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Emotional Eating, Nutritional Knowledge, and Socioeconomic Status as Predictors of Body Mass Index

Tifani Buss
Walden University

Walden University

College of Allied Health

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Tifani Buss

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Review Committee
Dr. Benita Stiles-Smith, Committee Chairperson, Psychology Faculty
Dr. Chris Kladopoulos, Committee Member, Psychology Faculty

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

Walden University
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MA, Walden University, 2016

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Dissertation Submitted in Partial Fulfillment

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Abstract

Obesity is an ill-health condition that can lead to other ill-health conditions such as cardiovascular disease, high blood pressure, asthma, type 2 diabetes, and some types of cancer. Obesity is also a condition that does not discriminate regarding age, gender, or race/ethnicity. In light of obesity's status as a global epidemic, efforts for prevention and intervention treatments are needed to improve individuals' health and quality of life. The purpose of this quantitative study was to examine emotional eating, nutritional knowledge, and socioeconomic status, as predictors of body mass index (BMI). These factors were examined through the lens of general strain theory. A survey design was used to collect data from 76 participants. Emotional eating scores were obtained from the Emotional Appetite Questionnaire, and nutritional knowledge scores were obtained from the General Nutrition Knowledge Questionnaire-Revised. Simple regression and multiple regression analyses showed no significant relationship between predictor variables and BMI. The positive social change implications of the study results will be clearer with further research examining these variables in greater detail. As each variable may impact differently upon different demographics of the population, more detailed research would help better identify the best ways to address these variables whether independently or collectively.

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Dedication

This dissertation is dedicated to my grandfather, my biggest fan. May he rest in peace.

Acknowledgments

I would like to thank God first and foremost for granting me this opportunity and for the tenacity to pursue it to the end. I would also like to thank my family and friends for their patience, love, and unending support.

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Chapter 1: Introduction to the Study

The issue of overweight/obesity is a growing health care epidemic worldwide (World Health Organization, 2021). Although the importance of treating the issue is widely known and understood, the manner in which to best treat the issue is still unknown. The difficulty in treating the issue lies in the fact that there are several contributing factors such as eating behaviors (Czepczor et al., 2021; Dhivyadharshini et al., 2019), family-related characteristics (Notara et al., 2020), and culture (Cuevas et al., 2022; Dao et al., 2021; J. T. Garcia & VandeVusse, 2020), which affect different individuals (Godoy-Izquierdo et al., 2021; Stefanovics et al., 2018) and populations (M. Chen et al., 2020; Kamboj et al., 2017) on different levels. Therefore, examining the multiple factors involved in this complex phenomenon more thoroughly is warranted (Catchings et al., 2021).

When considering the issue of overweight/obesity, there are several factors that have been examined. Two of the most commonly examined factors are nutrition and exercise. According to energy balance theory (Marks et al., 2015), if energy in exceeds energy out, an overweight condition will occur. Therefore, it makes sense to look at consumption in relation to expenditure.

Although the simplest explanation seems to be that individuals are consuming more energy than they are expending and therefore should decrease consumption and/or increase expenditure, the situation is more complex (Asmuniati et al., 2019). There are several other intervening factors that need to be considered if prevention and treatment efforts are to be successful. For example, when bariatric patients undergo weight loss

surgery, their capacity for consumption is limited to prevent them from overeating or eating more than they are expending. Often, exercise is also encouraged and/or prescribed. However, statistically, these patients have a very small chance of losing weight and keeping the weight off (Robitzsch et al., 2020).

This failure to lose and/or maintain weight loss has helped indicate that there is more to combating overweight and obese health conditions than the simple measure of input/output. More recent research has examined both internal and external factors that may play a role in overweight/obese health conditions. Internal factors such as motivation and mental health have been examined to try to determine the role they may play in overweight/obese health conditions (Marks et al., 2015). External factors such as social and economic resources that are either included or missing from a person's environment have also been examined (Glanz et al., 2015). Therefore, both psychological and social/environmental factors warrant further examination in relation to combating overweight/obese health conditions.

In Chapter 1, I briefly describe some of the research surrounding the issue of obesity and the variables of interest in the current study. Specifically, the factors of emotional eating, nutritional knowledge, and socioeconomic status (SES) are highlighted. Additionally, the importance of examining these factors together is addressed.

Background

When individuals lack sufficient coping skills to help them deal with stressful situations, they often choose maladaptive coping strategies or strategies that are unhelpful in the long run and are potentially unhealthful. One such coping strategy is emotional

eating. Emotional eating is defined as eating in response to negative emotions (Stapleton et al., 2020). Individuals with overweight/obese health conditions often eat in response to negative emotions such as stress, anxiety, and depression.

Obesity, which has been defined as having a body mass index (BMI) ≥ 30, has been linked with several ill-health conditions both physical and mental (Centers for Disease Control and Prevention [CDC], 2021). Physical diseases such as cardiovascular disease, stroke, chronic kidney disease, type 2 diabetes, and some forms of cancer are commonly found to be comorbid conditions with overweight/obesity (O'Loughlin & Newton-John, 2019). Depression, anxiety, personality disorders, and schizophrenia have been noted to be the most commonly comorbid mental health conditions related to overweight/obesity (Babey et al., 2021). In addition, depression and anxiety have also been correlated with disordered eating (McGarrity et al., 2019). Therefore, it makes sense to examine the disordered eating condition of emotional eating with overweight/obese health conditions.

However, not all individuals who engage in emotional eating are overweight/obese. Therefore, it makes sense to examine other potential contributing factors to overweight/obesity along with emotional eating. Nutrition knowledge is a newer construct of interest that has been examined in relation to BMI. Of note is the finding that those who have more nutrition knowledge have also been shown to have more general knowledge (Shahsanai et al., 2022). However, the research has shown that nutritional knowledge does not always transfer to action in that nutritional knowledge does not get applied to nutrition behaviors (Molan, 2019).

Additionally, those with more knowledge generally have better paying jobs. Therefore, it would make sense that those with better paying jobs also have more nutritional knowledge. With that being said, SES has been shown to be correlated with overweight/obesity and has also been linked to disordered eating in the way that individuals in lower SES groups tend to eat when suffering from depressed, anxious, or stressed conditions (Rosenqvist et al., 2022).

Taken together, the overlap in previous research regarding the variables of emotional eating, nutritional knowledge, and SES highlights the need to expand and clarify the connection of these variables to BMI. Furthermore, the issue of obesity is not only complex and multifactorial but is also circular in nature in that obesity can both cause and be caused by several factors. For example, a person may find out they have cancer and become obese due to poor quality of health and diminished personal care (Hong et al., 2019). However, the reverse is also true as individuals with obesity are at a higher risk of developing several comorbid health conditions such as cancer (Gomez et al., 2021). Therefore, the importance of identifying the most salient contributing factors or combination of factors is of utmost importance to help individuals avoid an overweight/obese condition and the potential comorbid conditions that may accompany the overweight/obese condition. Having comorbid diagnoses not only complicates care but also significantly reduces an individual's quality of life (Babey et al., 2021; Kaiser & Cafer, 2018; Romain et al., 2021).

Problem Statement

The obesity epidemic is a complex, widespread, and fast-growing problem that must be further researched for combating the issue. Over the past 4 decades, the number of children and adolescents with obesity has increased from 5% to 17 % with the prevalence rate in the adult population also rising substantially to over 36% (E. O. Miller et al., 2016). What we know about the obesity epidemic is that there are several contributing factors, most of which are preventable (Glanz et al., 2015). One factor is emotional eating (Marks et al., 2015). Additionally, nutritional knowledge is a newer construct of interest that has been examined in terms of its possible relationship with obesity (Lopez-Hernandez et al., 2020). Lastly, those who are in the lower SES population make up a large portion of the population of individuals who are impacted by overweight and obesity conditions (de Wilde et al., 2019). A quantitative study addressing the possible correlations between emotional eating, nutritional knowledge, SES, and BMI may provide important information regarding contributing factors that perpetuate overweight and obesity conditions. Therefore, the current study was needed to identify possible correlations among these contributing factors that may assist in improving prevention and intervention efforts (see Aka & Arapoglu, 2021; Rosenqvist et al., 2022; van Strien, 2018).

Purpose of the Study

The purpose of this quantitative study was to examine BMI as predicted by emotional eating, nutritional knowledge, and SES to expand on the current knowledge base (see de Wilde et al., 2019; Gerçeker & Bektaş 2021; López-Hernández et al., 2020).

By conducting a multiple regression analysis to examine emotional eating, nutritional knowledge, and SES as predictors of BMI, I hoped that the most salient contributing factors or combination of factors related to BMI would be identified (see O'Loughlin & Newton-John, 2019).

Research Questions

The following research questions were addressed:

RQ1: Does emotional eating predict BMI?

H_o1: There is no correlation between emotional eating and BMI.

H_a1: There is a significant positive correlation between emotional eating and BMI.

RQ2: Does nutritional knowledge predict BMI?

H_o2: There is no correlation between nutritional knowledge and BMI.

H_a2: There is a significant negative correlation between nutritional knowledge and BMI.

RQ3: Does SES predict BMI?

H_o3: There is no correlation between SES and BMI.

H_a3: There is a significant negative correlation between SES and BMI.

RQ4: Do emotional eating, nutritional knowledge, and SES combined predict BMI?

H_o4: There is no correlation between emotional eating, nutritional knowledge, and SES combined and BMI.

H_a4: There is a significant correlation between emotional eating, nutritional knowledge, and SES combined and BMI.

Theoretical Framework

The theoretical framework for the study includes Agnew et al.'s (2002) general strain theory (GST). This theory proposes that individuals make decisions based on the negative emotions they feel as a result of a strain or lack of resources. This strain-based decision-making process may include psychological, cognitive, and social components. In the current study, I proposed that lack of coping strategies may induce emotional eating, lack of nutritional knowledge may initiate improper nutritional food choices, and lack of finances may create food instability or inability to afford healthy food choices. Although traditionally used in sociological and criminological research settings (Stogner & Gibson, 2011; Walsh, 2000), the theory appeared to be applicable to the current study, which included psychological, cognitive, and social factors (see Daniels & Holtfreter, 2019; Piquero et al., 2010; Stogner & Gibson, 2010).

Nature of the Study

A multiple regression analysis addressing the factors of emotional eating, nutritional knowledge, and SES both individually and combined was used to examine their predictive relationship to BMI. According to Creswell and Creswell (2018), a multiple regression analysis is appropriate for use in examining the relationship between one outcome variable and several predictor variables. Therefore, a multiple regression analysis was appropriate for my design because I examined the relationship between three predictor variables (emotional eating, nutritional knowledge, and SES) and one

outcome variable (BMI). Additionally, I used a simple regression model to examine the individual relationships between emotional eating and BMI, nutritional knowledge and BMI, and SES and BMI.

Definitions

Body mass index (BMI): A person's weight in pounds divided by the square of height in inches. A high BMI can indicate high body fatness. BMI screens for weight categories that may lead to health problems, but it does not diagnose the body fatness or health of an individual (CDC, 2021).

Coping: A mechanism deployed to help an individual manage threatening and/or harmful situations in which the individual seeks to remove the threat or diminish the adverse impact the threat may have on the individual (Contrada & Baum, 2011).

Coping resources: Tools an individual uses to cope with negative or stressful situations that may take the form of physical, social, emotional, psychological, or environmental resources (Contrada & Baum, 2011).

Coping skills: The ability to determine a situation is negative or stressful and deploy coping resources to help cope with the situation (Agnew et al., 2002).

Emotional eating: A type of eating that occurs in response to negative emotions (Frayn et al., 2018).

Nutritional knowledge: The knowledge a person has about concepts and processes relating to nutrition and health, including knowledge of diet and health, diet and disease, foods representing major sources of nutrients, and dietary guidelines and recommendations (L. M. S. Miller & Cassady, 2015).

Obesity: A BMI ≥ 30.0 (CDC, 2021).

Overweight: A BMI of 25–29.9. (CDC, 2021).

Socioeconomic status (SES): Although traditionally a combined social and economic measure including the constructs of education, income, and occupation, for the purposes of the current study only the construct of income was used (see Johnson et al., 2019).

Strain: The condition an individual feels in response to a stressful and/or negative situation in which they do not have sufficient coping resources and/or skills (Agnew et al., 2002).

Assumptions

One of the assumptions about the study was that participants cared about their health and were therefore willing participants. Another assumption was that because the participants cared about their health, they provided truthful responses to survey questions. Additionally, I assumed that participants wanted to participate in research that may help discover solutions to improve their health.

Scope and Delimitations

The specific aspect of the research problem that was addressed in the current study was the possible relationships among several known contributing factors to the obesity epidemic in hopes of determining whether one factor acting alone or in combination with another may be more salient in contributing to the epidemic. Identifying these relationships may aid in the development and/or modification of intervention and prevention efforts to be more efficacious. Additionally, this was a

general population study that included anyone 18 years of age or older who speaks English and is a U.S. citizen. I excluded anyone with a diagnosed eating disorder. Therefore, generalizability may be limited to populations fitting these inclusion criteria. Although a behavioral economics approach using prospect theory could have been used, this theory was not chosen because my focus was not to better understand individuals' decision-making processes but instead was to examine their resources and potential relationships between those resources to effect a particular outcome.

Limitations

One limitation of the study was that the sample did not represent all income categories. With this, some BMI categories were not adequately represented, such as underweight, normal weight, and obese (see Mercadal, 2019). Another limitation was that all data points were self-reported. Additionally, one challenge of the study was recruitment because data collection was limited to those who had internet access and who were participating in social media.

Significance

Some of the most salient contributing factors to the overweight and obesity epidemic that have been identified include emotional eating (Gerçeker & Bektaş 2021), nutritional knowledge (López-Hernández et al., 2020), and SES (de Wilde et al., 2019). However, there was a gap in the literature concerning the examination of these factors and the role that they may play when combined. Examining how these factors contribute to overweight and obesity conditions when combined may provide an original contribution to the scientific knowledge base.

Professionals in the medical, nutrition, and mental health fields may be able to use the findings to inform treatment efforts. These may include multidisciplinary health care teams who are working to address obesity. There are implications for social change regarding social policies and community programs, such as providing individuals with the means to acquire nutritional knowledge through free community classes or programs for school-age children. Additionally, changes to policy in providing resources such as those found within the Supplemental Nutrition Assistance Program and Women, Infants, and Children programs may be affected. For example, program users may be required to enroll in a nutrition education class as a condition for receiving benefits.

Summary

Previous attempts to examine possible contributing factors to the obesity epidemic have included medical, psychological, and sociological approaches. More recently, an ecological approach has been suggested to help examine the issue of obesity by considering the contributing factors that are outside of an individual's control (Glanz et al., 2015). Factors such as work and social environments as well as neighborhoods and living wages are among those that have been examined.

The approach taken in the current study was to consider a person's resources when it comes to decision making and determine whether lack of resources is correlated with choices that lead to overweight/obese conditions. Specifically, the resources of coping mechanisms (represented by the variable emotional eating), nutritional knowledge, and finances (represented by the variable SES) were examined in relation to

BMI. I hypothesized that lack of resources would lead to making poor decisions regarding food and eating, which would lead to overweight/obesity.

In Chapter 2, I provide a more detailed overview of the theoretical framework for the study. Additionally, I provide a more thorough review of the literature regarding the variables of the study. This review highlights the importance of examining these variables together to contribute to the scientific knowledge base regarding overweight/obese health conditions.

Chapter 2: Literature Review of Related Research

Obesity is a worldwide epidemic that affects varying demographics and populations (Chen et al., 2020; Kamboj et al., 2017; Stefanovics et al., 2018). Although much research has been conducted to determine what the most salient contributing factors are, to date none of the identified factors have helped resolve the epidemic. What is known thus far is that this complex phenomenon involves several contributing factors that interact in varying ways depending on the unique characteristics of the individual (Babey et al., 2021; Godoy-Izquierdo et al., 2021).

Some of the most salient contributing factors that have been identified include emotional eating (Gerçeker & Bektaş 2021), nutritional knowledge (López-Hernández et al., 2020), and SES (de Wilde et al., 2019). I examined these factors separately and together to determine the strength of the correlation between them and BMI as a predictor of obesity. The results may inform future prevention and intervention efforts. Additionally, these factors were examined through the theoretical lens of GST. GST, an extension of strain theory, is a different conceptualization of strain and how it contributes to the negative aspects in a person's life (Agnew et al., 2002).

Literature Search Strategy

The keywords used in searches included *overweight*, *obesity*, *body mass index*, *BMI*, *socioeconomic status*, *SES*, *emotional eating*, *coping*, *nutritional knowledge*, and *strain theory*. I performed my search using the APA PsycArticles, APA PsycInfo, Thoreau, SAGE Journals, Science Direct, EBSCO Ebooks, and SocIndex databases. Several combinations of the search terms were used to search for literature that may link

any of the variables (e.g., body mass index AND socioeconomic status; obesity AND strain theory; emotional eating AND SES). The search ceased when the literature was saturated. Articles were limited to those published within the last 5 years with the exception of seminal work to support the use of GST.

Theoretical Framework

History

Traditionally, strain theories have been used to explain criminal/deviant behavior. The basic premise of strain theory is that individuals make decisions based on a strain or lack of resources (Walsh, 2000). In 1938, Merton proposed a version of strain theory called *anomie theory*. In Merton's version, there are two elements that need consideration when looking at an individual's decision-making processes as they relate to strain and criminal/deviant behavior. Those elements include a cultural and a social component:

1. Culturally defined goals, purposes, and interests comprise a frame of aspirational reference.

2. Social structure defines, regulates, and controls acceptable modes of achieving these goals.

Strain occurs when individuals are unable to meet these goals by the socially approved means. From here, Merton (1938) detailed the five types of individuals who exist in relation to meeting their goals: (a) the conformist who agrees with the culturally defined goals and the socially structured means to achieve them, (b) the retreatist who agrees with neither the goals nor the means, (c) the innovator who agrees with the goals but disagrees with the means and therefore chooses their own path to achieve culturally

defined goals, (d) the ritualist who agrees with the socially structured means but not the culturally defined goals and hence creates their own goals in life, and (e) the rebel who disagrees with the goals and the means to achieve them and hence creates their own goals and ways of achieving them.

However helpful these types may seem for explaining how individuals may respond to strain, they fall short of the individual considerations that Agnew et al. (2002) would later propose. These individual considerations help take the theory a step further in determining how individuals experience strain and how they choose to respond to that strain. For example, the individual may choose deviant yet noncriminal behavior to achieve their goals (Broidy, 2001). Taking into account individual factors helps make strain theory more widely applicable to include individuals who may engage in deviant and harmful behaviors that help them meet their needs and achieve their goals through noncriminal means. This is important because when individuals choose deviant behaviors that are unhealthy, such as substance or alcohol use, their behavior impacts not only themselves but their loved ones and the communities in which they live.

Agnew et al. (2002) proposed a version of strain theory called GST. Agnew et al.'s version of the theory is based on the premise of negative relationships with others, or relationships in which the individual is not treated the way they would like others to treat them. This viewpoint added three tenets that explain what creates strain for an individual: (a) others preventing an individual from reaching positively valued goals, (b) the removal of or threat of removal of positive stimuli that help the individual reach their goals, and

(c) the addition of negative stimuli that may interfere with an individual's ability to reach their goals.

When an individual perceives a strain to occur, the likelihood that the individual will experience negative emotions increases (Agnew et al., 2002). Next, the individual will seek to remove or eliminate the negative emotions that result from the strain. Therefore, a sense of pressure for corrective action prompts the individual to action. The course of action the individual will choose to pursue is based on several factors. Some of these factors include the importance the individual attaches to the goal, value, or identity being threatened; coping skills; coping resources; social supports; level of social control; and association with delinquent peers (Agnew et al., 2002). According to GST, these factors will influence how the strain is perceived, what the individual feels they can do about the strain they are experiencing, and the action the individual chooses to take to relieve the negative emotions they are experiencing due to the strain.

Additionally, there is research to suggest that personality traits should be considered as determining factors in how an individual experiences strain because personality traits may have a fundamental impact on how an individual perceives and reacts to strain (Agnew et al., 2002; Stapleton et al., 2020). There are two major personality traits that GST is concerned with, which are negative emotionality and constraint, because these two traits have been linked to delinquent behavior throughout the empirical literature (Agnew et al., 2002; Caspi et al., 1994; Hicks et al., 2010; Krueger et al., 1994; Taylor & Iacono, 2007). Individuals who are high in negative emotionality are more likely to experience events as aversive and are more likely to

experience intense emotional reactions to these events (Agnew et al., 2002). Individuals low in constraint are more likely to act on impulse (Agnew et al., 2002).

Individuals who are high in negative emotionality and low in constraint are likely to have strong emotional reactions to strain and act impulsively to reduce that strain, including deviant behavior (Agnew et al., 2002). The coping methods for strain that are often chosen by individuals who are high in negative emotionality and low in constraint are either aggressive or antisocial and may be highly risky, taking no one else into account because the individual will not be concerned with anyone else's feelings or rights (Agnew et al., 2002). Taken together, there are individual factors that need to be accounted for to fully understand an individual's unique experience of strain and choice of coping method(s). Not everyone perceives strain in such a way as to resort to deviant or criminal coping methods (Broidy, 2001).

Lack of resources may create strain (Jamison et al., 2017; Stogner & Gibson, 2010). Specifically, lack of coping strategies may induce emotional eating (Frayn et al., 2018; Spinosa et al., 2019), lack of nutritional knowledge may initiate improper nutritional food choices (Okumus & Ozturk, 2021), and lack of finances may create food insecurity (Kaiser & Cafer, 2018; Lopez-Cepero et al., 2020) or inability to afford healthy food choices (Wilson, 2017). Although traditionally used in sociological and criminological research settings (Walsh, 2000), GST was applicable to the current study, which included psychological, cognitive, and social factors (see Botchkovar et al., 2013; Piquero et al., 2010).

Prior Uses of the Theory

Although strain theory has been traditionally used in sociological and criminological research, GST has helped expand the use of strain theory to other settings, such as psychology research, in an effort to explain some types of deviant behavior that may not be criminal. For example, Walsh (2000) argued how the use of behavior genetics could complement the use of GST by adding a component that considers individual differences.

Deviant/Illegitimate Coping

Broidy (2001) used GST to examine strain, anger, and other types of negative affect along with legitimate coping and illegitimate outcomes and found that a relationship between strain and negative emotions exists; however, the nature of the relationship depends on the type of strain and emotion experienced. Specifically, negative emotional responses other than anger were associated with significant increase in legitimate coping and significant decrease in illegitimate/criminal outcomes. Broidy also noted that individuals experience anger with other negative emotions, yet each emotion had a distinct coping response.

In their study examining strain, negative emotions, and deviant coping among African Americans, Jang and Johnson (2003) looked at differences between inner- and outer-directed deviance while considering inner- and outer-directed negative emotions. What they found was that individuals who experienced negative emotions toward others were more likely to engage in other-directed coping behaviors such as aggression. Those who experienced negative emotions toward themselves were more likely to engage in

self-directed coping behaviors such as drug use. Additionally, Jang and Johnson found that self-directed coping behaviors were more significant than other-directed coping behaviors. Jang and Johnson also found that religiosity may help to ameliorate although not eliminate the deviance-generating effects of negative emotions in reaction to strain because those who were religiously committed were less likely than those who were not to engage in deviant coping. This evidence suggests that a consideration should be made that examines the way individuals perceive the strain they are experiencing when determining their coping behaviors.

Estrada-Martinez et al. (2012) used GST to examine whether distinct sources of stress such as exposure to perceived daily stress, financial stress, neighborhood stress, and racial discrimination stress in multiple life domains were equally salient in the risk for externalizing behaviors such as violence and internalizing behaviors such as depressive symptoms among African Americans transitioning to young adulthood. Results indicated that the stressors were not equally salient in the development of risk. Specifically, higher levels of racial discrimination stress over time increased risk for externalizing behavior over and above the impact of perceived daily stress. Additionally, higher levels of financial, neighborhood, and racial discrimination stress were associated with higher levels of internalizing behaviors, measured as depressive symptoms, over time.

SES

Botchkovar et al. (2013) examined the effects of previous and current strain and previous coping efforts on the coping strategies presently used across three different SES

groups. Botchkovar et al. found that there was a moderate correlation between strain and alcohol and/or criminal coping strategies regardless of SES group. Findings also illustrated that prior coping strategies influenced choice of later coping strategies depending on whether the strategy was effective in reducing strain. Although individuals in different SES groups may prefer differing methods of coping, an individual's method of coping may change in the future if the strategy becomes ineffective or if the individual's needs change.

Gender

One study examining gender differences in strain, negative emotions, and coping behaviors looked at gender in an African American sample to explain differences in crime and deviance (Jang, 2007). According to GST, strain generates negative emotions that provide motivation for criminal acts as a behavioral coping strategy. The more distressed an individual gets, the more likely they are to engage in criminal acts. Based on this idea, it would seem as though women, who are on average more distressed than men, would commit more crime. However, Jang found the opposite to be true.

Jang (2007) proposed that this difference occurs due to the differences in type of strain, emotional responses to strain, and conditioning factors that determine criminal versus noncriminal adaptations to strain and distress. The findings showed that women were more likely to report strain to physical health, interpersonal relations, and gender roles in the family and were less likely to report work-related, job, or racial strain than men. Women were also less likely to turn to deviant coping strategies because their strain

generated self-directed emotions such as depression and anxiety. These self-directed emotions were more likely to result in nondeviant, legitimate coping behaviors.

A more recent use of the theory included a study by Daniels and Holtfreter (2019) who examined the effects of anxiety and envy on maladaptive coping. The mediating effects of anger, depression, anxiety, and envy on maladaptive coping were examined for the full study sample and both a male and female subsample. Daniels and Holtfreter found that males reported significantly more crime than females whereas females reported significantly higher levels of strain, depression, and anxiety. Additionally, mean levels of anger and envy did not vary significantly by sex. However, in both the full sample and subsamples, strain was a significant predictor of offending.

Health Strain

Stogner and Gibson (2010) referred to GST to argue that poor health may lead to delinquency in a sample of adolescents. Stogner and Gibson hypothesized that health issues can lead to strain of all three types discussed in the theory, namely others blocking positively held goals, the removal of positive stimuli, and/or the addition of negative stimuli. The strain would then lead to negative emotional states such as anger, depression, anxiety, fear, or frustration. Additionally, the strain would create pressure for corrective action, making delinquent or criminal activity more likely. Stogner and Gibson found that health-related strains had a significant and positive effect on nonviolent delinquent behavior, and the influence of the health strain was independent of negative emotionality, self-esteem, low constraint, and religiosity.

Stogner and Gibson (2011) then examined the influence of health strain on substance use in a sample of adults. Findings showed that health strain affected the initiation of marijuana, cocaine, and other drug use. However, in some instances negative affect mediated the effects of health strain on initiation and frequency of use. These findings highlight the importance of considering how health-related strain may promote individuals to resort to coping methods such as substance use to self-medicate.

In another study, Ford (2014) examined poor health, strain, and substance use and found that health strain increased the risk of psychological distress and that psychological distress significantly increased the risk of various types of substance use. Ford used two measures of poor health: an index of negative health conditions and a more general indicator of overall health. Health strain was directly related to heavy drinking, marijuana use, and prescription drug misuse. Supportive of GST theory, poor health is a type of strain that is related to substance use via psychological distress.

Research Specific to Strain Theory and Health Behaviors

Additionally, a few studies using GST looked more specifically at the types of variables/concepts addressed in the current study. In one study, Piquero et al. (2010) examined gender, GST, negative emotions, and disordered eating to examine how strain and negative emotions relate to disordered eating across genders. Piquero et al. noted, there had been very little research applying GST to non-criminal negative behaviors such as self-harming behaviors associated with disordered eating. They also noted that the risk factors identified with eating disorders, namely negative emotions and stressful/strained

experiences, were consistent with the mechanisms outlined in GST, making the theory a good fit for the examination of disordered eating behaviors.

The hypotheses tested were that strain would increase negative emotions, negative emotions would increase disordered eating, and negative emotions would mediate the strain-disordered eating relationship (Piquero et al., 2010). Findings indicated that strain was positively and significantly associated with depressive symptoms among a full and split-gender models. Higher strain-inequity, which was defined as respondent feelings of unjust or unfair event outcome, also resulted in higher disordered eating in the full and female-specific models. Additionally, anger was associated with more disordered eating among males but was not very strong and was insignificant once depressive symptoms were added. Depressive symptoms were the strongest predictor of disordered eating in both the full and split-gender models.

Piquero et al.'s (2010) study provides evidence of how GST may be applied to behaviors other than criminal behaviors in a relevant and meaningful way. Applying the theory to a health-related behavior also has implications for further research regarding disordered eating and eating disorders. Additionally, identifying the types and sources of strain that individuals who engage in disordered eating experience may have implications for treatment, intervention, and prevention efforts as well as for changes in health policy.

Another study by J. A. Ford et al. (2014) looked at weight strain and binge drinking among adolescents and discussed the way that GST can be applied to obesity when considering the construct of obesity and the three main sources of strain named in GST. In line with the first source of strain, an inability to reach goals, obesity prevents

individuals from achieving personal goals such as athleticism and popularity. In line with the second source of strain, removal of positive stimuli, obesity interferes with the positively valued goal of maintaining good physical health and can prevent individuals from participating in positively valued activities such as developing friendships and pursuing higher education. In line with the third source of strain, presence of negative stimuli, obesity is often a source of negative interactions with others such as bullying and teasing.

Findings indicated that there is a link between weight strain and deviant coping (J. A. Ford et al., 2014). Weight strain resulted in depression and respondents binge drank as a coping mechanism. J. A. Ford et al. concluded that obesity is a source of chronic strain which negatively impacts important social relationships and the ability of adolescents to achieve and maintain important socially approved goals.

Summary

In summary, the source of strain experienced, the type of coping strategies the individual has available to them, and the individual's perception of the strain will all impact the type of coping strategy that the individual will employ when experiencing strain (Daniels & Holtfreter, 2019). Although some individuals may choose criminal means of coping, other individuals may choose maladaptive or unhealthful means of coping if they feel as though those means are their only options for coping (Hayward et al., 2018). For these individuals, eating, specifically disordered eating, may be one such strategy (Carels et al., 2019).

Emotional eating, a type of disordered eating, was one of the key variables for the current study (Boggiano et al., 2017). Lack of coping resources, such as money or knowledge, will also impact how an individual chooses to respond to strain (M. Chang et al., 2019). Therefore, the variables of SES, as measured by income, and nutritional knowledge were also key variables for the current study.

Literature Review

A review of the relevant literature was conducted to better understand what is already known about the obesity epidemic and the specific variables of emotional eating, nutritional knowledge, and socioeconomic status as they have been related to obesity. The literature review informed me of what is known, provided relevant information related to the variables in the current study, and helped me to identify where there may be a gap in the literature that needed further investigating. The following sections will provide an overview of the literature regarding the obesity epidemic and the variables of emotional eating, nutritional knowledge, and socioeconomic status.

Obesity

Obesity is a chronic health condition creating a rapidly growing epidemic worldwide (Catchings et al., 2021). Currently, approximately 42% of the US adult population is obese and about 71% is overweight (G. K. Singh et al., 2021). Linear-time-trend-model forecasts estimate the obesity rate will grow to 51% by the year 2030 (Stefanovics et al., 2018). Obesity is now the leading cause of morbidity and mortality among preventable conditions and is often comorbid with other conditions such as hypertension, diabetes, heart attack and stroke among others (Kamboj et al., 2017; Zare et

al., 2021). Additionally, it is not always physical health conditions that are comorbid with obesity. Mental health conditions such as depression, anxiety, personality disorders, and schizophrenia may also be comorbid conditions with obesity (Babey et al., 2021). These comorbid health conditions, specifically mental health conditions, make it more difficult for individuals to recover from weight loss surgeries (Robitzsch et al., 2021). Identifying the most salient contributing factors or combination of factors involved in this multifactorial issue of obesity is important to effectively treat the issue (Godoy-Izquierdo et al., 2021).

Some of the contributing factors that have been examined include perceived responsibility as it relates to stigma (Rodhain & Gourmelen, 2018), gender and weight stigma (Kim et al., 2019), age (Lima et al., 2021), race/ethnicity (Creber et al., 2017; de Wilde et al., 2019; J. T. Garcia & VandeVusse, 2020), peer influence (Zala, 2017), early life risk factors (Boone-Heinonen et al., 2017), and culture (M. Chen et al., 2020; Cuevas et al., 2022; Dao et al., 2021; Stefanovics et al., 2018). Regarding gender, the literature shows that dependent upon income and race/ethnicity, gender impacts and is impacted by obesity differently. Regarding age, cases of overweight and obesity amongst children and adolescents are beginning to rise to epidemic proportions (Notara et al., 2020). Additionally, childhood overweight/obesity has been linked to overweight and obesity in adulthood (Roy et al., 2021). Determining the most salient contributing factors is important to help create and employ effective prevention and intervention measures as early as possible (K. Czepczor-Bernat et al., 2021).

Due to the complex and multifactorial nature of the obesity issue, there are several factors that need to be examined both independently and in combination with one another (Romain et al., 2021). Some of those factors that have been examined independently include emotional eating (Dhivyadharshini et al., 2019), nutritional knowledge (Alkhaldy, et al., 2019), and socioeconomic status (Booth et al., 2017; H. J. Chen et al., 2018; Kaiser & Cafer, 2018; M. Miller et al., 2020; Neuman et al., 2021). Although socioeconomic status has been examined extensively, emotional eating and nutritional knowledge have not been examined as much. Additionally, these three factors have yet to be examined together. In the next few sections I will describe the literature regarding the factors of emotional eating, nutritional knowledge, and SES.

Emotional Eating

Emotional eating is defined as an emotion-focused coping strategy that is used to cope with negative emotions (Frayn et al., 2018). Emotional eating occurs as individuals eat in response to negative feelings such as stress, depression, or anxiety (van Strien, 2018; Koksal et al., 2020). When individuals use emotion-focused coping, the individual feels as though they either do not have another coping mechanism available to them or they lack the emotional capacity to deal with the situation. Therefore, the individual will choose this emotion-focused strategy instead of using a problem-focused strategy to get relief from negative feelings (McGarrity et al., 2019; Willem et al., 2021).

When individuals use emotion-focused strategies, their focus is on abolishing the negative feelings or emotions they are experiencing (Shateri et al., 2017). In contrast, when an individual uses a problem-focused strategy, the individual looks at the problem

contributing to their experience of negative feelings and seeks to create a solution to the problem which will resolve their negative feelings (Shateri et al., 2017). People with overweight/obese conditions have been shown to employ emotion-focused strategies such as emotional eating more often than problem-focused strategies (J. J. Annesi, 2019; Stapleton et al., 2020).

Usually, when individuals face adverse or stressful life events, they instinctively reduce their food consumption because their energies are physiologically diverted elsewhere (Suvarna et al., 2020). Specifically, the physiological stress response changes an individual's hormone levels in a way that prepares the individual for a fight or flight response which in turn disengages the bodily processes involved in hunger and digestion (Knol & Brantley, 2021). What this means is that when individuals are faced with stress they often eat less and/or lose weight. Overeating in stressful situations would be counterintuitive.

Emotional Eating as a Maladaptive Coping Strategy

Coping strategies that individuals choose to deal with adverse or stressful life events can be deemed adaptive and helpful or maladaptive and unhelpful (Hayward et al., 2018). Individuals who have an overweight or obese condition often choose maladaptive coping strategies (Varela et al., 2019). These strategies are not only unhelpful for dealing with the adverse or stressful event, but are also unhealthy, creating adverse health conditions such as overweight or obesity.

Maladaptive coping strategies include such things as avoidance and withdrawal from the issue or situation that provoked unpleasant feelings. In the case of overweight

and obesity, sometimes avoidance of the issue manifests in overeating, especially the overeating of highly palatable (high sugar/high fat) foods (Boggiano et al., 2017). This type of behavior allows the individual to refocus their negative feelings from the actual issue, which they feel is beyond their coping ability or resources, to an issue of food which they feel is more controllable.

Individuals who choose maladaptive coping strategies feel relief from the unpleasant feelings through avoidance of the issue (Herren et al., 2021). When the individual chooses to eat as a means of coping, this provides them with temporary relief in which case they will eat again to self-soothe and avoid unpleasant feelings the next time those feelings arise (Varela et al., 2019). This becomes a cycle of creating an unhealthy situation which often culminates in the individual becoming overweight or obese in addition to other health issues.

Choosing avoidance as a coping method does not help the individual to resolve the adverse or stressful life event and unless the event is dealt with the individual's health will continue to decline. This suggests that additional coping strategies must be learned by the individual to provide an alternative to dealing with adverse or stressful events. Learning alternative coping strategies can provide the individual with relief from adverse or stressful life events and ill-health conditions that may result from using emotional eating as a coping mechanism.

Reasons for Initiating Emotional Eating as a Coping Strategy

Some of the most commonly noted reasons found in the literature among overweight/obese individuals for initiating a coping mechanism included weight bias

(Carels et al., 2018), weight stigma (Thedinga et al., 2021), health conditions (Gomez et al., 2021), chronic pain (O'Loughlin & Newton-John, 2019), and perceived stress (M. Chang et al., 2021).

Weight Bias and Weight Stigma. Regarding weight bias, individuals with overweight/obesity who internalize this bias engage in a form of self-directed stigma. This type of internalized weight bias is both physically and emotionally detrimental as it often results in depression and/or anxiety (Carels et al., 2018). Additionally, Thedinga et al. (2021) found that individuals with overweight/obesity who experience weight stigma in physical activity settings such as gyms will avoid these settings. This did not mean that these individuals avoided physical activity or exercise, they just avoided places where they felt they may become stigmatized for their weight (Thedinga et al., 2021).

Health Conditions and Chronic Pain. Not only can ill-health conditions be caused by obesity, but obesity can also worsen the prognosis when an individual is experiencing an ill-health condition. Gomez et al. (2021) examined cancer patients and found that obesity not only affected the type of treatment the individual received but it also impacted their outlook of the situation, tolerance of treatment, and chance of relapse. Additionally, O'Loughlin and Newton-John (2019) reported that chronic pain conditions induce a stress response that results in "comfort eating" as a coping mechanism, regardless of BMI. O'Loughlin and Newton-John's study found that it is not the pain directly but the stress the individual feels because of the pain that creates a need to cope and hence an emotional eating situation.

Perceived Stress. Regarding perceived stress, M. Chang et al. (2021), found that helping individuals improve their coping self-efficacy mediated the association between perceived stress and a community-based lifestyle behavioral intervention. These results suggested that helping individuals understand how to handle their problem versus telling them what to do may go far in helping them to increase their coping self-efficacy. Increasing coping self-efficacy can in effect help the individual choose more adaptive coping strategies.

Sociodemographic Factors of Emotional Eating

The factors of gender, race/ethnicity, and SES have been found to influence the type(s) of coping strategies individuals choose to employ. Emotional eating has been found to be correlated with gender (Koksal et al., 2021), ethnicity (Coleman et al., 2019; Lopez-Cepero et al., 2020), SES (Spinosa et al., 2019), and age. The previously named factors should be considered when developing research strategies, interpreting research results, and designing prevention/intervention strategies.

Gender. Research regarding the use of eating as a coping strategy has shown that females are more likely to engage in emotional eating (Benard et al., 2018; He et al., 2021) and males are more likely to engage in stress eating (Herren et al., 2021; Ravichandran et al., 2021). Additionally, women in the lower SES population tend to engage in more depressed emotional eating and are more likely to be obese (Zare et al., 2021) whereas men in the higher SES populations tend to engage in stress eating (Spinosa et al., 2019). One study reported that women in higher SES populations who engaged in emotional eating due to stress reported doing so due to financial concerns

whereas men reported doing so due to occupational status concerns (Rosenqvist et al., 2022).

Race and Ethnicity. Race and ethnicity have also been shown to be correlated with individuals' eating habits. Specifically, Black women have been shown to be less likely to emotionally eat than White women (Herren et al., 2021). In addition, it has been suggested that because ethnic minorities mostly belong to lower SES categories, they may not have the means to choose eating as a coping strategy to adverse or stressful life events (Wilson, 2017).

SES. In terms of SES, emotional eating is often found in lower SES groups with a high percentage also found in upper SES groups (Rosenqvist et al., 2022). Emotional eating most often takes the form of "stressed eating" when looking at the general population (Jayne et al., 2020). However, in overweight/obese populations, emotional eating is more likely to be correlated with depression and anxiety (J. J. Annesi, 2020; Chwyl et al., 2021).

Age. Age is a factor of emotional eating insofar as children's emotional eating is more likely a product of their environment (Herle et al., 2018) and adolescents emotional eating may be more likely described as stress eating (Kazmierski et al., 2022; Okumus & Ozturk, 2020). However, most often, children and adolescents are not found to engage in emotional eating (Gerceker & Bektas, 2021). The elderly are also not found to engage in emotional eating. It is possible that hormone differences affecting hunger and satiety in the older life stage as well as maturity in dealing with emotional issues may explain lack of emotional eating found amongst the elderly (Wong et al., 2020). Okumus and Ozturk

(2021) examined the nutritional knowledge of individuals identifying as emotional eaters and found that the more nutritional knowledge the individual had, the less emotional eating the individual engaged in.

After reviewing the research regarding emotional eating, I could see that emotional eating may occur as a result of limited resources and/or coping strategies. This may imply that SES plays a role in reducing the types of resources and coping strategies available to lower SES populations. Therefore, examining the role of emotional eating with other potential contributing factors such as nutritional knowledge and SES is needed to expand the knowledge in the current research base.

Nutritional Knowledge

There was less research available for examination regarding nutritional knowledge because it is a newer construct of interest in the study of obesity. Findings indicated that although nutrition knowledge is related to food choices, it is not nutrition knowledge alone that influences individuals' food choices and behaviors (Molan, 2019). Parents' nutrition knowledge has been shown to influence children's eating behavior, regardless of overweight status (Gibson et al., 2020; Ferris, et al., 2017). Nutrition knowledge has also been found to be positively correlated with education level (Issahaku & Alhassan, 2021; Shahsanai et al., 2022).

Lopez-Hernandez et al. (2020) found that although some individuals possess a high level of nutrition knowledge, they do not necessarily purchase and consume foods based on that knowledge. However, those with a higher level of nutrition knowledge are more likely to make better food choices than those with a lower level of nutrition

knowledge (Alkhaldy et al., 2019). Teran et al. (2019) examined individuals' knowledge and awareness of food labels and their use of the information contained in those labels when making food purchasing decisions and found that, although several individuals were aware of the health information on those labels, only about half of those individuals used the information on those labels to make buying decisions. Additionally, of those who used the information on the labels, the individuals noted using only the information contained on the label without incorporating any of their own nutrition knowledge about purchasing healthy foods.

Some studies that examined whether nutrition knowledge made a difference in healthy eating food choices and behaviors found that there was an improvement in decision-making when nutrition knowledge was greater (Lopez-Hernandez et al., 2020; Lipowska et al., 2018). However, the differences varied in size and significance which may be indicative of regional and/or cultural factors in defining nutritional knowledge and how it is measured (Cunningham et al., 2020). The implications of the research thus far have been that nutrition education may make an impact in addressing overweight and obese conditions but must be combined with other preventative measures as well to see optimal impact (Asmuniati et al., 2019).

The research examining nutritional knowledge showed me that nutritional knowledge was not the only factor influencing individuals' food choices. I learned that individuals who possess nutritional knowledge do not always use that knowledge when making decisions about food. It may be possible that despite having nutrition knowledge, individuals use emotions to make food choices. Therefore, examining emotional eating

along with nutritional knowledge and SES may help provide a clearer understanding of the potential role of nutrition knowledge in the obesity epidemic.

Socioeconomic Status

Socioeconomic status (SES) has been identified in the literature as one of the contributing factors to the obesity epidemic (Noonan & Fairclough, 2018). Although SES has been measured in several different ways (Rakic et al., 2018) including the use of subjective measures and indexes, the use of income is the most widely used measure (Enzenbach & Kowall, 2021). Regardless of the method of measurement, results have remained mixed, showing individuals in both low and high SES categories reporting the highest number of cases of overweight and/or obesity (Aka & Arapoglu, 2021; Egen et al., 2017; Johnson et al., 2019; Ren et al., 2019; Wang et al., 2020). For example, in their study examining associated factors of obesity in school-aged children, D. P. Singh et al. (2020) reported a U-shaped correlation between SES and obesity.

Several theories have been proposed as to why the variation and mixed findings regarding SES and BMI correlations continue to be seen in the research. One theory is that when individuals are of a high SES, they can afford to buy more calorically dense, low nutrition foods and buy them in excess, which may contribute to overweight/obesity (Oddo et al., 2017). Higher SES also implies more education to obtain higher paying jobs. Therefore, having more education may mean having more nutritional knowledge and making wiser food choices which could help explain the differences seen in overweight/obesity rates between high and low SES populations (Khalaila, 2017).

Another theory concerning low SES is that individuals of low SES cannot afford nutrient dense foods such as fresh fruits and vegetables or enough food which may be potential food insecurity (Wilson, 2017). Lower SES implies lower educational attainment and if working, the individual may hold a minimum wage job or be employed in an organization in which opportunity for advancement to higher paying positions is not possible. These individuals may also possess less nutritional knowledge and therefore, make poorer food choices.

It is also known that individuals with lower SES often have poorer living conditions such as neighborhoods with less choices of supermarkets and more fast-food options (Wilson, 2017). Lower SES neighborhoods are also less likely to have recreational and/or safe spaces for physical activity, which further compounds the issue of overweight and/or obesity (Enzenbach & Kowall, 2021). Cultural factors also have to be considered when determining how SES impacts overweight and obesity conditions as different cultures have different food customs that may or may not be supported by their SES category (Dao et al., 2021; Micklesfield et al., 2018; Motswagole et al., 2020).

The research has provided mixed results regarding SES and the way it correlates with obesity (Johnson et al., 2019; Ren et al., 2019; D. P. Singh et al., 2020; Wang et al., 2020). It is possible that there are other factors involved that contribute to the mixed findings. Therefore, more research is needed to better understand the role that SES plays in contributing to the obesity epidemic. One of the possible factors that was mentioned was level of education and more specifically, nutritional knowledge (Aka & Arapoglu, 2021).

Summary and Conclusions

As a contributing factor to the obesity epidemic, SES may help describe the type and amount of foods individuals are able to purchase, it does not help describe how individuals make purchasing decisions. Additionally, SES helps inform us of other potential contributing factors that may be beyond an individual's control, such as environment. For example, those in lower SES populations may live in areas that are not conducive to eating healthy by limiting their access to supermarkets and farmer's markets (Wilson, 2017). With this, lower SES populations may live in areas that are not conducive to regular physical activity, further perpetuating the issue of overweight and obesity (Enzenbach & Kowall, 2021).

Another important point is that those in lower SES populations generally have lower levels of education and hence, lower levels of nutritional knowledge (Rakic et al., 2018; Aka & Arapoglu, 2021). When examining nutritional knowledge as a potential contributing factor to the obesity epidemic, it appears as though an increase in nutritional knowledge has the potential to make an impact (Lopez-Hernandez et al., 2020). However, those with nutritional knowledge report not always using that knowledge to make healthy food decisions. Therefore, more research is needed to determine what other potential factors may influence whether an individual uses their nutritional knowledge or not.

Emotional eating may be one such potential factor that helps determine whether an individual uses their nutritional knowledge when making food decisions. As found in the literature, those who engage in emotional eating are eating as a coping strategy to feel relief from negative emotions versus eating for sustenance (Willem et al., 2021). These

individuals are not thinking about their health in terms of eating a nutritionally balanced diet. Instead, these individuals are preoccupied with stress, worry, or some other negative emotion and seek relief from those feelings (van Strien, 2018).

Each of the factors of emotional eating, nutritional knowledge, and SES in some way influence body mass index. Research has shown that these factors have some degree of overlap (Franceschi et al., 2021; Koksal et al., 2021; Lima et al., 2021). It is not known whether these three factors may help to increase the predictability of BMI when combined. Therefore, the current study used a multiple regression analysis to examine emotional eating, nutritional knowledge, and SES combined as predictors of BMI to expand the scientific knowledge base regarding overweight and obesity. An increase in knowledge of these factors might help to create prevention and intervention efforts that may be more effective than current strategies in place.

In Chapter 3, I will discuss the research methods for the current study. I will detail the research design and rationale as well as the methodology, sample population, and sampling procedures. I will also detail the procedures for recruitment and participation requirements. Additionally, I will provide details of the data collection instruments used, operationalization of constructs, and the data analysis plan. I will conclude the chapter with a discussion of any threats to validity and the ethical procedures that were employed.

Chapter 3: Research Method

The purpose of this quantitative study was to examine the variables of emotional eating, nutritional knowledge, and SES as predictors of BMI. In Chapter 3, the research design and rationale for choosing this design to examine the variables of interest are described. Additionally, the methodology for examining these variables, including a description of the study population, sampling and recruitment strategies, and instruments used for data collection, is reviewed. Data analysis procedures, potential threats to validity, and potential ethical concerns are also detailed. The chapter concludes with a summary of the design and methodology for the study.

Research Design and Rationale

The variables of interest for the study included one criterion variable and three predictor variables. The criterion variable was BMI, and the predictor variables were emotional eating, nutritional knowledge, and SES. An online cross-sectional survey design was used to collect data to answer the research questions. The survey included two separate questionnaires that addressed the research questions regarding emotional eating and nutritional knowledge. Additionally, the survey included questions asking for self-report data from participants regarding height and weight measures for calculating BMI and income. The choice to use a survey design allowed for efficient gathering of data from multiple data points at a single point in time.

Survey designs are used frequently in behavioral sciences research because this type of research design enables researchers to investigate and quantitatively describe relationships between variables. Additionally, a survey design can be used to collect data

that may be considered sensitive in nature. For example, some individuals may be more likely to share their height and weight or income category on a survey compared to other methods such as interviews. Lastly, a survey design is needed to advance knowledge in the field because a survey design allows for examining associations among variables of a population by studying a sample of that population.

Methodology

Population

The target population for the study was the general population. I believed that members of the general population would be available for recruitment through social media sources. As of March 2022, Facebook reported the percentage of users from the United States at 179.65 billion (Omnicore, 2022). Additionally, 81% of users only access the platform through a mobile device.

Sampling and Sampling Procedures

The sampling strategy used was convenience sampling. Facebook users are 55% male, with the largest demographic group of users being between the ages of 25 and 35 years (Omnicore, 2022). Additionally, 75% of online users with an income of more than $75,000 use Facebook. Therefore, I hoped that a fairly representative sample would be recruited in terms of age, gender, and SES. Survey data were collected for approximately 28 weeks or until the first 76 surveys that were deemed complete were collected, which exceeded the initial 12-week time frame. This type of sampling method was chosen to ensure an adequate sample size.

Inclusion criteria were that the participants were U.S. citizens, English speakers, and at least 18 years of age. An exclusion criterion was diagnosis of an eating disorder. An a priori power analysis was performed for a medium effect size of .30 at power = .80 for α = .05, which indicated the population size needed to achieve statistically significant results with three predictor variables was 76 participants (see Cohen, 1992). A medium effect size was chosen because it was large enough to detect a noticeable effect. Power was chosen as the conventionally chosen power for general use. Lastly, the alpha level was set at the .05 level because this is the commonly accepted level in behavioral science research.

Procedures for Recruitment, Participation, and Data Collection

To recruit participants, I posted a recruitment flyer on social media, specifically the Facebook, Instagram, and Twitter platforms, which included the link to the survey. Additionally, the study was posted in the Walden University research participant pool to help recruit participants in a timely manner. The survey site used was Survey Monkey, which allowed participants to anonymously participate through the link. The first page of the survey included the informed consent form. Clicking "next" at the bottom of the informed consent form implied consent, at which time the participant was able to proceed with the survey.

The demographic data collected included height and weight measures that were used for constructing BMI, income to determine SES, age, gender, and race/ethnicity because these data have often been used to describe research findings including the variables of interest. On the final page of the survey, the participants were thanked for

their time and invited to view the research group page for the posted results when the study was complete.

Instrumentation and Operationalization of Constructs

This section includes a description of the instruments used in the study, including reliability and validity measures of the instruments that were reported in the literature. One of the instruments used was the General Nutrition Knowledge Questionnaire-Revised (see Kliemann et al., 2016), and the other instrument used was the Emotional Appetite Questionnaire (see Geliebter & Aversa, 2003). A description of how BMI and SES were calculated and operationalized for this study is also provided.

General Nutrition Knowledge Questionnaire- Revised

To assess nutritional knowledge, I used the General Nutrition Knowledge Questionnaire- Revised developed by Kliemann, et al. (2016). This 88-item survey instrument measures nutrition knowledge in four areas including dietary recommendations; food groups; healthy food choices; and diet, disease, and weight management; therefore it was appropriate to use in the current study. The General Nutrition Knowledge Questionnaire- Revised is available online for public use; therefore, no permissions were sought.

The overall internal reliability of the questionnaire was high (Cronbach's alpha = 0.93), as was the internal reliability of each section (Cronbach's alpha = 0.70–0.86). The external reliability outcome was greater than the recommended criteria of 0.7 (intraclass correlation coefficient = 0.72–0.89). To establish construct validity, Kliemann, et al. (2016) compared scores from a UK population of dietetic students with English students.

The dietetics students scored significantly higher than English students on all sections, demonstrating that the questionnaire had adequate construct validity. The overall mean score difference was 11.5 (95% confidence of interval: 9.3; 13.7), which represented a large-sized effect ($d = 1.2$).

Emotional Appetite Questionnaire

To assess emotional eating, I used the Emotional Appetite Questionnaire developed by Geliebter and Aversa (2003) . This 22-item instrument measures tendency to eat in response to both positive and negative emotions and in response to both positive and negative situations and therefore was appropriate to use for the current study. The developers granted permission to use the Emotional Appetite Questionnaire in that test content may be reproduced and used for noncommercial research and educational purposes without seeking written permission with the caveat that distribution must be controlled, meaning only to the participants engaged in the research or enrolled in the educational activity.

To establish construct convergent validity, Nolan et al. (2007) correlated Emotional Appetite Questionnaire subscale scores with scores on the emotional subscale, restrained subscale, and external eating subscale of the Dutch Eating Behavior Questionnaire and with BMI using a U.S. college population. Convergent validity was demonstrated by a significant positive relationship ($r = .539$, $p < .001$) between the combined negative emotions and situations scores of the Emotional Appetite Questionnaire and the emotional eating Dutch Eating Behavior Questionnaire score that is largely based on negative emotions. Discriminant validity was demonstrated by a

negative relationship of Emotional Appetite Questionnaire combined positive emotion and situation scores ($r = .247$, $p = .038$) with the Dutch Eating Behavior Questionnaire emotional eating score, in contrast to the positive correlation with combined negative scores ($r = 629$, $p < .001$). The negative Emotional Appetite Questionnaire score was also significantly positively correlated with BMI ($r = .211$, $p = .039$). Thus, the Emotional Appetite Questionnaire was shown to have construct validity, both convergent and discriminant, and the combined negative emotions and situations score was significantly correlated with BMI.

BMI

To calculate BMI, I used the English system. Weight in pounds was divided by height in inches squared and then multiplied by 703 (see CDC, n.d.). The calculated BMI was interpreted according to CDC guidelines: below 18.5 is underweight, 18.5–24.9 is healthy weight, 25–29.9 is overweight, and 30 and above is obese (CDC, 2021).

SES

Income categories were used to operationalize SES. Participants were asked to select the category within which their individual income fell. Categories included under $25,000, $25,001–$35,000, $35,001–$45,000, $45,001–$55,000, $55,001–$65,000, and over $65,000.

Data Analysis Plan

The software used for data analysis was the IBM Statistical Package for the Social Sciences Version 28. Preliminary data cleaning and screening included a review of all submitted surveys to check for completeness before including them in the data analysis.

To begin data analysis, I performed simple regressions for each predictor variable with the criterion variable. Next, the assumptions for multiple regression were tested, including the observation of histograms, which were examined for each variable to check for normal distribution (skewness and kurtosis; Warner, 2013). Additionally, scatterplots for every pair of variables were constructed to check for linearity, homogeneous variance, and presence of extreme bivariate outliers.

The analyzed data were used to address the following research questions and hypotheses:

RQ1: Does emotional eating predict BMI?

H_o1: There will be no correlation between emotional eating and BMI

H_a1: There will be a significant positive correlation between EE and BMI

RQ2: Does nutritional knowledge predict BMI?

H_o2: There will be no correlation between nutritional knowledge and BMI

H_a2: There will be a significant negative correlation between nutritional knowledge and BMI

RQ3: Does SES predict BMI?

H_o3: There will be no correlation between SES and BMI

H_a3: There will be a significant negative correlation between SES and BMI

RQ4: When combined, do emotional eating, nutritional knowledge, and SES predict BMI?

H_o4: When combined, emotional eating, nutritional knowledge, and SES will not predict BMI.

H_a4: When combined, emotional eating, nutritional knowledge, and SES will significantly predict BMI.

A standard multiple regression analysis was performed to test these hypotheses. To test the assumptions of multiple regression analysis (Laerd, 2018), I first ran a Durbin-Watson test to check for independence of observations. Next, scatterplots were used to check for linearity, and line of best fit was observed to check for homoscedasticity. Additionally, a correlation matrix was run to examine correlation coefficients and tolerance/ variance inflation factor values were observed to check for multicollinearity. Lastly, Cook's Distance was run to check for extreme outliers, and histograms were observed to check that residuals were approximately normally distributed.

The rationale for including the potential covariates and/or confounding variables of emotional eating, nutritional knowledge, and SES was that they were known to be useful predictors of BMI. Additionally, I expected that including the three predictors would account for a greater proportion of explained variance in BMI scores than each predictor alone. After making a prediction about the relationships between emotional eating, nutritional knowledge, SES, and BMI, I checked the accuracy of my prediction by calculating the coefficient of determination, r^2. Next, an analysis of variance was applied to determine statistical significance of the regression model expressed in r^2. Pearson's r was used to determine the strength and direction of relationships. Lastly, the F statistic was calculated, and results were interpreted by comparing the obtained F statistic to the F critical value at the .05 significance level to determine whether to reject the null hypotheses.

Threats to Validity

Threats to external validity included sampling bias and environmental effect. Sampling bias may have occurred due to the use of convenience sampling generated from the internet. This potential threat was noted in the limitations section as limiting generalizability of results. Additionally, the validity of the survey instruments to be used was determined using college populations (Kliemann et al., 2016; Nolan et al., 2007), which may have threatened validity in the general population sample. Environmental effect may have influenced participant responses if the participant was not in a comfortable environment and/or the participant was not alone when taking the survey. To address this potential threat, I asked participants to complete the survey on their own in a quiet room away from others where they felt comfortable.

Threats to internal validity may have included history and social desirability bias (see Warner, 2013). History may have affected participant responses in the way that they answered based on personal history, which may vary significantly among participants. This potential threat was noted in the limitation section as a potential limitation. Social desirability bias may have led participants to respond in a particular way to minimize a potential negative view of themselves and/or maximize a potential positive view of themselves. To address this potential threat, I asked participants to answer questions truthfully based on their knowledge and feelings. Finally, the varying ways the COVID-19 pandemic has been managed may have had an effect on individuals' eating patterns and behaviors (see Schulte et al., 2022).

No threats to construct validity were known to exist. The instruments chosen had good construct validity (see Kliemann et al., 2016; Nolan et al., 2007). Additionally, the expected effect size yielded detectable and meaningful results giving good statistical conclusion validity.

Ethical Procedures

The sites used to recruit participants were social media platforms accessible to the general public and a school-based research participant pool. Potential ethical concerns related to recruitment were addressed by considering only individuals 18 years of age and older in the general population. Before participants began the survey, I obtained permission from the Walden University Institutional Review Board (IRB) to conduct the study. After IRB approval (number 08-16-22-0268932), participants were provided with the details of the study, including their voluntary participation and their right to withdraw at any time. Additionally, participants were informed of the potential for harm no greater than that encountered in their everyday lives and were provided a resource for seeking assistance if they felt they had been harmed from their participation in the study. Lastly, the contact information for the school was provided to participants so that they could ask any further questions or file a complaint about their participation in the study.

There were no ethical concerns related to data collection because participants were considered willing participants after giving informed consent. If participants did not provide all requested data on the survey, the survey was treated as incomplete and excluded from data analysis procedures. Collected survey data was anonymous because participants completed surveys using an external link to the survey where personally

identifying data was not collected. The collected survey data and demographic information was downloaded and stored on a laptop designated for dissertation data collection and analysis only. It should be noted that after the collected data was downloaded it was not stored on the collection site. The data was password protected and only accessed by me to ensure confidentiality. Data will be retained for a period of 5 years at which time the laptop will be destroyed.

Summary

The purpose of this multiple regression analysis was to examine the combined and relative effects of emotional eating, nutritional knowledge, and SES in predicting BMI. Through the use of a survey design, I was able to anonymously collect potentially sensitive data. Additionally, I was able to collect a large enough sample of data for analysis at a single timepoint. The use of a multiple regression analysis allowed me to examine these variables simultaneously which helped to clarify potential covariate/confounding relationships that may have existed amongst emotional eating, nutritional knowledge, and SES when predicting BMI. In Chapter 4, I will detail the data collection procedures and provide the results for the previously mentioned analyses.

Chapter 4: Results

Chapter 4 provides a review of the study, a restatement of the research questions

and hypotheses, and a description of the data collection procedures, descriptive statistics,

and results of the inferential analyses performed. I also include an evaluation of the

statistical assumptions appropriate for multiple regression analysis and report the

statistical analysis findings, organized by research question, including tables and figures

to illustrate the findings. The chapter concludes with a summary of the answers to the

research questions and provides an introduction to Chapter 5.

Purpose

The purpose of this quantitative study was to examine the combined and relative

effects of emotional eating, nutritional knowledge, and SES in predicting BMI. The

collected data were analyzed to address the following research questions and hypotheses:

RQ1: Does emotional eating significantly predict BMI?

H_o1: There will be no correlation between emotional eating and BMI

H_a1: There will be a significant correlation between emotional eating and BMI

RQ2: Does nutritional knowledge significantly predict BMI?

H_o2: There will be no correlation between nutritional knowledge and BMI

H_a2: There will be a significant correlation between nutritional knowledge and

BMI

RQ3: Does SES significantly predict BMI?

H_o3: There will be no correlation between SES and BMI

H_a3: There will be a significant correlation between SES and BMI

RQ4: When combined, do emotional eating, nutritional knowledge, and SES

significantly predict BMI?

H_o4: When combined, emotional eating, nutritional knowledge, and SES will not

significantly predict BMI.

H_a4: When combined, emotional eating, nutritional knowledge, and SES will

significantly predict BMI.

The outcome variable was BMI, which was a continuous variable constructed

from height and weight measures participants reported in the collected survey data. The

predictor variables were emotional eating (measured by the Emotional Appetite

Questionnaire Negative Average Score), nutritional knowledge (measured by the General

Nutrition Knowledge Questionnaire- Revised Score), and SES (measured by income

category). All variables were continuous and constructed from the scores reported in the

collected survey data. None of the predictor variables were controlled for. The rationale

for selecting these predictor variables was to determine the relative proportion of the

variance in BMI scores accounted for by emotional eating, nutritional knowledge, and

SES.

Data Collection

The time frame for data collection was approximately 6 months, during which

time participants anonymously completed the survey through a link posted on social

media platforms (Facebook, Instagram, and Twitter) or through the Walden University

research participant pool. There were 81 surveys submitted, of which only 76 were

deemed complete with no missing data. The original data collection plan was estimated to

conclude within 12 weeks or whenever the first 76 completed surveys were collected; however, the 76 surveys were collected in 28 weeks. Additionally, the original data collection plan was to collect survey data through a link posted on the Facebook platform only. After 12 weeks of data collection, permission was obtained from the IRB to modify the data collection procedure to include the additional social media platforms, specifically Instagram and Twitter, as well as the Walden University research participant pool. Although four different sites were used for data collection, the same link to the survey was used at each of the four sites. Therefore, it is not possible to determine how many participants were recruited from each individual site. However, it is believed that use of the additional sites aided in a timelier completion of data collection.

Descriptive Statistics

The average age of participants in the study sample was 44.68 years with a standard deviation of 12.6; the youngest participant was 21 years of age, and the oldest participant was 76 years of age. Participants identified as 78% female, 18% male, and 4% nonbinary. Approximately 71% of participants identified as White, 14% Black or African American, 8% Hispanic or Latino, 3% Asian or Asian American, and 4% another race.

Almost half of participants (49%) fell into the BMI category ranked, "obese," which is defined as having a BMI over 30 (see Table 1). The sample population of interest was the general population, and this sample was believed to be representative of the proportion of individuals in the different BMI categories in the general population (CDC, 2022).

Table 1

Sample Statistics for BMI Category

| BMI Category	*f*	%
Healthy weight 18.5–24.9	14	18.4
Overweight 25.0–29.9	25	32.9
Obese 30 and above	37	48.7

Note. f = frequency.

Results

The average score for the Emotional Appetite Questionnaire Negative Score was 4.6 on a 9-point scale, with a standard deviation of 1.58. The average score on the General Nutrition Knowledge Questionnaire- Revised was 63.4 out of a possible 88, with a standard deviation of 9.7. The mode for income category was Category 6 (over $65K), with 62% of participants in the sample reporting this income category. The average BMI score was 30.2 with a standard deviation of 6.7.

Evaluation of Assumptions

RQ1

To answer RQ1 (does emotional eating significantly predict BMI?), I performed a simple logistical regression analysis. A scatterplot of Emotional Appetite Questionnaire Negative Score against BMI was plotted (see Figure 1). Visual inspection of this scatterplot indicated no linear relationship between the variables.

Figure 1

Scatterplot for Emotional Eating Negative Average Score (EENS) and Body Mass Index

(BMI)

Scatter Plot of Body Mass Index by Emotional Appetite Questionnaire Negative Average Score
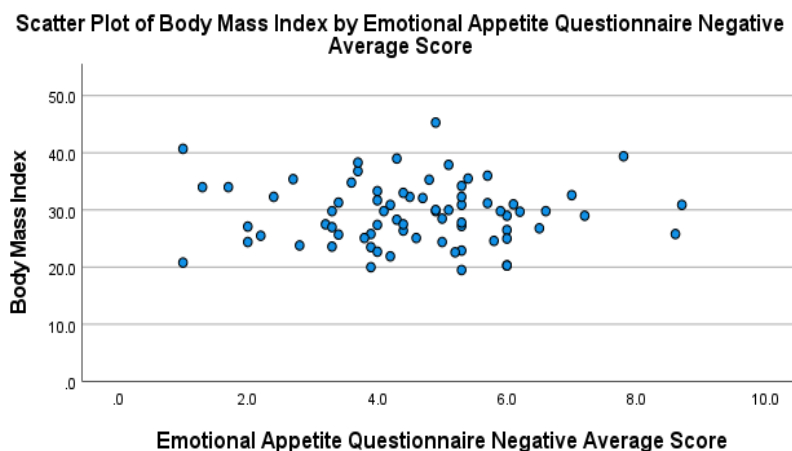
There was independence of residuals, as assessed by a Durbin-Watson statistic of

2.13 (see Table 2). This meant that I was able to tell how much of the variability in BMI

was accounted for by Emotional Appetite Questionnaire Negative Score independently.

Table 2

Simple Regression Model Summary for EENS and BMI

| Model	R	R^2	Adj. R^2	SEM	Durbin-Watson
1	.010	.000	-.014	5.40	2.13

Note. R = multiple correlation, R^2 = multiple correlation squared, Adj. R^2 = adjusted

multiple correlation squared, *SEM* = standard error of measurement.

There were three extreme outliers that were removed from analysis. Specifically,

three participants were outliers with BMIs of 54.2, 49.9, and 48.1. These data points were

removed from analysis due to their values being far from their predicted values and

therefore skewing results. There was homoscedasticity as assessed by visual inspection of a plot of standardized residuals versus standardized predicted values (see Figure 2).
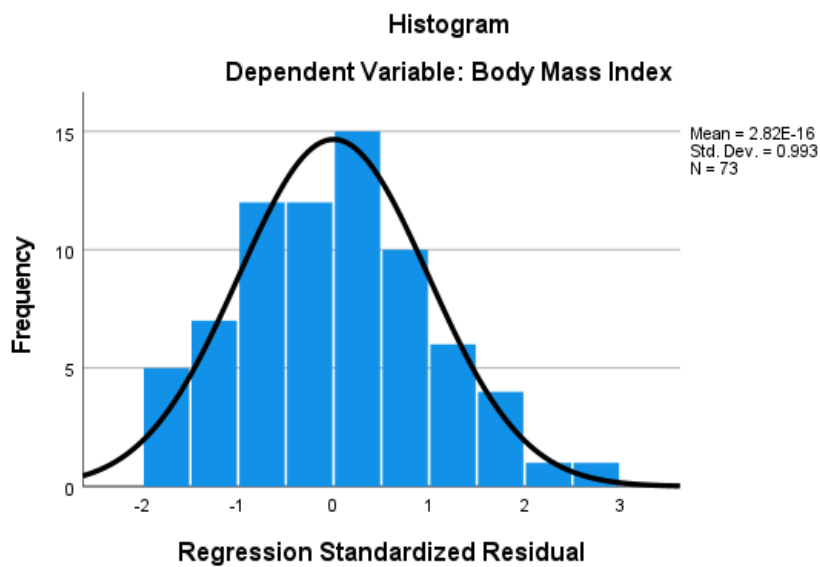
Figure 2

*Scatterplot of Residuals for EENS and BMI*
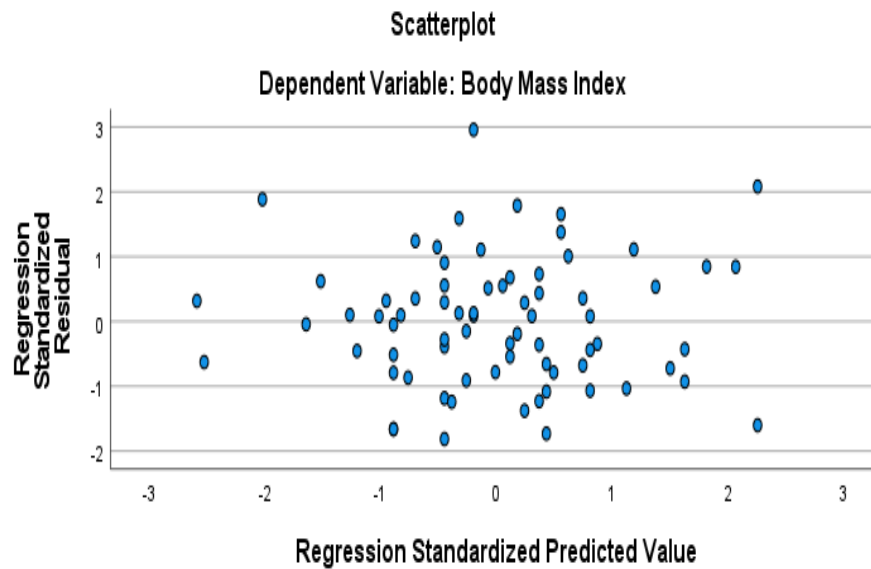
Residuals, or the amount of variance in BMI left after accounting for Emotional Appetite Questionnaire Negative Score, were normally distributed as assessed by visual inspection of a histogram and normal probability plot (see Figures 3 and 4).

Figure 3

Histogram of Residuals for EENS and BMI

Figure 4

Normal P-P Plot of Residuals for EENS and BMI
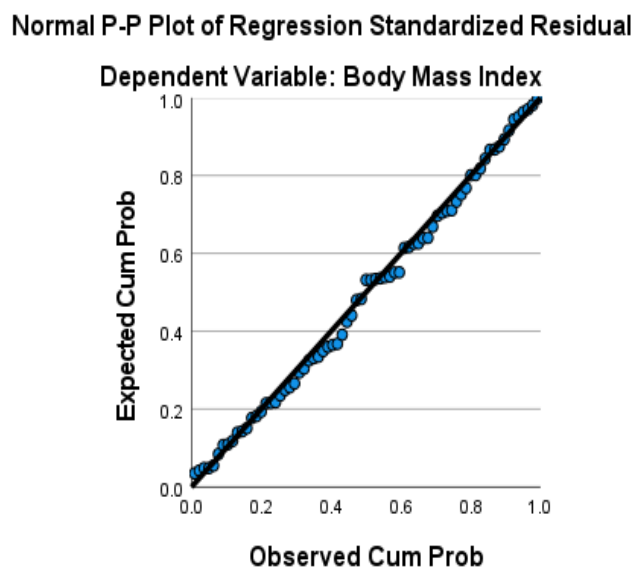
Emotional eating accounted for 0% of the variance in BMI with adjusted $R^2 = -1.4\%$, a small effect size according to Cohen's d (Warner, 2013). Emotional eating did not significantly predict BMI, $F(1, 71) = .008$, $p = .931$ (see Tables 3 and 4).

Table 3

Analysis of Variance of Residuals for EENS and BMI

Model		SS	df	MS	F
1	Regression	.219	1	.219	.008
	Residual	2074.06	71	29.21	
	Total	2074.28	72		

Note. SS = sum of squares, *df* = degrees of freedom, *MS* = mean square, *F* = Fisher's F ratio.

Table 4

Coefficients of Regression for EENS and BMI

		Unstandardized coefficients			
		B	SE	t	Sig.
1	(Constant)	29.48	1.94	15.17	<.001
	Emotional Appetite Questionnaire Negative Average Score	-.035	.401	-.087	.931

*Note. B* = constant, *SE* = standard error, *t* = t value, Sig. = significance level.

RQ2

To answer RQ2 (does nutritional knowledge significantly predict BMI?), I performed a simple logistical regression analysis. A scatterplot of General Nutrition Knowledge Questionnaire- Revised Score against BMI was plotted (see Figure 5). Visual inspection of this scatterplot indicated no linear relationship between the variables.

Figure 5

Scatterplot for Nutrition Knowledge Score (NKS) and Body Mass Index (BMI)
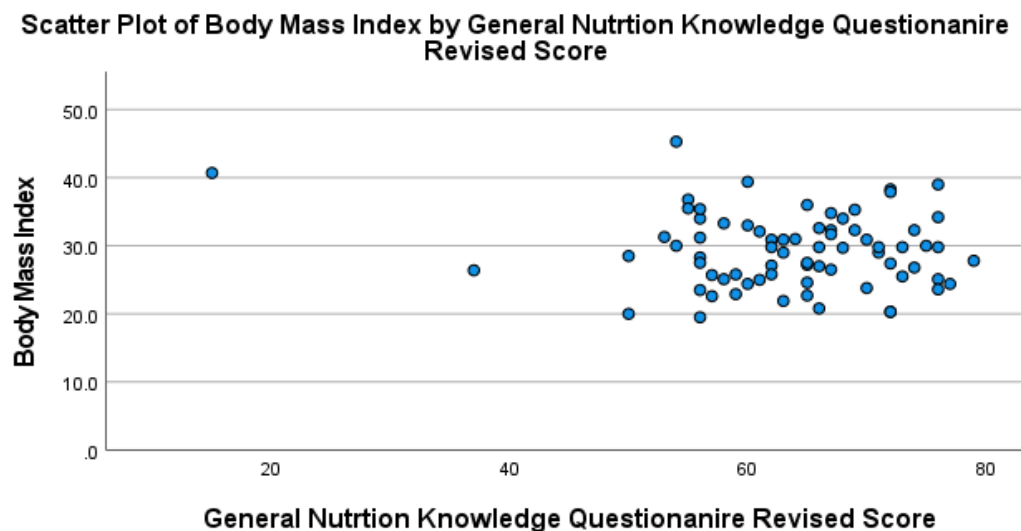
Scatter Plot of Body Mass Index by General Nutrtion Knowledge Questionanire Revised Score

There was independence of residuals as assessed by a Durbin-Watson statistic of 2.17 (see Table 5). This meant that I was able to tell how much of the variance in BMI was accounted for by General Nutrition Knowledge Questionnaire- Revised Score independently.

Table 5

Simple Regression Model Summary for NKS and BMI

| Model	R	R^2	Adj. R^2	*SEM*	Durbin-Watson
1	.135	.018	.004	5.36	2.17

Note. R = multiple correlation, R^2 = multiple correlation squared, Adj. R^2 = adjusted multiple correlation squared, *SEM* = standard error of measurement.

There were three extreme outliers that were removed from analysis. Specifically, three participants were outliers with BMIs of 54.2, 49.9, and 48.1. These data points were

removed from analysis due to their values being far from their predicted values and therefore skewing results. There was homoscedasticity as assessed by visual inspection of a plot of standardized residuals versus standardized predicted values (see Figure 6).

Figure 6

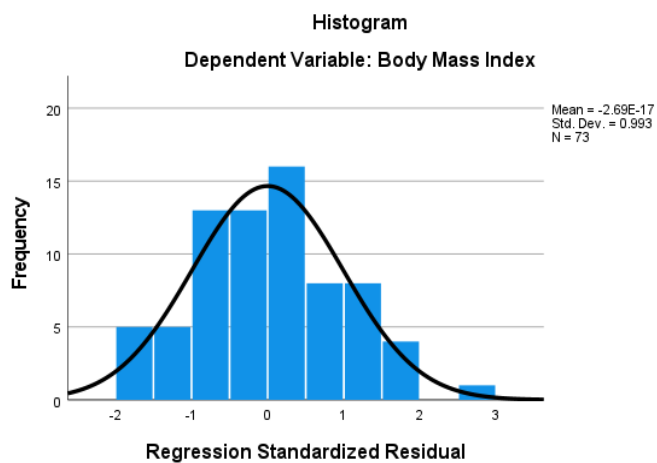*Scatterplot of Residuals for NKS and BMI*
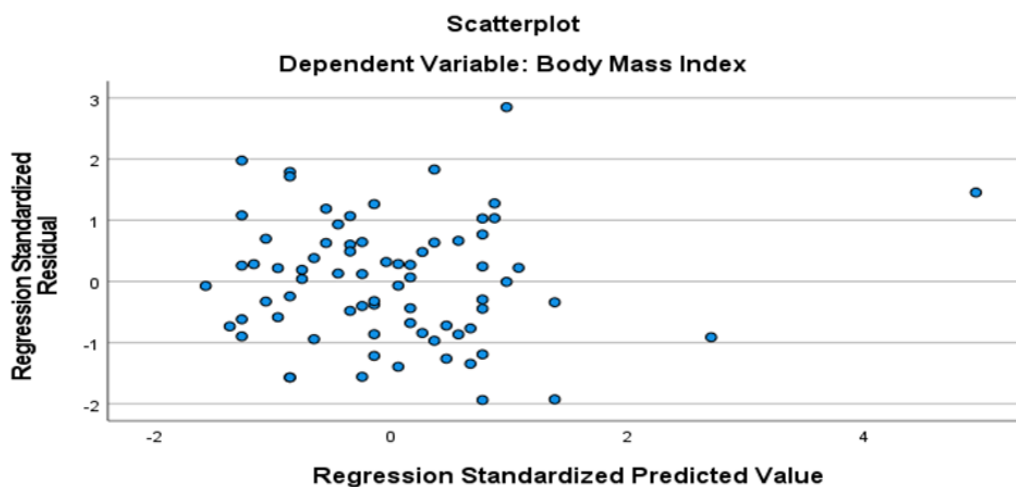
Residuals, or the amount of variance in BMI left after accounting for General Nutrition Knowledge Questionnaire- Revised Score, were normally distributed as assessed by visual inspection of a histogram and normal probability plot (see Figures 7 and 8).

Figure 7

Histogram of Residuals for NKS and BMI

Figure 8

Normal P-P Plot of Residuals for NKS and BMI
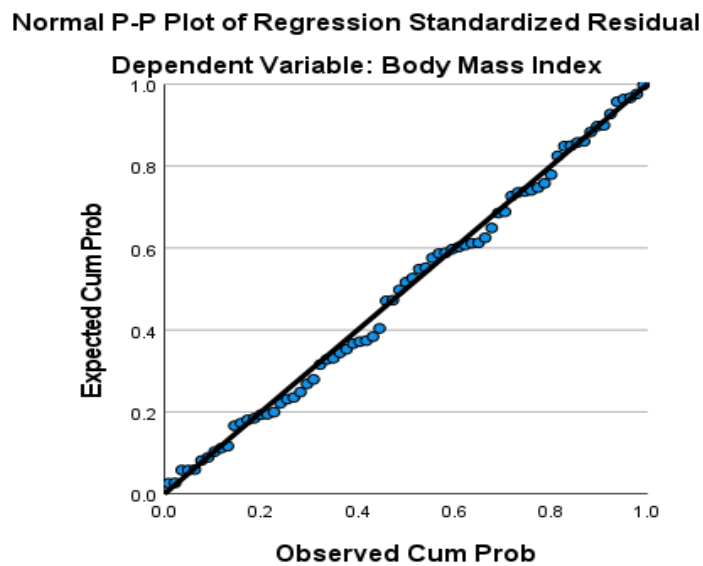
Nutritional knowledge accounted for 1.8% of the variation in BMI with adjusted $R^2 = .4\%$, a small effect size according to Cohen's *d* (Warner, 2013). Nutritional knowledge did not significantly predict BMI, $F (1, 71) = 1.32$, $p = .254$ (see Tables 6 and 7).

Table 6

Analysis of Variance of Residuals for NKS and BMI

Model		SS	df	MS	F	Sig.
1	Regression	37.89	1	37.89	1.32	.254
	Residual	2036.39	71	28.68		
	Total	2074.28	72			

Note. SS = sum of squares, *df* = degrees of freedom, *MS* = mean square, *F* = Fisher's F ratio, Sig. = significance level.

Table 7

Coefficients of Regression for NKS and BMI

Model		Unstandardized coefficients		t	Sig.
		B	SE		
1	(Constant)	34.01	4.13	8.24	<.001
	General Nutrition Knowledge Questionnaire Revised Score	-.074	.064	-1.15	.254

Note. B = constant, *SE* = standard error, *t* = t value, Sig. = significance level.

RQ3

To answer RQ3, does SES significantly predict BMI? a simple logistical regression analysis was performed. A scatterplot of SES, as represented by income

category, against BMI was plotted (see Figure 9). Visual inspection of this scatterplot

indicated no linear relationship between the variables.

Figure 9

Scatterplot for Socioeconomic Status (SES) and Body Mass Index (BMI)
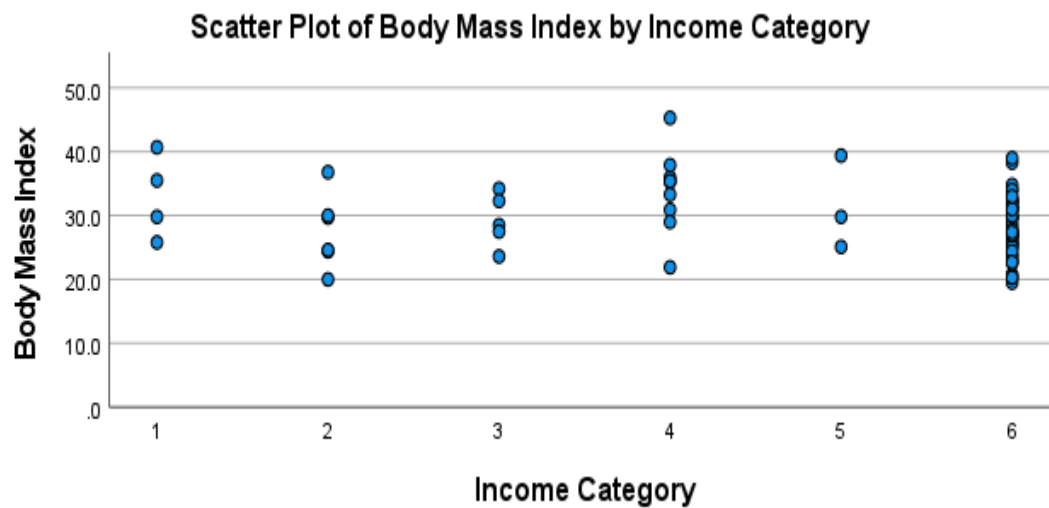
There was independence of residuals, as assessed by a Durbin-Watson statistic of

2.17 (see Table 8). This meant that I was able to tell how much of the variance in BMI

was accounted for by SES independently.

Table 8

Simple Regression Model Summary for SES and BMI

Model	R	R^2	Adj. R^2	SEM	Durbin-Watson
1	.187	.035	.021	5.31	2.17

Note. R= multiple correlation, R^2 = multiple correlation squared, Adj. R^2 = adjusted multiple correlation squared, SEM = standard error of measurement.

There were three extreme outliers that were removed from analysis. Specifically, three participants were outliers with BMIs of 54.2, 49.9, and 48.1. These data points were removed from analysis due to their values being far from their predicted values and hence skewing results.

There was homoscedasticity, as assessed by visual inspection of a plot of standardized residuals versus standardized predicted values (see Figure 10).

Figure 10

Scatterplot of Residuals for SES and BMI

Scatterplot
Dependent Variable: Body Mass Index
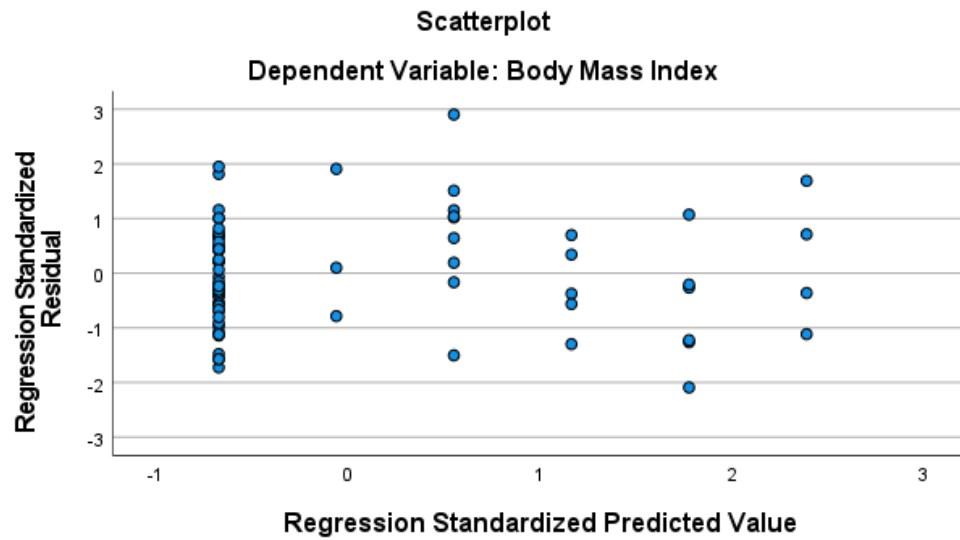
Residuals, or the amount of variance in BMI left after accounting for SES, were

normally distributed as assessed by visual inspection of a histogram and normal

probability plot (see Figures 11 and 12).

Figure 11

Histogram of Residuals for SES and BMI
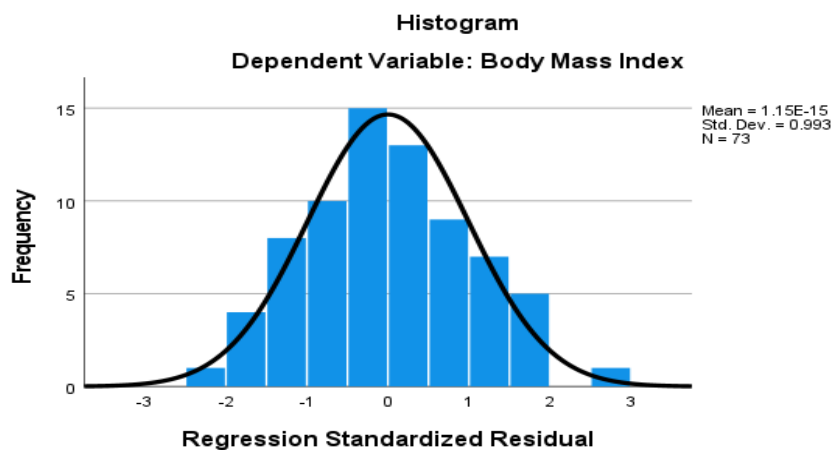
Figure 12

Normal P-P Plot of Residuals for SES and BMI
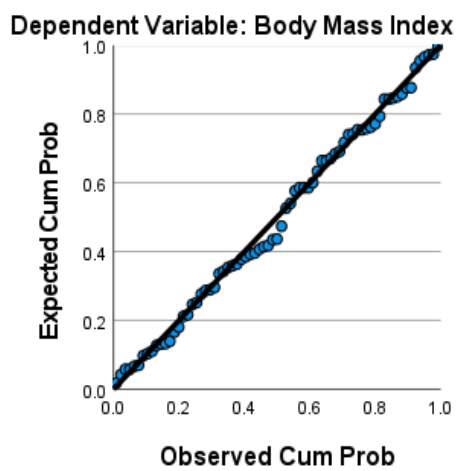
Socioeconomic status accounted for 3.5% of the variation in BMI with adjusted $R^2 = 2.1\%$, a small effect size according to Cohen's d (Warner, 2013). Socioeconomic status did not significantly predict BMI, F (1, 71) = 2.57, $p = .114$ (see Tables 9 and 10).

Table 9

Analysis of Variance of Residuals for SES and BMI

Model		SS	df	MS	F	Sig.
1	Regression	72.34	1	72.34	2.57	.114
	Residual	2001.94	71	28.20		
	Total	2074.28	72			

Note. *SS* = sum of squares, *df* = degrees of freedom, *MS* = mean square, *F* = Fisher's F ratio, Sig. = significance level.

Table 10

Coefficients of Regression for SES and BMI

Model		Unstandardized coefficients		t	Sig.
		B	SE		
1	(Constant)	32.33	1.98	16.34	<.001
	Income Category	-.613	.383	-1.60	.114

Note. *B* = constant, *SE* = standard error, *t* = t value, Sig. = significance level.

RQ4

To answer RQ4, when combined, do emotional eating, nutritional knowledge, and SES significantly predict BMI? a multiple regression was performed. The assumptions of multiple regression analysis were tested. There was independence of residuals, as assessed by a Durbin-Watson statistic of 2.28 (see Table 11).

Table 11

Multivariate Regression Model Summary for EENS, NKS, SES, and BMI

| Model	R	R^2	Adj. R^2	*SEM*	Durbin-Watson
1	.144	.021	-.023	4.95	2.28

Note. R = multiple correlation, R^2 = multiple correlation squared, Adj. R^2 = adjusted multiple correlation squared, *SEM* = standard error of measurement.

The assumption of linearity was tested for by observing: (1) a scatterplot of the studentized residuals plotted against the unstandardized predicted values (see Figure 13)

Figure 13

Scatterplot of Residuals for EENS, NKS, SES, and BMI

Scatter Plot of Studentized Residual by Unstandardized Predicted Value
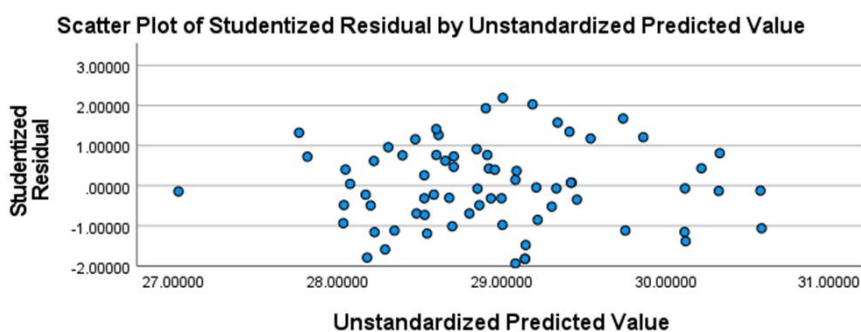
and (2) partial regression plots between each independent variable and the dependent variables (see Figures 14, 15, and 16).

Figure 14

Partial Scatterplot of Residuals for EENS and BMI

Partial Regression Plot

Dependent Variable: Body Mass Index
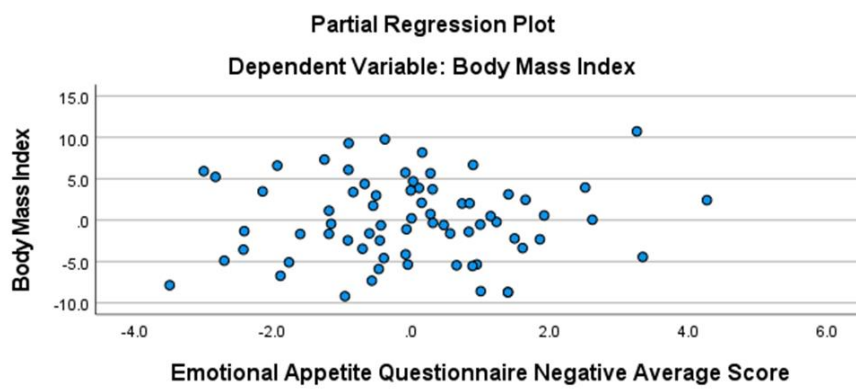
Figure 15

Partial Scatterplot of Residuals for NKS and BMI

Partial Regression Plot

Dependent Variable: Body Mass Index
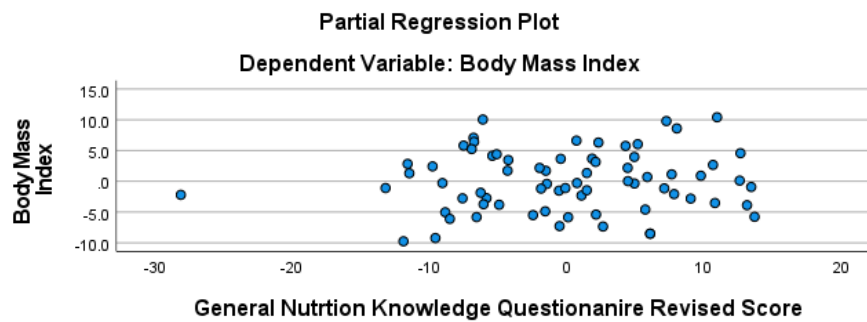
The residuals form a horizontal band, therefore, the relationship between the dependent variable and independent variables is likely to be linear.

Figure 16

Partial Scatterplot of Residuals for SES and BMI
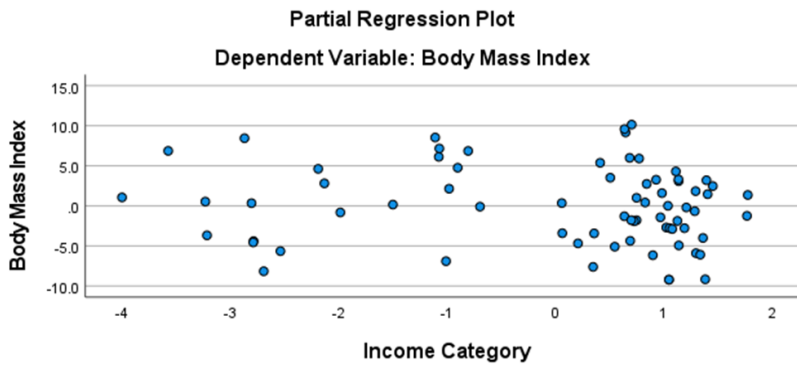
Additionally, partial regression plots showed no linear relationship between BMI and emotional eating; no linear relationship between BMI and nutritional knowledge; and no linear relationship between BMI and SES.

Table 12

Multivariate Regression Model of Coefficients for EENS, NKS, SES, and BMI

Model		Unstandardized coefficients			Collinearity statistics	
		B	*SE*	Sig.	Tolerance	VIF
1	(Constant)	26.59	5.23	<.001		
	Emotional Appetite Questionnaire Negative Average Score	.104	.388	.790	.965	1.04
	General Nutrition Knowledge Questionnaire Revised Score	.056	.075	.462	.973	1.03
	Income Category	-.346	.382	.369	.954	1.05

Note. B = constant, *SE* = standard error, Sig. = significance level, VIF = variance inflation factor.

There was homoscedasticity, as assessed by visual inspection of the scatterplot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by observation of correlation coefficients and Tolerance values (see Table 12). None of the independent variables had correlations greater than 0.7, and all of the Tolerance values were greater than 0.1, so there was no problem with collinearity.

To test for extreme outliers in the data, case-wise diagnostics and studentized deleted residuals, were observed for cases with residuals greater than ±3 standard deviations from the mean, which resulted in the removal of 3 cases from the regression analysis. Observation of studentized residuals showed 2 potential outliers, which were removed from analysis. Additionally, there was one case with a leverage value greater

than 0.2, which was removed from analysis. There were no values for Cook's distance

above 1, therefore, the assumption of no extreme outliers appears to have been met.

Figure 17

Histogram of Residuals for EENS, NKS, SES, and BMI
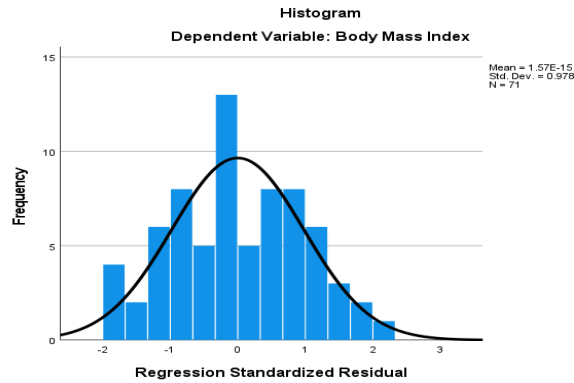
The assumption of normality was assessed by observation of a histogram and P-P

plot (see Figures 17 and 18). Observation of a P-P plot showed that the observation points

were aligned along the diagonal line and the residuals appeared to be approximately

normally distributed, therefore, the assumption of normality was not violated.

Figure 18

Normal P-P Plot of Residuals for EENS, NKS, SES, and BMI

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Body Mass Index
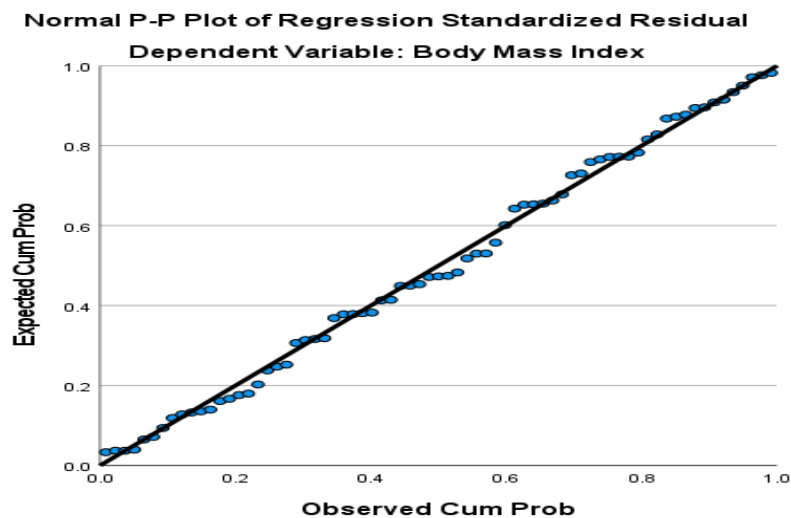
Statistical Analysis Findings

RQ1

Emotional eating did not statistically significantly predict BMI, $F (1, 71) = .008$, $p = .931$, accounting for 0% of the variance in BMI with adjusted $R^2 = -1.4\%$, a small effect size according to Cohen's d (Warner, 2013). A one-point increase in score of emotional eating leads to a 0.04, 95% CI [-0.83, 0.76] decrease in BMI. The regression equation for these results would be Predicted BMI = 29.48 – (0.04 x EEN).

RQ2

Nutritional knowledge did not statistically significantly predict BMI, $F (1, 71) = 1.32$, $p = .254$, accounting for 1.8% of the variation in BMI with adjusted $R^2 = .4\%$, a small effect size according to Cohen's d (Warner, 2013). A one-point increase in score of

nutritional knowledge leads to a 0.07, 95% CI [-0.20, 0.05] decrease in BMI. The

regression equation for these results would be Predicted BMI = 34.010 – (0.07 x NKS).

RQ3

Socioeconomic status did not significantly predict BMI, F (1, 71) = 2.57, p =

.114, accounting for 3.5% of the variation in BMI with adjusted R^2 = 2.1%, a small effect

size according to Cohen's d (Warner, 2013). A one category increase in income leads to a

0.61, 95% CI [-1.38, 0.15] decrease in BMI. The regression equation for these results

would be Predicted BMI = 32.33 – (0.61 x SES).

RQ4

While holding the effects of the other predictors constant, emotional eating did

not significantly predict BMI, $t(67)$ = .267, p = .790. For each 1- point increase in

negative emotional eating, BMI is expected to increase by .104 points. While holding the

effects of the other predictors constant, nutritional knowledge did not significantly predict

BMI, $t(67)$ = -.740, p = .462. For each 1- point increase in nutritional knowledge, BMI is

expected to increase by .056 points. While holding the effects of the other predictors

constant, SES did not significantly predict BMI, $t(67)$ = -.904, p = .369. For each 1-point

increase in SES, BMI is expected to decrease by .346 points. The regression equation for

these results would be Predicted BMI = 26.59 + (.104 x EEN) + (.056 x NKS) – (.346 x

SES).

A multiple correlation coefficient of .245 indicates a very weak level of

association. The R^2 for the overall model was .1% with an adjusted R^2 of .01%, a small

effect size according to Cohen's d (Warner, 2013). This means that the addition of all our

independent variables into a regression model explained 1% of the variability of our

dependent variable, BMI.

Table 13

Analysis of Variance of Residuals for the Multiple Regression Model

Model		SS	df	MS	F	Sig.
1	Regression	34.94	3	11.65	.475	.701
	Residual	1643.96	67	24.54		
	Total	1678.90	70			

Note. *SS* = sum of squares, *df* = degrees of freedom, *MS* = mean square, *F* = Fisher's F
ratio, Sig. = significance level.

The multiple regression model did not statistically significantly predict BMI, F(3,

67) = .475, p = .701, adj. R^2 = -.023 (see Table 13). When combined, the three variables

did not statistically significantly add to the prediction of BMI, p = .701. The answer to

my research question then is, no, when combined emotional eating, nutritional

knowledge, and SES do not significantly predict BMI.

Summary

In summary, emotional eating, nutritional knowledge, and SES did not

statistically significantly predict BMI, $F(3, 67)$ = .475, p = .701. This means that

combining the independent variables of emotional eating, nutritional knowledge, and SES

did not provide a model that is statistically significantly better at predicting BMI than the

mean model and it was not a statistically significantly better fit to the data than the mean

model. These findings appear somewhat surprising but informative, nonetheless. In

Chapter 5 I will interpret the study findings, highlight potential limitations, provide

recommendations for future research, and discuss the implications of the findings.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to determine whether emotional eating, nutritional knowledge, and socioeconomic status could better predict BMI when combined as compared to each factor's ability to predict BMI alone. I hypothesized that when combined, the three factors together could account for more of the variance in BMI than any of the factors alone. The goal was to determine whether a model of predicting BMI may be discovered that would lend to the possibility of helping develop more tailored or efficacious interventions that would help improve individuals' health by preventing an unnecessary rise in BMI, which adversely impacts overall health.

Findings indicated that more research is needed to understand the role that emotional eating, nutritional knowledge, and SES play in contributing to and predicting BMI. Emotional eating was shown to be predictive in the sense that the highest BMIs also had the highest emotional eating scores. However, results were not found to be statistically significant. Nutrition knowledge was not found to be a statistically significant predictor, and SES was not adequately represented throughout the sample in that most participants reported an income above $65,000.

In this chapter, an interpretation of the study findings is presented. Next, some limitations are highlighted along with recommendations for future research. Lastly, the implications of the findings are shared with some concluding thoughts.

Interpretations of the Findings

The null hypothesis for RQ1 was there is no correlation between emotional eating and BMI. The alternative hypothesis was there is a significant positive correlation

between emotional eating and BMI. Emotional eating did not statistically significantly predict BMI, $F(1, 71) = .008$, $p = .931$; therefore, the null hypothesis was not rejected.

The null hypothesis for RQ2 was there is no correlation between nutritional knowledge and BMI. The alternative hypothesis was there is a significant negative correlation between nutritional knowledge and BMI. Nutritional knowledge did not statistically significantly predict BMI, $F(1, 71) = 1.32$, $p = .254$; therefore, the null hypothesis was not rejected.

The null hypothesis for RQ3 was there is no correlation between SES and BMI. The alternative hypothesis was there is a significant negative correlation between SES and BMI. SES did not significantly predict BMI, $F(1, 71) = 2.57$, $p = .114$; therefore, the null hypothesis was not rejected.

The null hypothesis for RQ4 was when combined, emotional eating, nutritional knowledge, and SES do not predict BMI. The alternative hypothesis was when combined, emotional eating, nutritional knowledge, and SES significantly predict BMI. While holding the effects of the other predictors constant, emotional eating did not significantly predict BMI $t(67) = .267$, $p = .790$. While holding the effects of the other predictors constant, nutritional knowledge did not significantly predict BMI, $t(67) = -.740$, $p = .462$. While holding the effects of the other predictors constant, SES did not significantly predict BMI, $t(67) = -.904$, $p = .369$. Therefore, the null hypothesis for the model was not rejected.

Although not statistically significant, the results of this study address the role that the factors of emotional eating, nutritional knowledge, and SES play in helping to predict

BMI. When the three independent predictors were examined individually, SES showed the highest level of predictability while accounting for about 3% of the variance in BMI, while emotional eating accounted for less than 1% and nutritional knowledge accounted for less than 2% of the variance in BMI. When examining the factors together as predictors, SES was also the strongest predictor allowing for a .346-point decrease in BMI as SES increased. Emotional eating only showed a .104-point increase in BMI as negative emotional eating increased, and nutritional knowledge showed a .056-point increase in BMI as nutritional knowledge increased.

This last point may seem counterintuitive because a person may expect BMI to decrease as nutritional knowledge increased. However, as other research has shown, increase in nutritional knowledge does not always translate into improved nutritional habits (Park & Im, 2021). For example, some studies found that nutrition education alone was not enough to induce health change due to participants lacking practical skills to apply the knowledge (M. L. Garcia et al., 2019). Education-based programs have helped to increase nutrition knowledge in several populations including adults and children as well as normal weight and overweight/obese individuals (Franciscato et al., 2019). Additionally, parental involvement in nutrition education programs for children has been shown to positively influence results in that children were able to apply the nutrition knowledge they attained (Myers et al., 2018), and the results were longer termed because parental involvement helped the children to continue improving and using health behaviors.

According to the literature, school-based programs have been shown to produce results as far as improving students' nutritional knowledge (El Harake et al., 2018) and in some cases reducing BMI (Selmin & Yildirim, 2020). School-based programs that have used an environment-oriented approach have yielded great success with younger children as far as increasing nutrition knowledge and awareness (Chaudhary et al., 2020; Jakubowski et al., 2018). Additionally, these programs have helped with increasing interest in food-related activities such as food preparation and participation in physical activities (Lin et al., 2019).

Programs that include an experiential component were found to be more effective in terms of increasing health knowledge than education alone (del Rio et al., 2019; LaChausse, 2017). When individuals were shown how to apply what they learned, they were more interested in learning and scored better on measures of nutritional knowledge (Ferguson et al., 2021). This implies that when addressing overweight and obesity conditions, a multicomponent approach to prevention/intervention strategies would be a better alternative than strictly education-based programs (Czepczor-Bernat et al., 2020; Franceschi et al., 2021).

Although emotional eating showed the least variance in predicting BMI in the current study, James et al. (2022) found that young African American women participants reported that learning stress reduction/emotional coping strategies proved more beneficial to their situation than learning healthy eating or physical activity strategies. The women shared their awareness of the need for and desire to use a holistic approach to weight management that addressed emotional eating. In another study with young mothers,

Chang et al. (2019) provided participants with a 16-week stress management intervention including watching videos at home and then participating in peer group discussion. Findings indicated that the women with overweight/obesity reported improved self-efficacy and emotional coping response in both the short and long term.

When considering the factor of SES, the results in the current study indicated that as SES increased BMI decreased. This implies that more economic resources have a positive impact on BMI. However, in a study conducted by Masci et al. (2020), participants cited that although community resources were helpful in dealing with healthy eating and food insecurity, community awareness of such resources was lacking, and this might help explain the lack of use of such programs. Masci et al. suggested that communities should do more to advertise these community-based programs and resources so that more individuals in need can have an awareness of and/or use of these programs. For example, advertising through mail or social media outlets may help to spread the word throughout the community.

Just as being educated in coping strategies/stress management skills may help some individuals reduce emotional eating, being educated in using economic resources may play a role in helping individuals to make healthy nutrition choices. For example, one study showed that when families could manage their resources well, it reduced stress and strain (Jamison et al., 2017). When the family lacked resources or could not make use of what they had, they reported being so stressed they felt it interfered with their ability to parent. Additionally, in a study with African American overweight/obese adolescent participants, the adolescents expressed the desire to learn more coping strategies for

dealing with stress and described being able to talk about and manage stress with their families as a health need (Quattlebaum et al., 2021).

The potential predictive factors in the current study were chosen using strain theory, which is based on the idea that when individuals are lacking resources, they do not make the same decisions they would make if they were not lacking those resources (Agnew et al., 2022; Walsh, 2000). In the current study, I thought that when individuals lack financial resources, nutritional knowledge, and coping resources for efficiently handling emotional crises, they may make poor nutritional choices that would facilitate an increase in BMI. The results of this study indicated that members of the general population who reported having an average level of income and nutritional knowledge also reported being in the overweight BMI category. According to strain theory, this information would suggest that it would not be lack of knowledge or finances that is contributing to higher BMIs. Additionally, those with the highest BMIs also had the highest emotional eating scores. This would indicate that emotional eating may contribute significantly to higher BMIs in those individuals who are choosing emotional eating as a sole coping strategy. Therefore, under the lens of strain theory, the findings indicate that a lack of knowledge and/or skills to apply nutrition knowledge and a lack of education about better coping strategies and how to use them may have more to do with having a higher BMI than lack of nutrition knowledge or lack of finances.

Limitations of the Study

One of the limitations of the study was that convenience sampling was used, which resulted in not all income categories being represented. The predictor variable for

SES was recorded and analyzed according to income categories with a bracket of $10,000 ranging from under $25,000 to above $65,000. Most participants reported their income to be above $65,000, Although this may be representative of the population of social media users or Facebook users, it may not be representative of the lower SES population in the general public who does not have access to or means of participating in social media. Therefore, future research should consider alternative methods for recruiting participants to collect data from more income categories.

Another limitation was that the outcome variable of BMI was calculated from participants' self-reported height and weight measures. This is a limitation due to the potential error in self-reported data. If there was error in the participants' self-reported height and weight measures, the BMI would not have been accurately represented and could have skewed the data. For example, three extreme cases resulted in creating an outlier condition that skewed the data analysis, resulting in removal of those cases. However, these cases also had the greatest emotional eating scores. Therefore, the findings may have looked different if these cases were included.

A third possible limitation of the study was participant history. History may have affected participant responses in that participants may have answered based on their personal history, which may have varied significantly between participants. Cultural aspects of influence could be examined in future research. Additionally, data were collected after the COVID-19 pandemic; therefore, it is not known how the pandemic may have impacted the results of this study.

Recommendations

One recommendation for future research is to recruit participants using another method to see if more participants could be recruited from other income categories. When there is not sufficient representation, the correlation tends to be smaller (Warner, 2013). This may lead to a different interpretation of the results (Khalaila, 2017) that those who have more income tend to have more knowledge, including nutritional knowledge. Additionally, those who are in the lower SES categories may also possess fewer coping mechanisms and perhaps engage in more emotional eating. Therefore, obtaining a more varied sample is important to gain more clarity regarding how these potential issues may affect the lower SES population.

Another recommendation is to use a targeted sampling method to recruit more individuals from the obese category of BMI. Perhaps this could be accomplished by recruiting potential participants who are bariatric clinic patients and/or members of support groups such as overeaters anonymous. Using a targeted sampling strategy may provide further insight into whether the model is more predictive in that specific population than in the general population.

Lastly, a qualitative study may be conducted to identify other possible contributing factors when individuals with higher nutritional knowledge also have a high BMI. Identifying other possible contributing factors may allow for further quantitative research, which may help determine the nature and strength of the relationship between those factors and BMI as well as whether there are potential mediating or moderating factors that influence the relationship between nutritional knowledge and BMI.

Additionally, the measure used to record nutritional knowledge data was subdivided into 4 separate categories: dietary recommendations; food groups; healthy food choices; and diet, disease, and weight management. Those categories were not analyzed separately. Therefore, future researchers may want to focus on one category in particular or perform a different analysis using data collected from those subcategories.

Implications

The implications of this study are twofold: (a) the three predictor variables may have more predictive ability when examined individually rather than alone, and (b) lack of knowledge, albeit not specifically nutritional knowledge, is a common factor among these three predictor variables. Specifically, when individuals do not have resources or do not know how to use the resources they have, it contributes to poor nutritional decisions (M. L. Garcia et al., 2019). However, poor nutritional decisions do not always equate to overeating or incurring a higher BMI.

When looking at nutritional knowledge predictability, those who do not have a high level of nutritional knowledge generally make poor food decisions due to lack of knowledge (Alkhaldy et al., 2019). However, those who have a higher level of nutritional knowledge do not always use it, which is sometimes a result of not knowing how to apply that knowledge (Molan, 2019). This tends to overlap with lower SES because those with less income have fewer resources for obtaining food, and even when food or resources for obtaining food are provided, individuals lack knowledge of what to do (Jamison et al., 2017).

Lastly, when looking at emotional eating predictability, individuals who engage in emotional eating as a sole source of coping have higher BMIs than individuals who use other coping mechanisms and/or who engage in health behaviors that counteract the effects of emotional eating (Frayn et al., 2018). Specifically, some individuals who emotionally eat do so sporadically and/or have physical jobs or engage in purposeful exercise (Annesi, 2019). These things counteract the negative effects of emotional eating and therefore do not result in a higher BMI (Annesi, 2020).

It is possible that when examining different combinations of these factors, there may be greater predictability. For example, SES and nutritional knowledge or emotional eating and nutritional knowledge might be examined. However, a common factor appears to be that knowledge is lacking whether it is in nutrition specifics, application of nutritional knowledge, or in knowing effective coping strategies to deal with stressful and/or emotional situations.

Conclusion

This study helped highlight the need for more research to determine whether the findings may be replicated or if different findings may emerge given the recommendations and limitations. Targeted sampling strategies may lend more useful results regarding specific predictors. Therefore, future researchers should aim to design studies that will allow for the collection of data from specific populations or demographics.

When looking at social change, multi-component interventions have shown the best outcomes as far as improving health behaviors, in both the short and long term, and

in decreasing body mass index measures among both children and adults (see Blackford et al., 2021). Getting stakeholders involved may be the best approach to furthering research as stakeholders have the means to invest in future research and help with generating resources and support for program creation and implementation (see Tod et al., 2017; Wanjau et al., 2021). Having the vested interest of stakeholders can also help with eliciting policy change(s) where needed to effect change in prevention/ intervention efforts (see Kumanyika, 2018). For example, stakeholders may advocate for changes to minimum wage, government supplemental food programs, and changes in school curriculum to allow for nutritional programs to be added to elementary and middle school programs (see Hamulka et al., 2018). Additionally, teaching individuals effective coping strategies and helping them to increase their coping self-efficacy (see Chang et al. 2021) may help individuals choose better coping methods than emotional eating, also helping to eradicate overweight and obesity conditions.

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