this issue. The collaborators argued that excess weight could increase the risk of chronic diseases, such as diabetes, heart disease, and cancer. The authors suggest that interventions aimed at preventing and treating obesity should also address the condition's underlying physiological and metabolic consequences.

To effectively address the costs of obesity, providers planning interventions that are well received by their clients must consider an approach that addresses the multiple aspects of one's life that are affected by the condition. This includes not only reducing the prevalence of obesity but also addressing the emotional and social consequences of the condition. Understanding the relationship between stress, anxiety, mindful attention, impulsive eating, emotional awareness, and disregard for future consequences, and emotional eating is important for developing interventions to prevent and treat obesity.

Causes of Obesity

The task of identifying one behavior that can explain obesity is not simple. Pearl et al. (2020) argued that obesity is a complex disease caused by behavioral, biological, and environmental factors. Among the causes of obesity, impulsive eating, characterized by eating without considering the potential consequences, has also been linked to obesity (Maier et al., 2021). High stress and anxiety levels have been shown to be associated with more impulsive behaviors, and impulsive eating has been found to be associated with greater emotional eating, potentially leading to a vicious cycle of unhealthy eating behaviors (Bénard et al., 2018). The causes of obesity are multifaceted, and there are several factors associated with obesity, including genetic factors (e.g., monogenic, endocrine-related, and infectious causes), increase in caloric intake, and eating in

response to things other than hunger (e.g., emotional eating or impulsive eating; Dhundhari et al., 2021; Khan et al., 2018).

An investigation into the causes and treatments of genetic obesity was conducted by Miller (2023). He argued that early-onset obesity could lead to premature morbidity and mortality and stated that childhood obesity is linked to biological factors such as metabolic syndrome, insulin resistance, and cognitive decline. According to Miller (2023), the genetic causes of obesity can be categorized as syndromic [i.e., Prader Willi Syndrome (PWS) and Bardet-Biedl Syndrome (BBS)] and nonsyndromic (i.e., monogenic or polygenic) obesity. Mutations in specific genes cause monogenic obesity conditions within the Melanocortin-4 Receptor (MC4R) pathway, which regulates appetite in the hypothalamus (Miller, 2023). Congenital leptin deficiency, Leptin Receptor (LepR) mutation, Pro-Opiomelanocortin (POMC), and Protein Convertase Subtilisin Lexing type 1 (PCSK1) mutations are examples of monogenic obesity conditions (Miller, 2023). Polygenic obesity conditions involve multiple genes associated with syndromic causes of early-onset obesity, such as PWS, BBS, and Alström syndrome (Miller, 2023). Miller's (2023) article highlights the importance of healthcare providers closely examining potential genetic (i.e., biological) factors contributing to early-onset obesity. Neglecting these biological factors in weight gain could harm the patient's well-being, as many providers often attribute weight gain exclusively to behavioral issues and unhealthy food choices. Addressing the biological aspects of obesity is key. However, it is crucial that providers also assess the emotional and social causes of obesity when developing prevention and treatment of the disease. With a comprehensive approach,

including interventions that aim to reduce the prevalence of obesity, address the emotional and social consequences of the condition, and treat the underlying physiological and metabolic consequences, we can improve the health and well-being of individuals and reduce the significant costs associated with the condition. Addressing the biological aspects of obesity is key.

Several studies have identified emotional eating as one of the behaviors that promote obesity (Ciria et al., 2021; Annesi, 2018; Frayn et al., 2018). Emotional eating has often been misidentified as simply overeating and misinterpreted as poor eating habits. Emotional eating and overeating have been defined as the behaviors of eating in response to negative affect (Altheimer et al., 2021). Although emotional eating has been associated with overeating, not all individuals who self-identify as emotional eaters overeat. Emotional eating refers to the tendency to eat without the presence of hunger and/or in response to negative emotions (Altheimer et al., 2021), such as wanting to eat ice cream when one is sad. Emotional eating is a behavior where individuals turn to food as a coping mechanism for emotional distress (Whehling & Lusher, 2019). In addition, studies have shown that low emotion regulation skills, low emotion awareness skills, difficulty focusing on the present moment, and high levels of stress and anxiety are associated with emotional eating and impulsive eating behaviors (Bénard et al., 2018; Lacroix et al., 2019; Maier et al., 2021; Wehling & Lusher, 2019). Impulsive eating has also been identified as one of the leading causes of obesity, and is associated with low emotion regulation skills, disregard for future consequences, and poor awareness of how emotions impact eating behavior (Bénard et al., 2018; Maier et al., 2021). In addition,

individuals who experience life events that elicit negative emotions often resort to emotional eating to regulate their emotions, leading to further weight gain and obesity-related health concerns (Braden et al., 2018).

Emotional Eating

Emotional eating is a significant factor contributing to the obesity epidemic. Emotional eating can be defined as eating in response to negative emotions or in the absence of hunger without the intent to overeat (Altheimer et al., 2021; Annesi & Johnson, 2020). Although not all individuals who identify as emotional eaters overeat, emotional eating has been associated with overeating behavior. Overeating refers to the consumption of large amounts of food, whether in the presence or absence of hunger (Wehling & Lusher, 2019). Misconceptions surrounding emotional eating are not uncommon, including the belief that unplanned snack consumption is a form of emotional eating. Unplanned snack consumption is more likely a result of poor eating habits, a lack of restraint in food choices, and impulsive eating (Frayn et al., 2018). Emotional eating is often associated with stress and anxiety, suggesting that individuals who eat in response to negative emotions may use food to distract from their distressing feelings because they lack the necessary coping skills to manage their emotions effectively (Wehling & Lusher, 2019). Given the serious consequences of emotional and impulsive eating on health and well-being, interventions are needed to address these behaviors. However, current interventions primarily focus on changing behavior to promote weight loss, with less emphasis on the biopsychosocial influences that underlie emotional and impulsive eating. By investigating the multifaceted relationship between

these variables, studies aim to provide a more comprehensive understanding of the factors contributing to emotional and impulsive eating behaviors and to inform the development of more effective interventions (Wehling & Lusher, 2019).

Authors Schnepper et al. (2020) investigated the relationship between emotional eating, emotion regulation, and food perception by subjecting participants to emotional triggers while presenting them with appetizing food images. The authors aimed to understand the influence of emotional condition (i.e., negative and neutral) and self-reported individual differences (i.e., trait emotional and restrained eating) on participants' reactions to food images. Schnepper et al. (2020) hypothesized that emotion regulation theory (i.e., emotional eating is a learned strategy to regulate emotion) and cognitive theories (i.e., attributing emotional overeating to diet breaches in individuals who chronically attempt diet) would be associated with emotional overeating. Seventy-nine female participants aged 16-50 with normal BMI underwent a modified version of the Structural Clinical Interview for DSM-IV (SCID I). The Dutch Eating Behavior Questionnaire (DEBQ) assessed their eating behavior. Moreover, participants' positive and negative states were assessed via the Positive and Negative Affective Schedule (PANAS). In addition, participants underwent a seven-day Momentary Assessment (MA) before the lab experiment. The laboratory session involved an emotional eating task consisting of a neutral and a negative condition. Participants were exposed to idiosyncratic emotional and neutral scripts, followed by the presentation of food and object pictures, which they rated for pleasantness and the current desire to eat. Electroencephalography (EEG), Electromyography (EMG) and Electrocardiogram (ECG)

were recorded during the experiment. Idiosyncratic scripts were used to induce negative and neutral emotional states in participants. The negative situations mostly involved conflicts with family, friends, and partners and primarily evoked anger, sadness, and anxiety. The neutral situation involved everyday activities like brushing teeth or commuting.

The authors reported that changes in the PANAS scores confirmed emotion induction. During negative emotional states, trait-emotional eaters rated the food as more pleasant and displayed increased appetitive facial reactions. However, these effects were not observed in trait-restrained eaters, which challenges cognitive models proposing that restrained eaters are prone to emotional overeating. Moreover, emotional reactivity plays a part in emotional overeating. High responders exhibited a decrease in food specific P300 (i.e., brain activity) response during negative emotions, indicating that intense emotional states could distract or override attention toward appetite. Although restrained eating influenced the parieto-occipital P300 amplitude in the EEG readings, an indicator of attention to motivationally significant stimuli, it did not lead to downstream effects on ratings or facial responses. The authors argued that based on the results, trait-restrained eating might be associated with attentional control, irrespective of emotional reactivity. Schnepper et al.'s (2020) findings provide valuable insight into the effects of trait emotional eating and emotional reactivity to negative stimuli, which can help to better understand and differentiate the underlying mechanisms of impulsive eating and emotional eating.

Frayn and Knäuper (2018) reviewed adults' relationship between emotional eating and weight. They argued that negative emotions had been negatively associated with weight outcomes, whereas the relationship between eating in response to positive emotions and weight is less clear. In their review, Frayn and Knäuper (2018) included longitudinal studies and behavior weight loss interventions, and their focus was mainly on emotional eating in response to negative emotions. The review had three aims: (a) to describe how emotional eating is assessed in research concerned with weight outcomes, (b) to review the literature on the relationship between emotional eating and weight and weight loss success in intervention contexts, and (c) to explore and discuss ideal methods for targeting and treating emotional eating in weight loss interventions.

To address aim a, Frayn and Knäuper (2018) analyzed the following self-report measures of emotional eating: DEBQ (Appendix A), the Three Factor Eating Questionnaire (TFEQ), and the Emotional Eating Scale (EES), as these are the most frequently used measures cited in studies investigating emotional eating. They concluded that although these measures have shown good construct validity in assessing emotional eating, with convergent and divergent validity found in relation to other constructs, more research is needed to determine the convergent validity between emotional eating and internal disinhibition, as they are often used interchangeably in studies targeting weight loss for those who struggle with eating in response to negative emotions. For aim b, Frayn and Knäuper (2018) wanted to investigate the relationship between emotional eating and weight outcomes (i.e., weight gain, weight loss, and weight loss maintenance). The authors mainly reviewed research that fell into two categories: (a) longitudinal

studies using the DEBQ (Appendix A) to examine weight gain over time and (b) weight loss intervention studies that utilized the TFEQ to investigate the effect of internal disinhibition on weight loss and weight loss maintenance. The longitudinal studies showed that emotional eating contributes to weight gain more than external eating (i.e., impulsive eating). In addition, high levels of emotional eating predicted greater weight gain, mainly when it was triggered by anxiety or stress. The authors found that more emotional eating behavior led to more food consumption and, thus, more weight gain. A review of the intervention studies suggested that internal disinhibition is essential in facilitating short-term weight loss. At the same time, high levels of emotional eating were found to hinder weight loss program success. However, Frayn and Knäuper (2018) found that emotional eating appears to be less related to weight loss maintenance. Therefore, Frayn and Knäuper (2018) concluded that targeting emotional eating may help with initial weight loss. In aim b the authors reviewed interventions targeting emotional eating and weight loss, including mindfulness, Acceptance and Commitment Therapy (ACT), Cognitive Behavior Therapy (CBT), and Dialectical Behavior Therapy (DBT). First, the authors found that traditional weight loss programs have not been effective in addressing emotional eating, as they do not address emotion regulation challenges specific to emotional eaters. Moreover, Frayn and Knäuper (2018) found that mindfulness interventions, like Mindfulness-Based Eating Awareness Training (MB-EAT), have shown the potential to reduce emotional eating but may need to be combined with behavioral weight loss programs for better results. Finally, the authors found that ACT has shown promise in helping emotional eaters lose weight, while CBT and DBT, mainly

used for eating disorders, appear to be efficacious in managing emotional eating. Therefore, the authors concluded that mindfulness and ACT therapies are most promising in reducing emotional eating and promoting weight loss. Frayn and Knäuper (2018) review offers valuable insight into the relationship between emotional eating, impulsive eating, and mindfulness. The review provides compelling evidence that the DEBQ is a robust and reliable assessment tool for effectively measuring emotional and impulsive eating behaviors.

Evers et al. (2018) conducted two meta-analysis and reviewed 56 experimental studies involving 3,670 participants. The first meta-analysis investigated the causal relationship between emotions and eating behavior in individuals with and without emotional eating behavior. The second meta-analysis investigated the effect of negative and positive emotions on food consumption. The authors argued that overeating is a serious threat to human health and said emotional eating is a significant factor contributing to overeating and weight gain. According to Evers et al. (2018), emotions can be defined as nuanced states that occur over a brief period, and they can be explained as a combination of emotional sensations, expressions, and physiological responses. Moreover, the authors argued that mood, affect, and stress are related to but must not categorize as emotions. Emotions are always present, manifesting as strong, weak, or even lacking emotion (Evers et al., 2018). Different individuals will be affected by emotions at different levels and either consume or restrict food at different rates. Restrained eating involves limiting calorie intake for weight loss or maintenance (Evers et al., 2018). According to the authors, disinhibition, or the loss of self-control over

eating (i.e., impulsive eating), may transpire when emotions prompt restrained eaters to disregard their self-imposed dietary restraints. Emotional eating refers to eating, overeating, or binge eating in response to emotions, serving to regulate unwanted emotions.

In addition, Evers et al. (2018) found that positive emotions led to increased eating in all groups. In addition, restrained eaters exhibited increased eating in response to negative emotions. This finding supports the premise that negative emotions impair the cognitive control of restrained eaters, leading to disinhibition. Finally, the authors found that negative emotions triggered an increase in food consumption in individuals diagnosed with binge eating disorder. Evers et al. (2018) meta-analysis offers critical insight into the role of positive and negative emotion and its relation to emotional eating. They highlight that many studies examining the influence of emotions on eating fail to meet essential quality criteria to be included in this meta-analysis, reinforcing the argument for the need for more rigorous methods to understand the complexities of emotion-induced eating.

Impulsivity, Impulsive Eating, and Lack of Inhibition Control

Emotional eating has been identified as a serious issue when it becomes impulsive eating, leading to weight gain, and potentially leading to obesity-related health concerns (Andrei et al., 2018). Furthermore, when emotional eating becomes the primary coping mechanism to alleviate unwanted emotions, it can create emotional distress when the behavior spirals out of control, leading to further health concerns such as depression and anxiety (Bénard et al., 2018). Impulsivity has been defined as the tendency to act without

any consideration for the potential consequences following one's actions (Hudiburgh et al., 2021) and has been linked to a range of negative outcomes, including substance abuse, gambling, risky sexual behavior, impulsive buying, and unhealthy food choices (Waltmann et al., 2021). Impulsivity is a multidimensional construct that includes both cognitive and affect components that can be influenced by a range of factors, including genetics, brain structure, and function, environmental factors, and social cues (Maier et al., 2021; Waltmann et al., 2021; Donofry at al., 2020; Ottaviani et al., 2019; Thayer et al., 2009).

Researchers Kozak et al. (2019) investigated the neurobiology of impulsivity, its role as a vulnerability marker for substance use disorders (SUDs), and the treatment of co-occurring impulsivity in individuals with SUDs. The authors argued that the relationship between impulsive behavior had been extensively studied. They said that impulsivity is a well-established factor in addictive behaviors and can be divided into four categories: (a) lack of meditation, (b) lack of perseverance, (c) sensation seeking, and (d) urgency. In addition, the authors argue that brain injury and mental illness can disrupt inhibitory control (IC) mechanisms, leading to impulsive behaviors and contributing to the development of SUDs. Finally, the authors argued that their review would differentiate itself from previous reviews, as they examined the development and efficacy of treatment options for co-occurring impulsivity and SUDs, including pharmacological, neurophysiological, and behavioral approaches.

Although impulsivity has been widely researched, there is no consensus on its classification, leading researchers to cast a wide net of aspects they wish to investigate

(Kozak et al., 2019). They argued that impulsivity could be measured with self-report assessments, behavioral measures, and electrophysiological analysis. One common definition of impulsivity is the lack of behavioral inhibition, leading to impulsive actions. Motor impulsivity relates to the failure of motor inhibition associated with dorsolateral prefrontal lobe activity (Kozak et al., 2019). Behavioral tasks to measure motor impulsivity include the stop signal reaction time (SST) task, the go/no-go task, and the continuous performance task (CPT), to name a few (Kozak et al., 2019). Impulsivity is also associated with decision-making that lacks sensitivity to negative consequences and long-term outcomes (Kozak et al., 2019). The DSM-5 describes impulsivity as dysfunctional decision-making involving urgency and harmful behavior in emotionally charged situations (Kozak et al., 2019). Self-report assessments include the Barratt Impulsiveness Scale (BIS-11), Eysenck Impulsiveness Questionnaire (EIQ), Multidimensional Personality Questionnaire (MPQ), and the UPPS Impulsive Behavior Scale of Impulsivity (IBS). Behavioral tasks for impulsive decision-making commonly involve delayed discounting of reward tasks. Lastly, impulsivity is linked to attentional dysfunction and the inability to follow instructions (Kozak et al., 2019). Kozak et al. (2019) argued that recent findings suggest that personality traits, discounting preferences, and response inhibition tasks represent three conceptually related but quantitatively distinct domains of impulsivity.

Furthermore, the authors argue that impulsivity and addiction risk are connected through overlapping brain circuits and neurotransmitter systems, leading to three neurobiological systems: the regulatory, reward, and threat systems. The authors argued

that urgency had been associated with excessive lateral prefrontal cortex activity, leading to self-regulatory failures like substance misuse and food addiction. In addition, recent models of addiction and impulsivity have focused on glutamatergic and GABAergic mechanisms in structures like the ACC (Kozak et al. (2019). Moreover, elevated glutamate levels and reduced GABA levels are associated with substance dependence and impulsivity, respectively. Modulating these systems shows promise in treating substance use disorders and impulsive behaviors. Dopamine is another relevant neurotransmitter, with the D2 dopamine receptor being crucial for drug reinforcement. Dysfunction in the brain reward cascade due to genetic variants may cause hypo-dopaminergic drive, leading to greater impulsivity and drug-seeking behavior. Controversy exists over whether hyper- or hypoactivation of ventral striatal and dopamine functioning conveys addiction risk. Lastly, the authors conclude that other neurotransmitters potentially involved in impulsivity and substance use disorders include norepinephrine, which has been linked to impulsive behaviors and addictions, and serotonin, where low levels of its transmission have been associated with impulsive choices and addictions like early-onset alcoholism. The authors reviewed cross-sectional and longitudinal studies that have connected trait impulsivity to drug use. They found that trait impulsivity might predict initial substance use, SUD development, chronic use, relapse rates, and treatment retention. Moreover, the authors found that impulsivity levels are higher in individuals with SUD involving stimulant, opiate, and alcohol use. According to the authors, impulsivity has been associated with different stages of addiction, such as acquisition, escalation, abstinence,

relapse, and treatment. One interesting finding of their review is that research with animals suggests that impulsivity might precede substance use.

In contrast, another finding suggests that SUDs can also contribute to impulsivity. Chronic drug use may result in structural changes to the brain and behavioral self-control deterioration (i.e., biological). Kozak et al. (2019) found that environment (i.e., social) might also play a role in impulsivity, such as early exposure to alcohol use and trauma. They also found that females exhibit a greater drug-seeking behavior than males. According to Kozak et al. (2019), men report more problems with SUDs, while women are more likely to transition and continue to misuse them than men. Lastly, hormonal status, such as estrogen, progesterone, and circulating gonadal hormones play a major role in SUD. The research by Kozak et al. (2019) offers valuable insights into the complex relationship between impulsivity and addiction. Their article demonstrates that impulsivity can be related to various factors, such as brain structures, hormones, and neurotransmitters. The authors thoroughly examine how these factors may influence the development and progression of SUDs. Furthermore, the findings presented by Kozak et al. (2019) can also be potentially applied to other areas of research, such as impulsive eating. By understanding the underlying factors contributing to impulsivity, researchers can develop better strategies for preventing and treating impulsive behaviors in various contexts, including eating disorders and addiction.

Impulsivity is often associated with the tendency to act quickly and without consideration for potential consequences, which can be linked to a behavioral or cognitive construct (Minhas et al., 2021). However, impulsivity has also been associated

with a lack or inhibition/impulse control, which can be linked to brain pathways and physiological responses (Donofry et al., 2020). Denofry et al. (2020) reviewed the relationship between eating behavior, obesity, and functional brain network organization. They argued that obesity is associated with impairments in executive functions such as decision-making and inhibitory control, as well as reward valuation, which are believed to contribute to the difficulty in maintaining healthy lifestyle behaviors like adhering to a proper diet. According to Denofry et al. (2020), recent evidence suggests that these impairments are accompanied by disruptions in functional brain networks, particularly those supporting self-regulation, reward valuation, self-directed thinking, and homeostatic control.

The relationship between inhibition control and the autonomic nervous system has been originally explored by Julian Thayer and Richard Lane (2000) when they sought to develop a model of neurovisceral integration in emotion regulation and dysregulation. It was not until 2002 that Thayer and Bruce Friedman explored a model of inhibition control, sensitization, and their visceral concomitants. Their research is relevant to the understanding of the biological aspects of inhibition control. Thayer and Friedman (2002) aimed to explore the connection between the inhibitory process and sensitization and the individual-ability to utilize social, cultural, and/or practical skills that will allow one to adapt to life's demands (e.g., adaptive behaviors). The authors argued that patients diagnosed with anxiety disorders often present with subjective somatic complaints that are likely a result of the failure in the inhibitory neural connections. Anxiety disorders are characterized, among other things, by the inability to inhibit inappropriate responses to

external stimuli. Individuals depend on inhibitory neurons to engage in excitatory or inhibitory behavior, which facilitates the ability to express emotional and behavioral flexibility and transition from one emotional state to another (Thayer & Friedman, 2002).

Individuals who present with failure in this inhibitory process may exhibit changes in psychophysiology (e.g., heart rate and blood pressure). These symptoms are often associated with anxiety disorders, depression, and cardiovascular diseases, including poor vagally mediated Heart Rate Variability (HRV; Thayer & Friedman, 2002). Thayer and Friedman (2002) reported that decreased HRV is often observed in individuals who present with perseverative thinking, acute and chronic worry, prolonged stress, and poor psychophysiological self-regulation. They proposed that inhibitory cortical and subcortical circuits, especially in the frontal cortex, are connected to perseverative thinking and parasympathetic activation. When there is a disruption in the pathway that controls these mechanisms, a defensive behavioral pattern arises accompanied by behavioral, emotional, and autonomic inflexibility (Thayer & Friedman, 2002). This pattern of inflexible response is observed in impulsive eaters and emotional eaters (Denofry et al., 2020).

In recent years there has been considerable interest in inhibitory control mechanisms. Spitoni et al. (2017) investigated impaired inhibition in obese patients regarding executive function and reduced vagal tone (indicated by decreased HRV) in response to food stimuli. The authors argued that obese individuals often exhibit deficits in inhibitory control, leading to impulsive behaviors such as overeating. Spitoni et al.

(2017) cited the Neurovisceral Integration Model (NVIM; Thayer and Lane, 2000) and the Polyvagal Theory (Porges, 2007) as a foundation for the argument that inhibitory control is reflected in high HRV. According to Spitoni et al. (2017), high HRV is associated with effective self-regulation, while phasic HRV suppression (i.e., low vagal tone) is associated with stress and cardiac vagal control withdrawal. Therefore, the authors hypothesized that the drive to eat experienced by obese individuals without the need for caloric intake would be associated with impairment in inhibitory functions and vagal functions (indexed by a decrease in HRV) in response to food stimuli.

A total of 24 patients with obesity and 37 controls underwent Electrocardiogram (ECG) monitoring during baseline, food stimuli viewing, and recovery phase to measure physiology. In addition, the authors administered the Rule Shift Cards (RSC) and the Hayling Sentence Completion Test (HSCT) to assess inhibitory control and impulsiveness. The psychological assessment included the Symptoms Checklist-90-R (SCL-90-R), and the Body Uneasiness Test and Body Shape Questionnaire (BSQ) were used to measure body satisfaction. To further assess inhibitory control and impulsiveness, the authors used the Barratt Impulsiveness Scale 11 (BIS-11) and the Three-Factor Eating Questionnaire-R18 (TFEQ-R18) was used to assess cognitive restraint, uncontrolled eating, and emotional eating. The authors found significant differences between the experimental and control groups in the psychopathological, cognitive, and physiological dimensions. First, they found that obese patients displayed a systematic impairment in inhibitory control, which they argue contributes to maintaining unhealthy behaviors.

Second, inhibitory control was found to be weaker in obese participants. Obese individuals experienced more difficulty in several aspects of inhibition control, including response inhibition, motor impulsiveness, and perseveration. Furthermore, Spitoni et al. (2017) argued that deficits in those areas had been linked to impulsive and emotional eating and cognitive restraint. Finally, the authors found there is an association between deficits in inhibitory control and reduced HRV in obese individuals when exposed to food stimuli. They argued that impaired HRV regulation in response to food might contribute to the inability of obese patients to control food intake. In conclusion, Spitoni et al.'s (2017) findings are essential to support the argument that impulsive eating is multifaceted and is associated with psychological and biological factors. In addition, the authors found significant results when using the BIS-11 to assess impulsivity, one of the measures that will be used in this proposed study.

When biological (i.e., inhibition control, low HRV) and psychological (i.e., cognitive restrain) signs go unchecked, there is a greater risk of developing uncontrollable eating habits. Lacroix et al. (2029) conducted a qualitative investigation of addictive-like eating behavior in treatment-seeking Brazilian women and men. According to Lacroix et al. (2019), while the concept of addictive-like eating has gained attention, there is no consensus whether or not it should be categorized as a SUD, behavioral addiction, a severe form of binge eating disorder (BED), or mainly categorized within the spectrum of overeating. Furthermore, the authors argued that assessment tools might not fully capture the complexity of addiction-like eating, especially across different cultures, such as Brazil. To address this gap, Lacroix et al. (2019) conducted a semistructured

interview with 15 participants. The interview included questions addressing participants' personal experiences, the conceptualization of the problem, distress and impairment, and coping mechanisms. Using thematic analysis, the authors found three main themes: characteristics, causal factors, and consequences of addictive-like eating.

Lack of control was identified as a key characteristic, and emotional eating was described as a major causal factor (Lacroix et al., 2019). Consequences of addictive-like eating included emotional, interpersonal, occupational, and health-related impairments, primarily linked to weight gain (Lacroix et al., 2019). Lacroix et al. (2019) findings align with previous qualitative studies but suggest that current self-report questionnaires may not adequately capture the full range of addictive-like eating symptoms. In addition, Lacroix et al. (2019) offer valuable insight into how social factors, such as interpersonal interactions and occupational concerns, can influence one's ability to self-regulate and inhibit impulses to eat in the presence of desirable food.

Effects of Anxiety and Stress on Impulsive and Emotional Eating Behaviors

Stress and anxiety are significant factors that contribute to emotional eating, leading to unhealthy eating habits and an increased risk of obesity (Bénard et al., 2018). Individuals who are unable to manage their emotions effectively are more likely to rely on food as a coping mechanism to relieve negative affect, leading to an increase in emotional eating (Bénard et al., 2018). The effects of stress and anxiety on emotional eating have also been linked to the risk of health problems such as diabetes, high blood pressure, and heart disease (Wehling & Lusher, 2019; Andrei et al., 2018). The effects of stress and anxiety on emotional eating have also been linked to the risk of health

problems such as diabetes, high blood pressure, and heart disease. Emotional eating has been identified as a serious issue when it becomes impulsive, leading to weight gain and potentially to obesity-related health concerns (Andrei et al., 2018). Furthermore, when emotional eating becomes the primary coping mechanism to alleviate unwanted emotions, it can create emotional distress when the behavior spirals out of control, leading to further health concerns such as depression and anxiety (Bénard et al., 2018). Given the serious consequences of emotional and impulsive eating on health and well-being, interventions are needed to address these behaviors.

A recent study involving 324 adolescents explored the interaction between high anxiety and stress levels in predicting increased binge eating tendencies (Lim et al., 2021). The research was conducted over three waves as part of the CogBIAS Longitudinal Study Dataset (CogBias-L-S). The authors used a random intercept cross-lagged panel model (RI-CLPM) to examine the relationship between anxiety, stress, and binge eating tendencies measured by the Three-Factor Eating Questionnaire-R18 (TFEQ-R18). The primary hypothesis in this study posited that the combined effects of high anxiety and stress levels would forecast a rise in binge eating tendencies beyond their influence, represented by an interaction between anxiety and stress. The secondary hypothesis posited that elevated levels of depression, anxiety, and stress, would each independently contribute to a growth in binge eating tendencies. Lim et al. (2021) found that the interaction between anxiety and stress significantly negatively affected cognitive restraint at waves 2 and 3, suggesting that anxiety and stress interacted to predict increased binge eating tendencies related to cognitive restraint. However, the interaction

term between anxiety and stress did not support the second hypothesis that it would predict uncontrolled or emotional eating levels over time. In conclusion, the study emphasizes the importance of recognizing the interaction between high anxiety and stress as a potential risk factor for adolescent binge eating tendencies.

A study by Hun et al. (2021) analyzed the mediating effects of acculturation stress and ethnic identity on the relationship between anxiety and eating behaviors in Colombian migrants living in Chile. The authors recruited 959 Colombian immigrants who participated in this study. They argue that eating behaviors are influenced by biological, social, cultural, and psychological factors, and are often classified as emotional eating, restrained eating, and external eating (i.e., impulsive eating). In addition, contextual factors, such as income, access to food, education, healthcare, and even the type of regional food and culture surrounding the individual, can affect their emotional, social, and even biological behavior. According to Hun et al. (2021), an individual who migrates from one region to another will be exposed to a new culture, environment, and eating styles that can significantly affect one's perception of oneself. Exposure to these changes can lead to changes in mental health, and the acculturation process can trigger stress and anxiety.

Adapting to a new culture can affect an individual's perception of themselves, and Hun et al. (2021) aimed to analyze the mediating effects of acculturation stress and ethnic identity on the relationship between anxiety and eating behaviors in Colombian immigrants living in Chile. The authors' main hypotheses were: (a) anxiety is inversely related to ethnic identity and directly related to acculturation stress; (b) anxiety has a

positive relationship with emotional eating, restrained eating, and external eating; (c) these eating behaviors are inversely related to ethnic identity and directly associated with acculturation stress; (d) the relationship between anxiety and eating behaviors is mediated by a strong ethnic identity, reducing anxiety's negative effect on eating behavior; and (e) the relationship between anxiety and eating behaviors are mediated by acculturation stress, increasing anxiety's negative effect on eating behavior. To test their hypothesis, Hun et al. (2021) used the BAI, DEBQ (Appendix A), Smith Acculturation Stress Scale (SASS), and the Multigroup Ethnic Identity Measure Scale (MEIMS). They found that anxiety had an inverse relationship with ethnic identity and a direct relationship with acculturation stress. Anxiety also had a positive relationship with emotional, restrained, and external eating. Emotional eating was inversely related to ethnic identity and directly associated with acculturation stress. Restrained eating and external eating had no association with ethnic identity. Acculturation stress enhanced the negative effect of anxiety on emotional and restrained eating. However, ethnic identity had a protective effect, diminishing the negative impact of anxiety on emotional eating.

In summary, Hun et al. (2021) found that emotional eating was the only factor that acted as a mediator between both ethnic identity and acculturation stress, with ethnic identity reducing the negative impact of anxiety on emotional eating. Additionally, acculturation stress intensified the connection between anxiety and emotional eating. Hun et al.'s (2021) research is groundbreaking in Latin America as it contributes to enhancing public health policies for immigrant populations. The study's findings demonstrate that emotional eating and impulsive eating can be influenced by one's internal (psychological)

and external (social) factors while also affecting the body's (biological) response to stress and anxiety in relation to emotional eating. They also distinguished between emotional eating and external eating (i.e., impulsive eating). According to Hun et al. (2021), restrained eating and external eating showed no association with ethnic identity, suggesting that participants' self-identity (a biological factor) might not involve impulsive eating behavior. However, under acculturation stress, researchers observed a strong link between anxiety, emotional eating, and impulsive eating. This study supports the hypothesis that anxiety and stress are associated with impulsive and emotional eating.

Most researchers investigating emotional eating focus on eating in response to negative emotions. However, Braden et al. (2018) examined the relationship between eating in response to depression, anxiety, anger, boredom, and positive emotions while examining psychological and physical health variables. The authors' primary goal was to determine whether boredom and positive emotional eating were related to similar negative psychological and physical health variables as emotional eating due to depression, anxiety, or anger. In addition, the authors aimed to examine which types of emotional Eating are most closely associated with psychological and physical health variables. A total of 18 overweight and obese adults completed all steps of the study. They self-reported their height and weight (used to determine their BMI) and the type of emotional Eating engaged [Emotional Eating in response to Depression (EE-D); Emotional Eating in response to Anxiety/Anger (EE-A); and Emotional Eating in response to Boredom (EE-B)]. Participants also completed the Emotional Eating Scale (EES), Emotional Appetite Questionnaire (EMAQ), Symptom Checklist-90 Revised,

Eating Disorders Examination Questionnaire (EDE-!), Difficulties in Emotion Regulation Scale (DERS), and a short-form health survey.

The authors found that eating triggered by depression, anxiety/anger, and boredom was linked to poorer psychological well-being, increased eating disorder symptoms, and more significant emotion regulation difficulties. In addition, eating in response to positive emotions was not associated with adverse outcomes. Moreover, emotional eating was not related to poorer self-report physical health. Furthermore, among the different types of emotional Eating, EE-D showed the most robust relationship with lower psychological well-being, eating disorder symptoms, and poor emotion regulation. Eating due to boredom (EE-B) and EE-A was not uniquely associated with adverse outcomes. Eating in response to positive emotion was unrelated to negative psychological factors. Lastly, the authors found no association between positive emotional eating and poorer physical health. Exploratory analysis suggested a unique relationship between emotional eating types and specific facets of emotion regulation, such as difficulty engaging in goal-directed behavior. The authors argued that it is possible that when one experiences intense negative emotions such as depression or boredom, one might be unable to attend to alternative adaptive tasks. Therefore, the individual engages in maladaptive activity to improve their mood, such as emotional or impulsive eating. Braden et al.'s (2018) study offers valuable insight into the relationship between emotion and impulsive eating and offers support to the proposition that one might use food as a coping mechanism to regulate emotion.

Lastly, a study by Blyderveen et al. (2016) investigated the relationship between stress and eating, and it aimed to determine if affect regulation plays a moderating role in impulsive eating. The researchers recruited 86 undergraduate students who were randomly selected to the experimental group (i.e., watch videos about university exams) or the control group (i.e., watch videos about travel). The participants were told that a variety of (healthy and unhealthy) foods were available as a way to thank them for their participation. The food was used to measure participants' food choices after watching a stressful or joyful video (Blyderveen et al., 2016). The researchers anticipated that the participants would engage in either emotional suppression or impulsive eating to cope with negative emotions (Blyderveen et al., 2016). They expected that emotional suppression would predict a decrease in caloric intake, and impulsivity would result in the increase in caloric intake in response to a stressor (Blyderveen et al., 2016). The results revealed that participants in the experimental group engaged in higher caloric intake and that impulsivity was a moderator between stress and eating behavior (Blyderveen et al., 2016). Although Blyderveen et al.'s (2016) study has been published seven years prior to this literature review, this study was included in this review due to its relevancy to this study since it found that impulsivity was a moderator between stress and emotional eating.

Emotion Regulation and its Role in Emotional and Impulsive Eating Behaviors

Emotion regulation refers to the ability to manage and control one's emotions, which has been crucial in preventing emotional and impulsive eating behaviors (Andrei et al., 2018; Annesi, 2018). Recent studies have explored the complex relationship between

emotion regulation and developing and maintaining these maladaptive eating patterns. This growing body of literature underscores the importance of understanding how individuals use various strategies to cope with their emotional experiences. These strategies may be protective or risk factors for emotional and impulsive eating (Annesi, 2018). The interplay between emotion regulation and eating behavior has implications for treating eating disorders and weight management interventions. Being able to understand the role of emotion regulation in the context of individual differences, such as personality traits, cultural background, and environmental factors, is a valuable tool for researchers and clinicians to be able to provide a more comprehensive intervention that takes into consideration the factors contributing to emotional and impulsive eating.

A recent study by Maier et al. (2021) investigated the relationship between cognitive control, neural connectivity, and emotion regulation in individuals with low and high impulsivity. A total of 57 participants (25 identified as low-impulsive and 32 identified as high-impulsive) watched a negative emotion-inducing movie scene and were randomly instructed to either suppress or allow emotions to arise. After watching the movies scene, the participants completed an emotional Stroop task. Electromyography (EMG) measured muscle activity over the corrugator supercilia was used to assess emotion regulation, and a non-invasive imaging technique using Functional Near-InfraRed Spectroscopy (fNIRS) over the frontal brain areas was used to assess the neurophysiological mechanisms. The authors found that low-impulsive participants had lower EMG activation regardless of instruction, while high-impulsive participants had increased EMG activity when not instructed to suppress emotions. Despite similar

functional connectivity within the frontal lobe networks, low-impulsive participants displayed better emotion control and performed significantly better in the Stroop task. The emotion regulation condition did not significantly affect the results.

In conclusion, the authors found that the cognitive control network is closely associated with emotion regulation capabilities. Individuals with high cognitive control show an implicit ability to regulate emotions, while those with low cognitive control require external instructions for effective emotion regulation. Maier et al.'s (2021) argued that a there is a clear difference between how individuals respond to negative vs. positive emotion when it relates to impulsivity. They found that the functional connectivity within the Cognitive Control Network (CCN) is closely associated with emotion regulation capabilities, with the Dorsolateral Prefrontal Cortex (DLPFC), specificity the area BA46, playing a crucial role in emotion regulation control. High cognitive control individuals show implicit capabilities to regulate their emotions, while those with low cognitive control need external instructions for explicit emotion regulation to achieve similar outcomes. The findings from Maier et al. (2021) play a crucial role in this proposed study, as they demonstrate a biological link between impulsivity and cognitive ability to restrain impulse actions in response to emotional triggers. Pedersen et al. (2018) using a qualitative study, examined the self-regulatory strategies and self-efficacy beliefs employed by short-term (less than 12 months) and long-term (at least 12 months) weight loss maintainers in managing food intake. The authors defined successful long-term Weight Loss Maintenance (WLM) as losing 10% of initial body weight and keeping the weight off for at least six months. Fourteen females and four males underwent an

individual semistructured interview that followed a guide that focused on four themes associated with WLM success: planning, shopping, cooking/preparation, and eating. The Health Action Process Approach (HAPA) was used post-hoc to organize data and support analysis. The authors found that planning, shopping and storing, preparation and cooking, and eating were crucial aspects of WLM efforts. Planning helped participants maintain appropriate caloric intake for WLM and deal with unforeseen circumstances. In addition, long-term maintainers relied more on habitual behavior, while short-term maintainers focused on action planning. Moreover, shopping and storing also played a vital role in WLM, as it allowed participants to prepare a shopping list that limited food that was detrimental to WLM. Long-term weight loss maintainers relied on previous shopping experiences, while short-term weight loss maintainers tended to be more diligent in following the grocery list. Regarding food preparation and cooking, some participants tended to prepare and cook food for the week. In contrast, others whom fewer cooking abilities relied on other household members to help them prepare. The eating habits of all participants focused on portion control and mindful eating. Short-term maintainers used calorie count to make any food trades, and long-term maintainers displayed more flexibility in their eating patterns. The authors found that the strategies employed to support WLM vary among long-term and short-term weight loss maintainers. However, flexibility, habits, and self-control played key roles in maintaining weight loss in both groups.

It is essential to note that thematic analysis of the interviews uncovered additional themes that emerged from the data. These themes involved physical activity, planning,

motivation, and personal issues, including divorce, bullying, and illness. These personal issues occasionally resulted in weight gain, followed by weight loss and maintenance aspirations. Pedersen et al. (2018) findings demonstrate that WLM can be influenced by biological (i.e., illness), psychological (i.e., the stress of being bullied and negative emotions from divorce), and social (i.e., bullying and divorce) factors. In addition, their findings demonstrate that individuals use food as a coping mechanism to manage unwanted negative emotion (e.g., sadness due to divorce, stress due to bullying). Their findings further provide evidence supporting the use of the BPSM as the framework for this proposed study, as the BPSM acknowledges the interconnectedness of these factors and their collective impact on impulsive and emotional eating.

A systematic review was conducted by Favieri e al. (2021), where they investigated the relationship between emotional regulation and emotional intelligence in childhood and adolescence. In addition, the authors also aimed to evaluate if emotional regulation and emotional intelligence contribute to overeating behaviors. The authors reviewed 26 studies cross-sectional and longitudinal studies. Cross-sectional studies have confirmed a relationship between emotional regulation difficulties and overeating behavior, particularly in adolescence. Various theories have been proposed to explain this relationship, including cultural interpretations, the Escape Theory, and the role of attachment style and parental characteristics. The complexity of this relationship may be influenced by factors such as emotional suppression, cognitive reappraisal, and parental control. Longitudinal studies have also generally confirmed a negative relationship between emotional regulation and overeating, especially in adolescence.

The results highlight the role of emotional inhibition and reactivity in emotional and external eating (i.e., impulsive eating) and the difficulty in understanding and regulating negative emotions. Some studies suggest that the mother-child relationship may play a role in emotional dysregulation and emotional eating, although this has not been consistently confirmed in follow-up assessments. Social conformism and peer pressure may also contribute to overeating during adolescence. Favieri e al.'s (2021) review offers evidence that psychosocial factors (i.e., parental relationship, cognitive reappraisal) and biological factors (i.e., developmental stage) might play a role in one's ability to self-regulate. Their findings emphasize using food as a coping strategy to manage unwanted emotions. Their research supports using the BPSM framework for this study, as it demonstrated a connection between external eating (i.e., impulsive eating) and emotional eating, and challenges in emotion regulation.

Disregard for Future Consequences and its Role in Emotional Eating and Impulsive Eating

As previously examined, research has established that impulsive and emotional eating are considerable factors contributing to weight gain, obesity, and adverse health outcomes. Despite the awareness of potential health risks associated with weight gain, one may question which factors hinder an individual's capacity to acknowledge the relationship between excessive caloric intake and subsequent weight gain and obesity-related health conditions. A critical aspect underlying emotional and impulsive eating behavior is the apparent disconnect between the immediate action (i.e., eating to fulfill an immediate urge) and the long-term consequences of that action (i.e., weight gain and

adverse health effects), more precisely characterized as a disregard for future consequences.

Disregard for future consequences refers to an individual's tendency to prioritize immediate gratification over long-term outcomes (Macaskill et al., 2019). In the context of emotional and impulsive eating, disregard for future consequences manifests as prioritizing the immediate comfort and pleasure of eating over the potential negative consequences of excessive food consumption. These consequences may include weight gain, health problems, or worsening emotional well-being. Benard et al. (2018) examined the moderating influence of Consideration of Future Consequences (CFC) and impulsivity in the relationship between emotional eating (EmE) and body mass index (BMI). A total of 9,974 responses to a large ongoing study from the NutriNet-Sante cohort in France were analyzed to explore the relationship between nutrition, health, and the determinants of eating behavior (Benard et al., 2018). The participants completed the French version of the Three-Factor Eating Questionnaire (TFEQ-Q21), the Consideration of Future Consequences questionnaire, and the French version of the BIS-11. In addition, Socio-demographic (e.g., age, gender, occupational status, monthly income), lifestyle data (e.g., smoking status, level of physical activity, history of dieting), and anthropometric measures (i.e., BMI) were also analyzed in the study.

Emotional eating was positively associated with BMI, and the relationship was moderated by CFC and impulsivity (Benard et al., 2018). The authors argued that high impulsivity might impair the inhibitory control that regulates the resistance to act on urges to eat emotionally. Furthermore, impulsivity moderated the relationship between

EmE and BMI in women, and highly impulsive individuals were more susceptible to eating when triggered by negative emotions. The influence of disregard for future consequences on the association between EmE and weight status was moderated by both women and men. More future-oriented individuals showed a weaker relationship between EmE and BMI, suggesting a protective factor of CFC in managing negative emotions (Benard et al., 2018). The authors further posited that individuals with higher CFC may consume smaller portions or opt for lower-calorie foods. Bernard et al.'s (2018) findings lend credence to the premise that disregard for future consequences is a pivotal factor in initiating and continuing impulsive and emotional eating behavior.

A study by Pozolotina and Olsen (2019) investigated the link between Consideration of Immediate and Future Consequences (CFC-I and CFC-F) and Perceived Change in Future Self (PCFS) in relation to healthy and unhealthy behaviors. Additionally, the authors investigated the moderating role of PCFS on the relationship between CFC-I, CFC-F, and health behaviors. According to Pozolotina and Olsen (2019), CFC refers to the degree to which individuals consider the potential long-term outcomes of their current actions and how these potential outcomes influence their decision. The study's first objective was to test the relationships between CFC-I, CFC-F, and different health behaviors. Four scenarios were considered to help formulate the hypotheses. The first scenario involved individuals choosing immediate benefits from unhealthy behaviors, such as smoking or unhealthy eating. The second scenario described individuals avoiding smaller health investments in the present, such as skipping a fitness class or delaying dentist appointments, leading to a more considerable health cost in the

future. The third scenario represented individuals paying minor costs in the present to achieve better health in the future, such as going for a walk or joining a fitness class. Finally, the fourth scenario entailed individuals letting go of minor benefits in the present to gain more extensive health benefits in the future, such as avoiding unhealthy food or resisting the urge to smoke or drink.

The authors found that CFC-I was a stronger predictor of unhealthy behaviors, and whole CDC-F was a stronger predictor of healthy behaviors. These results support the premise that CFC is a two-factor construct and that health behaviors can be categorized into healthy and unhealthy. Furthermore, Pozolotina and Olsen (2019) also explored the relationship between perceived change in the future self (PCFS) and health behaviors, as well as its moderating effect on the relationship between CFCs and health behavior. The authors found that PCFS has a direct negative association with healthy behaviors. Those who believed their personality would change significantly in the future were less likely to engage in healthy behaviors. Conversely, PCFS also strengthened the positive relationship of CFC-I and dampened the negative relationship of CFC-C with unhealthy behaviors. Pozolotina and Olsen's (2019) findings provide essential insights into how disregard for future consequences might influence impulsive and emotional eating behaviors. Impulsivity often involves impaired cognitive functions, causing individuals to discount the consequences of their actions. In the context of eating or emotional eating, this disregard for future consequences might contribute to a preference for immediate ratification over considering the potential consequences, such as weight

gain and adverse health outcomes, ultimately leading to a vicious cycle of impulsive or emotional eating patterns.

Emotional Awareness and its Role in Emotional Eating and Impulsive Eating

Emotional awareness is critical in understanding emotional eating and impulsive eating behaviors. Emotional awareness refers to recognizing, understanding, and managing emotions effectively (Baer et al., 2018). Individuals with high emotional awareness are more likely to identify their emotional triggers and regulate their emotional responses, leading to healthier eating patterns (Lattimore, 2019). When emotional awareness is lacking, individuals might struggle to differentiate between emotional and physical hunger, making them more prone to emotional eating. Emotional eating is the act of consuming food in response to emotions, such as stress, sadness, or boredom, rather than genuine hunger (Lattimore, 2019). This coping mechanism may provide temporary relief or comfort but can lead to unhealthy eating habits and potential weight gain. Impulsive eating is characterized by a lack of self-control and the inability to resist the urge to consume food (Waltmann et al., 2021). Poor emotional awareness can contribute to impulsive eating, as individuals may not recognize the emotional triggers driving their behavior and fail to employ effective coping strategies (Barnhart et al., 2020). By enhancing emotional awareness, individuals can better understand their emotions, identify triggers, and implement healthier coping mechanisms to manage their emotional responses (Lattimore, 2019). Improving emotional awareness can potentially lead to improved self-control and reduced emotional and impulsive eating, ultimately promoting healthier eating habits and overall well-being (Baer et al., 2018).

To better understand the relationship between emotional awareness and emotional eating and obesity in middle school, Gerçeker and Bektas (2021) conducted a cross-sectional study in Turkey, comprised of 421 students from fifth to eighth grade. The authors argued that in the past 30 years, childhood obesity rates had doubled globally, with 16.9% of the children in the US being obese (Gerçeker & Bektas, 2021). According to Gerçeker and Bektas (2021), eating behaviors and parental feeding styles can impact the development of obesity in children. They argued that emotional eating is one of the leading causes of obesity and may be linked to deficits in emotion regulation. Furthermore, they argued that parents' emotional eating behavior might invertedly contribute to their children's disinhibited emotional eating. However, the authors noted that even if a child is obese or overweight, their awareness of obesity and emotional eating behavior may be low, contributing to weight gain.

In their study, Gerçeker and Bektas (2021) collected socio-demographic data and the children's height and weight to calculate BMI. Participants completed the Obesity Awareness Scale (OAS) and the Emotional Eating Scale (EES). The authors found no relationship between emotional eating, obesity, and obesity awareness within their sample group. Children in the study had low mean emotional eating scores and high obesity awareness scores. The low ratios of overweight and obese children led researchers to conclude that the participants were aware of their eating habits and obesity. Furthermore, no relationship was found between depressive symptoms and obesity between BMI and nutritional knowledge and dietary control. Although the findings of Gerçeker and Bektas (2021) should not be interpreted as a cause-and-effect relationship,

the absence of a relationship between the variables in their study does imply the possibility that children may have exhibited reduced emotional eating behavior due to their heightened awareness of obesity. These findings highlight the value of further research to explore the relationship between emotional awareness and impulsive or emotional eating behaviors.

An experimental study was conducted by Vander Wal et al. (2020) where the authors examined the differences between women with high and low disordered eating symptoms in emotional awareness, alexithymia (i.e., difficulty in identifying and describing one's own emotion, distinguishing between emotional and physical sensation, having restricted capacity for imagination, and possessing an externally oriented thinking style; Vander Wal et al., 2020), and facial affect recognition while manipulating Self-Focused Attention (SFA) using a 2X2 experimental design. The authors argued that women with eating disorders had been found to have difficulties identifying and describing emotions and inferring emotional states from social scenarios. Furthermore, they argued that SFA, linked to psychopathology, can potentially influence emotional awareness and facial emotion recognition. Vander Wal et al. (2020) hypothesized that: (a) women with high disordered eating symptoms would report greater alexithymia; (b) these women would score more poorly on emotional awareness and facial affect recognition; (c) women would perform worse on emotional awareness and facial affect recognition under SFA conditions compared to no SFA; ad (d) SFA would have a greater impact on the performance of women with high disordered eating symptoms than those with low symptoms.

A total of 79 female participants from a Midwestern US university were included in Vander Wal et al.'s (2020) study. The participants were divided into two groups based on their scores on the Eating Attitudes Test-26 (EAT-26): high levels of disordered eating symptoms (High-EAT) versus low levels (Low-EAT). In addition, participants completed the Toronto Alexithymia Scale-20 (TAS-20), the Levels of Emotional Awareness Scale—Short Version (eLEAS), the Facial Expression Recognition Task (FERT), the Depression Anxiety Stress Scale—21 (DASS-21), and the Wechsler Memory Scale, third edition, faces subtest (WMS—faces). Participants were then randomly assigned to self-focused attention (SFA) or non-self-focused attention (n-SFA) conditions, with the SFA group being informed that their participation would be recorded. The authors included a manipulation check to assess the efficacy of the SFA manipulation, and participants provided demographic information, including age, year in school, and racial and ethnic identification. Height and weight measurements were taken at the end of the study to calculate BMI.

The authors found that women with high disordered eating scores had more difficulty identifying feelings but not in describing feelings or externally oriented thinking. These women also displayed lower emotional awareness scores. However, disordered eating status had no significant effects on facial emotion recognition. The authors argued that this finding could be due to the sample being a screening sample rather than a clinical one. Furthermore, they also explored the role of SFA on emotion recognition and found that SFA negatively impacted self-emotional awareness scores. Additionally, women in the SFA condition were quicker to identify negative emotions.

Vander Wal et al.'s (2020) study found no significant interaction between eating disorder status and SFA. According to Vander Wal et al. (2020), the implications of their findings include the need to address emotional awareness and tolerance in women with disordered eating and the potential benefits of interventions to decrease SFA to reduce emotional vulnerability.

Understanding the underlying factors contributing to disordered eating behaviors is essential for developing effective interventions and treatment approaches. Emotional awareness, the ability to recognize and describe one's own emotions and the emotions of others, plays a crucial role in regulating impulsive and emotional eating behaviors. First, the study provided valuable insights into the difficulties women with high disordered eating symptom scores face in identifying and describing their feelings. Emotional awareness is critical in managing impulsive and emotional eating behaviors, as recognizing one's emotions allows for better control and regulation of emotional responses. Second, the study highlights the association between self-focused attention and emotional awareness. An increase in SFA may lead to decreased emotional awareness, contributing to impulsive and emotional eating behaviors. Furthermore, the study emphasizes the importance of emotional tolerance in individuals with disordered eating symptoms. Equipping individuals with the necessary skills to tolerate and regulate their emotions makes them more likely to resist the urge to engage in unhealthy eating habits. Lastly, while emotional awareness plays a significant role, other factors such as negative affect, self-focused attention, and social comparison may also contribute to impulsive and emotional eating behaviors. Therefore, Vander Wal et al.'s (2020) findings

offer valuable insight into understanding the role of emotional awareness in impulsive and emotional eating behaviors by assisting healthcare providers develop targeted and effective interventions to help individuals better manage their emotions and resist unhealthy eating by examining the intricacies of emotional awareness, self-focused attention, and their associations with disordered eating.

Mindful Attention and its Role in Emotional Eating and Impulsive Eating

Mindful attention has emerged as a state of awareness characterized by a non-judgmental and present-centered focus (Verrier & Day 2022). It has been linked to reduced emotional eating and is associated with emotional awareness, the ability to identify, understand, and manage one's emotions (Khan et al. (2017). Empirical studies have consistently demonstrated that mindful attention is negatively associated with emotional eating (Kennedy et al., 2018). In addition to reducing emotional eating, mindful attention has also been linked to emotional awareness. Mindfulness-based intervention that targets mindful attention effectively reduces emotional eating in overweight and obese women, significantly reducing emotional eating behaviors (Kennedy et al., 2018).

A study by Verrier and Day (2022) found that women with obesity who reported higher levels of mindful attention had better emotion regulation skills associated with lower levels of emotional eating. This finding suggests that mindful attention may help individuals better manage their emotions and choose more adaptive coping strategies in response to negative emotions, ultimately preventing emotional eating. These findings underscore the potential of mindful attention as an important target for interventions to

reduce emotional eating in at-risk populations. Furthermore, studies have highlighted the role of mindful attention in preventing emotional eating behaviors (Verrier & Day, 2022). In summary, mindful attention has been consistently linked to reduced emotional eating, increased emotional awareness, and better emotion regulation skills. The recent findings suggest mindful attention may be an important target for interventions to prevent emotional eating behaviors, particularly in at-risk populations (Verrier & Day, 2021). Further research is needed to explore the relationship between mindful attention and emotional eating, as well as to develop and evaluate interventions to improve mindful attention to prevent these behaviors (Kennedy et al., 2018).

In the context of this proposed study, mindful attention is categorized as one of the facets of impulsive eating. Review of studies investigating mindfulness and mindful eating also sheds light into how being mindful in the present moment plays a role in the ability to inhibit the impulse to eat and emotionally eat. Hendrickson and Rasmussen (2017) examined the effects of age and BMI on impulsive choices for food and monetary outcomes and to evaluate the efficacy of a brief mindful-eating training on delay discounting for food and monetary choices when compared to the control group. The authors argued that overweight and obese adults have been found to exhibit higher impulsivity and sensitivity to food rewards when compared to normal-weigh individuals. Furthermore, they stated that impulsivity is a multifaceted construct involving difficulties in inhibition control and risk taking. Hendrickson and Rasmussen (2017) delay discounting is an important facet of impulsivity. In delayed discounting, individuals will rather choose a smaller, immediate reward over a larger, more valuable delayed reward

(Hendrickson & Rasmussen, 2017). Higher scores in a delay discount measure indicates greater impulsivity tendencies (Hendrickson & Rasmussen, 2017). The authors recruited 172 adolescents and 176 adults who came to a first meeting and completed the Food Choice Questionnaire (FCQ) and Monetary Choice Questionnaire (MCQ). Participants then returned for a second session and were randomly assigned to one of three groups: (1) undergo a brief mindful-eating training; (2) watch a nutrition DVD; and (3) serve as control. All participants completed the FCQ and MCQ post-treatment.

Hendrickson and Rasmussen's (2017) study were twofold: (1) test the extend to which measures of obesity predicted impulsive choice patterns for food related and monetary outcomes in the experimental groups; and (2) determine the degree to which mindful-eating training affected impulsive choice patterns for food and money. The authors were testing the following hypothesis: (1) adolescents would exhibit more impulsive food-related and monetary choices compared to young adults; (2) obese individuals would be more impulsive for food-related and monetary outcomes compared with normal weight individuals regardless of age; and (3) regardless of age and obesity status, participants wo completed a mindful-eating workshop would exhibit less impulsive food choice patterns compared with baseline measures. In addition, participants in both control groups would not change relative to baseline.

The authors found that adolescents demonstrated higher monetary discounting rates than adults, implying that they are more sensitive to delays and prefer smaller, immediate outcomes over larger, later outcomes. This finding aligns with previous research. However, no developmental differences were found for food discounting

between adolescents and adults. Furthermore, the authors found that mindful eating led to adolescents and adults becoming less sensitive to delays of food-related outcomes compared to baseline rates, without affecting monetary outcomes. Based on these findings the authors suggested that mindful eating training specifically impacted food related decisions. Mindfulness has been shown to enhance executive functioning and working memory, potentially promoting a more self-controlled pattern of eating (Hendrickson & Rasmussen, 2017). However, further research is needed to understand which components of mindfulness contribute to delay-discounting outcomes. Hendrickson and Rasmussen's (2017) study provides essential insights into the role of mindful attention in mitigating impulsive eating behavior. The researchers discovered that mindful eating training effectively reduced impulsive eating but had no impact on impulsive spending. These findings underscore the complexity of impulsivity as a construct. Consequently, research examining impulsive eating should not depend on general measures of impulsivity; instead, it should focus on subscales that better align with the specific behaviors being evaluated.

Mindfulness (i.e., mindful attention) has also been studied in relation to emotional eating. Verrier and Day (2022) argued that emotional eating is a spontaneous strategy for regulating mood, typically occurring after experiencing psychological distress. Moreover, the authors stated mindfulness is linked to less impulsive actions and promotes conscious awareness of hunger, satiety, and deliberate food choices. Therefore, the authors investigated the influence of mindfulness on the relationship between distress and emotional eating. The study involved 392 participants from the United Kingdom (UK)

aged 17-72 years, with an average BMI within healthy ranges (e.g., 20-24). Distress was measured using the Depression, Anxiety, and Stress Scales (DASS), mindfulness was assessed using the Five Facet Mindfulness Questionnaire (FFMQ), and emotional eating was measured using the Three Factor Eating Questionnaire's Subscale (TFEQ-EE).

The authors discovered that mindfulness was negatively associated with emotional eating when distress was low. Additionally, higher levels of mindfulness could reduce depression and anxiety-related emotional eating, but only when these emotional states were relatively mild. Furthermore, the authors identified mindfulness's description and non-judgment facets as key components in moderating the relationship between distress and emotional eating. According to Verrier and Day (2022), these facets contribute to a reflective and dispassionate cognitive style that helps buffer against negative emotions and improve emotional processing and regulation. Verrier and Day's (2022) findings expand upon previous findings because they use a larger and more diverse sample. Their findings are relevant to this proposed study, as they provide supporting evidence that mindfulness, or mindful attention, is a necessary skill for addressing emotional eating, especially when it is used as a coping mechanism to reduce unwanted emotional distress.

Intuitive, mindful, emotional, external, and regulatory eating behaviors and beliefs were investigated by Kerin et al. (2019). The authors explored the interconnections and core elements of adaptive and maladaptive eating behaviors. A total of 2018 female participants completed the 21-item Intuitive Eating Scale (IES), the 28-item Mindful Eating Scale (MES), the Overeating Regulation Scale (ORS), and the

DEBQ (Appendix A) was used to assess dietary restrain, emotional eating, and external eating (i.e., impulsive eating). The authors found that most relationships between the measures were statistically significant, with the most substantial association found between eating for physical reasons (i.e., intuitive eating) and emotional eating. Furthermore, a principal component analysis revealed a four-component structure for eating behaviors. Component one was "attuned eating" and included positive aspects of intuitive and mindful eating and overeating regulation and negative aspects of emotional eating, impulsive eating, and overeating dysregulation in leisure and discomfort contexts. Component two was "unrestrained eating," which featured positive elements of intuitive and mindful eating and a negative aspect of dietary restraint. Component three showed "eating and hunger awareness," involving positive aspects of reliance on hunger/satiety cues and awareness. Lastly, component four was "casual eating attitudes," which included positive aspects of non-reactivity and flexibility in mindful eating.

In conclusion, Kerin et al.'s (2019) study highlights the complexity of eating behavior, demonstrating that although some adaptive and maladaptive eating concepts exist along a spectrum of attuned versus disinhibited eating, others capture unique attitudes, beliefs, motivations, and behaviors concerning food and eating. Furthermore, the findings reveal the intrinsic link between mindfulness, or mindful attention, and an individual's ability to determine whether their urge to eat stems from hunger or an emotional state. Kerin et al.'s (2019) findings underscore the importance of exploring multiple emotional awareness and mindful attention aspects.

Biopsychological Aspects of Emotional Eating and Impulsive Eating

The BPSM provides a comprehensive framework for investigating the complex nature of impulsive and emotional eating. This model considers the interplay of biological, psychological, and social factors that comprise the different categories of the BPSM, which all contribute to the development and perpetuation of these behaviors (Engel, 1977). For example, biological factors are crucial in regulating hunger, satiety, and energy balance (McCabe et al., 2023). Hormonal imbalances (e.g., hypoglycemia or thyroid disorders) can also be categorized as biological (Picks et al., 2019). They can disrupt normal hunger and satiety signals, leading to impulsive and emotional eating (Römer et al, 2023; Zhou et al., 2020). Genetic predisposition (e.g., neurotransmitter imbalance or personality traits associated with impulsivity) may also play a role in these behaviors (Kings et al., 2019). Psychological factors like anxiety and stress can also play a role in impulsive and emotional eating (Jokinen & Hartshorne, 2022). Individuals who experience high levels of stress and anxiety may turn to food as a means of coping, leading to impulsive and emotional eating behaviors (Papinczak et al., 2019). Furthermore, a lack of emotional awareness and difficulty regulating emotions can contribute to these behaviors (Gerçeker & Bektas, 2021).

Social factors also impact impulsive and emotional eating behavior. For example, the availability of highly palatable, energy-dense foods in the environment, as well as cultural attitudes that promote the use of food as a means of comfort and reward, can contribute to impulsive and emotional eating behaviors (Roberts Kennedy, 2021). Additionally, a lack of social support and a lack of positive role models can also

contribute to these behaviors. These circumstances can be considered social factors that can trigger one to eat impulsively or emotionally. A biopsychosocial approach that addresses physiological imbalances and reduces psychosocial stressors may be more effective than traditional weight loss interventions that primarily focus on changing behavior to promote weight loss (Wehling & Lusher, 2019). By exploring the multifaceted relationship between these variables, this proposed research aims to provide a deeper understanding of the factors contributing to emotional and impulsive eating behaviors and inform the development of more effective interventions for obesity.

Summary and Conclusion

The variables anxiety, stress, emotional awareness, emotion regulation, mindful attention, and disregard for future consequences in relation to impulsive eating and emotional eating can all be explained through the BPSM. The BPSM highlights the importance of considering these factors when investigating impulsive and emotional eating behaviors. It is unwise to try to identify only one cause of a behavior, such as biology or psychology. It is more likely that all of these factors contribute at different levels to the development and maintenance of these behaviors (Engel, 1977). Interventions primarily focus on changing behavior to promote weight loss, with less emphasis on the biopsychosocial influences that underlie emotional and impulsive eating. By investigating the multifaceted relationship between these variables, studies aim to provide a more comprehensive understanding of the factors contributing to emotional and impulsive eating behaviors, and to inform the development of more effective interventions (Wehling & Lusher, 2019). For example, anxiety and stress can trigger

impulsive and emotional eating behaviors by disrupting normal hunger and satiety signals (Buckner et al. 2021). In contrast, a lack of emotional awareness and difficulty regulating emotions can lead to impulsive and emotional eating as a means of coping (Picks et al., 2019). Mindful attention and disregard for future consequences can also play a role in these behaviors. Individuals less mindful of their eating behaviors and more focused on immediate rewards may be more likely to engage in impulsive and emotional eating. In conclusion, the biopsychosocial model provides a comprehensive framework for investigating impulsive and emotional eating behaviors. By considering the interplay of biological, psychological, and social factors, researchers can gain a deeper understanding of these behaviors and develop more effective interventions for individuals who struggle with impulsive and emotional eating.

My review of literature on emotional and impulsive eating revealed a gap that requires further exploration. While previous research has investigated various aspects of emotional eating, such as the relationship between food addiction and impulsivity (Lacroix et al., 2019), emotional eating related to mindfulness (Kennedy et al., 2018), and coping with negative emotion and dysfunctional thoughts related to food (Wehling & Lusher, 2019), no study to date has comprehensively explored all the variables I am interested in, namely emotional eating, stress, anxiety, disregard for future consequences, emotion regulation, impulsive eating, mindful attention, and emotional awareness. Furthermore, most reviewed studies only incorporated two variables when examining their relationship with emotional eating. To address this gap in the literature, my proposed study aims to investigate all these variables within the same study, to determine

the strongest predictor and moderator of emotional eating and impulsive eating. The methodology employed in this research is designed to effectively explore these relationships and provide a comprehensive understanding of the factors influencing emotional and impulsive eating.

In Chapter 3, I outline the research methodology and describe how it addresses the identified gap. The chapter covers the objectives of the study, the research design, and the underlying rationale. It also delves into the intended population, sample, sampling techniques employed, and the methods used for collecting and accessing archived data. Furthermore, Chapter 3 describes the instruments and operationalization of concepts, ethical considerations, and potential internal, external, and statistical validity challenges. Finally, by detailing the methodological approach, Chapter 3 sets the foundation for a comprehensive investigation of the variables of interest and their relationship with emotional eating and impulsive eating.

Chapter 3: Research Method

Introduction

The purpose of this correlational study was to explore the relationship among emotional eating, stress, anxiety, disregard for future consequences, emotion regulation, impulsive eating, mindful attention, and emotional awareness. Emotional eating, a behavior associated with obesity, involves consuming food when not hungry or in response to strong emotions (Annesi & Johnson, 2020). During these episodes, individuals attempt to manage their emotions by using food as a means to manage emotional distress (Annesi & Johnson, 2020). Those who struggle with emotion regulation often have difficulty concentrating on the present moment (Feingold & Zerach, 2021), and lack awareness of the influence of emotions on their eating habits (Donofry et al., 2019). In addition, they may disregard the detrimental effects of impulsive eating on their well-being (Bénard et al., 2018; Maier et al., 2021). This can result in cycle of emotional and impulsive eating, potentially leading to weight gain and poor general health (Frayn et al., 2018). Moreover, when emotional eating becomes the sole coping strategy for managing negative emotions, it can increase emotional distress if the behavior becomes unmanageable (Bénard et al., 2018). Providers specialized in weight loss tend to develop interventions targeting behavior modification to reduce emotional eating and promote weight loss. Providers specialized in weight loss seldom pay, attention to the biopsychosocial factors underlying emotional eating and weight gain (Wehling & Lusher, 2019). By examining the multifaceted interplay between these variables, I sought to broaden the understanding of the biopsychosocial factors

contributing to emotional and impulsive eating patterns and inform the development of more effective interventions.

Employing a quantitative, correlational approach, I addressed the literature gap by examining the degree to which anxiety, stress, mindfulness, and neglect of future consequences predict impulsive eating, and the extent to which mindfulness, impulsive eating, emotional awareness, and disregard to future consequences predicted emotional eating. Furthermore, I investigated whether stress moderates the association between emotional eating and impulsive eating, and if emotional awareness moderated the relationship between mindful attention and emotional eating, as well as the link between emotion regulation deficits and emotional eating. To analyze the predictor/outcome model, I used multiple linear regression, and for testing moderator effects, I employed Model 1 of the Hayes Process in SPSS. I based the analysis on archival data collected by me in 2017.

In this chapter, I explore various aspects of the research design, encompassing a comprehensive description of the data collection method, instrumentation, sample, and data analysis. Additionally, in this chapter I provided an overview of the rationale behind choosing this specific research design. It also includes an in-depth discussion of the data collection process, covering the population and sample size determined through a power analysis using the G*Power computer program/software. Finally, I thoroughly reviewed and discussed the protection of human participants and ethical considerations within this study

Research Design and Rationale

For the current study I used archival data collected in 2017. The study had five research questions. The first three questions used moderation analysis using the Hayes Process, Model 1, on SSPP. The following research questions investigated moderation variables between the dependent variable and the independent variable. In research question one I aimed to determine if stress [moderator, ratio variable measured by the stress subscale in the DASS, moderated the relationship between emotional eating [independent, ratio variable measured by the emotional eating subscale on the DEBQ (Appendix A)] and impulsive eating (dependent, ratio variable measured by the external eating subscale in the DEBQ, Appendix A). Moreover, in RQ_2 I explored to what extent did emotional awareness [moderator, ratio variable measured by the lack of emotional awareness subscale in the DERS, and the diffused emotions subscale in the DEBQ, Appendix A)] moderated the relationship between mindful attention [independent, ratio variable measured by the attention and motor subscales of the Barratt Impulsivity Scale (BIS-11) and emotional eating (dependent, ratio variable measured by the emotional eating subscale in the DEBQ, Appendix A). I designed RQ3 to help me determine to what extent does inability to regulate emotion (moderator, ration variable measured by the limited access to emotion regulation strategies on the DERS, moderates the relationship between mindful attention (independent, ratio variable measured by the attention-attention and motor-motor subscales of the BIS-11, and impulsive eating (dependent, ratio variable measured by the external eating subscale in the DEBQ, Appendix A).

I explored predictors and outcomes using multiple linear regression on RQs 4 and 5. I designed research question 4 investigate to what extent are mindful attention (predictor, ratio variable measured by the attention and motor subscales of the BIS-11, Appendix D), impulsive eating (predictor, ratio variable measured by the external eating subscale of the DEBQ, Appendix A), emotional awareness (predictor, ratio variable measured by the diffused emotion subscale of the DEBQ, Appendix A and the emotional awareness and lack of emotional clarity subscales in the DERS, Appendix C), and disregard of future consequences (predictor, ratio variable measured by the nonplanning subscales of the BIS-11, Appendix D) predictive of emotional eating (outcome, ratio variable measured by the motional eating subscale in the DEBQ, Appendix A). And I designed RQ 5 to investigate to what extent do anxiety (predictor, ratio variable measured by the anxiety subscale in the DASS), stress (predictor, ratio variable measured by the stress subscale in the DASS), mindful attention (predictor, ratio variable measured by the attention and motor subscales of the BIS-11), and disregard of future consequences (predictor, ratio variable measured by the nonplanning subscales of the BIS 11) predict impulsive eating (outcome, ratio variable measured by the external eating subscale in the DEBQ, Appendix A).

Methodology

Population

For this study I focused on adults aged 18 to 65 who self-identify with having either emotional and/or behavioral challenges such as difficulty in self-regulating emotions, an inability to relax under stress, a tendency to use food as a means to alleviate

uncomfortable or negative emotions, experiencing distress related to their eating habits, or struggling to control impulsive behavior in response to urges. Individuals who did not express any of the criteria for the study, or were below 18 or above 65 did not qualify to participate in the study.

Sampling and Sampling Procedures

I recruited participants from Kaiser Permanente's Positive Choice Wellness Center (PCWC) clinic in San Diego, Facebook, and Craigslist. In addition, I placed flyers (Appendix G) in permitted areas within Alliant International University (AIU), San Diego campus. A flyer (Appendix G) to recruit participants; I wrote the flyer (Appendix G) with language that would get the attention of people interested in participating in the study. I also highlighted that the participants did not need to identify as emotional eaters. Nevertheless, a snowball sampling technique was applied as participants recommended friends through word of mouth to participate in the study. Participants were selected based on inclusion/exclusion criteria (Appendix H).

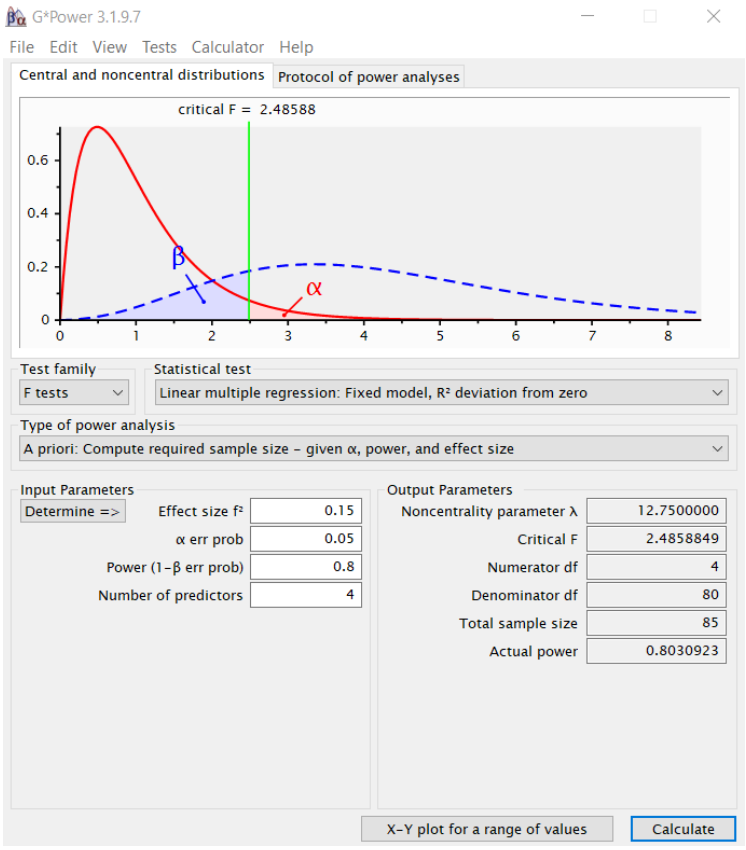
Power Analysis

I conducted an a priori power analysis using the G*Power (Erdfelder et al., 1996) software program version 3.1.9.7 (Figure 1), to determine the minimum sample size required for this study. The effect size was set at 0.15, reflecting a medium effect size. This choice was based on prior research in the field, indicating that an effect of this magnitude is considered meaningful and relevant to our study objectives. The critical alpha level was set at 0.05, which is the standard level for determining statistical significance. This level ensures that any observed effects are unlikely to occur by chance

alone. Additionally, a power level of 0.80 was chosen, aligning with the commonly used power level in social science research. Based on the power analysis, 85 participants are needed for this proposed study. Since I have completed data from 96 participants, this study had a high enough power to detect significant effects,

Figure 1

Results from Power Analysis



Archival Data

For this study I used archival data collected by me during my attendance in a doctoral program in San Diego, CA. The research proposal underwent review and approval by the Institutional Review Board (IRB) of Alliant International University

(Appendix I) and Kaiser Permanente (Appendix J) in June 2017 prior to data collection. To recruit participants, I distributed printed flyers (Appendix G) in various educational institutions (universities, colleges) and medical offices (such as nutritionists, bariatric surgeons, dieticians, and endocrinologists) throughout San Diego, CA. Additionally, community recruitment methods involved using online platforms like Craigslist and Facebook, where I posted an electronic version of the printed flyer (Appendix G). Data collection took place between July and August of 2017.

For the identification of emotional eating and impulsive eating behavior symptom severity, as well as the exploration of the relationship between emotional awareness and emotional/impulsive eating, I used specific subscales from DEBQ (Appendix A). The subscales of interest include emotional eating, impulsive eating, and diffused emotions. However, I did not use the emotions and restrained eating subscales on the DEBQ (Appendix A) in this study. To address the questions regarding the role of emotional awareness and emotion regulation in predicting emotional or impulsive eating, I used specific subscales from the Difficulty in Emotion Regulation Scale (DERS, Appendix C). These subscales consist of difficulty engaging in goal-directed behavior (mindful attention), impulse control difficulties, limited access to emotion regulation strategies, and lack of emotional awareness. Notably, the subscales of lack of emotional clarity and nonacceptance of emotional responses from the DERS (Appendix C) were not included in this study.

Measuring impulsivity involved assessing scores from the BIS-11(Appendix D) subscales. The BIS-11 (Appendix D) attention subscale provided insight into the ability

to focus attention or concentrate (mindful attention). Higher scores on this subscale indicate impulsive behavior and difficulty in mindfully focusing attention. The BIS-11 (Appendix D) motor subscale, on the other hand, measures control of motor actions (i.e., the ability to think before acting on impulses) and perseverance. Scores on the BIS motor subscale reflects one's ability to resist impulsive actions. Lastly, the BIS-11 (Appendix D) nonplanning subscale measures the ability to regulate emotions and thoughts. Lower scores on the BIS-11 (Appendix D) nonplanning subscale indicate varying levels of regard or disregard for future consequences. Analyzing the BIS-11 (Appendix D) subscales helped me identify which facets of impulsivity were significantly associated with and/or predict emotional or impulsive eating.

I determined anxiety and stress symptom severity by assessing scores from the anxiety and stress subscales of the DASS. These subscales aided in evaluating the extent to which anxiety and/or stress contributed to impulsive and emotional eating. It should be noted that I did not investigate measures of depression from the DASS for this study. By using these specific measures and subscales, I intended to shed light on various aspects of emotional eating, impulsive eating, emotional awareness, emotion regulation, impulsivity, anxiety, and stress in relation to the phenomenon of interest.

I have secured all data collected for this study in a locked storage on a dedicated hard drive that has remained in my possession since its collection. No one had access to the data and no one was able to use the data for any other purposes during this period. To ensure compliance and ethical adherence, I obtained prior permission from both Kaiser Permanente's Institutional Review Board (IRB) and Alliant International University's IRB

to collect the data in 2017. In order to use the data for my dissertation at Walden University, I have taken the necessary steps to obtain permission from the relevant institutions. I have obtained a letter from Kaiser Permanente granting approval for the use of the data in this study. I have received permission from Walden University's IRB to use the archival data in this study.

Procedure

Participants registered for the website www.luciafoster-research.com in order to have access to the study. The only requirement to register to the website was to offer his/her/their email and create a password that the researcher had no access to. Following, they completed an online inclusion/exclusion screening questionnaire to determine if he or she could be considered as a participant for this study. Upon completion of the inclusion/exclusion form, the participant received a research ID number that was utilized in all steps of the study. The website generated a number (that started with 001 and up to 100 for non-Kaiser members, and 101 to 200 for all Kaiser members) for each participant to ensure the participant's confidentiality. Participants that fulfilled the inclusion/exclusion criteria were then asked to complete and informed consent (Appendix E), and subsequently complete the DASS, DEBQ (Appendix A), DERS, and the BIS-11 questionnaires on the website Qualtrics. Once participants completed the steps, they received a message thanking them for their participation. No debriefing or follow-up instructions were necessary for this study.

Inclusion Criteria

I included Participants if they expressed interest in voluntarily participating in the study. Participants' ages should range from18 to 65 years old, and they had to be English speakers with a reading level equal or higher than a 6th grade student. Participants were not required to self-identify as emotional eaters in order to be considered as a potential candidate to participate in this study.

Exclusion Criteria

Since the participants needed to complete four questionnaires online, Individuals without basic understanding of the English language or without a reading level of a 6th grade student or higher, did not meet criteria for participating in the study.

Instrumentation and Operationalization of Constructs

Dutch Eating Behavior Questionnaire (DEBQ)

Emotional eating was measured by the Emotional Eating Subscale (EES), and impulsive eating was measured using the External Eating Subscale (ExtES) of the DEBQ (Appendix A). The EES is comprised of 13 questions (i.e., questions 1, 3, 5, 8, 10, 13, 20, 23, 25, 30, 32), and the ExtES is comprised of 10 questions (i.e., questions 2, 6, 9, 12, 15, 18, 21, 24, 27, and 33) within the DEBQ (Appendix A). The DEBQ is graded from a 5-point Likert scale (i.e., 1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often). Strien, Frijters, Bergers, and Defares developed the DEBQ (Appendix A) in 1986 and reported the following psychometric properties of the DEBQ (Appendix A). They reported that the scales present with high internal consistency and factorial validity [(Cronbach's alpha = Restrained Eating = .95, Emotional Eating13 (13-item

questionnaire) = .94, Emotional Eating9 (9-item questionnaire) = .93, Emotional Eating4 (4-item questionnaire) .86, External Eating = .80), (Restrained Eating vs. Emotional Eating13 r = .37, Restrained Eating vs. Emotional Eating9 r = .34, Restrained Eating vs. Emotional Eating4 r = .35, Restrained Eating vs. External Eating r = .16; Emotional Eting13 Vs. Emotional Eating9 r = .97, Emotional Eating13 Vs. Emotional Eating4 r = .89, Emotional Eating13 Vs. External Eating r = .48; Emotional Eating9 Vs. Emotional Eating4 r =.75, Emotional Eating9 Vs. External Eating r = .44; Emotional Eating4 Vs. External Eating r = .49)].

In a more recent study, Arhire et al., (2021) examined the validation of the DEBQ (Appendix A) in a Romanian adult population. They found that Cronbach's alpha coefficients were computed for each scale included in the study. The obtained values surpassed the recommended threshold of 0.7, indicating satisfactory internal consistency for each subscale (Arhire e al., 2021). Specifically, the EES demonstrated a Cronbach's alpha coefficient of 0.954, higher than Strien et al. (1986) originally reported. The diffused emotions subscale exhibited a coefficient of 0.84, and the clearly defined emotions showed a coefficient of 0.953. Additionally, the ExtES, which measured eating in response to external stimuli, yielded a coefficient of 0.856, which was again higher than originally reported by Strien et al. (1986). Lastly, the restrained eating subscale obtained a coefficient of 0.913. Arhire et al.'s (2021) findings indicate that all five scales in the utilized version of the DEBQ (Appendix A) demonstrate robust internal consistency.

Depression, Anxiety, and Stress Scale (DASS)

Participants in the study completed the 42-item self-report DASS scale. The DASS was developed by Lovibond and Lovibond in 1995 and involved the creation of self-report measures designed to assess negative emotional symptoms related to anxiety and depression (Lovibond & Lovibond, 1995). A bootstrapping approach was employed to establish the scales, initially defining factors based on clinical consensus (Lovibond & Lovibond, 1995). The measure is divided into three scales, including 14 items each, and assesses negative emotional states such as tension/stress, anxiety, and depression. These scales are further divided into subscales that assess specific symptoms of depression, anxiety, and stress that are rated using a 4-item Likert scale (i.e., 0 – did not apply to me at all, 1 – applied to me to some degree or some of the time, 2 – applied to me to a considerable degree or a good part of the time, 3 – applied to me very much or most of the time.) Within the depression scale, the subscale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. Within the stress scale, the subscale assesses levels of chronic and non-specific arousal (i.e., difficulty relaxing, being easily upset/agitated, irritable and over-reactive, impatient, and nervous arousal.) Finally, within the anxiety scale, the subscale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious effect.

Brown et al. (1997) sought to investigate the psychometric properties of the DASS. Results revealed high internal consistency (Cronbach's alpha=0.96, 0.89, and 0.93 for the depression, anxiety, and stress scales, respectively) of the scales and subscales

when used with participants diagnosed with a phobia, anxiety, and mood disorders (range of Cronbach's alpha=0.88-0.96). In addition, the results of a factor structure revealed the factor loading of the 42 items loaded onto their respective scales and subscales. In a more recent publication, Hekimoglu et al. (2012) explored the psychometric properties of the Turkish versions of the DASS-42 in a clinical sample. They found that Cronbach's alpha values for the depression scale were .92, the stress scale was .88, and the anxiety scale was .86. The results of both studies indicate that the DASS-42 presents robust internal consistency.

Difficulty in Emotion Regulation Scale (DERS)

The DERS is a 36-item self-report questionnaire developed by Gratz and Roemer in 2004. The scale assessed an individual's difficulties in regulating emotions effectively (Fallahi et al., 2021). Individuals typically engage in behavioral avoidance to regulate aversive motives or move away from unpleasant stimuli. Saritas-Atalar, et al. (2015) sought to investigate the psychometrics of the DERS in a sample of Turkish adolescents. Results revealed that the DERS has high internal consistency (Cronbach's alpha = .91). Among the subscales, they found that the Limited Access to Emotional Regulation Strategies (Cronbach's alpha = .84), the Non—Acceptance of Negative Emotional Response Subscale (Cronbach's alpha = .80), Impulse Control Difficulties (Cronbach's alpha = .85), and the Difficulties Engaging in Goal-Directed Behavior (Cronbach's alpha = .85) subscales have high internal consistency. However, the Lack of Emotional Clarity (alpha = .64) and the Lack of Emotional Awareness (alpha = .60) subscales have relatively low internal consistency. The authors also investigated the concurrent validity

of the DERS. They reported that the DERS has high concurrent validity and is valid and age-appropriate for investigating emotional regulation difficulties in adolescents.

Barratt Impulsivity Scale (BIS-11)

Impulsivity was measured by the *BIS-11* (Annagur et al., 2015). The BIS-11 was developed in 1995 by Dr. Barratt and the International Society for Research on Impulsivity ("Barratt Impulsivity Scale (BIS-11)," n.d.). The BIS-11 has emerged as a widely recognized and highly regarded assessment tool, serving as a gold-standard measure in the field (Reise et al., 2013). It has significantly contributed to developing and refining theories focusing on impulse control. In addition, it has played a pivotal role in numerous investigations exploring the multifaceted nature of impulsivity and its intricate connections to biological, psychological, and behavioral factors. (Reise et al., 2013). The BIS-11 is a 30-item questionnaire with a 4-point rating system (1=never/rarely, 2=occasionally, 3=often, 4=almost always/always) designed to assess traits of impulsivity, such as attentional impulsiveness (task-focus, thoughts, and racing thoughts, inability to focus attention or concentrate), motor impulsivity (tendency to act on the spur of the moment and consistency of lifestyle, acting without thinking), and nonplanning impulsiveness (careful thinking and planning and enjoyment of challenging mental tasks). In addition, the nonplanning impulsiveness subscale will be used to measure disregard for future consequences.

Meule (2013) sought to investigate the subscales of the BIS-11 and how accurately they assess impulsivity and overeating. According to Meule (2013), patients diagnosed with Binge Eating Disorder (BED) obtained higher scores in the motor

impulsivity subscale. When the relationship between the BIS-15 and the DEBQ (Appendix A) was examined, results revealed that the attentional and motor subscales on the BIS-15 were positively correlated to the external eating subscale and the DEBQ (Appendix A; Meule, 2013). Moreover, results also revealed that attentional impulsivity is a significant mediator between external eating and attentional bias (Meule, 2013). Fossati et al. (2001) investigated the psychometric properties of an Italian Version of the BIS-11 in nonclinical subjects, and Yao et al. (2007) investigated the psychometrics on the Chinese version of the BIS-11. Fossati et al.'s results revealed that the Italian version of the BIS-11 had an internal consistency on the Cronbach's alpha index = .79 and test-retest reliability =.89. In contrast, Yao et al.'s results found an internal consistency on the Cronbach's alpha = .80, and test-retest reliability = .70 (Fossati et al., 2001; Yao et al., 2007).

Data Analysis Plan

Upon obtaining permission to utilize the archival data, I carried out the statistical analysis using the Statistical Program for Social Sciences (SPSS) software. In the process of data cleaning, unfinished surveys were excluded from the analysis to ensure the integrity and reliability of the dataset. To address outliers, the Empirical Rule was employed as a guideline. According to this rule, it is predicted that approximately 68% of the data will fall within one standard deviation from the mean, around 95% of the data points are expected to fall within two standard deviations, and approximately 99.7% will likely fall within three standard deviations from the mean ("Empirical rule," 2009). Furthermore, I examined the statistical assumptions for multiple linear regression and the

model one, as outlined by Hayes in SPSS, and assessed whether any violations occurred. Once these steps were completed, the subsequent statistical analysis of the multiple linear regressions and moderator analysis using model one on the Hayes Process on SPSS followed.

Research Questions and Hypotheses

Research Question 1 (RQ1): To what extent does stress [moderator, ratio variable measured by the stress subscale in the depression, anxiety, and stress scale (DASS)] moderate the relationship between emotional eating [independent, ratio variable measured by the emotional eating subscale on the Dutch eating behavior questionnaire (DEBQ, Appendix A)] and impulsive eating (dependent, ratio variable measured by the external eating subscale in the DEBQ, Appendix A)?

Null Hypothesis ($H_0$1): Stress is not a significant moderator in the relationship between emotional eating and impulsive eating.

Alternative Hypothesis ($H_1$1): Stress is a significant moderator in the relationship between emotional eating and impulsive eating.

Research Question 2 (RQ2): To what extent does emotional awareness [moderator, ratio variable measured by the lack of emotional awareness subscale in the difficulty in emotion regulation scale (DERS), and the diffused emotions subscale in the DEBQ, Appendix A)] moderate the relationship between mindful attention [independent, ratio variable measured by the attention-attention and motor-motor subscales of the Barratt impulsivity scale (BIS-11)] and emotional eating (dependent, ratio variable measured by the motional eating subscale in the DEBQ, Appendix A)?

Null Hypothesis ($H_0$2): Emotional awareness is not a significant moderator in the relationship between mindful attention and emotional eating.

Alternative Hypothesis ($H_1$2): Emotional awareness is a significant moderator in the relationship between mindful attention and emotional eating.

Research Question 3 (RQ3): To what extent does inability to regulate emotion [moderator, ratio variable measured by the lack of emotional awareness subscale in the difficulty in emotion regulation scale (DERS)] moderate the relationship between mindful attention (independent, ratio variable measured by the attention-attention and motor-motor subscales of the BIS-11) and impulsive eating (dependent, ratio variable measured by the external eating subscale in the DEBQ, Appendix A)?

Null Hypothesis ($H_0$3): Inability to regulate emotion is not a significant moderator in the relationship between mindful attention and impulsive eating.

Alternative Hypothesis ($H_1$3): Inability to regulate emotion is a significant moderator in the relationship between mindful attention and impulsive eating.

Research Question 4 (RQ4): To what extend are mindful attention (predictor, ratio variable measured by the attention-attention and motor-motor subscales of the BIS-11), impulsive eating (predictor, ratio variable measured by the external eating subscale of the DEBQ, Appendix A), emotional awareness [predictor, ratio variable measured by the diffused emotion subscale of the DEBQ (Appendix A) and the emotional awareness and subscale in the DERS], and disregard of future consequences (predictor, ratio variable measured by the nonplanning subscales of the BIS-11) predictive of emotional eating

(outcome, ratio variable measured by the motional eating subscale in the DEBQ, Appendix A)?

Null Hypothesis ($H_0$4): Mindful attention, impulsive eating, emotional awareness, and disregard of future consequences are not significant predictors of emotional eating.

Alternative Hypothesis ($H_1$4): Mindful attention, impulsive eating, emotional awareness, and disregard of future consequences are significant predictors of emotional eating.

Research Question 5 (RQ5): To what extent do anxiety (predictor, ratio variable measured by the anxiety subscale in the DASS), Stress (predictor, ratio variable measured by the stress subscale in the DASS), mindful attention (predictor, ratio variable measured by the attention-attention and motor-motor subscales of the BIS-11), and disregard of future consequences (predictor, ratio variable measured by the nonplanning subscale of the BIS-11) predict of impulsive eating (outcome, ratio variable measured by the external eating subscale in the DEBQ, Appendix A)?

Null Hypothesis ($H_0$5): Anxiety, stress, mindful attention, and disregard of future consequences are not significant predictors of impulsive eating.

Alternative Hypothesis ($H_1$5): Anxiety, stress, mindful attention, and disregard of future consequences are significant predictors of impulsive eating.

Statistical Test Used to Test Hypothesis

Using a quantitative, correlational design, I aimed to expand the knowledge in the literature by exploring the extent to which anxiety, stress, mindful attention and disregard for future consequence predict impulsive eating, and to what extent mindful attention,

impulsive eating, emotional awareness, and disregard for future consequences predict emotional eating. Additionally, I examined whether stress moderates the relationship between emotional eating and impulsive eating, and whether emotional awareness moderates the relationship mindful attention and between emotional eating, and whether inability to regulate emotion moderates the relationship between mindful attention and emotional eating. I used a multiple linear regression to analyze the predictor/outcome model, and the model one in the Hayes Process in SPSS to test for moderator effects. I will use archival data collected in 2017 by me.

How Results Were Interpreted

To interpret the results of multiple linear regression and the model one output in Hayes SPSS, I followed these steps. First, I assessed the overall significance of the multiple linear regression model using the *F*-test and its corresponding p-value to determine its significance over the null hypothesis. Next, I carefully analyzed the estimated coefficients of the predictor variables, considering both their direction (i.e., positive or negative) and magnitude. Significance testing was conducted to identify statistically significant relationships, using a predetermined significance level (i.e., $p < 0.5$). Additionally, I examined the adjusted *R*-squared value to gauge the proportion of variance explained by the predictors. To ensure the validity and robustness of the results, I thoroughly evaluated the assumptions of multiple linear regression. This involved scrutinizing the residuals for linearity, independence, homoscedasticity, and normality. Diagnostic plots, such as scatterplots, histograms, and *Q*-*Q* plots, aided in this

assessment. By diligently following these steps, I gained a comprehensive understanding of the results while upholding the integrity of the analysis.

Research Questions Graphics

Below are the graphic representations of the research questions explored in this study.

Figure 2

RQ. 1 – Hayes Model 1. Moderator: Stress. Independent Variable: Emotional Eating. Dependent Variable: Impulsive Eating.

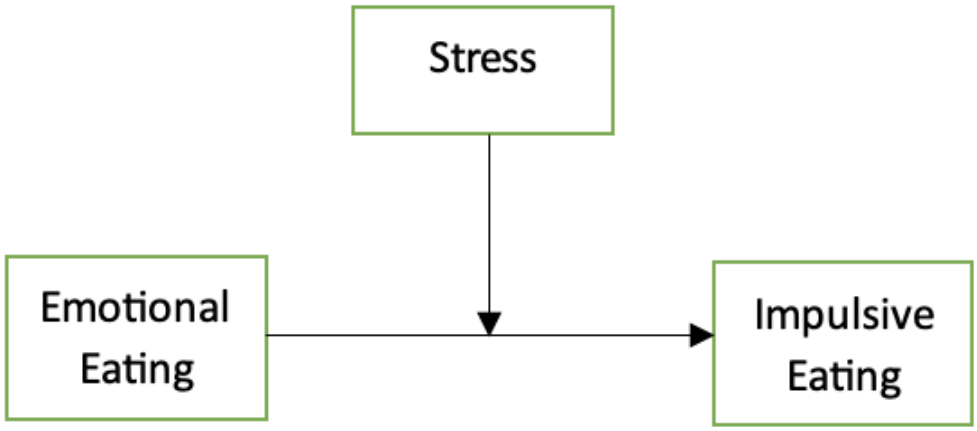


Figure 3

RQ.2 – Hayes Model 1. Moderator: Emotional Awareness. Independent Variable: Mindful Attention. Dependent Variable: Emotional Eating

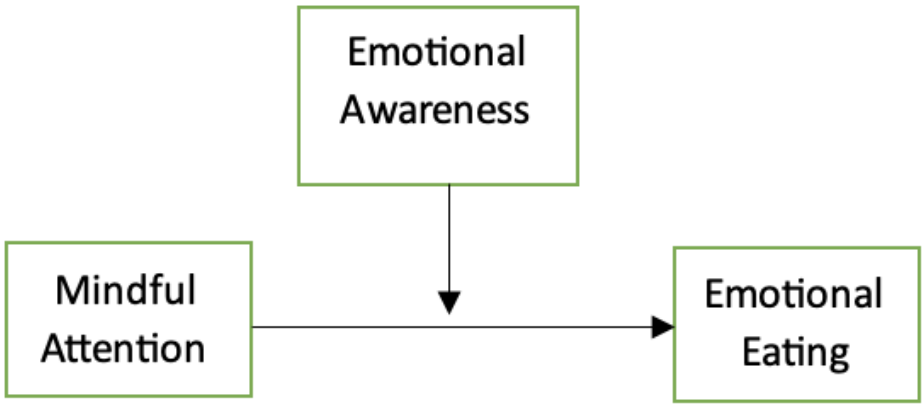


Figure 4

RQ. 3 – Hayes Model 1. Moderator: Inability to Regulate Emotion. Independent Variable: Mindful Attention. Dependent Variable: Impulsive Eating.

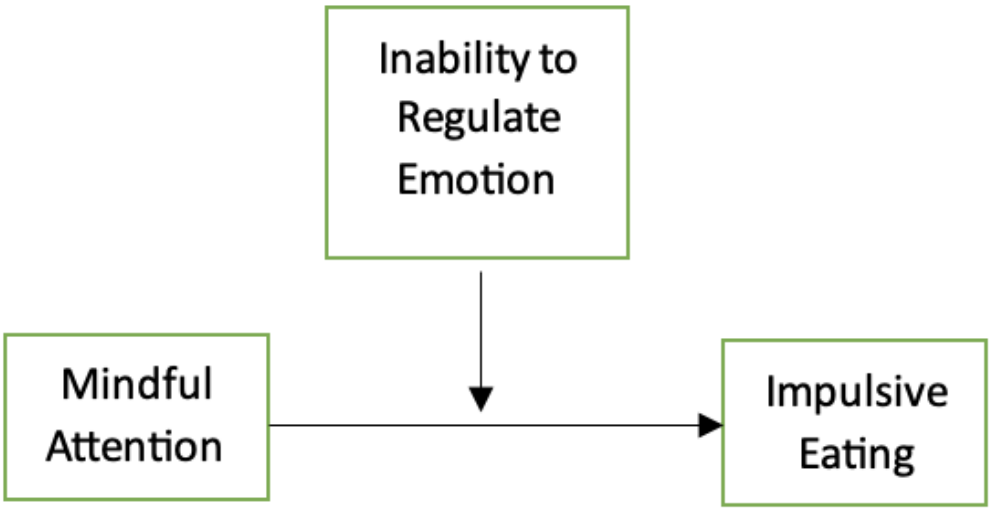


Figure 5

RQ4 – Multiple Linear regression Model. Predictors: Mindful Attention, Impulsive Eating, Emotional Awareness, Disregard for Future Consequences. Outcome: Emotional Eating.

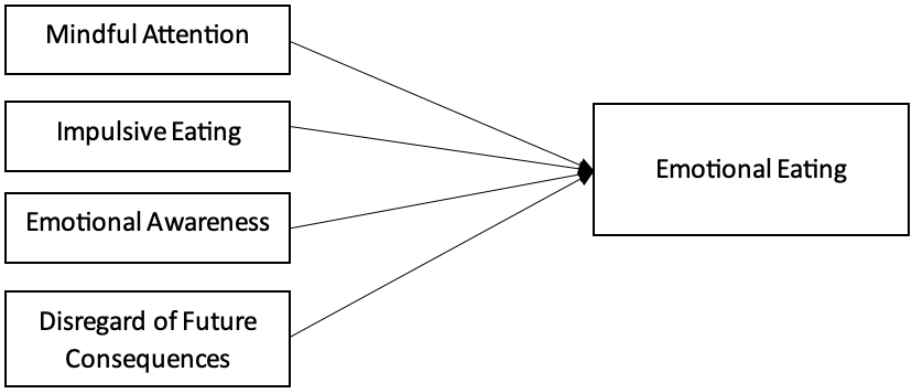
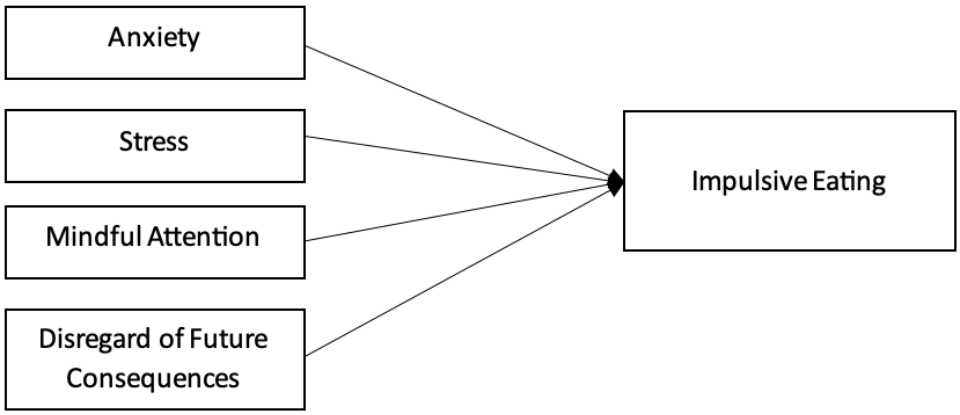


Figure 6

RQ. 5 – Multiple Linear Regression Model. Predictors: Anxiety, Stress, Mindful Attention, and Disregard of Future Consequences. Outcome: Impulsive Eating.



Statistical Assumptions

Employing a correlational design presents certain limitations to the study. While a correlational study may reveal a relationship between predictor and outcome variables, it is crucial not to assume that the predictor causes the outcome (Frankfort-Nachmias & Guerrero, 2018). While multiple linear regression offers advantages in analyzing multiple predictors simultaneously and testing individual predictors, it is essential to address the assumptions of linearity, homoscedasticity, normality, multicollinearity, and endogeneity (Frankfort-Nachmias & Guerrero, 2018). Ensuring these assumptions are met or properly addressed can enhance the validity and reliability of the regression results.

Multiple linear regression assumes that the relationship between the independent and dependent variable is linear (i.e., assumption of linearity; Roback & Legler, 2021). If the true relationship is non-linear, the model might not adequately capture the association between the variables. Additionally, the assumption of homoscedasticity is crucial, which

means that the variance of the errors should be constant across all levels of the independent variables. Moreover, there is a concern with multicollinearity, where two or more variables have a high correlation with each other. This can lead to unstable estimates. A Breusch-Pagan test of linearity can be utilized to address the linearity assumption, and the Variance Inflation Factors (VIFs) can be employed to test the multicollinearity assumption (Roback & Legler, 2021).

Furthermore, it is essential to consider the assumption of normality in multiple linear regression. The errors or residuals of the model are assumed to be normally distributed, which is crucial for hypothesis testing, confidence intervals, and prediction intervals to be valid. Additionally, one must be cautious about the assumption of endogeneity. Endogeneity occurs when a bidirectional relationship exists between the dependent variable and one or more of the independent variables. In other words, the dependent variable may influence the independent variables, leading to biased and inconsistent parameter estimates. To address endogeneity, techniques such as instrumental variables, difference-in-differences, or panel data models can be employed to mitigate potential bias.

Utilizing model one of the Hayes Process in SPSS to examine moderation effects may present some limitations. Being a correlational method, the Hayes Process is not designed to establish causal relationships between variables. Consequently, it is essential to emphasize that the findings from this analysis should be interpreted as associations rather than causal relationships (Hayes, 2017). Moreover, like other regression-based techniques, the Hayes Process can be affected by multicollinearity, leading to unstable

estimates and difficulties in interpreting individual effects. To minimize the risk for multicollinearity, I will assess VIFs, and interpret the results cautiously to avoid overgeneralization of the conclusions.

Threats to Validity

External Validity

External validity was addressed through careful consideration of the study's population, sampling methods, and generalizability of findings. Although participants were recruited primarily from a weight loss clinic, efforts were made to ensure a diverse sample by including participants from various backgrounds and ethnicities. Furthermore, selecting established and validated measures, such as the DEBQ (Appendix A), DASS, DERS, and BIS-11, strengthens the external validity as these instruments have been widely used in similar research contexts. The findings of this study will contribute to the existing literature on predictors of emotional and impulsive eating, expanding our understanding beyond the specific sample and potentially providing insights applicable to broader populations.

Internal Validity

There are several potential threats to internal validity that were addressed. One key concern was experimenter bias, given my experience working with obese patients and familiarity with the DEBQ (Appendix A), DASS, DERS, and BIS-11 instruments. In order to minimize research bias and ensure objective data collection and interpretation, I have followed standardized protocols throughout participant recruitment and data collection stages. I expanded recruitment to members of the general community to ensure

a diverse sample; I have taken the National Institute of Health (NIH, Appendix D)) web-based training course on “Protecting Human Research Participants” prior to recruitment. Before participants had access to the questionnaires, they signed an informed consent where I emphasized the importance of honest and accurate responses. By adhering to these protocols, I aimed to minimize any personal biases and maintain consistency in the study.

Sampling bias is another threat to internal validity, which can arise from non-random participant selection. While the sample was recruited at specific locations like weight loss clinics and gyms, which may have attracted individuals concerned about their weight, efforts were made to mitigate this bias. Recruitment also took place through diverse channels such as Craig's List, Facebook, and universities, and the study flyer did not target only obese or emotionally eating individuals. Additionally, using a multiple linear regression model allows for a non-random assignment of participants, treating them as a representative sample of the population. This approach helps to mitigate the impact of sampling bias in the study. Lastly, the study addressed omitted variable bias, which can occur when relevant variables are not included in the analysis, leading to biased estimates of the relationships between the included variables. Furthermore, careful consideration was given to avoid imposing causal inferences on the results. By proactively addressing potential threats to internal validity, such as experimenter bias, sampling bias, and omitted variable bias, I strengthen the integrity of my findings to provide valuable insights into the predictors of emotional and impulsive eating.

Ethical Aspects of the Study

Data collection and storage was conducted with strict adherence to ethical standards. Prior to their involvement, all participants were thoroughly briefed on the potential risks and benefits associated with their participation in the study. They were informed about the data storage methods, and it was clarified that the data would be securely kept and subsequently disposed of after seven years. As the primary researcher, I obtained the necessary approvals from several institutions before initiating the participant recruitment process. This included approval from my dissertation committee, Alliant International University's IRB, and Kaiser Permanente's IRB. It is important to note that the process of recruiting participants only began once I had obtained full approval from these entities, ensuring that the study was fully compliant with all necessary ethical guidelines. Recruitment of participants was carried out effectively and efficiently, with all participants being recruited within a span of 40 days. This process was conducted in an ethical manner, with respect for the rights and dignity of all individuals who chose to participate in the study.

The protection and ethical use of archived data will be given utmost priority throughout the study. To ensure the confidentiality and security of the data, no one but me will have access to the data or any information on the participants, preventing unauthorized access. Committee members or statistical assistants will only have access to the de-identified data that had been previously cleaned during the original process of storing the data on SPSS. It was my ethical obligation to guarantee that the utilization and dissemination of the findings would not pose any harm to individuals who participated in

the study. Therefore, the archived data were exclusively used for the purpose of this study and are not accessible to any other individuals or organizations. As the analysis will be conducted solely on de-identified archival data, patients' informed consent will not be required, and no treatments or invasive procedures will be performed. To uphold data privacy, the de-identified archival data will be securely stored on a password-protected external flash drive for a period of 5 years. After this timeframe, all files will be permanently deleted to ensure their complete destruction.

Summary

The purpose of this correlational study was to explore the intricate connections between emotional eating, stress, anxiety, the tendency to disregard future consequences, the ability to regulate emotions, impulsive eating, mindful attention, and emotional awareness. The study utilized archival data collected by me in 2017, specifically in San Diego, CA. The dataset comprises de-identified information from 96 participants who completed the DEBQ (Appendix A), DASS, DERS, and BIS-11 questionnaires. The statistical analysis employed multiple linear regression and model one of the Hayes Process in SPSS. The next chapter will contain information on the results of data analysis employed in this study. I will review the data, the statistical analysis, and the results of the analysis.

Chapter 4: Results

Introduction

In this chapter, I presented the findings of my correlational study. The main variables I explored in this study were emotional eating, stress, anxiety, disregard for future consequences, emotion regulation, impulsive eating, mindful attention, and emotional awareness. Emotional eating, previously associated with obesity, involves consuming food when individuals are not hungry or as a response to intense emotional states (Annesi & Johnson, 2020). During these episodes, individuals attempt to manage their emotions by turning to food as a coping mechanism for emotional distress (Annesi & Johnson, 2020).

I employed a correlational research design in this study and used multiple linear regression and Hayes Process Model 1for moderation analysis. In this research I wanted to enhance my comprehension of the intricate interactions among various variables, shedding light on the underlying factors contributing to patterns of emotional and impulsive eating behaviors. The dataset I used consisted of archival data collected by me in 2017, providing a valuable foundation for my analysis.

I adjusted the variables' labels to facilitate a clear understanding of the variables involved in the analysis. Specifically, impulsive eating was assessed through the external eating subscale of the DEBQ, and thus, *external eating* was relabeled *as impulsive eating*. Notably, the impulsive eating subscale is positively measured, meaning higher scores indicate stronger impulsive eating behavior. I measured *disregard for future consequences* using the BIS-11 nonplanning subscale and was appropriately relabeled

as *Disregard.* The disregard scale was positively measured, signifying that higher scores indicate a greater lack of consideration for future consequences. I assessed *inability to regulate emotion* through the limited access to emotion regulation strategies on the DERS, and this variable was thus relabeled as *emotion regulation*. It is important to note that the emotion regulation subscale was negatively measured, meaning that the higher the score, the weaker the person's ability to regulate emotion. The variable emotional awareness was derived from the combination of scores from the lack of emotional awareness subscale in the DERS and the diffused emotions subscale in the DEBQ, providing a consolidated measure under the label *emotional awareness.* It is important to note that the emotional awareness subscale was negatively measured, meaning that the higher the score, the weaker the person's awareness of their emotions. Furthermore, I established the variable *mindful attention* by combining the total scores of the attention-attention and motor-motor subscales of the BIS-11. The *mindful attention* scale was positively measured, signifying that higher scores indicate a higher ability to attend to the present moment mindfully. The variables *stress*, *anxiety*, and *emotional eating* retained their original labels, requiring no differentiated relabeling for this analysis. Stress, anxiety, and emotional eating were positively measured, meaning higher scores indicated stronger symptomatology.

Research Questions and Hypotheses

Research Question 1 (RQ1): To what extent did stress (moderator, ratio variable measured by the stress subscale) moderated the relationship between emotional eating

(independent, ratio variable measured by the emotional eating subscale) and impulsive eating (dependent, ratio variable measured by the impulsive eating subscale)?

Null Hypothesis ($H_0$1): Stress is not a significant moderator in the relationship between emotional eating and impulsive eating.

Alternative Hypothesis ($H_1$1): Stress is a significant moderator in the relationship between emotional eating and impulsive eating.

Research Question 2 (RQ2): To what extent did emotional awareness (moderator, ratio variable measured by the emotional awareness subscale) moderate the relationship between mindful attention (independent, ratio variable measured by the mindful attention subscale) and emotional eating (dependent, ratio variable measured by the emotional eating subscale)?

Null Hypothesis ($H_0$2): Emotional awareness is not a significant moderator in the relationship between mindful attention and emotional eating.

Alternative Hypothesis ($H_1$2): Emotional awareness is a significant moderator in the relationship between mindful attention and emotional eating.

Research Question 3 (RQ3): To what extent did ability to regulate emotion (moderator, ratio variable measured by the emotion regulation subscale) moderate the relationship between mindful attention (independent, ratio variable measured by the mindful attention subscale) and impulsive eating (dependent, ratio variable measured by the impulsive eating subscale)?

Null Hypothesis ($H_0$3): Ability to regulate emotion is not a significant moderator in the relationship between mindful attention and impulsive eating.

Alternative Hypothesis ($H_1$3): Ability to regulate emotion is a significant moderator in the relationship between mindful attention and impulsive eating.

Research Question 4 (RQ4): To what extend were mindful attention (predictor, ratio variable measured by the manful attention subscale), impulsive eating (predictor, ratio variable measured by the impulsive eating subscale), emotional awareness (predictor, ratio variable measured by the emotional awareness subscale, and disregard of future consequences (predictor, ratio variable measured by the disregard subscale) predictive of emotional eating (outcome, ratio variable measured by the motional eating subscale)?

Null Hypothesis ($H_0$4): Mindful attention, impulsive eating, emotional awareness, and disregard of future consequences are not significant predictors of emotional eating.

Alternative Hypothesis ($H_1$4): Mindful attention, impulsive eating, emotional awareness, and disregard of future consequences are significant predictors of emotional eating.

Research Question 5 (RQ5): To what extent were anxiety (predictor, ratio variable measured by the anxiety subscale), stress (predictor, ratio variable measured by the stress subscale), mindful attention (predictor, ratio variable measured by the mindful attention subscale), disregard of future consequences (predictor, ratio variable measured by the disregard subscale) predictive of impulsive eating (outcome, ratio variable measured by the impulsive eating subscale)?

Null Hypothesis ($H_0$5): Anxiety, stress, mindful attention, and disregard of future consequences are not significant predictors of impulsive eating.

Alternative Hypothesis ($H_1$5): Anxiety, stress, mindful attention, and disregard of future consequences are significant predictors of impulsive eating.

I structured Chapter 4 as follows: I began with a discussion of the 2017 data collection timeframe and the efforts expended in organizing the dataset for the present study. Subsequently, I examined any disparities in the data collection process compared to the presentation in Chapter 3. Following this, I presented the baseline descriptive and demographic characteristics of the sample, explaining the representativeness of this study's participants concerning the broader population of interest. In addition, I examined the results section, which reviewed the descriptive statistics pertaining to both dependent and independent variables. I thoroughly assessed the underlying assumptions and provided a comprehensive account of the statistical analysis' findings, which were systematically organized in alignment with the respective research questions. These findings were substantiated with rigorous statistical measures and effect size indicators. I concluded Chapter 4 by carefully summarizing the key findings of the research questions.

Data Collection

The data used in this study consisted of archival data collected in 2017. After obtaining IRB approval to analyze the data on August 28, 2023 (refer to Appendix M for details), with the IRB approval number 08-18-23-1006317, my initial task was to clean the dataset, identify the subscales that represented the variables in this study, and create a dataset including the eight subscales representing the variables (i.e., emotional eating, impulsive eating, emotional awareness, emotion regulation, stress, anxiety, and disregard of future consequences). I excluded incomplete entries, such as questionnaires lacking

responses and any data that had been previously collected that were not relevant to this study (i.e., HRV data and food logs). It is worth noting that the dataset provided was de-identified, ensuring the absence of personal information. The dataset did not include demographic information (e.g., gender, age, SES), thus eliminating the need to run a descriptive and demographic characteristic of the sample.

I did not observe any discrepancies between the expected data outlined in Chapter 3 and the data I encountered during the analysis. Before conducting any analysis, I performed a preliminary check to ensure the dataset met the minimum entry requirement for statistical power. According to the software G*Power analysis, a minimum of 85 participants was necessary to obtain reliable results. After conducting assumptions tests for this study, I confirmed the validity of all entries, found no violations of the assumptions (see the assumptions section for detailed analysis), and proceeded with the intact dataset, which included data from 96 participants.

Sample

For this study I focused on adults aged 18 to 65 who self-identified as experiencing emotional or behavioral challenges. These challenges included difficulties in self-regulating emotions, an inability to relax under stress, a tendency to use food to alleviate uncomfortable or negative emotions, experiencing distress related to their eating habits, or struggling to control impulsive behavior in response to urges. To determine the appropriate sample size, I employed G*Power software, which indicated that a minimum sample size of 85 was required. With a total of 96 participants, I considered the results in

this study to be representative of the larger target population. Detailed descriptive statistics of the variables are provided in the assumptions section below.

Results

Assumptions

I checked the assumptions for multiple regression using SPSS software. None of the assumptions were found to be significantly violated. The dependent variables (i.e., emotional eating and impulsive eating) exhibited normal distribution, all variables were continuous, observations were independent, and the multiple regressions were linear. Additionally, assumptions of independence of observation (autocorrelation) and multicollinearity were not violated. No significant multivariate outliers were detected, and the residuals were normally distributed. However, two variables did minorly violate the assumption of homoscedasticity. The results of assumptions can be verified in the next sections.

Assumption 1: Normality of the Dependent Variables

The Kolmogorov-Smirnov (K-S) test indicated that the two dependent variables used in the following analyses did not violate the assumption of normality (see Table 1; Chen et al., 2020): Emotional eating, $K\text{-}S = .06$, $p = .20$, and impulsive eating, $K\text{-}S = .07$, $p = .20$.

Table 1

Test of Normality of Impulsive Eating and Emotional Eating

	Kolmogorov-Smirnov[a]		
	Statistic	*df*	Sig.
Emotional eating	.06	96	.20*
Impulsive eating	.07	96	.20*

Note. * Indicates that the *p*-value is not significant, meaning it did not violate the assumption of normality.

Figure 7

Histogram of Emotional Eating

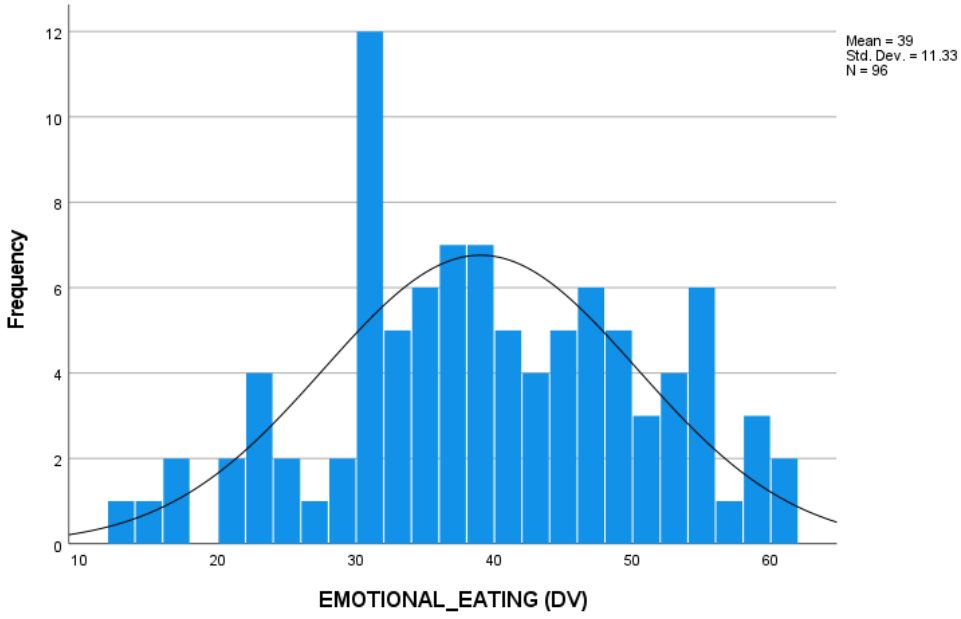


Figure 8

Q-Q Plot of Emotional Eating

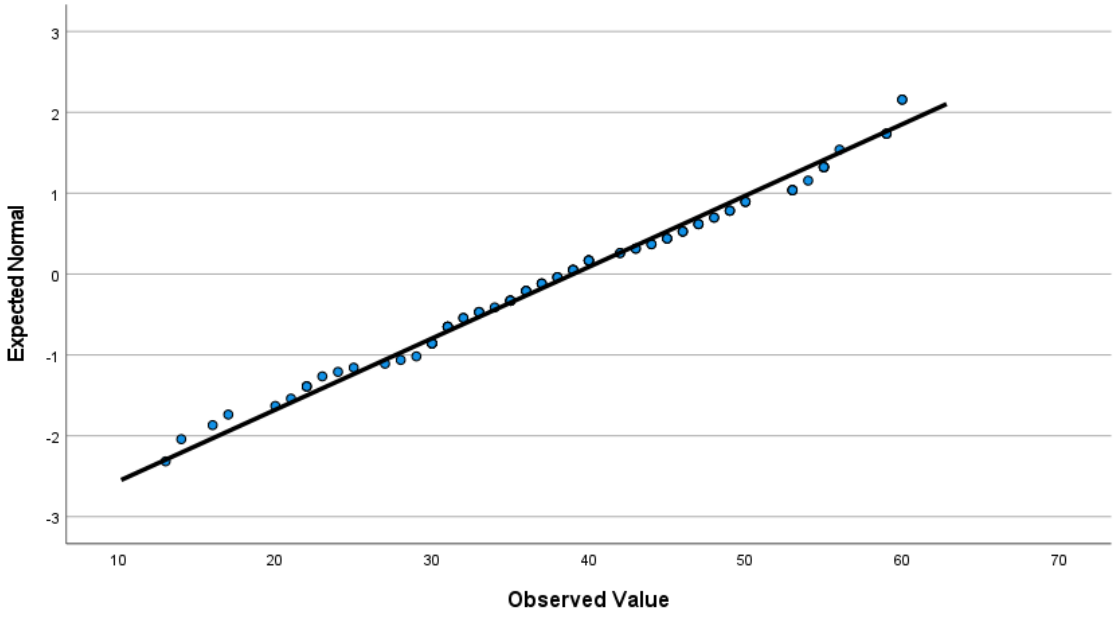


Figure 9

Box Plot of Emotional Eating

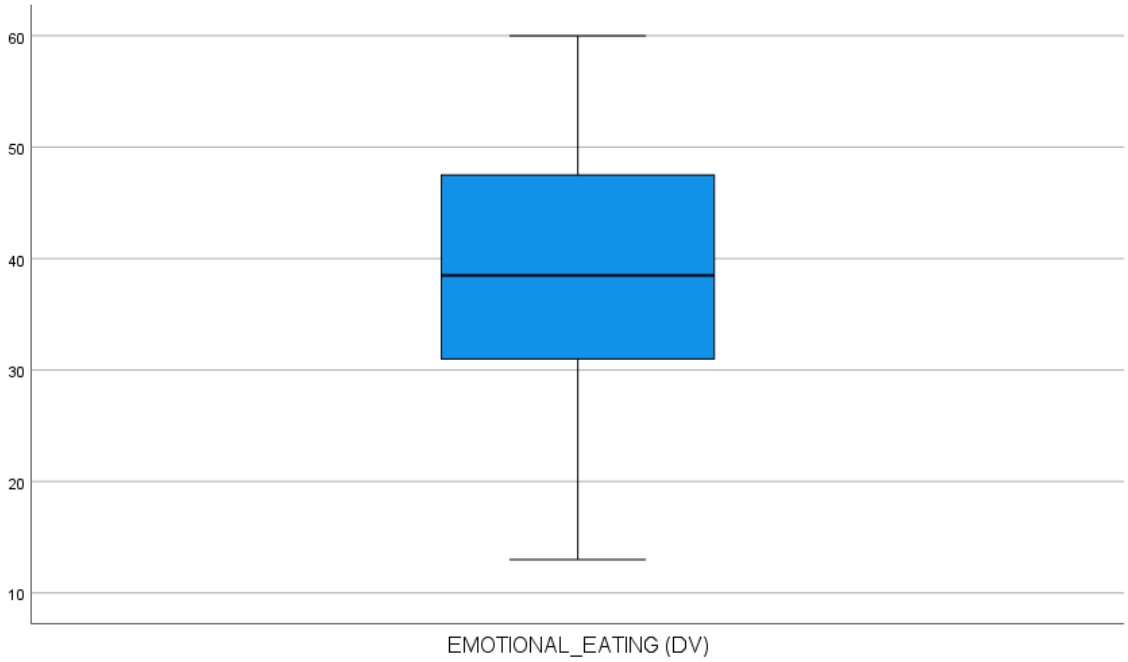


Figure 10

Histogram of Impulsive Eating

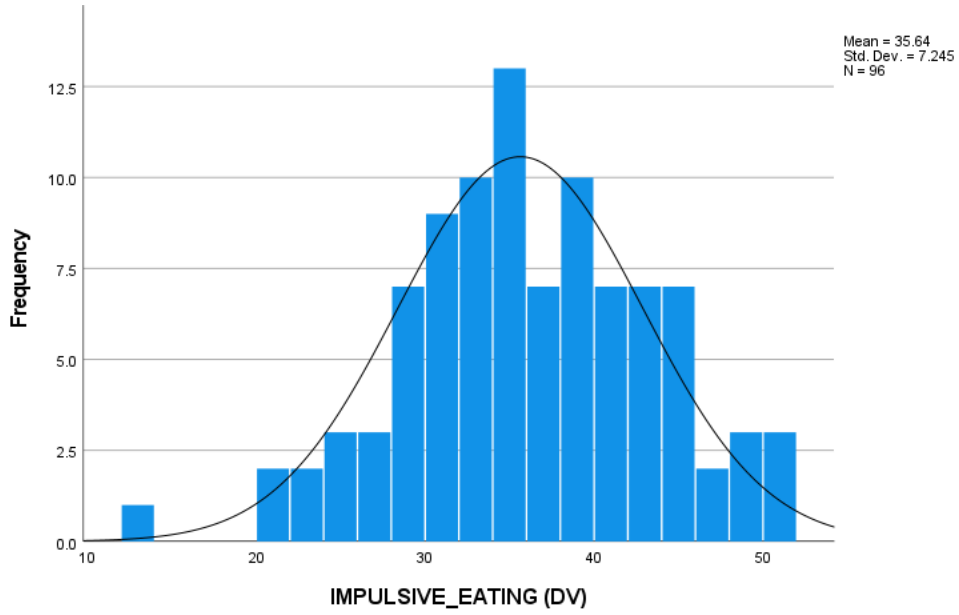


Figure 11

Q-Q Plot of Impulsive Eating

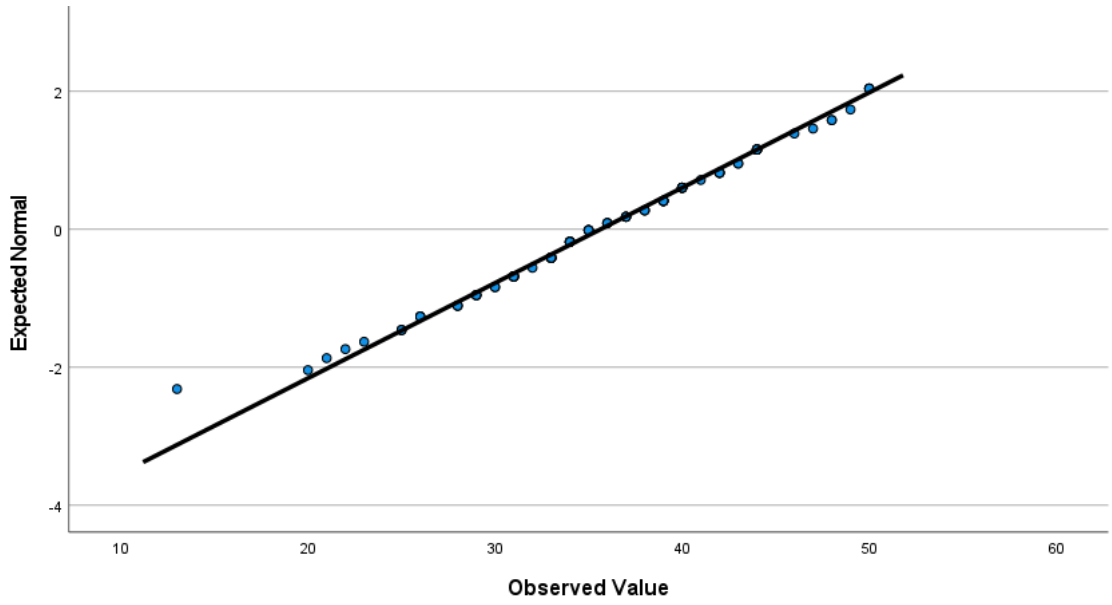
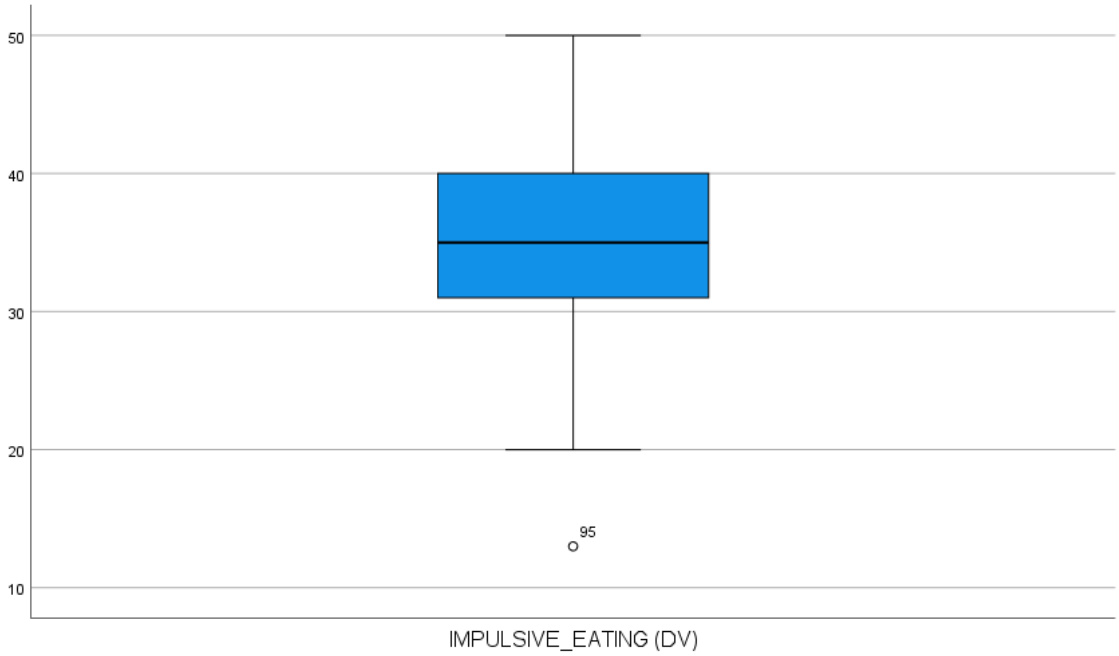


Figure 12

Box Plot of Impulsive Eating



Assumption 2: The Variables are Continuous

While the individual questions on the subscales used as variables in this study were measured using a Likert scale, I added up the scores obtained in the subscales to create ratio variables measured in continuous scales.

Assumption 3: Independence of Observation (Autocorrelation)

The residuals (i.e., the difference between the observed values and the predicted values) are independent of each other. The Durbin-Watson test did not detect any systematic patterns or correlations in the residuals.

RQ1. The Durbin-Watson statistic (see Table 2) from this regression was 1.91, which is between the acceptable range of 1.5 and 2.5 (Turner, 2020). Therefore, the assumption of autocorrelation (Independence) was not violated.

Table 2

Independence of Observation – Model Summary of Stress and Emotional Eating as Predictors of Impulsive Eating

		Change Statistics				
Model	R^2	*F* Change	*df1*	*df2*	Sig. *F* Change	Durbin-Watson
1	.45	38.04	2	93	.00	1.91

RQ2. The Durbin-Watson statistic (see Table 3) from this regression was 1.66, which is between the acceptable range of 1.5 and 2.5. Therefore, the assumption of autocorrelation (Independence) was not violated.

Table 3

Independence of Observation – Model Summary for Mindful Attention and Emotional Awareness as Predictors of Emotional Eating

		Change Statistics				Durbin-Watson
Model	R^2	*F* Change	*df1*	*df2*	Sig. *F* Change	
1	.50	46.31	2	93	.00	1.66

RQ3. The Durbin-Watson statistic (see Table 4) from this regression was 1.59, which is between the acceptable range of 1.5 and 2.5. Therefore, the assumption of autocorrelation (Independence) was not violated.

Table 4

Independence of Observation – Model Summary for Emotion Regulation and Mindful Attention as Predictors of Impulsive Eating

		Change Statistics				Durbin-Watson
Model	R^2	*F* Change	*df1*	*df2*	Sig. *F* Change	
1	.29	19.29	2	93	.00	1.59

Note. a. Predictors: (Constant), Emotion Regulation, Mindful Attention (S
b. Dependent Variable: Impulsive Eating

RQ4. The Durbin-Watson statistic from this regression was 1.92 (see Table 5), which is between the acceptable range of 1.5 and 2.5. Therefore, the assumption of autocorrelation (Independence) was not violated.

Table 5

Independence of Observation – Model Summary for Disregard for Future Consequences, Impulsive Eating, Emotional Awareness, and Mindful Attention as Predictors of Emotional Eating

		Change Statistics				Durbin-Watson
Model	R^2	*F* Change	*df1*	*df2*	Sig. *F* Change	
1	.67	45.13	4	91	.00	1.92

Note. a. Predictors: (Constant), Disregard, Impulsive Eating, Emotional Awareness, Mindful Attention
b. Dependent Variable: Emotional Eating

RQ5. The Durbin-Watson statistic from this regression was 1.80 (see Table 6), which is between the acceptable range of 1.5 and 2.5. Therefore, the assumption of autocorrelation (Independence) was not violated.

Table 6

Independence of Observation - Model Summary for Disregard of Future Consequences, Anxiety, Stress, and Mindful Attention as Predictors of Impulsive Eating

		Change Statistics				Durbin-Watson
Model	R^2	*F* Change	*df1*	*df2*	Sig. *F* Change	
1	.37	13.11	4	91	.00	1.80

Note. a. Predictors: (Constant), Disregard, Anxiety, Stress, Mindful Attention
b. Dependent Variable: Impulsive Eating

Assumption 4: Linearity

Since I used multiple linear regression, it was important to understand how the variables collectively influenced the dependent variables. To assess linearity of the RQs, I assessed the correlations between the variables. If the relationship between two variables was non-zero, that meant that there was some association between the variables (Peralta et al., 2018). Therefore, a non-zero relationship was a sign that there's some degree of linearity between the variables, even if it's not a perfect one.

RQ1. The assumption of linearity (see Table 7) was not violated because both correlations between the predictor (i.e., Emotional Eating and Stress) variables and the criterion (i.e., Emotional Eating) were non-zero (Peralta et al., 2018), impulsive eating, $r = .61$ ($p < .00$), and stress, $r = .44$ ($p < .00$). In other words, the correlation between Impulsive Eating and Emotional Eating is positive, suggesting that as Emotional Eating increases, Impulsive Eating tends to increase as well. The correlation between Impulsive

eating and Stress is also positive, indicating that as Stress increases, Impulsive Eating tends to increase as well.

Table 7

Correlations Between Emotional Eating, Stress (Predictors), and Impulsive Eating (Criterion).

	Impulsive Eating	Emotional Eating	Stress
Impulsive Eating	1	.61*(.00)	44*(.00)

Note. $N = 96$; * = Sig. (2-tailed)

RQ2. The assumption of linearity (see Table 8) was not violated because both correlations between the predictor variables (i.e., Mindful Attention and Emotional Awareness) and the criterion (i.e., Emotional Eating) were non-zero [emotional awareness, $r = .71$ ($p < .00$), and mindful attention, $r = .18$ ($p = .04$)]. In other words, the results show a strong positive relationship between Emotional Awareness and Emotional Eating, indicating that as Emotional Awareness increases, Impulsive Eating tends to increase as well. A positive relationship was also found between mindful attention, and emotional eating. However, though the relationship is statistically significant, the relationship is weaker than that of emotional awareness.

Table 8

Correlations among Emotional Eating, Emotional Awareness (Predictors), and Mindful

	Emotional Eating	Emotional Awareness	Mindful Attention
Mindful Attention	.18 *(.04)	.30 *(.00)	1.00

Correlations Coefficient and Significance Coefficient

		Emotional Eating	Emotional Awareness	Mindful Attention
Mindful Attention	Pearson Correlation	.18 *(.04)	.30 *(.00)	1.00

Note. $N = 96$; * = Sig. (2-tailed)

RQ3. The assumption of linearity (see Table 9) was not violated because both correlations between the predictor variables (i.e., Mindful Attention and Emotional Awareness) and the criterion (i.e., Impulsive Eating) were non-zero [mindful attention, $r = .30$ ($p = .00$), and inability to regulate emotion (i.e., emotion regulation), $r = .18$ ($p = .00$). Specifically, the results show that as mindful attention increases, impulsive eating also increases, and as emotion regulation increases, impulsive eating increases as well.

Table 9

Correlations among Mindful Attention, Emotion Regulation (Predictors), and Impulsive Eating (Criterion)

	Impulsive Eating	Mindful Attention	Emotion Regulation
Impulsive Eating	1.00	.30 *(.00)	.18 *(.00)

Note. *N* = 96; * = Sig. (2-tailed)

RQ4. The assumption of linearity (see Table 10) was not violated because all correlations between the predictor variables (i.e., mindful attention, impulsive eating, emotional awareness, and disregard for future consequences) and the criterion (i.e., emotional eating) were non-zero (mindful attention, *r* = .18 (*p* =.04), impulsive eating, r = .61 (*p* = .00), emotional awareness, r = .71 (*p* = .00), and disregard for future consequences, *r* = .05 (*p* = .31). In other words, the correlation between predictors (Mindful attention, impulsive eating, emotional awareness, and disregard for future consequences) and the criterion (emotional eating) was as follows: mindful attention showed a weak positive relationship with emotional eating, suggesting that mindful attention increases, so does emotional eating. Impulsive eating showed a moderate positive relationship with emotional eating, suggesting that as impulsive eating increases, emotional eating also tends to increase. Emotional awareness showed a strong positive relationship with emotional eating, suggesting that as emotional awareness increases,

emotional eating also tends to increase. Finally, the results indicated that disregard for future consequences did not show a significant relationship (i.e., a non-significant *p*-value) with emotional eating, suggesting that there is no evidence that disregard for future consequences plays a role in emotional eating.

Table 10

Correlation Coefficients and Significance Levels for the Relationship Between Impulsive Eating, Emotional Awareness, Mindful Attention, and Disregard for Future Consequences (Predictors), and Emotional Eating (Criterion)

	Emotional Eating	Mindful Attention	Impulsive Eating	Emotional Awareness	Disregard
Emotional Eating	1.00	.18 *(.04)	.61 *(.00)	.70 *(.00)	.05 *(.31)
Mindful Attention	.18 *(.04)	1.00	.47 *(.00)	.29 *(.00)	.54 *(.00)
Impulsive Eating	.61 *(.00)	.47 *(.00)	1.00	.45 *(.00)	.16 *(.06)
Emotional Awareness	.71 *(.00)	.30 *(.00)	.45 *(.00)	1.00	.40 *(.00)
Disregard	.05 *(.31)	.55 *(.00)	.16 *(.06)	.40 *(.00)	1.00

Note. $N = 96$; * = Sig. (1-tailed)

RQ5. The assumption of linearity (see Table 11) was not violated because all correlations between the predictor variables (i.e., anxiety, stress, mindful attention, disregard for future consequences) and the criterion (i.e., impulsive eating) were non-zero [impulsive eating, r = .48 (p = .00), stress, r = .44 (p = .00), mindful attention, r = .41 (p = .00), and disregard for future consequences, r = .16 (p = .06)]. In other words, the

correlation between predictors (i.e., anxiety, stress, mindful attention, and disregard for future consequences) and the criterion (impulsive eating were as follows: anxiety showed a moderate positive relationship with impulsive eating, suggesting that as anxiety increases, so does impulsive eating. Stress showed a moderate positive relationship with impulsive eating, suggesting that as stress increases, impulsive eating also tends to increase. Mindful attention showed a moderate positive relationship with impulsive eating, suggesting that as mindful attention increases, impulsive eating tends to increase as well. Finally, the results indicated that disregard for future consequences did not show a significant relationship (i.e., a non-significant p-value) with impulsive eating, suggesting that there is no evidence that disregard for future consequences plays a role in impulsive eating.

Table 11

Correlations and significance Levels Between Anxiety, Stress, Mindful Attention, and Disregard for Future Consequences (Predictors), and Impulsive Eating (Criterion)

	Impulsive Eating	Anxiety	Stress	Mindful Attention	Disregard
Impulsive Eating	1.00	.48 *(.00)	.44 *(.00)	.47 *(.00)	.16 *(.06)
Anxiety	.48 *(00)	1.00	.42	.46 *(.00)	.25 *(.00)
Stress	.44 *(.00)	.42 * (.00)	1.00	.49 *(.00)	.44 *(.00)
Mindful Attention	.47 *(.00)	.46 *(.00)	.49	1.00	.55 *(.00)
Disregard	.16 *(.06)	.25 *(.01)	.45	.55 *(.00)	1.00

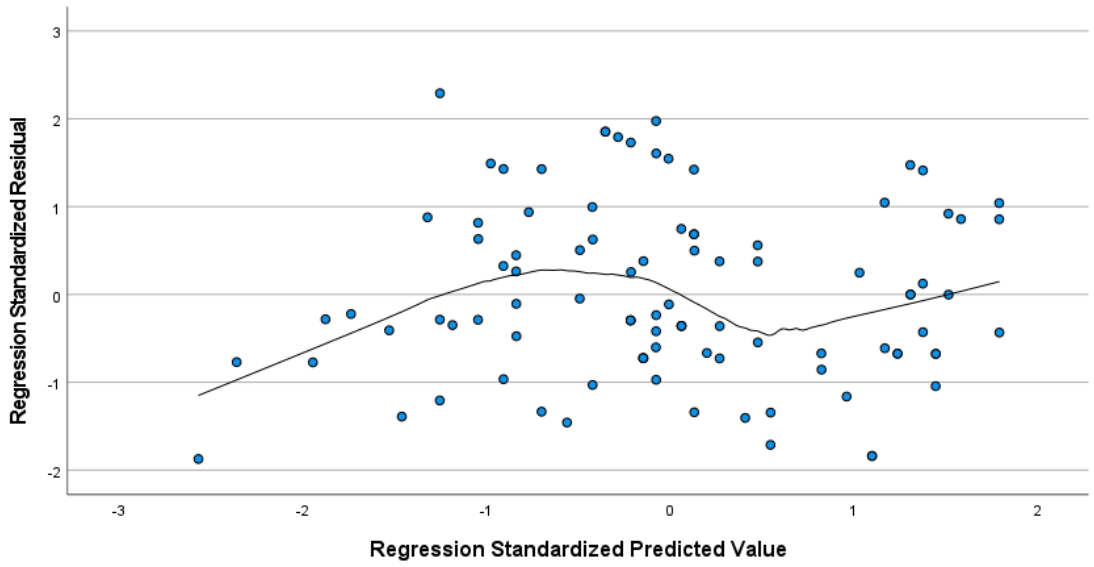
Note/ *N* = 96; * = Sig. (1-tailed)

Assumption 5: Homoscedasticity

Research Question 1: To test homoscedasticity, plots of the standardized residuals were created, and the standardized predicted values were computed. The Loess Line (see Figure 13) revealed a slight curvilinear shape, so therefore, there was a minor violation in homoscedasticity (Field, 2018).

Figure 13

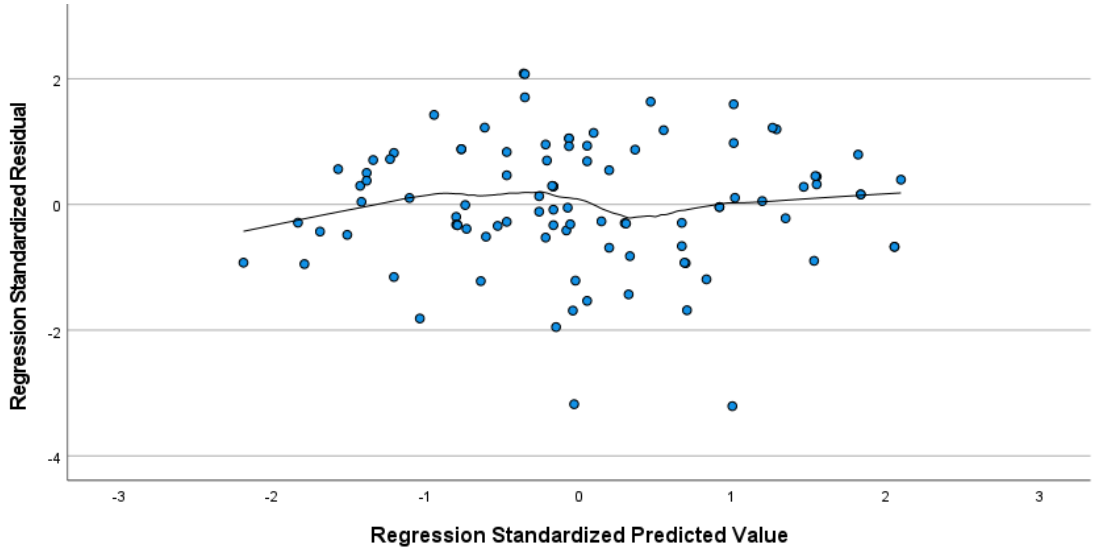
Standardized Residual vs. Standardized Predicted Value (Impulsive Eating)



Research Question 2: To test homoscedasticity (see Figure 14) plots of the standardized residuals were created, and the standardized predicted values were computed. The Loess Line was not precisely horizontal, but within an acceptable range, therefore, there was no violation of homoscedasticity.

Figure 14

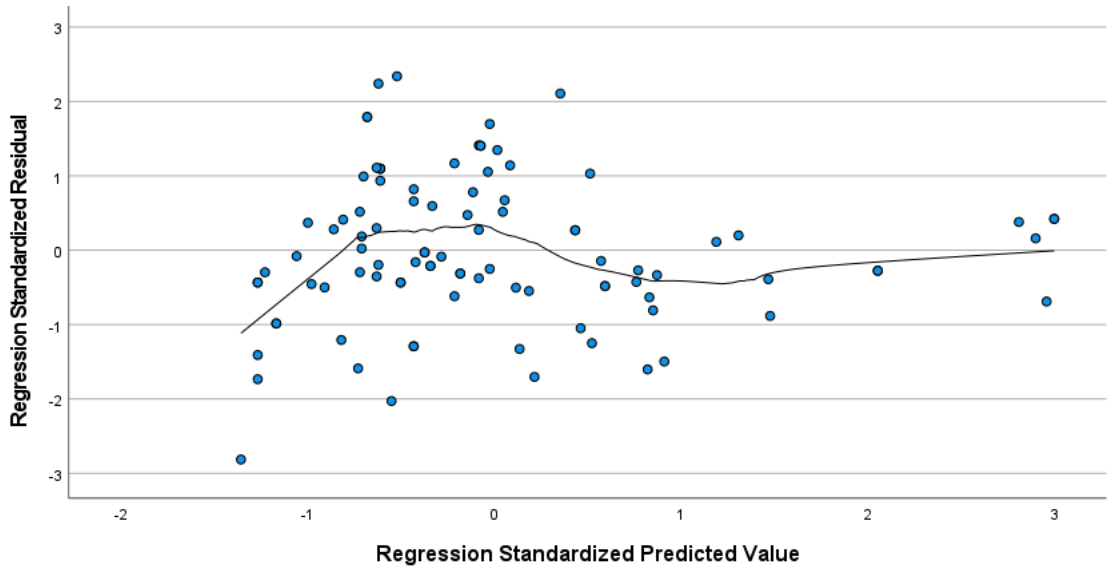
Standardized Residual vs. Standardized Predicted Value (Emotional Eating)



Research Question 3: To test homoscedasticity (see Figure 15) plots of the standardized residuals were created, and the standardized predicted values were computed. The Loess Line revealed a slight curvilinear shape, therefore, there was a minor violation in homoscedasticity.

Figure 15

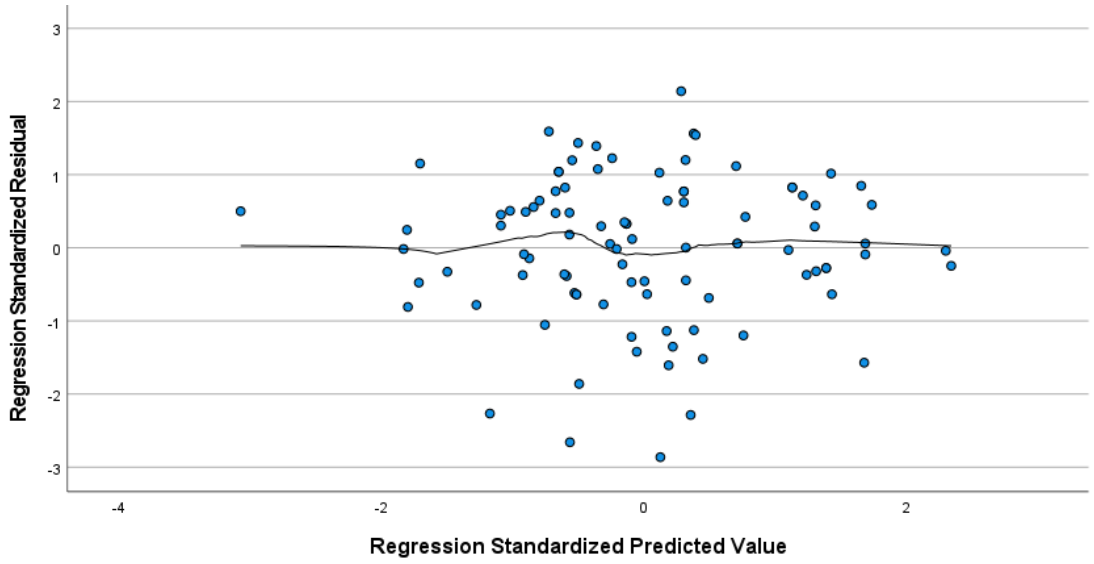
Standardized Residual vs. Standardized Predicted Value (Impulsive Eating)



Research Question 4: To test homoscedasticity, plots of the standardized residuals were created, (see Figure 16) and the standardized predicted values were computed. The Loess Line was nearly horizontal, so therefore, there was no violation of homoscedasticity.

Figure 16

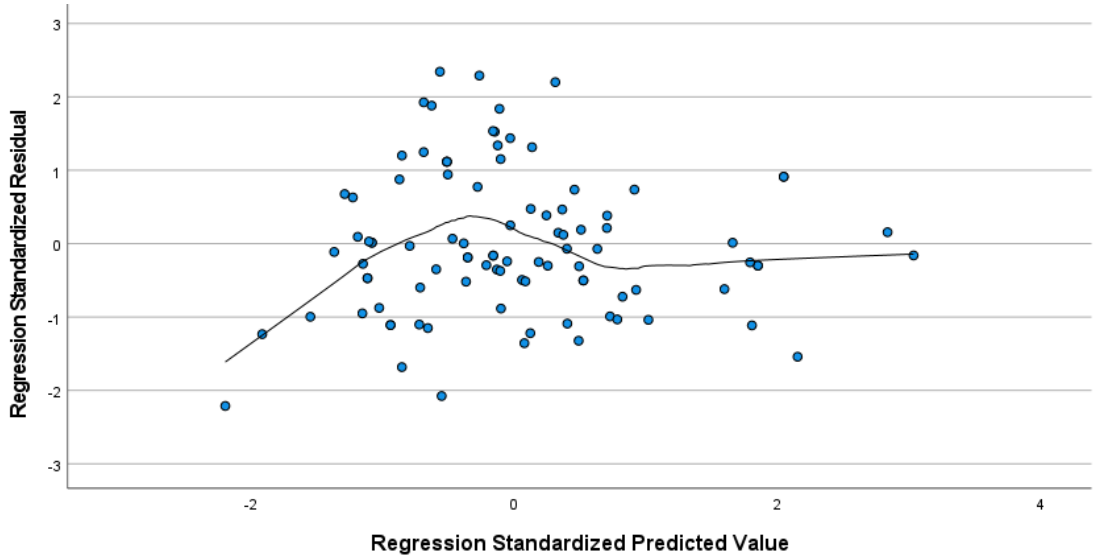
Standardized Residuals vs. Standardized Predicted Value (Emotional Eating)



Research Question 5: To test homoscedasticity, plots of the standardized residuals were created, and the standardized predicted values were computed. The Loess Line revealed a slight curvilinear shape (see Figure 17), so therefore, there was a minor violation in homoscedasticity.

Figure 17

Standardized Residual vs. Standardized Predicted Value (Impulsive Eating)



Assumption 6: Multicollinearity

Research Question 1: The assumption of multicollinearity was measured using VIF scores for the variables that were below the value of 10 threshold (Field, 2018). The VIF scores for emotional eating were 1.08, and for stress was also 1.08 (see Table 12). Therefore, the assumption of multicollinearity was not violated.

Table 12

Multicollinearity statistics of Predictors (Emotional Eating and Stress

	1		2	*t*	Sig.	3	
Model3	*B*	Std. Error	*Beta*			Tolerance	VIF
1 (Constant)	13.75	2.70		5.10	.00		
Emotional Eating	.34	.05	.53	6.57	.00	.93	1.08
Stress	.67	.18	.30	3.73	.00	.93	1.08

Note. 1 = Unstandardized Coefficient; 2 = Standardized Coefficient; 3 = Collinearity Statistics

Research Question 2 The assumption of multicollinearity (see Table 13) was measured using VIF scores for the variables that were below the value of 10 threshold. The VIF scores for Emotional Awareness was 1.09, and for Mindful Attention was also 1.09. Therefore, the assumption of multicollinearity was not violated.

Table 13

Multicollinearity statistics of Predictors (Emotional Awareness and Mindful Attention)

Model		1	2		*t*	Sig.	3	
		B	Std. Error	*Beta*			Tolerance	VIF
1	(Constant)	9.66	4.56		2.12	.04		
	Emotional Awareness	1.08	.12	.72	9.32	.00	.92	1.09
	Mindful Attention	-.07	.16	-.03	-.41	.68	.92	1.09

Note. 1 = Unstandardized Coefficient; 2 = Standardized Coefficient; 3 = Collinearity Statistics

Research Question 3: The assumption of multicollinearity was measured using the VIF (see Table 14). VIF scores for the variables were below the value of 10 threshold. The VIF score for mindful attention was 1.65, and for emotion regulation was also 1.65. Therefore, the assumption of multicollinearity was not violated.

Table 14

Multicollinearity Statistics of Predictors (Mindful Attention and Emotional Awareness)

		1		2	*t*	3	
Model		*B*	Std. Error	*Beta*		Tolerance	VIF
1	(Constant)	20.84	3.10		6.73		
	Mindful Attention	.35	.15	.26	2.27	.61	1.65
	Emotional Awareness	.39	. 13	.34	3.07	.61	1.65

Note. 1 = Unstandardized Coefficient; 2 = Standardized Coefficient; 3 = Collinearity Statistics

Research Question 4: The assumption of multicollinearity was measured using the VIF (see Table 15). VIF scores for the variables were below the value of 10 threshold. The VIF scores for mindful attention was 1.87, impulsive eating was 1.61, emotion awareness was 1.47, and disregard for future consequences was 1.71. Therefore, the assumption of multicollinearity was not violated.

Table 15

Sample Multicollinearity Statistics of Predictors (Mindful Attention, Impulsive Eating, Emotional Awareness, and Disregard for Future Consequences)

		1		2		3	
Model		*B*	Std. Error	*Beta*	*t*	Tolerance	VIF
1	(Constant)	2.02	4.12		.49		
	Mindful Attention	-.14	.18	-.06	-.78	.54	1.87
	Impulsive Eating	.60	.12	.39	5.02	.62	1.61
	Emotional Awareness	.97	.11	.64	8.74	.68	1.47
	Disregard	-.71	.24	-.23	-2.91	.59	1.71

Note. 1 = Unstandardized Coefficient; 2 = Standardized Coefficient; 3 = Collinearity Statistics

Research Question 5: The assumption of multicollinearity was measured using the VIF (see Table 16). VIF scores for the variables were below the value of 10 threshold. The VIF scores for anxiety was 1.36, and for stress was 1.51, mindful attention was 1.80, and disregard of future consequences was 1.54. Therefore, the assumption of multicollinearity was not violated.

Table 16

Multicollinearity statistics of Predictors (Anxiety, Stress, Mindful Attention, and Disregard for Future Consequences)

	1	2		*t*	Sig.	3	
Model	*B*	Std. Error	*Beta*			Tolerance	VIF
1 (Constant)	13.17	3.4		3.85	.00		
Anxiety	.84	.30	.27	2.77	.01	.73	1.36
Stress	.57	.23	.25	2.47	.01	.66	1.51
Mindful Attention	.46	.15	.33	3.00	.00	.56	1.80
Disregard	-.40	.20	-.20	-2.09	.05	.65	1.54

Note. 1 = Unstandardized Coefficient; 2 = Standardized Coefficient; 3 = Collinearity Statistics

Assumption 7: Outliers

Univariate Outliers: The following variables were checked for outliers: Emotional eating, impulsive eating, stress, anxiety, mindful attention, emotional awareness, emotion regulation, and disregard of future consequences. An outlier was defined as any z-score that was greater than 1.96, or less than -1.96, as defined by the Empirical Rule which states that 95% of a normal data set must fall between 1.96 standard deviations from the mean (“Empirical rule,” 2009).

The results indicate that all variables had outliers. The following z-scores were outliers and deleted from the subscale: Emotional eating: *z* - 2.203, *z* = -2.21, *z* = -2.29;

impulsive eating $z = 1.98$, z = 1.98, $z = 1.98$, $z = -2.02$, $z = -2.16$, and $z = -3.12$; stress: $z = 2.17$; anxiety: $z = 3.32$, z = 3.32, $z = 2.03$; disregard for future consequences: $z = 2.01$; mindful attention: $z = 2.68$, z = 2.68, $z = 2.68$, 2.49, and $z = -2.08$; emotional awareness $z = 2.05$, $z = 2.05$, $z = 2.05$, and $z = -2.08$; and emotion regulation $z = 3.52$, $z = 2.74$, $z = 2.74$, $z = 2.58$, and $z = 2.58$

The comparative analysis of descriptive statistics, as presented in Table 17 (inclusive of outliers) and Table 19 (exclusive of outliers). Impulsive eating originally had a mean of 35.64 (*SD* = 7.24), but after deleting six outliers, the new mean was 35.74 (*SD* = 6.18), with a change of one-tenth of a point, which was not enough to sway the original results. The assessment of normality, as demonstrated in Tables 18 (inclusive of outliers) and Table 20 (exclusive of outliers), indicated that the removal of outliers from the respective variables did not yield a statistically significant impact on the final results. After deleting a total of 15 outliers, the only variable that changed from violating the assumption of normality ($p = .01$) to not violating the assumption of normality ($p = .19$) was disregard of future consequences (see Table 21 for side-by-side normality comparison). Since univariate normality is not an assumption needed to run a regression model, no further action was taken. As such, I decided to retain the dataset in its entirety, and the subsequent phase involved conducting the planned statistical assumptions.

Data With Outliers

Table 17

Descriptive Statistics for Variables: Anxiety, Disregard, Stress, Emotional Regulation, Emotion Awareness, Mindful Attention, Impulsive Eating, Emotional Eating (With Outliers)

	Anxiety	Disregard	Stress	Em. Reg.	Em. Awar.	Mind. Att.	Imp. Eating	Em. Eating
M	10.25	12.61	13.04	15.49	28.67	24.94	35.64	39.00
SD	2.34	3.68	3.21	6.39	7.48	5.26	7.24	11.33
Skewness	.84	-.04	.10	1.4	.19	.66	-.24	-.10
Std. Error of Skewness	.25	.25	.25	.25	.25	.25	.25	.25
Kurtosis	1.05	-.93	-.81	1.75	-.53	.38	.17	-.56
Std. Error of Kurtosis	.49	.49	.49	.49	.49	.49	.49	.49

Note. *N*= 96. Em. Reg = Emotion Regulation; Em. Awar. = Emotional Awareness; Mind. Att. = Mindful Attention; Imp. Eating = Impulsive Eating; Em. Eating = Emotional Eating

Table 18

Test of Normality Anxiety, Disregard, Stress, Emotional Regulation, Emotion Awareness, Mindful Attention, Impulsive Eating, Emotional Eating (With Outliers)

	Kolmogorov-Smirnov[a]		
	Statistic	*df*	Sig.
Anxiety	.13	96	.00
Disregard	.10	96	.01
Stress	.11	96	.00
Emotional Regulation	.18	96	.00
Emotion Awareness	.19	96	.01
Mindful Attention	.14	96	.00
Impulsive Eating	.07	96	.20*
Emotional Eating	.06	96	.20*

Note. * Indicates that the *p*-value is not significant, meaning it did not violate the assumption of normality. \

Data Without Outliers

Table 19

Descriptive Statistics for Variables: Anxiety, Disregard, Stress, Emotional Regulation, Emotion Awareness, Mindful Attention, Impulsive Eating, Emotional Eating (Without Outliers)

	1	2	3	4	5	6	7	8
M	10.03	12.54	12.97	14.49	28.35	24.45	35.74	39.80
SD	2.01	3.62	3.14	4.86	6.90	4.37	6.18	10.58
Skewness	.28	-.06	.06	.10	.19	.21	.01	.07
Std. Error of Skewness	.25	.25	.25	.25	.25	.25	.25	.25
Kurtosis	-.71	-.96	-.86	.19	-.61	-.57	-.57	-.76
Std. Error of Kurtosis	.50	.49	.49	.50	.50	.50	.50	.49

Note. 1= Stress, 2 = Disregard; 3 = Stress, 4 = Emotion Regulation; 5 = Emotional Awareness, 6 = Mindful Attention; 7 = Impulsive Eating; 8 = Emotional Eating

Table 20

Test of Normality for variables Anxiety, Disregard, Stress, Emotional Regulation, Emotion Awareness, Mindful Attention, Impulsive Eating, Emotional Eating (Without Outliers)

	Kolmogorov-Smirnov[a]		
	Statistic	*df*	Sig.
Anxiety	.14	81	.00
Disregard	.09	81	.19
Stress	.12	81	.00
Emotional Regulation	.20	81	.00
Emotion Awareness	.09	81	.08
Mindful Attention	.16	81	.00
Impulsive Eating	.08	81	.20*
Emotional Eating	.08	81	.20*

Note. * Indicates that the *p*-value is not significant, meaning it did not violate the assumption of normality.

Table 21

Tests of Normality Comparison for variables Anxiety, Disregard, Stress, Emotional Regulation, Emotion Awareness, Mindful Attention, Impulsive Eating, Emotional Eating

	Without Outliers Kolmogorov-Smirnov[a]			With Outliers Kolmogorov-Smirnov[a]		
	Statistic	*df*	Sig.	Statistic	*df*	Sig.
Anxiety	.14	81	.00	.13	96	.00
Disregard	.09	81	.19	.10	96	.01
Stress	.12	81	.00	.11	96	.00
Emotional Regulation	.20	81	.00	.18	96	.00
Emotion Awareness	.09	81	.08	.10	96	.01
Mindful Attention	.16	81	.00	.14	96	.00
Impulsive Eating	.08	81	.20*	.07	96	.20*
Emotional Eating	.08	81	.20*	.06	96	.20*

Note. *. This is a lower bound of the true significance. It indicates that the *p*-value is not significant, meaning it did not violate the assumption of normality.

a. Lilliefors Significance Correction

Multivariate Outliers

Research Question 1: Mahalanobis distance is a statistical measure used to identify outliers or influential data points in a regression analysis (Zou et al., 2018). It measures how far each data point is from the center of the data distribution, taking into account the correlations between variables (Zou et al., 2018). In a regression context, it can help identify cases that have a disproportionate influence on the regression coefficients or assumptions of normality and homoscedasticity (Zou et al., 2018).

According to the Mahalanobis Critical Distance calculator, there were no multivariate outliers in the dataset. The critical Mahalanobis distance for a regression model with two predictors and one criterion with a sample size of 96 was 15.07, and the maximum Mahalanobis distance from the data set was 9.42 (see Table 22).

Table 22

Descriptive Statistics for Predicted Value, Residuals, and Diagnostic Measures

	Minimum	Maximum	*M*	*SD*	*N*
Predicted Value	23.17	44.35	35.64	4.86	96
SD Predicted Value	-2.56	1.79	.00	1.00	96
Standard Error of Predicted Value	.56	1.80	.93	.25	96
Adjusted Predicted Value	24.06	44.48	35.63	4.83	96
Residual	-10.17	12.44	.00	5.37	96
SD Residual	-1.87	2.29	.00	.99	96
Stud. Residual	-1.95	2.32	.00	1.00	96
Deleted Residual	-11.06	12.79	.00	5.55	96
Stud. Deleted Residual	-1.98	2.38	.00	1.01	96
Mahal. Distance	.01	9.42	1.98	1.65	96
Cook's Distance	.00	.11	.01	.01	96
Centered Leverage Value	.00	.10	.02	.02	96

Note. a. Dependent Variable: Impulsive Eating

Research Question 2: According to the Mahalanobis Critical Distance calculator, there were no multivariate outliers in the data set. The critical Mahalanobis distance for a regression model with two predictors and one criterion with a sample size of 96 was 15.07, and the maximum Mahalanobis distance from the data set was 7.99 (see Table 23).

Table 23

Descriptive Statistics for Predicted Value, Residuals, and Diagnostic Measures

	Minimum	Maximum	*M*	*SD*	*N*
Predicted Value	21.50	55.79	39.00	8.00	96
SD Predicted Value	-2.19	2.10	.00	1.00	96
Standard Error of Predicted Value	.84	2.49	1.37	.43	96
Adj. Predicted Value	22.07	55.77	.39	7.99	96
Residual	-26.00	16.89	.00	8.02	96
SD Residual	-3.21	2.08	.00	.99	96
Stud. Residual	-3.24	2.10	.00	1.00	96
Deleted Residual	-26.61	17.09	.01	8.23	96
Stud. Deleted Residual	-3.43	2.14	-.00	1.02	96
Mahal. Distance	.03	7.99	1.98	1.95	96
Cook's Distance	.00	.11	.01	.02	96
Centered Leverage Value	.00	.08	.02	.02	96

Note. a. Dependent Variable: Emotional Eating

Research Question 3: According to the Mahalanobis Critical Distance calculator, there were no multivariate outliers in the data set. The critical Mahalanobis distance for a regression model with two predictors and one criterion with a sample size of 96 was 15.07, and the maximum Mahalanobis distance from the data set was 7.99 (see Table 24).

Table 24

Descriptive Statistics for Predicted Value, Residuals, and Diagnostic Measures

	Minimum	Maximum	*M*	*SD*	*N*
Predicted Value	26.08	46.91	35.64	4.14	96
SD Predicted Value	-2.30	2.72	.00	1.00	96
Standard Error of Predicted Value	.62	1.85	1.01	.32	96
Adj. Predicted Value	27.08	46.59	35.64	4.10	96
Residual	-13.64	11.58	.00	5.94	96
SD Residual	-2.27	1.93	.00	.99	96
Stud. Residual	-2.29	1.94	.00	1.00	96
Deleted Residual	-14.08	11.72	-.00	6.11	96
Stud. Deleted Residual	-2.35	1.95	-.00	1.01	96
Mahal. Distance	.03	7.99	1.98	1.95	96
Cook's Distance	.00	.13	.01	.02	96
Centered Leverage Value	.00	.08	.02	.02	96

Note. a. Dependent Variable: Impulsive Eating

Research Question 4: According to the Mahalanobis Critical Distance calculator, there were no multivariate outliers in the data set. The critical Mahalanobis distance for a regression model with four predictors and one criterion with a sample size of 96 was 19.85, and the maximum Mahalanobis distance from the data set was 11.34 (see Table 25).

Table 25

Descriptive Statistics for Predicted Value, Residuals, and Diagnostic Measures

	Minimum	Maximum	*M*	*SD*	*N*
Predicted Value	10.65	60.65	39.00	9.24	96
Std. Predicted Value	-3.07	2.34	.00	1.00	96
Standard Error of Predicted Value	.71	2.41	1.48	.40	96
Adjusted Predicted Value	10.15	60.81	39.03	9.23	96
Residual	-19.18	14.35	.00	6.56	96
Std. Residual	-2.86	2.14	.00	.98	96
Stud. Residual	-2.96	2.17	-.00	1.00	96
Deleted Residual	-20.56	14.74	-.03	6.89	96
Stud. Deleted Residual	-3.10	2.22	-.01	1.02	96
Mahal. Distance	.06	11.34	3.96	2.52	96
Cook's Distance	.00	.13	.01	.10	96
Centered Leverage Value	.00	.12	.04	.03	96

Note. a. Dependent Variable: Emotional Eating

Research Question 5: According to the Mahalanobis Critical Distance calculator, there were no multivariate outliers in the data set. The critical Mahalanobis distance for a regression model with two predictors and one criterion with a sample size of 96 was 19.85, and the maximum Mahalanobis distance (see Table 26) from the data set was 14.04.

Table 26

Descriptive Statistics for Predicted Value, Residuals, and Diagnostic Measures

	Minimum	Maximum	*M*	*SD*	*N*
Predicted Value	26.04	48.94	35.64	4.38	96
SD Predicted Value	-2.19	3.04	.00	1.00	96
Standard Error of Predicted Value	.68	2.34	1.30	.33	96
Adjusted Predicted Value	26.99	49.12	35.66	4.38	96
Residual	-13.04	13.82	.00	5.77	96
SD Residual	-2.21	2.34	.00	.98	96
Stud. Residual	-2.29	2.36	-.00	1.00	96
Deleted Residual	-13.99	14.04	-.02	6.05	96
Stud. Deleted Residual	-2.35	2.43	.00	1.01	96
Mahal. Distance	.29	14.04	3.96	2.62	96
Cook's Distance	.00	.08	.01	.01	96
Centered Leverage Value	.00	.15	.04	.03	96

Note. a. Dependent Variable: Impulsive Eating

Assumption 8: Normality of Residuals

Research Question 1: The assumption of normality of the standardized residuals was not violated because the histogram was relatively normal. Therefore, the residuals may be assumed to be relatively normally distributed (see Figures 18 and 19).

Figure 18

Histogram of the Standardized Residuals – DC: Impulsive Eating

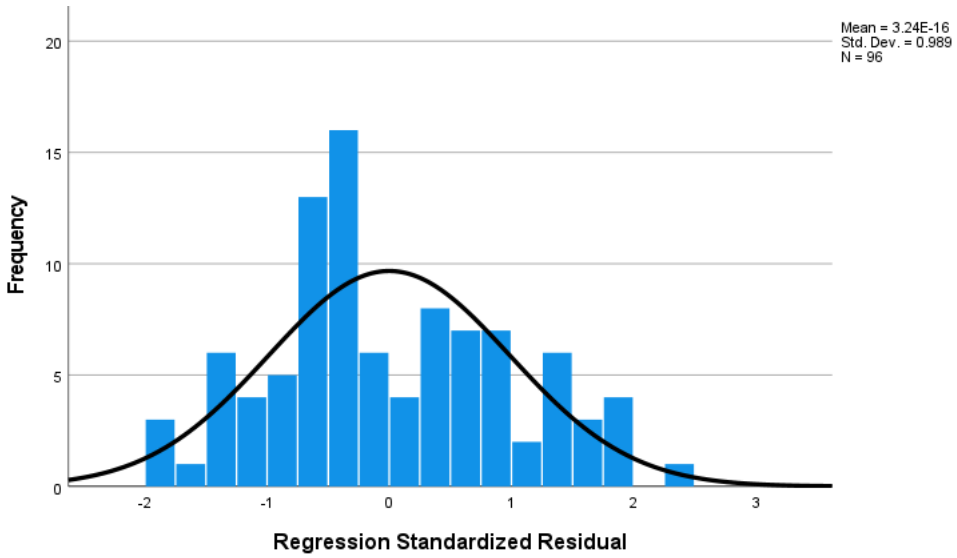
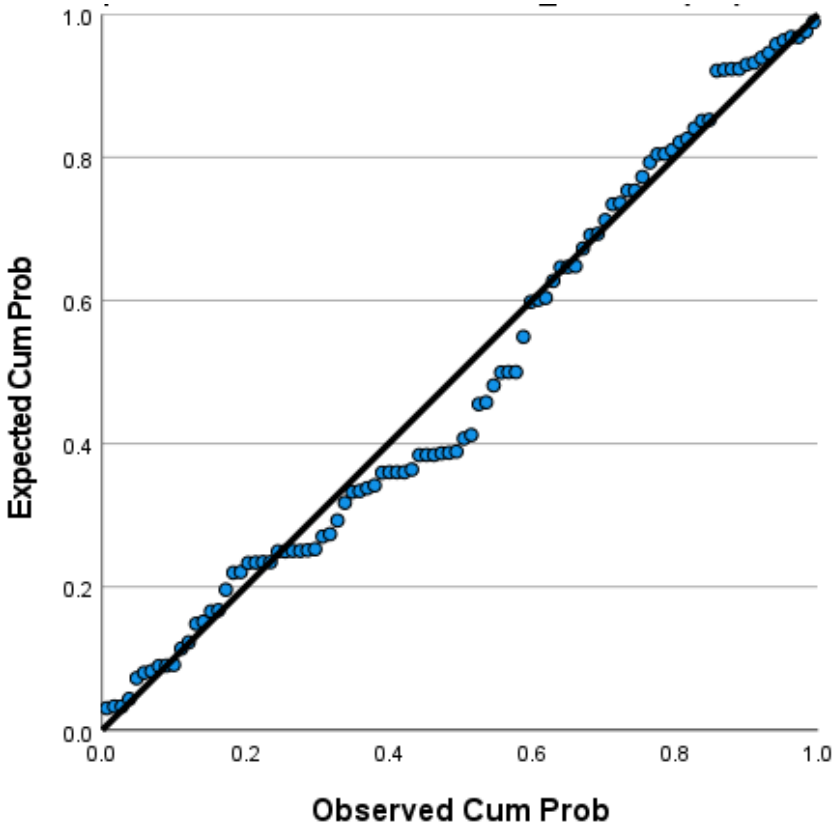


Figure 19

P-P Plot of Regression Standardized Residuals – DV: Impulsive Eating



Research Question 2: The assumption of normality of the standardized residua: ls was not violated because the histogram was normal (see Figures 20 and 21). Therefore, the residuals may be assumed to be normally distributed.

Figure 20

Histogram of the Standardized Residuals – DV: Emotional Eating

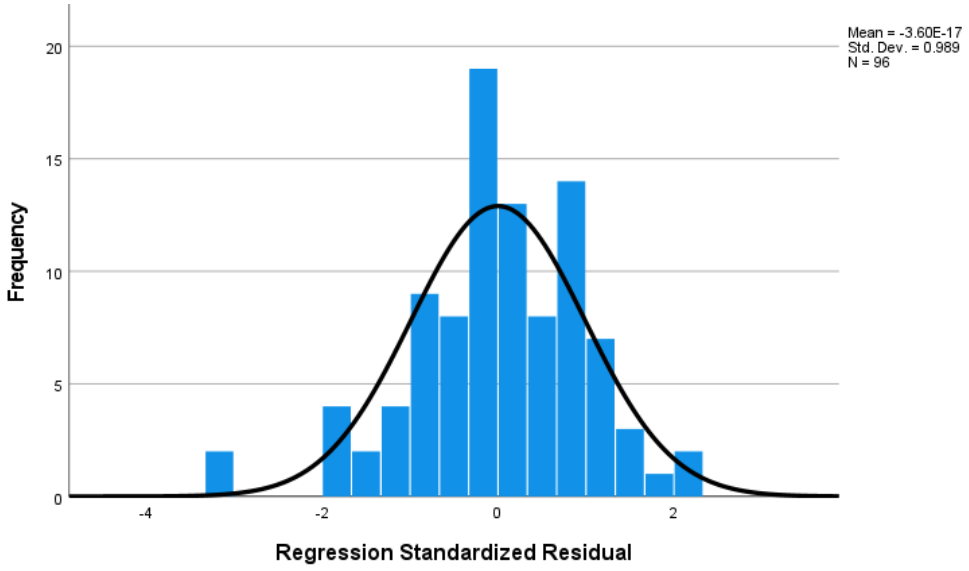
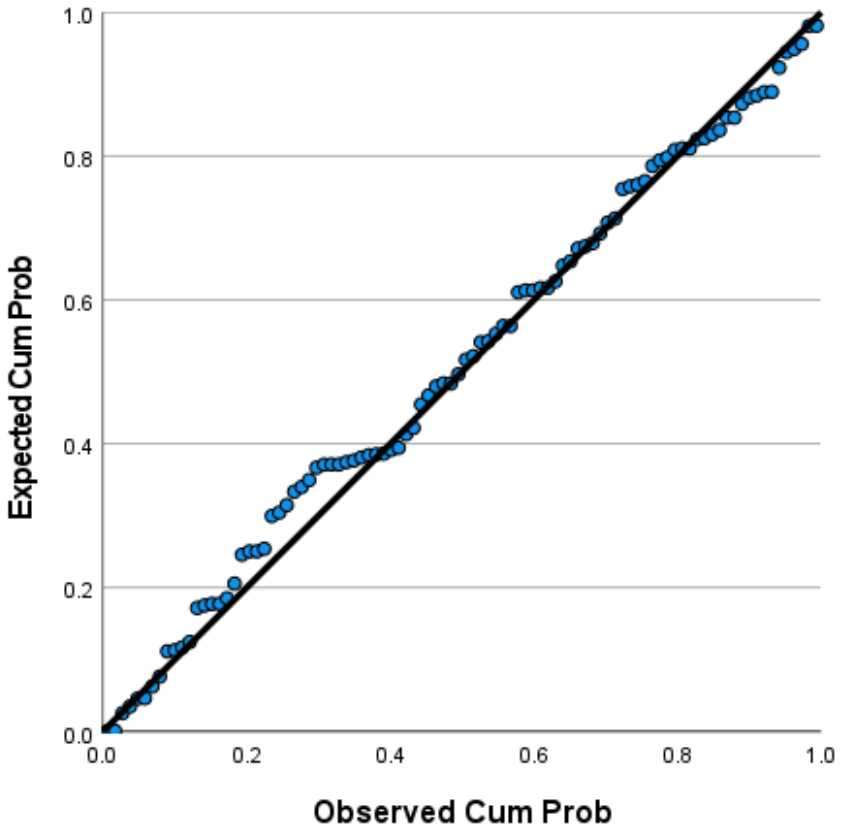


Figure 21

P-P Plot of Regression Standardized Residual – DV: Emotional Eating



Research Question 3: The assumption of normality (see Figures 22 and 23) of the standardized residuals was not violated because the histogram was normal. Therefore, the residuals may be assumed to be normally distributed.

Figure 22

Histogram of the Standardized Residuals – DV: Impulsive Eating

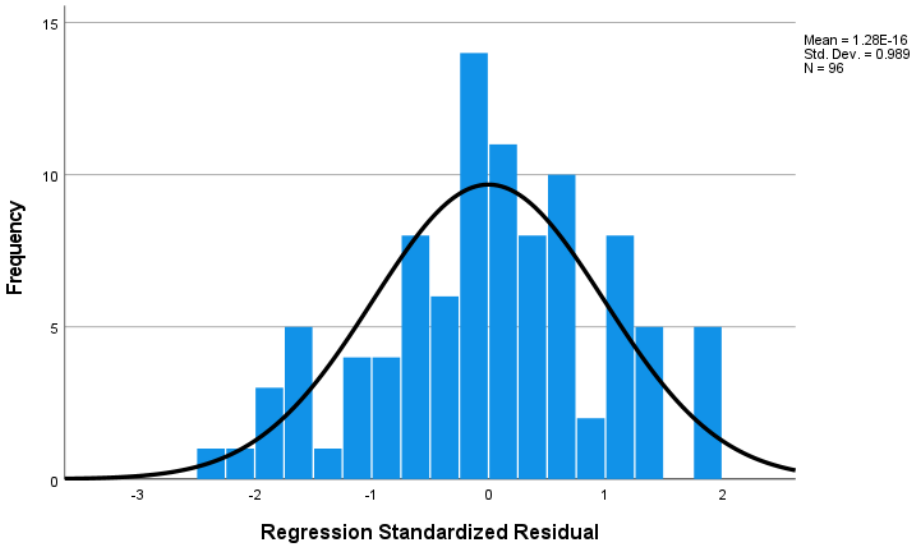
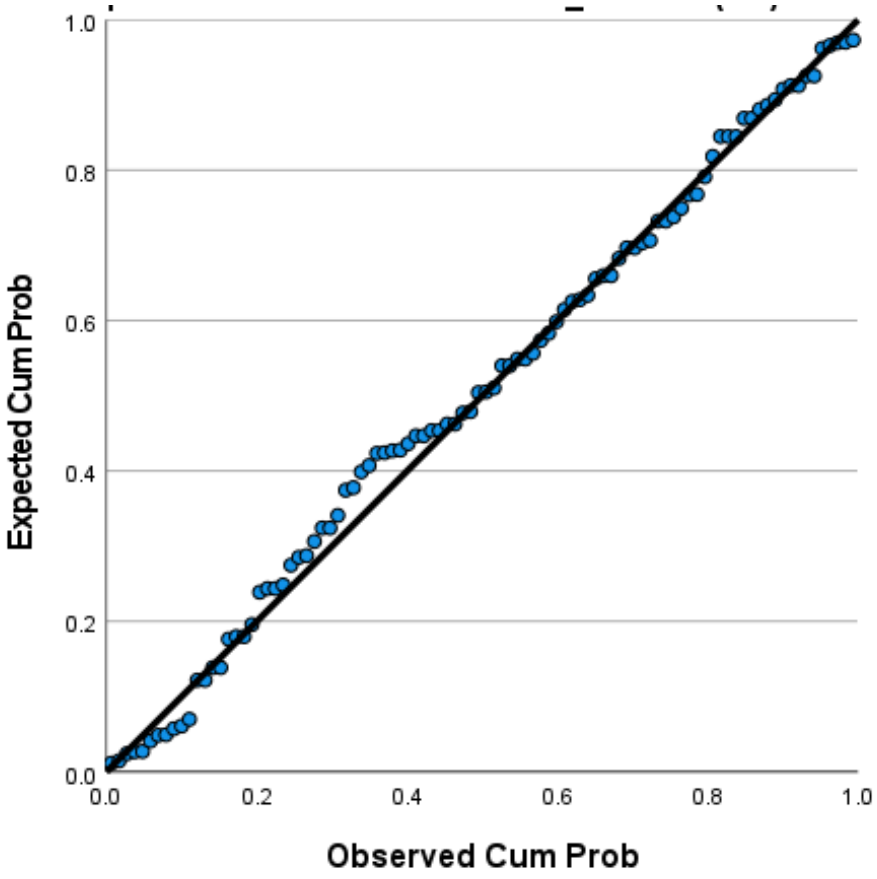


Figure 23

P-P Plot of Regression Standardized Residuals – DV: Impulsive Eating



Research Question 4: The assumption of normality (see Figure 24) of the standardized residuals was not violated because the histogram was relatively normal. Therefore, the residuals may be assumed to be relatively normally distributed (see Figure 25).

Figure 24

Histogram of the Standardized Residuals – DV: Emotional Eating

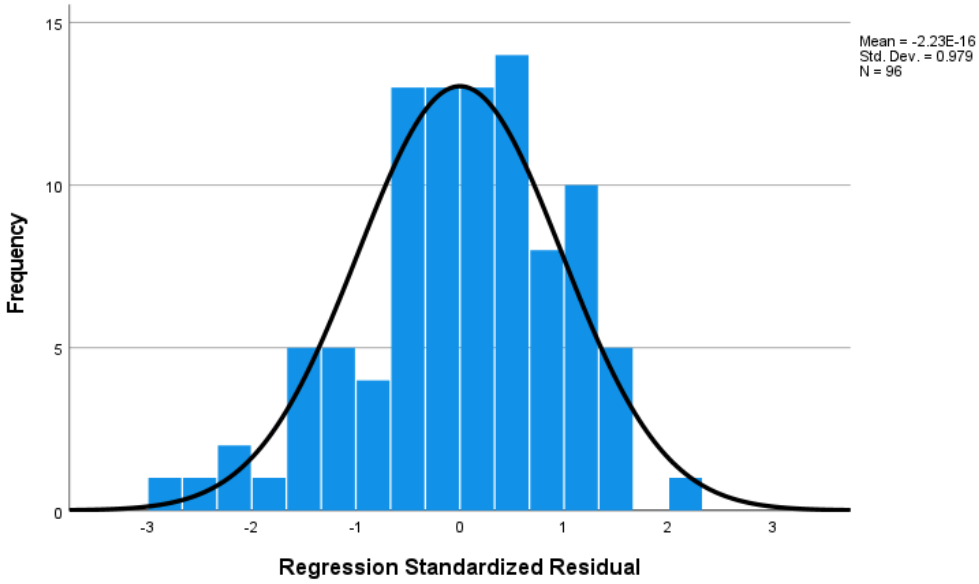
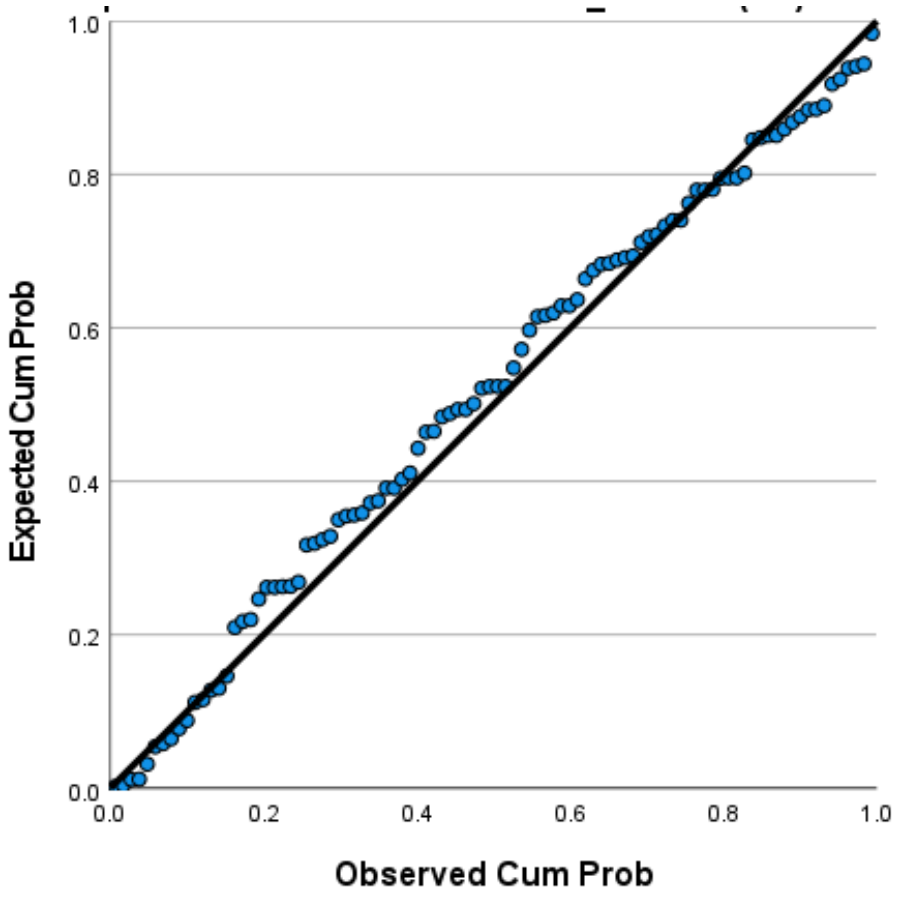


Figure 25

P-P Plot of Regression Standardized Residual – DV: Emotional Eating



Research Question 5: The assumption of normality (see Figures 26 and 27) of the standardized residuals was not violated because the histogram was normal. Therefore, the residuals may be assumed to be normally distributed.

Figure 26

Histogram of the Standardized Residuals – DV: Impulsive Eating

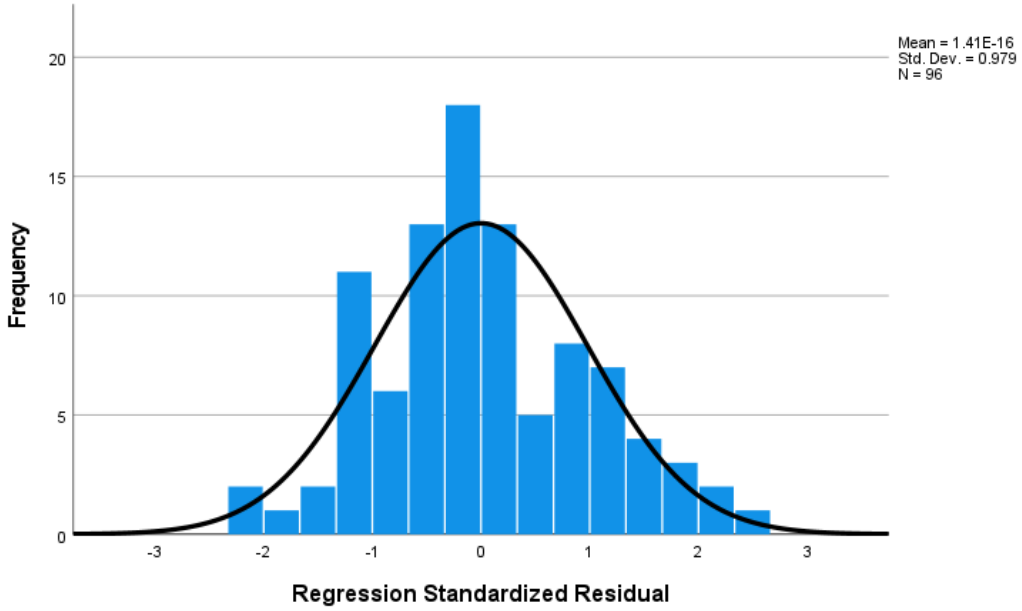
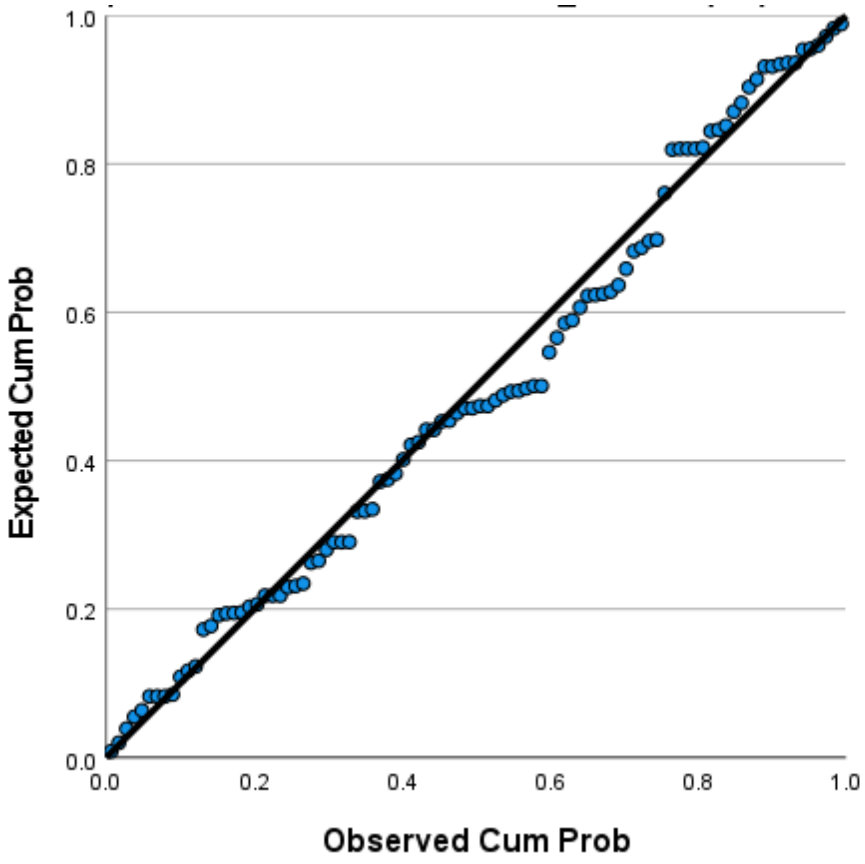


Figure 27

P-P Plot of Regression Standardized Residual – DV: Impulsive Eating



Multiple Linear Regression and Hayes Process Model One for Moderation Analysis

Multiple linear regressions are valuable to help us understand how several independent variables collectively influence a dependent variable (Frankfort-Nachmias & Leon-Guerrero, 2018). Within my analysis, I examined the *F*-values and associated *p*-values to assess the overall model's significance for each of the RQs. The *F*-value determines whether the overall regression model is statistically significant. The *p*-value associated with the *F*-statistic helped me assess the significance of the model. A small *p*-

value (typically below 0.05) suggests that the model is statistically significant, indicating that one or more predictors significantly impact the dependent variable (Frankfort-Nachmias & Leon-Guerrero, 2018).

I also examined the β (Beta) coefficients. The β-coefficients represent the strength and direction of the relationship between each independent variable and the dependent variable while controlling for the other variables in the model while informing how much the dependent variable is expected to change for a one-unit change in the independent variable, holding all other variables constant (Frankfort-Nachmias, & Leon-Guerrero, 2018).

In addition, I examined the R^2 to measure the proportion of variance in the dependent variable that can be explained by the independent variables included in the model. When it ranges from 0 to 1, with a higher R^2 it indicates a better fit of the model (Frankfort-Nachmias & Leon-Guerrero, 2018). *R*-squared helped me assess how well the predictors collectively explain the variation in the outcome variable (Frankfort-Nachmias & Leon-Guerrero, 2018).

To evaluate the magnitude of the relationships between the variables, I looked into the R^2 results. A larger R^2 indicated a more substantial effect size, which can be categorized as small, medium, or large based on established conventions within our field of study (Bakker et al., 2019). A small effect size occurs if R^2 is close to 0 (e.g., 0.01 or 1%) and suggests that the independent variable(s) explain only a small portion of the variance in the dependent variable (Bakker et al., 2019). This indicates a weak relationship. A medium effect size occurs if the R^2 value around 0.25 (25%) is often

considered a moderate effect size (Bakker et al., 2019). It suggests that the independent variable(s) explain a substantial portion of the variance. A large effect size occurs if the R^2 value is close to 1 (e.g., 0.90 or 90%), indicating that the independent variable(s) have a strong influence and explain most of the variance in the dependent variable (Bakker et al., 2019). A large effect size suggests a robust relationship. In the moderation analysis used in RQ1, RQ2, and RQ3, an increase in R^2 indicated that the relationship between predictors depends on other variables in the model (Bakker et al., 2019).

Research Question 1

To what extent does stress (moderator, variable) moderate the relationship between emotional eating (independent variable) and impulsive eating (dependent variable)?

Null Hypothesis ($H_0$1): Stress is not a significant moderator in the relationship between emotional eating and impulsive eating.

Alternative Hypothesis ($H_1$1): Stress is a significant moderator in the relationship between emotional eating and impulsive eating.

A multiple regression model with the predictors of stress and emotional eating, and the criterion variable of impulsive eating was run. The output showed that the regression model was statistically significant (see Table 27), $F(2,93) = 38.04$, $p = < .001$. Based on Bakker et al'. (2019) description of what is considered a small, moderate, and large effect sizes, the regression is considered to have a large effect size ($R^2 = 0.45$). In other words, approximately 45% of the variance in the dependent variable is explained by the independent variables in the regression model (Senter, 2008). Both predictor variables

were statistically significant (see Tables 28 and 29), with emotional eating being the stronger predictor ($\beta = .52$, $p < .00$), and stress coming in second ($\beta = .30$, $p < .00$). According to the SPSS Hayes Process (version 4.0) Stress was a statistically significant moderator between emotional eating and impulsive eating $F(1,92) = 6.7$, $p < .00$.

Table 27

Analysis of Variance (ANOVA) Summary for the Regression Model Predicting Impulsive Eating

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	2243.73	2	1121.87	38.04	<.00[b]
	Residual	2742.51	93	29.49		
	Total	4986.24	95			

Note. a. Dependent Variable: Impulsive Eating

b. Predictors: (Constant), Stress, Emotional Eating

Table 28

Model Summary for the Regression Model Predicting Impulsive Eating

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate
1	.67[a]	.45	.44	5.43

Note. a. Predictors: (Constant), Stress, Emotional Eating
b. Dependent Variable: Impulsive Eating

Table 29

Regression Coefficients for the Model Predicting Impulsive Eating

		1	2			
Model		*B*	SD Error	*Beta*	*t*	Sig.
1	(Constant)	13.75	2.70		5.10	< .00
	Emotional Eating	.34	.05	.52	6.57	< .00
	Stress	.67	.18	.30	3.73	< .00

Note. a. Dependent Variable: Impulsive Eating; 1 = Unstandardized Coefficient; 2 = Standardized Coefficient

Research Question 2

To what extent does emotional awareness (moderator) moderate the relationship between mindful attention (independent variable) and emotional eating (dependent variable)?

Null Hypothesis ($H_0$2): Emotional awareness is not a significant moderator in the relationship between mindful attention and emotional eating.

Alternative Hypothesis ($H_1$2): Emotional awareness is a significant moderator in the relationship between mindful attention and emotional eating.

A multiple regression model with the predictors of emotional awareness and mindful attention, and the criterion variable of emotional eating was run. The output (see Table 30) showed that the regression model was statistically significant, $F(2,93) = 46.31$, $p = < .00$ with a large effect size ($R2 = 0.50$), meaning that approximately 50% of the variance in the dependent variable is explained by the independent variables in the regression model. However, only emotional awareness was statistically significant ($\beta = .71$, $p < .00$), and mindful attention was not a statistically significant predictor of emotional eating ($\beta = - .01$, $p = .68$; see Tables 31 and 32). According to the SPSS Hayes Process (version 4.0), emotional awareness was not a significant moderator between mindful attention and emotional eating, $F(1,92) = .11$, $p = .75$.

Table 30

Analysis of Variance (ANOVA) Summary for the Regression Model Predicting Impulsive Eating

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	6084.63	2	3042.32	46.31	< .00[b]
	Residual	6109.37	93	65.69		
	Total	12194.00	95			

Note. a. Dependent Variable: Emotional Eating

b. Predictors: (Constant), Mindful Awareness, Emotional Awareness

Table 31

Model Summary for the Regression Model Predicting Emotional Eating

Model	*R*	R^2	Adjusted R^2	Std. Error of the Estimate
1	.71[a]	.50	.49	8.11

Note. a. Predictors: (Constant), Mindful Awareness, Emotional Awareness
b. Dependent Variable: Emotional Eating Subscale

Table 32

Regression Coefficients for the Model Predicting Emotional Eating

		1	2			
Model		*B*	Std. Error	*Beta*	*t*	Sig.
1	(Constant)	9.66	4.56		2.12	.04
	Emotion Awareness	1.08	.12	.71	9.32	< .00
	Mindful Awareness	-.07	16	-.03	-.41	.68

Note. a. Dependent Variable: Emotional Eating; 1 = Unstandardized Coefficient; 2 = Standardized Coefficient

Research Question 3

To what extent does inability to regulate emotion (moderator variable) moderates the relationship between mindful attention (independent variable) and impulsive eating (dependent variable)?

Null Hypothesis ($H_0$3): Inability to regulate emotion is not a significant moderator in the relationship between mindful attention and impulsive eating.

Alternative Hypothesis ($H_1$3): Inability to regulate emotion is a significant moderator in the relationship between mindful attention and impulsive eating.

A multiple regression model with the predictors of inability to regulate emotion (the higher the score means that the weaker is the person's ability to regulate emotion) and mindful attention, and the criterion variable of impulsive eating was run. The output showed that the regression was statistically significant (see Table 33), $F(2,93) = 19.29$, $p < .00$ with a large effect size ($R^2 = 0.29$), meaning that approximately 29% of the variance in the dependent variable is explained by the independent variables in the regression model (see Table 34). Both predictors were statistically significant (see Table 35) with inability to regulate emotion (i.e., emotion regulation) being the strongest predictor, ($\beta = .34$, $p < .00$) followed by Mindful Attention ($\beta = .25$, $p = .02$). According to the SPSS Hayes Process (version 4.0) emotion regulation was not a statistically significant moderator between mindful attention and impulsive eating, $F(1,92) = .73$, $p = .40$.

Table 33

Analysis of Variance (ANOVA) Summary for the Regression Model Predicting Impulsive Eating

Model		Sum of Squares	*df*	Mean Square	*F*	*Sig.*
1	Regression	1461.94	2	730.97	19.29	< .00[b]
	Residual	3524.30	93	37.90		
	Total	4986.24	95			

Note. a. Dependent Variable: Impulsive Eating

b. Predictors: (Constant), Emotion Regulation, Mindful Attention (Sum)

Table 34

Model Summary for the Regression Model Predicting Impulsive Eating

Model	*R*	R^2	Adjusted R^2	Std. Error of the Estimate
1	.54[a]	.29	.28	6.16

Note: a. Predictors: (Constant), Emotional Awareness, Mindful Attention
b. Dependent Variable: Impulsive Eating

Table 35

Regression Coefficients for the Model Predicting Impulsive Eating

		1	2		*t*	Sig.
Model		*B*	Std. Error	*Beta*		
1	(Constant)	20.84	3.09		6.70	<.00
	Mindful Attention	.35	.15	.25	2.27	.02
	Emotion regulation	.39	.13	.34	3.07	.00

Note. a. Dependent Variable: Impulsive Eating

Research Question 4

To what extent are mindful attention (predictor variable), impulsive eating (predictor), emotional awareness (predictor variable), emotional awareness, and disregard of future consequences (predictor variable) predictive of emotional eating (outcome variable)?

Null Hypothesis ($H_0$4): Mindful attention, impulsive eating, emotional awareness, and disregard of future consequences are not significant predictors of emotional eating.

Alternative Hypothesis ($H_1$4): Mindful attention, impulsive eating, emotional awareness, and disregard of future consequences are significant predictors of emotional eating.

I ran A multiple regression model with the predictors of mindful attention, impulsive eating, emotional awareness, and disregard of future consequences with the outcome variable of emotional eating. The output showed that the regression was statistically significant (see Tables 36 and 37), $F(4,91) = 45.13$, $p < .001$ with a large effect size ($R^2 = 0.66$), meaning that approximately 66% of the variance in the dependent variable is explained by the independent variables in the regression model. All predictors were statistically significant (see Table 38), except for mindful attention ($\beta = -.06$, $p = .44$). The strongest predictor was emotional awareness ($\beta = .64$, $p < .00$), followed by impulsive eating ($\beta = .39$, $p < .00$), and disregard for future consequences ($\beta = -.23$, $p = .00$).

Table 36

Analysis of Variance (ANOVA) Summary for the Regression Model Predicting Impulsive Eating

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	8106.91	4	2026.73	45.13	< .00[b]
	Residual	4087.08	91	44.91		
	Total	12194.00	95			

Note. a. Dependent Variable: Emotional Eating

b. Predictors: (Constant), Disregard, Impulsive Eating, Emotional Awareness, Mindful Attention

Table 37

Model Summary for the Regression Model Predicting Emotional Eating

Model	*R*	R^2	Adjusted R^2	Std. Error of the Estimate
1	.81[a]	.66	.65	6.70

Note. a. Predictors: (Constant), Disregard, Impulsive Eating, Emotion Awareness, Mindful Attention

b. Dependent Variable: Emotional Eating

Table 38

Regression Coefficients for the Model Predicting Emotional Eating

		1	2			
Model		*B*	St. Error	*Beta*	*t*	Sig.
1	(Constant)	2.01	4.12		.49	.63
	Mindful Attention	-.14	.18	-.06	-.78	.44
	Impulsive Eating	.60	.12	.39	5.02	.00
	Emotion Awareness	.97	.11	.64	8.74	.00
	Disregard	-.71	.24	-.23	-2.91	.00

Note. a. Dependent Variable: Emotional Eating

Research Question 5

To what extend do anxiety (predictor variable), Stress (predictor variable), mindful attention (predictor variable), and disregard of future consequences (predictor) predict impulsive eating (outcome variable)?

Null Hypothesis ($H_0$5): Anxiety, stress, mindful attention, and disregard of future consequences are not significant predictors of impulsive eating.

Alternative Hypothesis ($H_1$5): Anxiety, stress, mindful attention, and disregard of future consequences are significant predictors of impulsive eating.

A multiple regression model with the predictors of anxiety, stress, mindful attention, and disregard for future consequences with the outcome variable of impulsive eating was run. The output showed that the regression was statistically significant (see Tables 39 and 40), $F(4,91) = 13.11$, $p < .00$ with a large effect size ($R^2 = 0.37$), meaning that approximately 37% of the variance in the dependent variable is explained by the independent variables in the regression model. All of predictors were statistically

significant (see Table 41). The strongest predictor (see Table 41) was mindful attention (β = .33, p = .00), followed by anxiety (β = .27, p = .01), stress (β =. 25, p = .01), and disregard of future consequences (β = -.20, p = .05).

Table 39

Analysis of Variance (ANOVA) Summary for the Regression Model Predicting Impulsive Eating

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	1822.66	4	455.66	13.11	< .00[b]
	Residual	3163.58	91	34.76		
	Total	4986.24	95			

Note. a. Dependent Variable: Impulsive Eating
b. Predictors: (Constant), Disregard, Anxiety, Stress, Mindful Attention

Table 40

Model Summary for the Regression Model Predicting Impulsive Eating

Model	*R*	R^2	Adjusted R^2	Std. Error of the Estimate
1	.60[a]	.37	.34	5.90

Note. a. Predictors: (Constant), Disregard, Anxiety, Stress, Mindful Attention
b. Dependent Variable: Impulsive Eating

Table 41

Regression Coefficients for the Model Predicting Impulsive Eating

		1	2			
Model		*B*	Std. Error	*Beta*	*t*	Sig.
1	(Constant)	13.17	3.42		3.85	.00
	Anxiety	.84	.30	.27	2.77	.01
	Stress	.57	.23	.25	2.47	.01
	Mindful Attention	.46	.15	.33	3.0	.00
	Disregard	-.40	.20	-.20	-1.99	.05

Note. a. Dependent Variable: Impulsive Eating

Summary

Research Question 1

The first hypothesis posited that stress would be a significant moderator in the relationship between emotional eating and impulsive eating. A multiple regression model was run to investigate this hypothesis, using stress and emotional eating as predictors, with impulsive eating as the criterion variable. The analysis results indicated statistical significance (as presented in Table 27), with the regression model achieving a significant *F*-statistic [$F(2, 93) = 38.04$, $p < .00$] and demonstrating a large effect size ($R^2 = 0.45$). In other words, approximately 45% of the variance in the dependent variable is explained by the independent variables in the regression model. What this means for this study is that roughly 45% of the reasons behind why someone emotionally eats have been attributed to stress and impulsive eating. However, there is still about 55% that the regression model did not explain. Individuals might be engaging in emotional eating

behaviors due to factors not considered in our regression model or because the situation is more complicated than we predicted. So, while the model has been valid, there is more to explore to understand the situation entirely.

Both predictor variables were statistically significant (see Tables 28 and 29), with emotional eating emerging as the stronger predictor ($\beta = 0.52$, $p < .00$) and stress following as the second significant predictor ($\beta = 0.30$, $p < .00$). Employing the SPSS Hayes Process (version 4.0) to examine moderation, I found that stress indeed functioned as a statistically significant moderator in the relationship between emotional eating and impulsive eating [$F(1,92) = .671$, $p = .01$]. The results support the first hypothesis, suggesting that stress significantly moderates the relationship between emotional eating and impulsive eating. The analysis indicates that stress is essential in influencing the strength and nature of this relationship, highlighting the complexity of the interplay between these variables.

Research Question 2

The second hypothesis suggested that emotional awareness would be a significant moderator in the relationship between mindful attention and emotional eating. A multiple regression model was formulated to investigate this hypothesis, incorporating Emotional awareness and mindful attention as predictors, with emotional eating as the criterion variable. The results of the analysis indicated statistical significance (as shown in Table 30), with the regression model achieving a noteworthy F-statistic [$F(2, 93) = 46.31$, $p < .00$] and revealing a large effect size ($R^2 = 0.50$). In other words, approximately 50% of the variance in the dependent variable is explained by the independent variables in the

regression model. In essence, the model has successfully explained half of the reasons or factors influencing how emotional awareness and mindful attention are related to emotional eating behavior. However, around 50% of the variability remains unexplained, which could be due to factors not considered in the model or complexities in the phenomenon itself. In summary, while the model has shed light on a significant portion of the issue, there is more to uncover and explore to gain a complete understanding.

Notably, emotional awareness emerged as the sole statistically significant predictor ($\beta = 0.71$, $p < .00$), while mindful attention did not show statistical significance as a predictor of emotional eating ($\beta = -.031$, $p = 0.68$; see Tables 31 and 32). However, employing the SPSS Hayes Process (version 4.0) to examine moderation, it was found that emotional awareness did not function as a significant moderator in the relationship between mindful attention and emotional eating [$F(1, 92) = 0.11$, $p = 0.75$]. In summary, while emotional awareness strongly influences emotional eating in this context, the results do not support hypothesis two, suggesting that emotional awareness does not serve as a significant moderator in the relationship between mindful attention and emotional eating in this particular analysis.

Research Question 3

The third hypothesis proposed that the inability to regulate emotion (i.e., emotion regulation;) be a significant moderator in the relationship between mindful attention and impulsive eating. It is important to note that emotion regulation was negatively measured, meaning that higher scores indicate the weaker the person's ability to regulate emotion. A multiple regression model was constructed to explore this hypothesis, incorporating the

predictors of inability to regulate emotion (i.e., emotion regulation) and mindful attention, with impulsive eating as the criterion variable. The analysis results demonstrated statistical significance (see Table 33), as evidenced by the *F*-statistic [$F(2, 93) = 19.29$, $p < .00$], indicating a large effect size ($R^2 = 0.29$). In other words, approximately 29% of the variance in the dependent variable is explained by the independent variables in the regression model (see Table 33). In simpler terms, this statement conveys that approximately 29% of the variability in the dependent variable (i.e., impulsive eating) has been explained or accounted for by the independent variables (i.e., emotion regulation and mindful attention) integrated into the regression model. In essence, the model has successfully shed light on nearly one-third of the factors or reasons for how much emotion regulation and mindful attention play a role in impulsive eating. However, it is essential to note that approximately 71% of the variability remains unexplained. In summary, while the model has provided insights into a substantial portion of the issue, a significant part of the reason why individuals engage in impulsive eating remains unexplained.

Both predictors exhibited statistical significance (see Table 34), with emotion regulation emerging as the most influential predictor ($\beta = 0.34$, $p < .00$), followed by mindful attention ($\beta = 0.25$, $p = 0.02$). These results suggest that the inability to regulate emotion (i.e., emotion regulation) and mindful attention contribute significantly to predicting impulsive eating. However, employing the SPSS Hayes Process (version 4.0) to test for moderation, it was found that the inability to regulate emotion (i.e., emotion regulation) did not serve as a statistically significant moderator in the relationship

between mindful attention and impulsive eating [$F(1, 92) = 0.73$, $p = 0.40$]. In summary, while both inability to regulate emotion (i.e., emotion regulation) and mindful attention independently play a role in predicting impulsive eating, the results do not support hypothesis three, indicating that the inability to regulate emotion (emotion regulation) does not significantly moderate the relationship between mindful attention and impulsive eating in this context.

Research Question 4

The fourth hypothesis posited that mindful attention, impulsive eating, emotional awareness, and disregard for future consequences would be significant predictors of emotional eating. A multiple regression model was constructed to test this hypothesis, utilizing mindful attention, impulsive eating, emotional awareness, and disregard of future consequences as predictors, and emotional eating as the outcome variable.

The analysis results, as presented in Tables 34 and 35, demonstrated statistical significance. The F-statistic revealed a significant regression model, $F(4, 91) = 45.13$, $p < .00$, with a large effect size, as indicated by an R^2 value of 0.66. In other words, approximately 66% of the variance in the dependent variable is explained by the independent variables in the regression model. This statement means that approximately 66% of the variability in emotional eating has been accounted for or understood by including mindful attention, impulsive eating, emotional awareness, and disregard of future consequences within the regression model. Essentially, the model has successfully explained about two-thirds of the factors or reasons (i.e., mindful attention, impulsive eating, emotional awareness, and disregard for future consequences) that influence

emotional eating. Nevertheless, it is essential to recognize that roughly 34% of the variability remains unexplained. This unexplained portion may stem from factors not considered within the model or complexities inherent in the phenomenon. In summary, while the model has provided substantial insights into the issue, a significant part of the variability remains unexplored and necessitates further investigation.

Upon examining the individual predictors (see Table 36), it was found that all predictors, except for mindful attention (β = -0.05, p = .44), exhibited statistically significant relationships with emotional eating. Emotional awareness emerged as the most potent predictor (β = 0.64, p < .00), followed by impulsive eating (β = 0.39, p < .00) and disregard for future consequences (β = -0.23, p = .00). These findings strongly support hypothesis four, suggesting that emotional awareness, impulsive eating, and disregard for future consequences are significant predictors of emotional eating. Although mindful attention did not exhibit statistical significance in this context, the model explained 66% of the variance in emotional eating, with emotional awareness demonstrating the most robust predictive capability.

Research Question 5

The fifth and final hypothesis posited that anxiety, stress, mindful attention, and disregard for future consequences would be significant predictors of impulsive eating. A multiple regression model was constructed to investigate this, utilizing anxiety, stress, mindful attention, and disregard for future consequences as predictors, and impulsive eating as the outcome variable. The analysis results demonstrated statistical significance, as depicted in Tables 37 and 38. The *F*-statistic revealed a statistically significant

regression model, $F(4, 91) = 13.11$, $p < .001$, with a large effect size, as indicated by an R^2 value of 0.37. In other words, approximately 37% of the variance in the dependent variable is explained by the independent variables in the regression model, meaning, roughly 37% of the variability observed in the dependent variable (i.e., impulsive eating) has been explained or accounted for by the independent variables (i.e., anxiety, stress, mindful attention, and disregard for future consequences) integrated into the regression model. In practical terms, the model has accounted for nearly 37% of the factors or reasons contributing to how impulsive eating is associated with anxiety, stress, mindful attention, and disregard for future consequences. Nonetheless, it is important to acknowledge that approximately 63% of the variability remains unexplained. This unexplained portion may arise from factors not considered within the model or complexities inherent to the phenomenon.

Examining the individual predictors (see Table 39), it was found that all of them exhibited statistical significance. Mindful attention emerged as the strongest predictor ($\beta = 0.33$, $p = .00$), followed by anxiety ($\beta = 0.27$, $p = .01$), stress ($\beta = 0.25$, $p = .01$), and disregard for future consequences ($\beta = -0.25$, $p = .05$). These findings support hypothesis five, suggesting that anxiety, stress, mindful attention, and disregard for future consequences collectively play a significant role in predicting impulsive eating behavior among the study participants. The model accounted for 37% of the variance in impulsive eating, with mindful attention demonstrating the most robust predictive capability.

In the following chapter, I will delve into a comprehensive discussion of the interpretation of the results within the context of the BPSM framework, describe the

limitations of the findings, and address recommendations for future researchers. In addition, I will describe the potential impact of this study's findings on social change. Chapter 5 will conclude with the key elements that emerged from this research.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

In the preceding chapters, I comprehensively explored the intricate relationships among emotional eating, stress, anxiety, disregard for future consequences, emotion regulation, impulsive eating, mindful attention, and emotional awareness. The main objective of this study was to deepen the understanding of the underlying factors contributing to emotional and impulsive eating behavior patterns. I addressed the concerns surrounding the issue of obesity by shedding light on the biopsychosocial facets of emotional and impulsive eating, which, in turn, offer information for the development of more nuanced interventions of emotional and impulsive eating.

This study revealed significant insights into the complex interactions among emotional eating, stress, anxiety, disregard for future consequences, emotion regulation, impulsive eating, mindful attention, and emotional awareness. These findings, based on robust data and thorough analyses, offer essential understanding of the intricate relationships between these variables. Notably, stress was found to moderate the relationship between emotional and impulsive eating, underscoring its influential role. Emotional awareness emerged as a predictor of emotional eating, while mindful attention was a strong predictor of impulsive eating. Additionally, factors such as disregard for future consequences, anxiety, and stress played significant roles in predicting emotional and impulsive eating behaviors.

Summary of Findings

Throughout this study, I uncovered critical insights into the complex relationships among emotional eating, stress, anxiety, disregard for future consequences, emotion regulation, impulsive eating, mindful attention, and emotional awareness. The findings, rooted in robust data and comprehensive analyses, provide essential insights into the intricate interplay between the variables examined. These insights carry significant implications for both research and practical applications. The following is a summary of the main findings.

Emotional Eating and Impulsive Eating (Research Question 1)

Stress significantly moderated the relationship between emotional eating and impulsive eating. This indicates that stress plays a pivotal role in influencing the strength and nature of the link between emotional eating and impulsive eating behaviors.

Emotional Awareness and Mindful Attention (Research Question 2)

Emotional awareness was identified as a significant predictor of emotional eating. However, contrary to the hypothesis, emotional awareness was not a significant moderator in the relationship between mindful attention and emotional eating.

Mindful Attention and Impulsive Eating (Research Question 3)

The inability to regulate emotion (emotion regulation) and mindful attention were significant predictors of impulsive eating. However, the inability to regulate emotion did not significantly moderate the relationship between mindful attention and impulsive eating.

Predictors of Emotional Eating (Research Question 4)

Emotional awareness, impulsive eating, and disregard for future consequences emerged as significant predictors of emotional eating. These factors collectively played a crucial role in explaining emotional eating behavior, shedding light on why individuals engage in this behavior.

Predictors of Impulsive Eating (Research Question 5)

Anxiety, stress, mindful attention, and disregard for future consequences were significant predictors of impulsive eating. Mindful attention was the strongest predictor in this context, highlighting its role in impulsive eating behavior.

The findings offer valuable insights into the nuanced relationships between these variables, contributing to the understanding of emotional and impulsive eating patterns. In the following sections, I will discuss these findings within the context of the BPSM, explore the study's limitations, and provide recommendations for future research. Additionally, I will examine the potential societal impact of these findings.

Interpretation of Findings

In research question 1, wanted to understand if stress significantly affects how emotional eating and impulsive eating are connected. My analyses showed that stress significantly impacts the relationship between emotional and impulsive eating. When people are stressed, it affects how much they emotionally eat and engage in impulsive eating. The statistical tests also confirmed that emotional eating is a stronger predictor than stress. This means that emotional eating significantly influences impulsive eating

behavior more than stress and suggests that stress does play a significant role in the connection between emotional eating and impulsive eating.

The second hypothesis, related to research question 2, I explored whether awareness of emotions plays a role in how mindful attention affects emotional eating habits. Emotional awareness was an essential factor in why people eat emotionally. The results suggested that people who are more in touch with their emotions tend to engage in emotional eating. This is likely because they know when they are experiencing negative or uncomfortable emotions and engage in emotional eating to reduce physiological expressions of that emotional discomfort (e.g., rapid heart rate, sweaty hands, rapid breathing). However, mindful attention, which is the ability to stay focused on the present moment, did not seem to impact emotional eating behavior in this analysis significantly. Consequently, emotional awareness did not moderate the relationship between mindful attention and emotional eating, meaning it did not change the relationship between these two factors because no significant relationship was found between mindful attention and emotional eating.

With research question 3, I investigated the role of emotion regulation and mindful attention in impulsive eating. Both factors emerged as significant predictors of impulsive eating behavior. Emotion regulation, measured negatively (higher scores indicating weaker ability to regulate emotion), stood out as the most influential predictor, emphasizing its role in impulsive eating tendencies. Mindful attention also exhibited significance, indicating its impact on impulsive eating. However, contrary to the alternate hypothesis, it was found that the inability to regulate emotion (emotion regulation) did

not significantly moderate the relationship between mindful attention and impulsive eating. While the inability to regulate emotion and mindful attention independently play roles in predicting impulsive eating, they do not interact significantly in this context. Perhaps impulsive eating is not influenced by emotion regulation because the behavior is not employed to reduce unwanted emotions but to create pleasant ones derived from tasty and comforting food. Mindful attention in this context might be serving as a reminder that the food being exposed in a specific moment (e.g., a box of donuts available at the work's break room) has promoted good experiences and memories in the past, and having the urge to eat it is more related to habit and conditioning than to use food as a coping mechanism to regulate emotion.

The fourth hypothesis, related to research question 4, I explored mindful attention, impulsive eating, emotional awareness, and disregard for future consequences and identifying which factor was the stronger predictor of emotional eating. These factors collectively played a crucial role in explaining emotional eating behavior. When examining each factor individually, it became evident that they did not carry the same weight. Emotional awareness emerged as the most influential factor, indicating that being attuned to one's emotions significantly drives emotional eating. Impulsive eating also exerted a notable impact, highlighting the role of impulsive tendencies in emotional eating behavior.

Conversely, disregard for future consequences displayed a negative relationship while contributing to understanding emotional eating. This suggests that individuals less concerned about the future consequences of their actions may be more likely to engage in

emotional eating. In contrast, mindful attention did not significantly impact emotional eating in this context. This implies that being mindful and attentive to the present moment may not strongly predict emotional eating behavior.

Lastly, in research question 5, I explored the significance of anxiety, stress, mindful attention, and disregard for future consequences as predictors of impulsive eating. These factors collectively emerged as significant contributors to understanding impulsive eating behavior. Mindful attention was the strongest predictor of impulsive eating behavior among these predictors. Anxiety and stress also exhibited notable impacts, emphasizing the connection between emotional states and impulsive eating tendencies. Conversely, disregard for future consequences, while contributing to the understanding of impulsive eating, displayed a negative relationship. This suggests that individuals less concerned about the future consequences of their actions may be more likely to engage in impulsive eating. These findings provide valuable insights into the factors influencing impulsive eating. Mindful attention, anxiety, and stress collectively play significant roles, highlighting the intricate nature of impulsive eating behaviors.

Strongest Predictors and Moderators

For impulsive eating, the stronger predictor was mindful attention. Individuals with high levels of mindful attention were more likely to engage in impulsive eating. This suggests that awareness of the present moment may trigger impulsive eating behaviors.

Anxiety and stress also played significant roles in predicting impulsive eating. Individuals experiencing higher anxiety and stress levels were more prone to impulsive eating. This implies that emotional states, particularly anxiety and stress, contribute to

impulsive eating tendencies. Moreover, stress was identified as the stronger moderator, indicating that stress influences the relationship between emotional eating and impulsive eating. When individuals experience stress, the link between emotional eating and impulsive eating becomes more pronounced, highlighting the role of stress in shaping this relationship.

Disregard for future consequences, though a predictor of impulsive and emotional eating, displayed a negative relationship with both DVs. People less concerned about the future consequences of their actions were more likely to engage in impulsive eating. This indicates that less future-oriented individuals may be more inclined to act impulsively when eating. For emotional eating, emotional awareness was the most influential predictor. People more in touch with their emotions tended to engage in emotional eating, likely because they used food to cope with emotional discomfort. Impulsive eating was also a significant predictor of emotional eating. Individuals with higher impulsive eating tendencies were more likely to engage in emotional eating. Regarding emotional eating, individuals who were less concerned about future consequences were less likely to engage in emotional eating. This suggests that less future-oriented individuals may not use emotional eating as a coping mechanism.

Individual Variables' Effect on Impulsive Eating and Emotional Eating

Emotional Awareness

Emotional awareness pertains to an individual's capacity to recognize, comprehend, and appropriately respond to emotions (Verrier & Day, 2022; Baer et al., 2018). Aligned with Lattimore's (2019) findings that when emotional awareness is low,

individuals might struggle to differentiate between emotional and physical hunger, making them more prone to emotional eating, the results of this study supported their results. My findings showed a negative relationship between emotional awareness and impulsive and emotional eating. Lower emotional awareness was associated with higher instances of these behaviors. This finding highlights the importance of enhancing emotional awareness in interventions to reduce impulsive and emotional eating. Individuals with limited emotional awareness may engage in these behaviors more frequently, possibly to cope with their emotions. Therefore, in support of Vander Wal et al. (2020), who argued that emotional awareness is a necessary skill to tolerate and regulate emotions, findings in this study support the idea that focusing on strategies that improve emotional awareness can be crucial in reducing these eating behaviors.

Emotion Regulation

Emotion regulation refers to an individual's ability to effectively manage and control their emotional responses (Andrei et al., 2018; Annesi, 2018). Maier et al. (2021) investigated the relationship between cognitive control, neural connectivity, and emotion regulation in individuals with low and high impulsivity. Their results clearly distinguish between how individuals respond to negative vs. positive emotions concerning impulsivity and that high cognitive control individuals show implicit capabilities to regulate their emotions. In contrast, those with low cognitive control needed external instructions to regulate emotion regulation explicitly.

Findings in this study support Maier et al.'s (2021) findings, as they indicated that those with poor emotion regulation skills tend to engage in impulsive and emotional

eating behaviors more frequently. These findings emphasize that interventions enhancing emotion regulation skills may reduce impulsive and emotional eating. By helping individuals develop healthier ways to cope with their emotions, they may be less inclined to resort to impulsive or emotional eating as a means of emotional regulation.

Mindful Attention

As defined by Verrier and Day (2022), mindful attention represents a heightened state of awareness marked by a nonjudgmental, present-centered focus. This concept primarily revolves around the ability to be fully engaged in the current moment. In the context of impulsive and emotional eating, mindful attention displayed a nuanced relationship. While the results in this study partially aligned with those of Kennedy et al. (2018), who consistently found a negative association between mindful attention and emotional eating, my findings revealed a more intricate scenario. Specifically, the data suggested a negative correlation between mindful attention and impulsive eating. This implies that individuals reporting greater mindful attention tend to exhibit fewer impulsive eating behaviors. This insight underscores the potential of mindful attention in assisting individuals in effectively managing their impulses and opting for more adaptive coping mechanisms to curtail impulsive eating.

Conversely, the study indicated that mindful attention did not significantly impact emotional eating, implying that its influence on this behavior may be relatively limited. It is worth noting that Kennedy et al. (2018) did not differentiate between impulsive eating and emotional eating, whereas I distinctly delineated the differences in this study. This differentiation allowed for a more nuanced examination of responses to emotional and

impulsive eating that had not been comprehensively explored. These findings, therefore, highlight the intricate interplay between mindful attention, impulsive eating, and emotional eating, particularly in the context of the Biopsychosocial Model. For future research endeavors, a more detailed investigation of these relationships could provide valuable insights into the multifaceted nature of these eating behaviors.

Stress

Stress, which is the body's response to challenging situations or demands (Lim et al., 2021), displayed a positive relationship with both impulsive eating and emotional eating. As stress levels increased, the likelihood of engaging in these eating behaviors also increased. Stress emerged as a significant factor contributing to both impulsive and emotional eating, highlighting the need for stress management strategies in addressing these behaviors. This connection underscores the importance of considering the psychological aspects (e.g., stress management) when addressing impulsive and emotional eating. The findings in this study support the findings of Lim et al. (2021), who found that the interaction between anxiety and stress significantly negatively affected cognitive restraint. In the context of this study, Lim et al.'s (2021) findings emphasize the importance of recognizing the interaction between high anxiety and stress as a potential risk factor for individuals to engage in emotional and impulsive eating behaviors.

The findings in this study also support Blyderveen et al. (2016) results, where they found that impulsivity moderates stress and eating behavior (Blyderveen et al., 2016). The current study found that stress significantly moderates impulsive eating and

emotional eating. In other words, stress plays a significant role in the connection between emotional eating and impulsive eating.

Anxiety

Anxiety, characterized by excessive worry or fear (Lim et al., 2021), demonstrated a positive relationship between impulsive and emotional eating. Higher anxiety levels were associated with higher engagement in both behaviors. Anxiety played a significant role in promoting both impulsive and emotional eating behaviors. As such, anxiety management may be critical in interventions targeting these behaviors. Reducing anxiety could help individuals control their impulsive and emotional eating tendencies.

Disregard for Future Consequences

Disregard for future consequences is the tendency to prioritize immediate gratification over long-term outcomes (Macaskill et al., 2019). The findings in this study support Bernard et al. (2018) argument that high impulsivity might impair inhibitory control, leading to impulsive eating. My findings also supported Pozolotina and Olsen's (2019) research on considerations of immediate and future consequences and their findings that individuals who scored higher in considerations of future consequences were associated with healthier behaviors. Findings in the current study showed that high disregard for future consequences exhibited a positive relationship with impulsive eating. Those who exhibited this trait were more likely to engage in impulsive eating. However, it also showed a negative relationship with emotional eating. Those who prioritized immediate gratification were less likely to engage in emotional eating. This intriguing finding suggests a complex relationship between these behaviors. It highlights that

individuals who value immediate rewards more might engage in less emotional eating, possibly due to consuming smaller portions or lower-calorie foods. However, they are more prone to impulsive eating, emphasizing the role of disregard for future consequences in promoting this behavior.

The findings in this study support my previous argument that impulsivity often involves impaired cognitive functions, causing individuals to discount the consequences of their actions. In the context of eating or emotional eating, this disregard for future consequences might contribute to a preference for immediate gratification over considering the potential consequences, such as weight gain and adverse health outcomes, ultimately leading to a vicious cycle of impulsive or emotional eating patterns.

Table 42 provides a comprehensive delineation of the intricate interplay between predictor and moderator variables (i.e., mindful attention, emotional awareness, emotion regulation, stress, anxiety, disregard for future consequences) concerning the DVs (i.e., emotional eating and impulsive eating) as well as the implications of the findings.

Table 42

Relationships Between Study Variables and Impulsive and Emotional Eating Behavior with Implications

Variable	Impulsive Eating	Emotional Eating	Importance and Implications
Emotional Eating	Positive relationship - As emotional eating increases, impulsive eating also increases.		This finding confirms that both impulsive and emotional eating are interlinked and often co-occur, highlighting the complexity of these behaviors. Addressing emotional eating is essential when dealing with impulsive eating.
Impulsive Eating		Strong positive relationship - Impulsive eating is highly associated with emotional eating behavior.	The strong relationship between impulsive and emotional eating emphasizes that both behaviors often reinforce each other. Interventions targeting one may impact the other.
Stress	Positive relationship - As stress increases, impulsive eating increases.	Positive relationship - Stress is associated with higher levels of emotional eating.	Stress plays a significant role in promoting both impulsive and emotional eating, highlighting the need for stress management strategies in addressing these behaviors.
Anxiety	Positive relationship - Higher anxiety is linked to more impulsive eating.	Positive relationship - Anxiety is associated with higher emotional eating.	Anxiety contributes to both impulsive and emotional eating behaviors. Anxiety management may be a key factor in interventions.
Emotion Regulation	Negative relationship - Impaired emotion regulation is linked to higher impulsive eating.	Negative relationship - Impaired emotion regulation is linked to higher emotional eating.	The role of emotion regulation in both behaviors suggests that interventions focusing on improving emotion regulation skills may be effective in reducing impulsive and emotional eating.

Variable	Impulsive Eating	Emotional Eating	Importance and Implications
Emotional Awareness	Negative relationship - Low emotional awareness is linked to higher impulsive eating.	Negative relationship - Low emotional awareness is linked to higher emotional eating.	Enhancing emotional awareness is crucial in reducing impulsive and emotional eating, as individuals with lower awareness tend to engage in these behaviors more frequently.
Mindful Attention	Negative relationship - Better emotion regulation linked to less emotional eating.	Mixed relationship - Mindful attention is linked to less emotional eating, but no significant effect on impulsive eating.	The role of mindful attention highlights its potential in reducing emotional eating, possibly by improving emotion regulation skills. However, it doesn't appear to significantly impact impulsive eating.
Disregard for Future Consequences	Positive relationship - High disregard for future consequences is linked to more impulsive eating.	Positive relationship - High disregard for future consequences is linked to more impulsive eating and less emotional eating.	High disregard for future consequences is a common factor in promoting impulsive eating. However, it also reduces emotional eating, which suggests that those who prioritize immediate gratification may engage in less emotional eating. This finding underscores the complex relationship between these behaviors.

Analyses and Interpretation of Findings in the Context of the BPM Framework

The central focus of this dissertation was to explore the biopsychosocial markers of emotional eating and impulsive eating, recognizing that simple dietary and exercise interventions do not solely influence these behaviors but are complex manifestations shaped by various biological, psychological, and social factors. To achieve this goal, I utilized the Biopsychosocial Model (BPSM) as a theoretical framework because it

recognizes the intricate interplay of biological, psychological, and social factors in understanding and addressing emotional and impulsive eating. The dissertation first examined the existing literature to gain insights into the relationship between these behaviors and potential markers within the BPSM. In the following section, I compared this study's findings to the studies discussed in Chapter 2 that offered significant findings regarding emotional eating and impulsive eating and their links to various components of the BPSM.

Several variables exhibit a nuanced interplay among biological, psychological, and social factors, contingent upon the context under examination. For instance, McCabe et al. (2023) argued that stress and anxiety can alter hormonal balance, which typically assumes pivotal roles in regulating hunger, satiety, and energy homeostasis. In parallel, Jokinen and Hartshorne (2022) argued that anxiety and stress can influence both impulsive and emotional eating on a psychological and biological level. Perhaps this influence may originate from the body's need to downregulate elevated cortisol and adrenaline levels when one experiences heightened anxiety states. In light of the absence of direct measurements such as cortisol levels, HRV, or specific physiological indicators that would classify the variables within the domains of biology, psychology, or sociology, I will approach the results by examining the potential interplay of biological, psychological, and sociological factors in shaping each variable's role.

Impulsive Eating

The robust positive connection between impulsive eating and disregard for future consequences implies a biological factor. Those with high impulsivity seem inclined to

favor immediate satisfaction over long-term outcomes due to inherent traits. This notion resonates with Bénard et al.'s (2018) findings, indicating that heightened impulsivity can hinder inhibitory control, potentially rooted in inherent traits. As described by Braden et al. (2018), the concept of impulsivity revolves around difficulties in managing emotions, uncovering a distinct biological facet in its involvement with impulsive eating. In line with this, Thayer et al. (2009) argue that inhibition control is pivotal in emotional regulation, suggesting that individuals facing inhibition control challenges may owe it to various factors, encompassing genetics, brain structure and function, and social cues. My research findings corroborate the insights put forth by Bénard et al. (2018) and Thayer et al. (2009), as they affirm the substantial association between impulsive eating and emotion regulation. Additionally, impulsive eating exhibits strong correlations with stress, anxiety, and mindful attention, hinting at a confluence of social factors, such as stress and mindful attention, and psychological factors, such as anxiety, in precipitating impulsive eating.

Emotional Eating

Biological underpinnings may also underscore emotional eating. Similar to the work conducted by Bénard et al. (2018), research posits biological elements' involvement in emotional eating. Heightened impulsivity, often attributed to biological traits, can foster an increased reliance on food as a coping mechanism for alleviating negative emotions, thus contributing to emotional eating. The findings from this study substantiate this perspective, as impulsive eating emerges as a robust predictor of emotional eating in both RQ1 and RQ4. Moreover, emotional eating shares a compelling link with emotion

regulation, aligning with the observations made by Maier et al. (2021). In the current study, emotional awareness, impulsive eating, and disregard for future consequences are significant predictors of emotional eating. Despite emotional eating being potentially triggered by psychological elements, such as anxiety, or sociological influences, such as the portrayal of eating ice cream when sad in movies, it appears to have a fundamental biological basis. This stems from the idea that individual will resort to emotional eating to alleviate psychological and physiological discomfort.

Stress and Anxiety

While the roots of stress and anxiety are undeniably complex, their link to impulsive eating emphasizes a biological dimension. Stress and anxiety's association with hormonal changes leading to cravings, as observed by Blyderveen et al. (2016), hints at a biological facet. This biological underpinning is further illuminated in Maier et al.'s (2021) research, where their results suggest that individuals with superior cognitive control can implicitly manage emotions, potentially alleviating stress-induced impulsive eating. Nevertheless, as this study did not collect cortisol levels or physiological measures to definitively establish a biological connection between anxiety, stress, and impulsive and emotional eating, we cannot confidently assert, based on the findings, that stress and anxiety have a biological underpinning in emotional eating or impulsive eating.

Jokinen and Hartshorne (2022) have described stress and anxiety as psychological factors that play a role in impulsive and emotional eating. Findings in the current study supported the statement that anxiety and stress play a significant role in promoting both impulsive and emotional eating behaviors, leading me to categorize stress and anxiety as

both psychological (i.e., behaviors and emotions emerging from anxious thoughts and the need to reduce psychological discomfort with food) and social factors (i.e., current stressful situations triggering anxiety and the need to reduce psychological discomfort with food).

Emotion Regulation

Impaired emotion regulation's impact on both impulsive and emotional eating substantiates a robust psychological connection. Braden et al. (2018) emphasized that emotional eating often arises from the inability to manage emotions effectively, aligning with the psychological dimension of emotion regulation. Findings in the current study support Braden et al.' (2018) findings and conclusion. Emotion regulation was related to both emotion and impulsive eating, suggesting that individuals with poor emotion regulation skills engage more often in impulsive and emotional eating. As I hypothesized, individuals with poor emotion regulation skills use food to self-regulate. Emotion regulation directly relates to one's efforts to regulate emotion. I categorize emotion regulation as a psychological factor.

Emotional Awareness

The correlation between low emotional awareness and impulsive and emotional eating points to a psychological factor. Vander Wal et al. (2020) found that individuals with disordered eating symptoms had more difficulty identifying and describing emotions, emphasizing the psychological dimension of emotional awareness. Findings in the current study supported Lattimore's (2019) findings that low emotional awareness was linked to an increased likelihood of engaging in impulsive and emotional eating. This

study's findings around emotional awareness and emotional and impulsive eating highlight the importance of enhancing emotional awareness in interventions aimed at reducing these behaviors, aligning with the idea that improving emotional awareness can be crucial for managing emotions and curbing problematic eating habits. Based on this study's findings and in agreement with Vander Wal et al. (2020), I categorize emotional awareness as a psychological factor.

Mindful Attention

Mindful attention embodies a multifaceted concept with connections to both psychological and social dimensions. Defined by Verrier and Day (2022) as a heightened state of awareness marked by a non-judgmental, present-centered focus, mindful attention primarily aligns with psychological factors. It revolves around one's ability to fully engage in the present moment, emphasizing the cognitive and emotional aspects of human experience. Within the context of impulsive and emotional eating, the relationship between mindful attention and these behaviors offers intriguing insights. While this study's findings supported Kennedy et al.'s (2018) findings of a negative association between mindful attention and emotional eating, this study's results added another layer of complexity. The findings revealed a negative correlation between mindful attention and impulsive eating, indicating that individuals with higher mindful attention tend to engage in fewer impulsive eating behaviors. This observation underlines the psychological aspect of mindful attention, suggesting its role in assisting individuals in managing impulses and adopting more adaptive coping mechanisms.

On the other hand, the study also highlighted the social facet of mindful attention, as it indicates that mindful attention does not significantly impact emotional eating. This finding implies that the influence of mindful attention on emotional eating may be relatively limited. In contrast to Kennedy et al. (2018), it must be recognized that this study distinguished between impulsive eating and emotional eating, facilitating a nuanced exploration of their differences. This differentiation allowed for a more comprehensive examination of emotional and impulsive eating responses. Therefore, based on this study's findings, mindful attention was categorized as psychological and social factors.

Disregard for Future Consequences

Disregard for Future Consequences was a multifaceted concept reflecting both psychological and social dimensions. Defined as the tendency to prioritize immediate gratification over long-term outcomes (Macaskill et al., 2019), it inherently aligns with both psychological and social factors. The current study found a positive relationship between high disregard for future consequences and impulsive eating. Individuals exhibiting this trait are more likely to engage in impulsive eating, reflecting its psychological underpinning as impulsive eating often involves impaired cognitive functions that lead to discounting the consequences of one's actions. Paradoxically, the findings reveal a negative relationship between disregard for future consequences and emotional eating. Those who prioritize immediate gratification are less likely to engage in emotional eating. This discovery highlighted the intricate relationship between these behaviors. It suggests that individuals who value immediate rewards more may engage in less emotional eating. However, they are more prone to impulsive eating, emphasizing

the role of disregard for future consequences in promoting this behavior. In essence, the complex nature of disregard for future consequences implies that it functions as both a psychological and social factor in impulsive and emotional eating. It underscores the significance of considering the interplay of these dimensions when addressing and understanding these behaviors and their implications for individuals' overall well-being.

Emotional and impulsive eating are complex behaviors influenced by an intricate interplay of biological, psychological, and social factors. The findings discussed here highlight the multidimensional nature of these behaviors, which are not solely determined by diet and exercise interventions. The findings of this study indicate that emotional awareness, emotion regulation, mindful attention, stress, anxiety, and disregard for future consequences have distinct and interconnected roles in influencing impulsive eating and emotional eating.

Interventions targeting these eating behaviors should consider these multifaceted biopsychosocial markers, offering a holistic approach to address the complexities of impulsive and emotional eating. Moreover, these findings highlight the importance of adopting tailored strategies that address the unique influence of each variable to effectively mitigate impulsive and emotional eating and improve overall well-being and good health.

Limitations of the Study

The present study utilized archival data collected in 2017 within San Diego County, California. Although the sample exhibited diversity concerning age, gender, and ethnicity, it is essential to acknowledge that the results might not fully generalize to the

broader population of emotional and impulsive eaters across the United States. Given the utilization of archival data, the research questions were structured around the available questionnaires and scales provided to the participants. Upon data analysis, questions arose regarding the adequacy of specific questionnaires in addressing the study's hypotheses. For instance, mindful attention was assessed using a combination of the attention-attention and motor-motor subscales in the BIS-11. While these subscales measured one's ability to focus on the moment and assess mindless actions, it raised the possibility that employing a dedicated scale explicitly designed to measure mindful attention, such as the Mindful Attention Awareness Scale (MAAS; Brown and Ryan, 2003), might have yielded different results.

Furthermore, it is essential to recognize that the chosen correlational design in this study inherently carries limitations. While correlational designs can establish relationships between variables and identify predictors for specific outcomes, they do not possess the capacity to determine causation. The findings in my study left some questions unanswered as to why mindful attention and disregard for future consequences influenced impulsive and emotional eating differently. Another noteworthy limitation is the absence of physiological measures, such as HRV, breathing patterns, skin conductance, or cortisol levels. The inability to link physiological responses to the questionnaires restricted the study's ability to categorize any of the variables as purely biological factors definitively. Lastly, the study did not collect demographic information from the participants. Including variables related to social status, gender, and age and investigating aspects such as a

history of trauma and eating disorders could have provided valuable insights into the observed results.

Recommendations

The current study's limitations and strengths can guide the need for future studies. Future research should consider employing a more refined and comprehensive measure of mindful attention. In the present study, the BIS-11 subscales were utilized to assess the ability to focus in the moment. However, to gain a more profound understanding of the role of mindful attention in emotional and impulsive eating behaviors. I recommend that future researchers enhance their exploration of mindful attention by utilizing specialized scales like the Mindful Attention Awareness Scale (MAAS; Brown and Ryan, 2003).

Moreover, future research should also consider delving deeper into causal relationships by incorporating experimental designs alongside correlational approaches, such as mixed methods design, where the qualitative approach would help expand the information collected in the quantitative stage. This would enable researchers to manipulate variables and assess the impact of interventions, offering a more robust understanding of the factors influencing emotional and impulsive eating behaviors.

Julian Thayer (2000,2002, 2009) has published several studies investigating the physiological markers of stress, anxiety, and poor inhibition control. Integrating physiological measures, such as Heart Rate Variability (HRV), in future research is highly recommended. Examining how HRV correlates with individuals exhibiting poor emotion regulation skills, high levels of emotional or impulsive eating, and impulsivity could shed light on the physiological underpinnings of these behaviors. This addition

would provide a more comprehensive view of the biological factors influencing emotional and impulsive eating.

Another area where future research could expand its focus to assess participants' demographic characteristics and clinical histories thoroughly. Investigating variables related to social status, age, and gender and exploring histories of trauma and eating disorders could unveil crucial insights into how these factors interplay with emotional and impulsive eating. Furthermore, considering financial strains, access to healthcare, and socioeconomic status could offer a more holistic understanding of the social factors involved. Moreover, conducting longitudinal studies that track participants' behaviors and experiences over an extended period would provide insights into emotional and impulsive eating. This approach could help uncover how these behaviors change or persist over time, accounting for various life events and personal development.

Lastly, designing intervention studies that target specific factors associated with emotional and impulsive eating would be a valuable area for future research. By implementing and evaluating the effectiveness of interventions aimed at improving emotion regulation or promoting mindful eating, researchers can contribute to developing evidence-based strategies for managing these behaviors. These recommendations collectively aim to advance the field of emotional and impulsive eating research by addressing methodological limitations, exploring causal relationships, and broadening the understanding of the multifaceted factors involved in these behaviors.

Implications

Positive Social Change

This study carries significant implications relating to various sectors. As the World Health Organization (WHO) has identified obesity as the fifth leading cause of global mortality (WHO, 2020), healthcare and mental health professionals have consistently advocated for weight-loss interventions rooted in exercise and portion control to enhance patients' overall well-being (Lacroix et al., 2019). It is in this context that the study's findings take center stage.

The findings shed light on intricate connections between emotion, behavior, and biology, providing insights that can potentially drive positive social change. The study underscores the critical relationships between emotional eating and interconnected factors: emotion regulation, stress, anxiety, mindful attention, emotion regulation, emotional awareness, and disregard for future consequences. It was found that these factors are significantly associated, collectively weaving a complex web that influences eating behaviors. The strong positive relationship observed between emotion regulation, stress, and anxiety suggests that individuals who struggle with regulating their emotions are more susceptible to stress and anxiety, which, in turn, significantly influences their emotional and impulsive eating habits. These findings challenge conventional wisdom and provide an opportunity to reevaluate how the medical community perceives individuals struggling with obesity and related eating behaviors. The findings in this study underscore the significance of considering the interplay between biological, psychological, and social factors in weight management and emotional eating.

Moreover, the study's results indicate that mindful attention is not only a psychological factor but also plays a vital role in impulsive eating behaviors. The data revealed a negative correlation between mindful attention and impulsive eating, demonstrating that individuals with higher levels of mindful attention are less likely to engage in impulsive eating. These findings can potentially improve weight loss interventions by promoting a more holistic approach to patient care, by say, incorporating meditation into one's daily routine. Based on the study's findings, mental health providers can develop treatment plans that address unwanted behavior as well as cognitive distortions and incorporate interventions to strengthen individuals' ability to cope with physiological distress. For instance, techniques like slow-paced breathing exercises, which improve inhibitory control and enable patients to control undesirable physiological reactions to stress and anxiety, offer a promising pathway to holistic well-being (Meyer et al., 2018). The current study contributes to the larger body of knowledge regarding obesity and eating disorders, emphasizing the critical role of biology in shaping behaviors and propelling the field toward more comprehensive and effective interventions.

Additionally, the findings in this study hold profound implications for positive social change across multiple domains. At the individual level, our findings open the door to a more compassionate understanding of those grappling with obesity and emotional eating, reducing the stigma often attached to these conditions. We can promote more effective and empathetic weight loss interventions that address the root causes of emotional eating, thus enhancing individual well-being. This research contributes to

developing more comprehensive and supportive treatment plans within the family context as well. By acknowledging the intricate links between emotion regulation, stress, anxiety, and eating behaviors, providers can pave tailor strategies that address not only cognitive aspects but also psychophysiological factors. Families dealing with obesity and emotional eating can also benefit from a more holistic approach to fostering healthier habits and physical and emotional well-being for the family as a unit, understanding how one's behavior can influence and be influenced by social interactions.

Finally, on the societal and policy level, our research encourages a fresh perspective on public health initiatives. It emphasizes the necessity of considering biological, psychological, and social factors when tackling weight management and emotional eating. By recognizing these interconnected elements, policymakers can shape more effective policies that address the multifaceted nature of these issues and foster a healthier society.

While our research does not provide an exhaustive solution, it underscores the importance of multifaceted interventions, aligning with existing theoretical frameworks that acknowledge the interconnectedness of biology, emotion, and behavior. Moreover, methodologically, we contribute to the growing body of knowledge on obesity and eating disorders, offering empirical evidence of the complex relationships between psychophysiological traits, stress, anxiety, and eating behaviors. This knowledge can serve as a foundation for future research and inform the development of interventions that bridge the gap between these domains, instigating positive social change at multiple levels.

Conclusion

This study's findings hold significance for mental health professionals and academic settings. The findings from this study offer evidence-based results to assist providers in developing treatment plans that target unwanted behaviors and cognitive distortions and provide interventions to enhance the body's resilience to physiological distress (Braden et al., 2018). In addition, this research contributes to the broader knowledge base surrounding obesity and eating disorders, as it shed light on the role of biology and social experiences in behavior and emotion. Researchers interested in obesity, weight loss, or psychophysiology can now utilize the findings from this study to design follow-up research that encompass investigating not only behavior and emotion but also psychosocial characteristics (e.g., stress, anxiety) affected by biological factors (e.g., difficulties with impulse control and emotion regulation), which collectively influence behaviors such as emotional eating and impulsive eating.

The current study's findings offer a fresh perspective on the multifaceted nature of obesity and related eating behaviors. By delving into the complex interactions between emotion, behavior, and biology, this research provided a compelling foundation for developing comprehensive treatment plans, reducing stigmas surrounding weight management, and a more holistic approach to well-being. Researchers and practitioners alike can build upon these findings to advance interventions encompassing biological, psychological, and social elements, ultimately paving the way for more effective strategies to combat obesity and promote healthier lifestyles.

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Appendix A: DEBQ

DEBQ

Tatjana van Strien

Dutch eating behaviour questionnaire

Scientific research purposes only

Directions

For each item, decide if the item is true about you: never, rarely, sometimes, often or very often. Cross the compartment that corresponds to your rating. Please respond to all items, making sure that that you cross the compartment for the rating that is true about you. If you need to change an answer, make a big cross through the incorrect compartment and make an arrow to the cross on the correct compartment.

AMSTERDAM · BERN · FIRENZE · GÖTTINGEN · HELSINKI · KØBENHAVN · OXFORD · PARIS · PRAHA · STOCKHOLM · WIEN

HOGREFE

	NEVER	RARELY	SOME-TIMES	OFTEN	VERY OFTEN
1 Do you have the desire to eat when you are irritated?					
2 If food tastes good to you, do you eat more than usual?					
3 Do you have a desire to eat when you have nothing to do?					
4 If you have put on weight, do you eat less than you usually do?					
5 Do you have a desire to eat when you are depressed or discouraged?					
6 If food smells and looks good, do you eat more than usual?					
7 How often do you refuse food or drink offered because you are concerned about your weight?					
8 Do you have a desire to eat when you are feeling lonely?					
9 If you see or smell something delicious, do you have a desire to eat it?					
10 Do you have a desire to eat when somebody lets you down?					
11 Do you try to eat less at mealtimes than you would like to eat?					
12 If you have something delicious to eat, do you eat it straight away?					
13 Do you have a desire to eat when you are cross?					
14 Do you watch exactly what you eat?					
15 If you walk past the baker do you have the desire to buy something delicious?					
16 Do you have a desire to eat when you are approaching something unpleasant to happen?					
17 Do you deliberately eat foods that are slimming?					
18 If you see others eating, do you also have the desire to eat?					
19 When you have eaten too much, do you eat less than usual the following days?					
20 Do you get the desire to eat when you are anxious, worried or tense?					
21 Do you find it hard to resist eating delicious foods?					
22 Do you deliberately eat less in order not to become heavier?					
23 Do you have a desire to eat when things are going against you or when things have gone wrong?					
24 If you walk past a snack bar or a café, do you have the desire to buy something delicious?					
25 Do you have the desire to eat when you are emotionally upset?					
26 How often do you try not to eat between meals because you are watching your weight?					
27 Do you eat more than usual, when you see others eating?					
28 Do you have a desire to eat when you are bored or restless?					
29 How often in the evening do you try not to eat because you are watching your weight?					
30 Do you have a desire to eat when you are frightened?					
31 Do you take into account your weight with what you eat?					
32 Do you have a desire to eat when you are disappointed?					
33 When you are preparing a meal are you inclined to eat something?					

Name: _____ ☐ F ☐ M

Date of birth: _____ Date of today: _____

a What is your current weight? _____ kg

b What is your current height? _____ m _____ cm

c Has your body weight been constant the past six months?

☐ Yes, my weight did not change much in the past six months.

☐ No, I lost weight. Specifically, I lost _____ kg in the past six months.

☐ No, I gained weight. Specifically, I gained _____ kg in the past six months.

☐ No, sometimes I gained weight and sometimes I lost weight.

d What is your highest weight ever (excluding pregnancy): _____ kg

e What is your lowest weight ever (after age 15): _____ kg

f Have you ever had an eating binge? An eating binge is an episode of eating an amount of food that others would regard unusually large.

☐ yes

☐ no

If so, how often in the past three months did you have an eating binge?

☐ weekly, namely _____ times a week

☐ monthly, namely _____ times a month

☐ in the past three months I never had an eating binge

When having an eating binge, how often do you have the feeling that you cannot stop?

☐ hardly ever

☐ sometimes

☐ often

☐ very often

Scoring of the DEBQ

Each response has a value:

Never = 1
Rarely = 2
Sometimes = 3
Often = 4
Very often = 5

In order to calculate rough scores on the scales and subscales, please add the responses on the items as follows:

Diffuse emotions
item 3, item 8, item 10, item 28

Clearly labelled emotions
Item 1, item 5, item 13, item 16, item 20, item 23, item 25, item 30, item 32

Emotional eating
Item 1, item 3, item 5, item 8, item 10, item 13, item 16, item 20, item 23, item 25, item 30, item 32

External eating
item 2, item 6, item 9, item 12, item 15, item 18, item 21, item 24, item 27, item 33

Restrained eating
item 4, item 7, item 11, item 14, item 17, item 19, item 22, item 26, item 29, item 31

Appendix B: Provider Participation Agreement Form

Provider Participation Agreement form

After reviewing all relevant information regarding the Stress and Emotional Eating study being proposed by Lucia Foster-Engen, MA, BCB, I have agreed to allow Mrs. Foster-Engen to recruit patients utilizing services at the Positive Choice Integrative Wellness Center and have also granted her permission to use one of the Biofeedback offices to collect the data needed for this study. This authorization is fully contingent upon the following parameters:

1. Approval of the study and human subject recruitment by Kaiser Permanente's IRB department.
2. HIPAA requirements under Kaiser Permanente's code of compliance are properly met, and no protected health information (PHI) of any study participant will be provided to any member of the research team.
3. All participants of the study will be assigned a research ID number to be used in identifying them on all official research documents as well as by members of the research staff.

Positive Choice Integrative Wellness Center – Kaiser Permanente San Diego
Name of the participating clinic

Department Administrator
Title of person authorizing recruitment of patients

Christopher Heslin, MS
Printed Name of person authorizing recruitment of patients

Signature of person authorizing recruitment of patients

1/23/17
Date

Appendix C: Certificate of Completion NIH course 2017

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Lucia Foster** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 03/11/2016.

Certification Number: 2029429.

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Appendix D: CITI Completion Certification from 2023

Completion Date 11-Jun-2023
Expiration Date N/A
Record ID 56460782

This is to certify that:

Lucia Foster-Engen

Not valid for renewal of certification through CME.

Has completed the following CITI Program course:

Student's
(Curriculum Group)
Doctoral Student Researchers
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Walden University

CITI
Collaborative Institutional Training Initiative
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Fort Lauderdale, FL 33301 US
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