

MOTIVATIONAL FACTORS OF EATING AND EXERCISE BEHAVIORS OF  
NON-OBESE AND OBESE YOUNG ADULTS

by

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## DEDICATION

I dedicate this dissertation to both of my parents, LaQuita Siqueiros and Frank Siqueiros. My parents were always very supportive with anything I chose to do. I am a tall woman; I stand at six feet two inches and reached my full height during pre-adolescence. My parents always told me, tall girls are the most beautiful, smartest, or athletic. They encouraged I always sit or stand tall without slouching. They tried their best to help my self-esteem and insecurities with being so tall at such a young age. I lost both of my parents through this academic journey. Neither one of them attended college but I know they are proud of my academic destination. I love and miss you mom and dad!

As a tall young person I knew I stuck out from the crowd and this dissertation is also dedicated to those young people who feel they stick out from the crowd. Specifically, obese young people who are insecure and lack self-esteem, this dissertation is dedicated to you. As a high school nurse I attempted a small study with a group of obese freshmen who were provided pedometers to track their activity. I awarded an iTunes card to the participant who lost the most weight over a semester. The student who won the card lost the most weight because she had joined the girls' soccer team that had increased her physical activity significantly.

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## ABSTRACT

**Purpose/Aims:** Identify motivational factors of non-obese (BMI 18.5-29) and obese (BMI  $\geq$  30) young adults (20-25 years) of eating and exercise behavior. Specific aims: 1) Compare differences in motivational styles of eating and exercise behavior in two groups of young adults, non-obese and obese, 2) Compare motivational styles controlling for eating and exercise behaviors that moderate the relationship between motivational styles and BMI.

**Background:** Obesity is a worldwide epidemic without adequate prevention or treatment.

Motivational styles of non-obese and obese young adults of eating and exercise behaviors are not fully understood. Organismic Integrated Theory (OIT), a sub theory of Self-Determination Theory (SDT) are human motivation theories used in this study to examine motivational styles. It is hypothesized that non-obese will rate their intrinsic motivation high and obese will rate their extrinsic motivation high.

**Methods:** A comparative descriptive design was used to investigate motivation of eating and exercise behavior in two groups of young adults. Participants completed a demographic survey and three motivation surveys. The three motivation surveys included General (Global) Motivation Scale (GMS), Regulation of Eating Behavior Scale (REBS), and Exercise Regulation Questionnaire (BREQ-3). Logistic regression was used to examine motivational styles in these two groups.

**Results:** Demographic data analysis found significant differences between both groups with having an obese family member, level of education, and medical condition influencing weight. Logistic regression analysis of motivational styles of REBS found those who ranked their external motivation high were 1.5 times likely to be obese. Logistic regression analysis of

motivational styles of BREQ-3 found those who ranked their external motivation high were 2.4 times likely to be obese. On the other hand, those who ranked their integrated motivation high were 0.41 times likely to be obese.

Implications: Nurse practitioners (NPs) can coach obese young adult patients by examining motivational style through an autonomously supportive relationship and motivational interviewing (MI). Obesity in youth increases risk of obesity in adulthood and habits adopted at a young age may transition into adulthood. Therefore, research, prevention and treatment need to focus on the young.

## **CHAPTER 1: INTRODUCTION**

### **Problem Statement**

Obesity is a worldwide epidemic correlating with serious consequences for poor health throughout life. In the U.S. it was estimated that 39.8% of adults were obese between 2015-2016 (Hales, Carroll, Fryar, & Ogden, 2017). Obese adolescents are five times more likely to be obese adults than non-obese adolescents (Simmonds, Llewellyn, Owen, & Woolacott, 2016). Therefore, throughout this dissertation, adolescent (13-19 years) obesity as well as young adult (20-25 years) obesity references will be discussed. Adolescent obesity rates have more than quadrupled over the last 4 decades; approximately 20.5% of adolescents age 12-19 are obese (Ogden, Carroll, Kit, & Flegal, 2014) compared to an estimated 4.6% of adolescents in 1970 (Ogden & Carroll, 2010). In 2013, the CDC reported that 13.7% of adolescents in grades 9 - 12 were obese increasing from 10.5% in 2001 (United States Centers for Disease Control and Prevention, 2015b). Increases in BMI have been found in both boys and girls beginning with the birth year 1970 and after; obesity was rare until the increase of BMI in the 1980s (von Hippel & Nahhas, 2013). A meta-analysis of skin fold measurements dating from 1951 found the rate of fatness has increased sharply since 1980 and is highest among peri-pubertal children (10-14 years) in developed countries (Olds, 2009). However, no significant change in the prevalence of obesity has been found in adolescents from 2003 – 2012 (Ogden et al., 2014). Although this rise in prevalence may have stabilized in the last 10 years, the rate of severely obese (BMI greater than 97 percentile) Hispanic and non-Hispanic adolescent boys and African American girls continues to rise (Ogden, Fryar et al., 2018).

Obesity is defined using Body Mass Index (BMI) and is calculated using weight in kilograms divided by height in meters squared ( $BMI = \text{Kg}/\text{meters}^2$ ). Higher BMI and larger waist circumference are associated with increased fatness and increased risk of diabetes (Han, Al-Gindan, Govan, Hankey, & Lean, 2019). BMI has been established as the standard for measuring fatness; however, there are times that it does not accurately characterize fatness, such as in the case of lean people with large muscle mass, who measure high on the BMI like obese people (Han et al., 2019). Adult obesity is defined as having a BMI of 30 or greater and morbid obese is defined as having a BMI of 40 or greater.

The pathophysiology of obesity or excessive fatness has been associated with the inflammatory effects of adiponectin. Adipose tissue secretes hormones, such as adiponectin, that regulate appetite and satiety and subsequently body weight (Brashers & Jones, 2010). In obesity, adiponectin is decreased, resulting in dysregulation of appetite and satiety that would normally regulate body weight (Brashers & Jones, 2010). Decreased adiponectin results in elevated inflammatory markers and insulin resistance (Brashers & Jones, 2010). The level of adiponectin was a significant predictor of metabolic syndrome in Latino pre-adolescents residing in Los Angeles, California with BMIs in the 95% range (Shaibi et al., 2007). However, this correlation was not found in Asian Indian adolescents (Snehalatha, Yamuna, & Ramachandran, 2008), indicating possible differences in cultures and among ethnicities.

### **Significance of the Problem**

Long-term consequences of obesity include diabetes and hypertension (Pulgarón, 2013). Consequences of obesity lead to an economic burden on society that not only has repercussions for health care but impacts productivity as well (United States Centers for Disease Control and

Prevention, 2015a). It is estimated the health care cost of obesity in 2014 was \$149.4 billion (Kim & Basu, 2016). Annual productivity costs of obesity absenteeism range between \$3.38 billion and \$6.38 billion; this is equal to \$79 to \$132 per obese individual per year (United States Centers for Disease Control and Prevention, 2015a). Furthermore, obese adolescents are at significant increased risk of being awarded disability pension in adulthood (Reilly & Kelly, 2011).

Female obese adolescents are less likely to advance their education or careers as young adults than their peers who are of normal weight during adolescents (French et al., 2018; Merten, Wickrama, & Williams, 2008). Not only does this lead to decreased employment and earnings compared to their normal weight peers, but also increases the likelihood they will experience depressive symptoms. Increased depression among obese young adults may therefore lead to psychosocial co-morbidities such as attention deficit hyperactivity disorder (ADHD), behavioral problems, and impaired sleep (Merten et al., 2008).

### **Factors of Successful Weight Loss**

Individuals may be intrinsically or extrinsically motivated to maintain a non-obese status. Behavior performed purely for enjoyment is categorized as intrinsic motivation while behavior that is performed in order to reach an outcome is categorized as extrinsic motivation (Ryan & Deci, 2000). Intrinsic motivation may be innate for some individuals, however for others, this conduct needs to be adopted and learned in order to acquire behavior such as healthy eating and exercise. Thus, it is important to identify the successful motivational factors that have influenced obesity status. Healthy eating and exercise behaviors have been observed non-obese young adults. Encouraging similar behaviors among obese young adults may promote weight loss.

Weight reduction programs aim to reduce risky behavior of overeating and inactivity. Reducing overeating and inactivity can be achieved. Once successful motivational styles have been identified, intrinsic motivation can be encouraged in obese individuals. A key element of effective coaching obese young adults to lose weight is to examine their motivational style, intrinsic or extrinsic, as it relates to eating and exercise. Supportive coaching is instrumental for successful weight loss in obese individuals (Deci & Ryan, 2000).

### **Purpose Statement**

The purpose of this dissertation was to identify motivational factors of eating and exercise behavior in obese ( $BMI \geq 30$ ) and non-obese ( $BMI 18.5-29$ ) young adults (20-25 years).

Two specific aims were to:

1. Compare differences in motivational styles of eating and exercise behavior in two groups of young adults, group 1 (non-obese) and group 2 (obese).
2. Compare motivational styles controlling for eating and exercise behaviors that moderate the relationship between motivational styles and BMI.

Aim 1 introduces three research questions: Are the motivational styles of general motivation, eating, and exercise behaviors significant predictors of obesity status? Intrinsic and external motivational styles will be examined on each predictor, general motivation, eating, and exercise behavior. These three research questions have corresponding alternative hypothesis: motivational styles of general, eating, and exercise behaviors are significant predictors of obesity status. Aim 2 introduces the fourth research question: Are the motivational styles significant predictors of obesity status after controlling for the significant predictors? This last research question has its

corresponding alternative hypothesis: Motivational styles are significant predictors of obesity status after controlling for significant predictors.

### **State of the Science**

#### **Prevention and Treatment**

Obesity has been studied quantitatively in terms of prevention and treatment and qualitatively in terms of experiences and perceptions. No universal prevention program meeting the criteria of the American Psychological Association (APA) has been found to be effective in preventing obesity (Haynos & O'Donohue, 2012). APA criterion include: 1) two well-designed studies conducted by different investigators demonstrate efficacy in, a) superior to pill, placebo, or other treatment, b) equivalent to established treatment in studies with adequate statistical power; or 2) large series of single case design studies demonstrating efficacy. These studies should have, a) use good experimental designs, and b) compare the intervention to another treatment as in 1a. Further criteria include using treatment manuals and clearly specified participant characteristics (Haynos & O'Donohue, 2012). Obesity in adolescence is significantly associated with severe obesity in adulthood (Suchindran, North, Popkin, & Gordon-Larsen, 2010), therefore, this dissertation discusses not only obesity in young adulthood but obesity in adolescence as well.

Treatment of obesity consists of behavioral and psychological treatment, family-based interventions, pharmacotherapy, nutritional education, decreasing sedentariness through exercise, and bariatric surgery. A review of recommendations to treat obesity supports the use of intense diet and exercise incorporated with behavioral therapy; using education alone is discouraged (Kirschenbaum & Gierut, 2013). These recommendations align with the US Department of

Agriculture and the Department of Health and Human Services who have published and revised *Dietary Guidelines for Americans* every five years since 1980 (Young, 2004), as well as the Physical Guidelines Advisory Committee. However, adoption of these recommendations are impacted by lack of safe walking routes and parks to participate in physical activity and increased time watching television or playing video games, which encourages sedentariness (Spruijt-Metz, 2011). Few trials support the use of exercise to decrease obesity (Spruijt-Metz, 2011) which may be related to lack of robust methodology in intervention design using exercise with obese (Cliff, Okely, Morgan, Jones, & Steele, 2010). Findings from a systematic review of bariatric surgeries in adolescents showed an inability to predict which obese adolescents would benefit most from these procedures. This inability may be due to the lack of or limited psychosocial outcomes and predictors associated with improved health and level of functioning in adolescents (White et al., 2015). Another systematic review found gastric banding to be the safest and most effective bariatric surgery procedure for obese adolescents compared to gastric bypass, stapling, and sleeve gastrectomy (O'Brien, 2013).

### **Motivation**

Motivation is manifested intrinsically or extrinsically and is considered to occur on a continuum from high motivation to low motivation respectively. Scores for self-determined or intrinsic motivation are at the high end of the continuum and lower scores are associated with external motivation on the opposite end. Four different regulatory styles of extrinsic motivation are integrated, identified, introjected, and extrinsic which progressively are more extrinsic respectively. Compared to extrinsic motivation, intrinsic motivation increases the likelihood of

long-term behavior changes. This motivation continuum is organismic integration theory (OIT), a sub theory of self-determination theory (SDT) (Ryan & Deci, 2000).

Intrinsic motivation is innate. For example, in the absence of reward, during early childhood, children actively play and are inquisitive (Ryan & Deci, 2000; Yogman, Garner, Hutchinson, Hirsh-Pasek, & Michnick Golinkoff, 2018). However, as people age, acquire life responsibilities, and experience non-supportive conditions, intrinsic motivation is disrupted, and school and work reduce opportunities to exercise and eat nutritious foods. Maintenance of supportive conditions increases intrinsic motivation and allows healthy eating and exercise required for weight loss (Deci & Ryan, 2000). An example of a supportive condition is to have a primary care provider who is autonomously supportive allowing the patient to choose which food to eliminate from their unhealthy diet or which exercise to continue or initiate.

Currently, young adults find many barriers to eating healthy due to time constraints, high cost of healthy foods, and convenience of fast foods (Sogari, Velez-Argumedo, Gómez, & Mora, 2018). Despite obstacles to healthy eating and exercise, healthy eating and exercise are achievable. Little is known about the motivating styles of non-obese and obese young adults with eating and exercise behaviors. Motivational styles of non-obese and obese young adults with eating and exercise behaviors will be investigated in this dissertation.

### **Self-Determination Theory (SDT)**

Self-determination theory (SDT) is a human motivation theory chosen to understand the motivational styles of obese and non-obese young adults. Increasingly used in health promotion but originating from educational psychology, Edward Deci and Richard Ryan, used inductive empirical methods that identified three basic psychological needs for self-determined motivation:

autonomy, competence, and relatedness (2000). These three basic psychological needs are considered innate but can be improved or learned through adoption and processing, meaning that new behavior can be adopted and applied to new and prior situations (Ryan & Deci, 2000). When these needs are satisfied, self-motivation is enhanced; when thwarted, self-motivation diminishes (Ryan & Deci, 2000).

Self-determination theory (SDT) has been used to measure motivation in different populations such as young students, smokers, addicts, medical students, and industry workers using different measures (Deci & Ryan, 2000). Causes of intrinsic motivation are not examined by SDT; however, SDT is concerned with the socially supportive conditions that elicit and sustain versus diminish or subdue intrinsic motivation. (Deci & Ryan, 2000). For behavior to be adopted long term, the goal is to move externally motivated behaviors to intrinsically motivated behaviors through the influence of the social environment (Ryan & Deci, 2000). This can occur through friends, family, teachers, or nurse practitioners (NPs). Parents and friends can be supportive of healthy eating and exercise by modeling behavior and encouraging their children and friends to emulate modeled behavior. Teachers and NPs can demonstrate support by inquiring their students or patients' desires and feelings about current behavior and discuss what it would look like if they changed their behavior.

### **Knowledge Gaps in Adult Obesity and Motivation of Eating and Exercise Behavior**

Lacking in research is the examination of motivation with healthy eating and exercise behavior in obese and non-obese young adults. The study of obesity has ranged the entire spectrum of research, from qualitative and quantitative to descriptive and systematic reviews. Statistics currently available tell about the risk of obese youth transitioning into obese adults

(Suchindran et al., 2010) but what is lacking are studies of motivational styles of eating and exercise behaviors in obese and non-obese young adults. Little is known about what motivational styles obese and non-obese young adults have relating to healthy eating and exercise behavior. This knowledge gap will be addressed by investigating the motivational styles of healthy eating and exercise behaviors in obese and non-obese young adults. These questions are in need of answers and this gap needs to be addressed since the obesity epidemic has persisted over the past 40 years. These findings may be applied to a larger population or an interventional study for further understanding of motivational styles.

Currently lacking from research is further investigation as to what or why obese people become motivated to change eating and exercise behavior. In terms of pursuing long-term weight loss as a goal, *what* is motivation with healthy eating and exercise and ‘why’ is the process of behavior change with healthy eating and exercise (Deci & Ryan, 2000). Answering the *what* and the *why* questions will allow us to predict behavior in non-obese and obese young adults (Deci & Ryan, 2000). A comparative descriptive quantitative study was used to compare motivational styles of eating and exercise behavior in two groups of young adults, obese and non-obese

Another gap noted in the literature is theory-based studies that incorporate complex factors related to obesity in youth such as personal behavior, family behavior, and environment (Spruijt-Metz, 2011). Specifically in youth, theory based research will most likely impact obesogenic behavior (Spruijt-Metz, 2011). A better understanding of healthy eating and exercise behavior in youth is needed in order to decrease the incidence of obesity. Self-determination theory incorporates motivational behavior of autonomy and competence of healthy eating and exercise, and relatedness with others such as family and friends.

## Young Adult Development

Erickson considers young adulthood as the *intimacy isolation* stage of ego development (Colyar, 2003). It is during this time that communication and responsibility is encouraged. However, due to a lack of complete brain maturity until young adulthood some young adults may demonstrate a delay in communication and responsibility. Differing stages of brain development can impact behavior, including health behavior. Specifically, the frontal lobe matures into the mid-20 years of age (Reyna & Farley, 2006). The frontal lobe functions include goal-oriented behavior, memory, elaboration of thought, inhibition of emotion, and motor movement programming (McCance & Huether, 2014). Some young adults are more likely to prefer immediate to delayed gratification. This includes eating an unhealthy snack or junk food now instead of the delayed gratification of cooking a healthy meal and avoiding snacks to enjoy the benefits of weight loss later. Young adult impulsivity presents a challenge to promoting the desired delayed gratification of healthy eating and exercise behaviors. Once young adults are able to delay gratification and engage in eating healthy and exercising, they gain control of their goal to reach non-obese status. Subsequently these lifestyle changes decrease the rate and prevalence of youth obesity and possibly decrease the burden on society (Reyna & Farley, 2006).

Young adults who overeat impulsively and who are inactive have been found to be at higher risk of obesity (Chamberlain, Derbyshire, Leppink, & Grant, 2015). Therefore, a better understanding of successful motivational styles of young adults is needed. Supportive relationships with non-obese peers provide an opportunity to re-evaluate their risk perception with unhealthy eating and decreased exercise behavior (Reyna & Farley, 2006). This relationship may enable a behavior shift from risky unhealthy eating and little to no exercise to healthy eating

behavior and daily exercise. Health care provider weight loss coaching including supportive conditions promoting successful motivational styles may heighten this risk perception and increase healthy behaviors (Reyna & Farley, 2006).

Habits that begin in childhood or adolescence are likely to carry into adulthood. Unhealthy food choices as a child less than eight years of age when cognitive skills are lacking, often carry into adulthood (Kaur, 2019). In addition, habits such as eating nutritionally healthy food and exercising with family or friends may transition into young adulthood. The stage of young adulthood is a time when more independence is acquired. For example, the independence of driving allows for opportunities to initiate habits to make nutritionally valuable choices when meal planning and grocery shopping. Young adults are likely to have discretionary funds to spend on food, grocery shopping, or eating out with friends. This independence allows for opportunities to shop for healthy food to consume. Coaching this population during this transition to independence with healthy lifestyle choices may promote long term-term non-obese status.

### **Implications for Nursing Practice**

Enhancing intrinsic motivation rather than decreasing extrinsic motivation may improve non-obese status in adulthood (Koestner, Otis, Powers, Pelletier, & Gagnon, 2008). Focusing on intrinsic or autonomous motivation at the primary care level may provide new information about how to help young adults sustain non-obese status. Primary care providers can use their patient motivation to help coach them to non-obese status. Theoretically, there is value in supporting intrinsic rather than extrinsic motivation for achievement of health goals (Koestner et al., 2008).

### **Conclusion**

“We are behaving ourselves to death” (Anonymous). In order to decrease the rate of obesity, we must first examine motivational styles of non-obese and obese young adults with eating and exercise behavior. This study will contribute to the knowledge of whether intrinsic or extrinsic motivational styles are factors related to obesity status in young adults. With a better understanding of motivational styles, we can more effectively coach externally motivated obese young adults and promote non-obese status. With the prediction of a decreased life span in obese young adults, we need to examine the motivation styles of both non-obese and obese young adults. Switching the focus to understanding motivational styles of non-obese and obese young adults may provide insight into the obesity epidemic.

## CHAPTER 2: LITERATURE REVIEW

### Introduction

This chapter presents the selection process, analysis and synthesis of the literature review. An overview of obesity, as well as its incidence, prevalence, and impact on society are discussed. The theoretical framework that provides the foundation for the study is critically analyzed and synthesized. Finally, a conceptual model is presented.

### Literature Search Strategy

Four databases were used for this literature search: CINAHL, PubMed, PsycINFO, and Google Scholar. All resources were queried several times using different combinations of these key terms – *adolescent, young adult, obesity, weight loss, motivation, self-determination theory, meta-analysis, systematic review, state of the science, research design, and history*. Inclusion criteria were English language, full-text availability, and focus on human subjects. Exclusion criteria were pregnancy or other conditions that may explain overweight or obesity status. Duplicated studies were eliminated. Previously obtained studies were also included, as long as they were pertinent to this project and met the same inclusion and exclusion criteria.

### Incidence and Prevalence of Obesity

Obesity is a worldwide epidemic that is associated with severe preventable premature deaths related to heart disease, stroke, Type 2 diabetes, and some cancers. 93 million or 39.8% of adults (age 20 & over) in the United States are obese. More specifically, 35.7% of adults age 20-39 are obese. This prevalence has significantly increased from 1999 to 2016 and is above the Healthy People 2020 goal of 30.5%. Women, and non-Hispanic black and Hispanic adults have a higher prevalence of obesity (Hales et al., 2017). The trend of obesity rates influence the

prediction of life expectancy; for the first time, it is predicted that future generations in the first half of this century will have a shorter life expectancy than current generations (Olshansky et al., 2005). Longevity is decreased by 5 to 20 lived years in those who are morbidly obese (Olshansky et al., 2005).

Adolescent obesity significantly increases risk of adult obesity; therefore, references from both adolescent obesity and adult obesity will be presented and discussed. When screening obesity in adolescents was initiated, incidence and prevalence of adolescent obesity increased (Young, 2004). Screening for early disease in asymptomatic people increases incidence and prevalence, initially (Young, 2004). The increase of incidence and prevalence may be related to the recent increase of screening adolescent obesity. Prior to the implementation of current obesity screening guidelines, primary care providers may not have measured their pediatric patients' height and weight. The current U.S. Preventive Services Task Force gives screening childhood obesity for children over six years of age a grade 'B' recommendation. A grade 'B' recommendation is defined as a "high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial" (Barton, 2010). This recommendation of screening pediatric obesity changed in 2005. This change is due to recent findings that moderate to high intensity diet, exercise, and behavioral counseling results in improvement of weight status among children and adolescents who complete weight loss programs (Barton, 2010). Subsequently, primary care providers may have increased reporting obesity findings resulting in an apparent increase in incidence and prevalence of obesity. The American Academy of Pediatrics published these updated guidelines in 2010 and recommend intensive counseling and behavioral interventions including motivational interviewing to

promote improvements in weight status (Barton, 2010). Due to these recommendations, primary care providers may have increased confidence in screening and treating obesity. They may also have considered the stigma of obesity, and taken the time to discuss this with their patients using a soft approach due to the stigma. Practitioner education and the dissemination of pediatric obesity practice guidelines may influence the prevention of obesity.

### **Impact on Society**

The cost to treat obesity is an economic burden to society that not only has repercussions for the health care system but impacts productivity as well (United States Centers for Disease Control and Prevention, 2015a). The estimated health care cost of obesity in 2008 was \$147 billion. Adolescent obesity is associated with increased risk of adult cardio metabolic morbidity and colon cancer mortality (Reilly & Kelly, 2011). Annual productivity costs of work absenteeism of obese workers range between \$3.38 billion and \$6.38 billion (United States Centers for Disease Control and Prevention, 2015a). Adolescent obesity is associated with increased disability pension awarded in adulthood (Reilly & Kelly, 2011).

### **Risks of Obesity**

#### **Cognitive and Psychological Development**

Obese young adults who overeat have been found to demonstrate increased impulsivity, which leads to reduced regulation of eating and exercise behavior (Chamberlain et al., 2015). The frontal lobe is responsible for impulse control, planning, and executive function and is not fully matured until approximately 25 years of age (Reyna & Farley, 2006), and a barrier to behavior modification occurs due to this cognitive knowledge characteristic. Consequently, vulnerability to obesity exists but this decreases with age (Reyna & Farley, 2006).

When young adults make wise exercise and food choices, risky behavior shifts to less risky behavior. However, young adults who demonstrate impulsive behavior lack autonomy because of the absence of self-discipline (Keenan, 1999). The absence or lack of self-discipline may explain why some obese young adults do not eat healthy or exercise. Internationally, in Western countries where overweight and obesity ranges from 55% to 70%, men are more likely to eat unhealthier than women and think eating healthy is less important than women (Munt, Partridge, & Allman-Farinelli, 2017). Therefore, this dissertation research investigated the motivational styles of non-obese and obese young adults.

According to Erickson's theory of psychosocial development, young adulthood is characterized by relationship building with friends and romantic partners. It is during this time young adults establish long-term relationships. If long-term relationships are not established, isolation and loneliness are more likely to develop (Branje & Koper, 2018). This isolation and loneliness may lead to increased risk of depression (Matthews et al., 2016).

There is a bi-directional association between depression and obesity (Mannan, Mamun, Doi, & Clavarino, 2016). The risk of obesity is increased in depressed adults and obese adults are at increased risk of depression. Therefore, young adults who do not to establish long-term relationships and experience isolation and loneliness they may be at increased risk of depression and obesity.

### **Victimization of Obese Students**

Obese people are victimized at various levels in society. Victimization from peers in school result in decreased self-confidence, increased anxiety, and isolation in obese young females which results in difficulty developing relationships (Griffiths & Page, 2008). The

likelihood that young obese individuals will make friends with those who demonstrate behavior most desirable to emulate is diminished due to bullying. Obese youth who are bullied or victimized are less likely to establish relationships and that include with those who demonstrate healthy eating and exercise behavior in order to emulate their behavior.

In a qualitative study of obese female adolescents, lack of support from parents results in poor body image (Griffiths & Page, 2008). Obese female youth describe an ideal best friend as someone who is empathetic, nonjudgmental, and supportive (Griffiths & Page, 2008). On the other hand, obese young females can further isolate themselves due to guarding their trust in their peers (Griffiths & Page, 2008).

### **Family and Genetic Factors**

Obesity is highly heritable depending on the population (Yang, Kelly, & He, 2007). Some 253 quantitative trait loci for obesity-related phenotypes have been identified and the location of 52 genomic regions have been replicated in multiple studies (Yang et al., 2007). However, genetic epidemiologists have expressed concern about the lack of replication studies and inadequate sample sizes (Yang, Kelly & He, 2007). Furthermore, obesity does not demonstrate the Mendelian pattern of inheritance complicates our understanding of obesity and further research is needed in repeated studies. In relation to other risk factors of obesity, this genetic association continues to be small (Pate et al., 2013).

Parental influence on obese youth is supported through the social environment. Family meals can indicate a relationship between child and family, and therefore can form adolescent competence of healthy eating as well as relatedness between child, siblings, and parents. However, frequency of meals eaten together as a family was found to have mixed findings of

healthy diet and obesity status (Spruijt-Metz, 2011; Pate et al., 2013). Increased frequency of family meals and available healthy food in the home was associated with a healthier diet (Spruijt-Metz, 2011). Conversely, no association was found between excessive fatness in adolescents and family meal frequency (Pate et al., 2013). It is unclear how these conflicting findings were concluded. Further findings in these studies were with parental restriction of foods. Restricting intake of pleasurable food in youth leads to eating when not hungry (emotional eating) and predicts adiposity (Spruijt-Metz, 2011). On the other hand, parental restriction of energy dense foods in school age children was associated with lower BMIs but this was not the finding in pre-adolescence (Pate et al., 2013).

There is further susceptibility to obesity during adolescence because both growth and physical activity begin to slow (Stankov, Olds & Cargo, 2012). Other factors that increase the risk of obesity are poor eating habits, decreased physical activity, and family relationships such as parental concern of their child's weight and restrictive feeding practices (Ham & Allen, 2012; Pate et al., 2013).

### **Physiological Risks**

During pre-puberty and puberty, insulin sensitivity decreases approximately 30% and minorities including African Americans, Hispanics, Pima Indians, and Asians have been found to be more insulin resistant than their Caucasian counterparts (Spruijt-Metz, 2011). Increased adiposity, especially central or visceral adiposity, is directly related to this increased insulin resistance (Spruijt-Metz, 2011). Obesity increases the risk of diabetes, and obese or overweight youth account for over 85% of newly diagnosed Type II diabetics (Pulgaron & Delamater, 2014).

Metabolic syndrome is a consequence of obesity that increases one's risk of cardiovascular problems. The definition of metabolic syndrome is having three of the following five conditions: 1) blood pressure of or greater than 130/85; 2) waist circumference of or greater than 102 cm in men and 88 cm in women; 3) elevated fasting glucose greater than 100mg/dL; 4) triglycerides greater than 150mg/dL; and, 5) suboptimal high density lipoproteins (HDL), less than 40mg/dL in men and less than 50 in women (Jolliffe & Janssen, 2007).

Adipose tissue serves as an endocrine organ and releases adipokines, hormones that cause a pro-inflammation state and can have local and systemic effects (Ouchi, Parker, Lugus, & Walsh, 2011). Chronic inflammation produces restructured vasculature that manifests as hypertension (HTN), hyperlipidemia, and insulin resistance. There are several adipokines that play a role in this restructuring such as the pro-inflammatory adipokines leptin and resistin (Ouchi et al., 2011). Leptin is also responsible for appetite regulation through the hypothalamus in the central nervous system. Adiponectin, an anti-inflammatory and protective adipokine, is inversely related to coronary artery disease, HTN and left ventricular hypertrophy. In other words, higher levels of adiponectin are found in the leaner population and lower levels in the obese (Ouchi et al., 2011).

Lack of sleep has also been found to decrease leptin that regulates satiety and increases ghrelin, an appetite stimulant (Spruijt-Metz, 2011). The American Academy of Sleep Medicine and Sleep Research Society state that it may be appropriate for young adults to get more than nine hours per night but sleeping less than seven hours on a regular basis is associated with obesity (Panel, 2015). One reason the recommended amount of sleep is not obtained may be due to stress that activates the hypothalamic pituitary axis which release glucocorticoids such as

cortisol (Spruijt-Metz, 2011). This chronic elevated level of glucocorticoids increases the likelihood in intake of energy dense, fatty, comfort foods subsequently increasing central adiposity, insulin resistance, and metabolic syndrome (Spruijt-Metz, 2011).

### **Environmental Risks**

To exemplify the physical activity environmental factor, Yang, Kelly and He (2007) mention that Japanese people who immigrated to California or Hawaii are heavier than their relatives who remain in Japan. Furthermore, the gene-environment interaction shows that youth with high-risk genes such as adipogenesis, leptin-insulin signaling pathways and/or inflammatory cytokine genes develop obesity when they enter a high-risk environment (Yang et al., 2007). Lack of safe walking routes and sedentary lifestyles of youth with increased use of electronic media decrease opportunities for physical activity (Sahoo et al., 2015). In order to decrease obesity, a better understanding of the causes and consequences of obesity needs to be understood.

Since 2000, BMI has increased in young adults, with black women being the most vulnerable (Lee, Lee, Guo, & Harris, 2011). This is most likely due to a change in physical and social environments such as unemployment that increases stress, and poor health behaviors, such as overeating and physical inactivity (Lee et al., 2011). Cities have been planned without safe walking routes and parks in which to participate in physical activity. Additionally, increased time watching television encourages inactivity and exposes people to marketing of food products specifically targeted to youth.

### **Adolescent Obesity Increases the Risk for Adult Obesity**

Eating caloric dense foods, a lack of exercise, and sedentariness that begin in adolescence persist over a lifetime. This long-term duration of risky behavior leads to physical consequences of obesity. Obese adolescents are at a significantly increased risk of becoming severely obese as adults (Suchindran et al., 2010). Adolescence is a period that transitions from childhood into young adulthood; however, this transition can be delayed due to spending more time devoted to obtaining an education. Such responsibilities may result in less physical activity, increased sedentariness, and poor eating habits that increase the adolescents' risk for obesity. Engagement in risky behavior such as inactivity increases with age and has been shown to progress from adolescence to adulthood (Lee et al., 2011).

Adolescent obesity is not a temporary phase that is grown out of later in life. Severely obese adolescents are 70.5% more likely to become severely obese young adults than normal weight or overweight adolescents (Suchindran et al., 2010). Furthermore, 7.9% obese adolescents become severely obese adults (Suchindran et al., 2010). This increases the risk of many physiological conditions such as Type 2 diabetes and cardiovascular disease. Therefore, the time that intervention is needed to combat obesity and potential life threatening consequences is during adolescence and young adulthood. This is also an opportune time to intervene because habits initiated at this age can be adopted into adulthood.

### **Prevention of Obesity**

Primary prevention is needed in order to decrease the incidence of obesity: "prevention is better than cure" (Young, 2004, p. 270). Active primary prevention such as obtaining the recommended three hours of moderate to vigorous physical activity per week and limiting

caloric intake requires motivation to acquire a healthy and active lifestyle. Passive primary prevention such as mandated food labeling, does not require action on the part of the individual (Young, 2004). No universal prevention program that meets the criteria of the American Psychological Association (APA) has been found to be effective in preventing obesity. The APA requires programs be replicated in multiple studies and use standardized treatment manuals across programs. In their systematic review, Haynos and O'Donohue (2012) found many prevention studies provide inadequate statistical power, do not include the important variable of cost, intervention fidelity, or long-term follow up data. This supports the APA recommendations for increase of adequate prevention studies of obesity that are currently lacking.

Prevention of obesity needs to start with the young and the school setting may be the best place to start. School-based prevention programs with emphasis on healthy school food and activity may be most beneficial due to the inclusion of multiple stakeholders such as family, students, and policy makers (Spruijt-Metz, 2011). Haynos and O'Donohue (2012), report that school programs take the focus away from academics and may not affect the eating and exercise behavior that can occur in other settings but also state that school-based programs are cost effective. There have been no prospective studies examining obesity and the school food environment (Pate et al., 2013). Behavioral strategies such as diet and exercise that include parents who model healthy eating and exercise behavior in weight loss programs increase motivation (Stevens, 2010). Researching motivation in non-obese and obese young adults is needed in order to prevent obesity.

Since 1980, the U.S. government has tried to prevent chronic disease such as obesity by publishing *Dietary Guidelines for Americans* written by both the U.S. Department of Agriculture

and the Department of Health and Human Services (Young, 2004). These guidelines include both exercise and dietary recommendations for all age groups. However, small consideration has been taken of prevention of high-risk behavior such as inactivity and unhealthy eating that lead to obesity.

### **Treatment of Obesity**

Treatments to combat the epidemic of obesity include several modalities. These treatments comprise diet or nutritional education, exercise, decreasing sedentariness, family based interventions, behavior and pharmacological interventions, and surgical interventions such as bariatric surgery. Interpersonal psychotherapy for binge eating disorder (BED) and loss of control (LOC) eating has been used due to the similarity of this behavior and the experiences of obese individuals.

Diet and exercise are needed to maintain non-obese status. Diet and exercise has been found to improve insulin resistance (Spruijt-Metz, 2011) and moderate to vigorous exercise is related to decreased adiposity over time (Pate et al., 2013). A review of five expert committee recommendations to treat obesity found all committees support the use of intense diet and exercise incorporated with behavioral therapy while two committees discouraged the use of education alone (Kirschenbaum & Gierut, 2013). Current research, however, has not pinpointed what motivates obese young adults to participate in recommended behaviors such as exercise is lacking.

Including family in lifestyle modifications has been found to be the most effective treatment (Spruijt-Metz, 2011). Participating in preparing and cooking healthy meals and exercising with family members increases the likelihood of non-obesity status. Repeated healthy

cooking and grocery shopping skills improve competence in preparing healthy meals. This may be the result of relatedness with other family members who are non-obese or have non-obesity as a goal. This may be the same with exercise skills. Competence can increase by exposing oneself to different exercises that one may have felt incompetent or unable to perform previously.

Behavioral interventions are first line therapy for adolescent obesity. Behavioral interventions include cognitive and behavioral management such as “problem solving, goal setting, limiting exposure to unhealthy food, healthy thinking about food and body” for lasting behavior change (Whitlock, O'Connor, Williams, Beil, & Lutz, 2010). Behavioral interventions provide information about diet, exercise, behavioral change strategies, coping skills, and relapse prevention has been most effective in decreasing weight at one year (Whitlock et al., 2010). Behavioral interventions provided at medium intensity (26-75 hours in 12 months) to high intensity (more than 75 hours in 12 months) benefited children age 14-18 years in weight management at both 6 and 12 months over pharmacological interventions (Whitlock et al., 2010). However, even with successful behavior change the significance of change in BMI is inadequate (Spruijt-Metz, 2011). This may be due to the lack of theory-based studies that have been reported in research.

Due to the complexity of obesity, pharmacological interventions are included in effective comprehensive weight management programs and are needed to treat obesity. Pharmacological interventions are more effective with weight loss when included with behavioral based counseling (Barton, 2010). Metformin had modest but significant improvement of BMI in adolescents but longer-term trials are needed (Baur, 2011; Brufani et al., 2013). Possible adverse gastrointestinal side effects occurred in less than 3% of patients taking Orlistat, a medication

currently available to treat obesity. The United States Preventative Services Task Force (USPSTF) has found that obese adolescents who complete comprehensive moderate to high intensity programs that include dietary, physical activity, and behavioral counseling results in decreased weight (Barton, 2010).

Recently, extreme modalities of weight loss by surgical interventions, such as gastric bypass, have attracted obese young adults. A Dutch study following young adults six years after bariatric surgery found that adherence to post-surgical dietary recommendations declined with time and resulted in less weight loss. Also, these young adults ranked their quality of life lower than the national norms but baseline quality of life was not obtained prior to the intervention (de Jong & Hinnen, 2017). Further studies are needed to evaluate bariatric surgery effectiveness in the young.

### **Theoretical Framework**

Theory-based research can impact obesity in youth; however, few theories have been used in studies of obesity. Theories such as Advocacy Coalition Framework (ACF) to Social Construction Framework (SCF) have been used in policy prevention obesity studies (Clarke, Swinburn, & Sacks, 2016). This study utilizes theory to guide the examination of motivational styles of non-obese and obese young adults. The purpose of this study is to identify motivational styles of eating and exercise behavior in non-obese and obese young adults. Findings may provide new knowledge about differences in motivational styles of non-obese and obese young adults in order for coaching to a non-obese status.

Motivational styles will be examined with the use of Organismic Integration Theory (OIT), a sub-theory of Self-Determination Theory (SDT). Motivation regulations, or styles, are

concepts within SDT. Organismic integration theory (OIT) is facilitated by SDT and SDT supports OIT (Ryan & Deci, 2000).

### **Self-Determination Theory (SDT)**

Self-determination theory (SDT), a theory of human motivation was selected as the basis for understanding the motivating styles of obese young adults. Originating from educational psychology but increasingly used in health promotion, Edward Deci and Richard Ryan identify three basic psychological needs for self-motivation using inductive empirical methods: autonomy, competence, and relatedness (2000). These three basic psychological needs have been related to goal attainment in different populations such as people with addictions, smokers, and students. Self-motivated individuals are more likely to reach their goal, whether it be smoking cessation or succeeding in school. These three psychological needs are indirectly related but congruent; when the needs are fulfilled, self-motivation is increased, when hindered, self-motivation decreases (Ryan & Deci, 2000). One who is self-motivated may also have an increased perception of competence or relatedness in reaching their goal. On the other hand, if one does not possess self-motivation, either because they have not felt supported or competent in reaching goals, these goals are less likely to be reached.

Grounded in the appreciation for intrinsic motivation and counseling, SDT was first developed by Carl Rogers who revolutionized counseling methods using person centered approaches (Deci & Ryan, 2000). SDT allows for relationships to support goal attainment in order for successful psychological results in obese individuals who pursue weight loss goals (Deci & Ryan, 2000). Using SDT in primary care practice can be used to help obese people gain self-control over their actions, aid in helping to recognize ambivalence in order to promote

behavior change, and lead to the ultimate goal, to autonomously support this population to make lasting change. Also, using SDT in practice helps predict weight loss outcomes in the obese population (Deci & Ryan, 2000).

These three basic psychological needs of SDT -- autonomy, competence, and relatedness -- are considered intrinsic but can be improved through adoption and processing, meaning that new behavior can be adopted and applied to new and prior experiences (Ryan & Deci, 2000). Self Determination Theory can also be used in an educational setting such as physical education or nutrition courses by understanding how, why and what motivates obese individuals to learn (Deci & Ryan, 2000). As in education, SDT can be used in primary care to discover what, why, and how obese individuals are motivated (Deci & Ryan, 2000).

## **Motivation**

### **Motivational Styles of OIT**

Motivation represents SDT and OIT by its self-determined behavior, meaning people try to process socially endorsed customs internally to their own personal values. Motivation is on a continuum with amotivation on the left side and intrinsic motivation on the right side. Amotivation is “the state of lacking the intention to act” that “results from not valuing” a behavior, not feeling competent to perform the behavior, or “not expecting it to yield a desired outcome” (Ryan & Deci, 2000, p. 72). There is no self-regulation to amotivation. In other words, not accepting responsibility and amotivation are considered the same and on the same end of the motivational continuum (Figure 1).

At the center of the continuum of motivation are four regulatory styles of extrinsic motivation that are the external controls responsible for actions (Ryan & Deci, 2000). These

regulatory styles will be presented as motivational styles in this paper. The four motivational styles of extrinsic motivation are 'external,' 'introjected,' 'identified,' and 'integrated' (Ryan & Deci, 2000). These are increasingly autonomous and decreasingly extrinsic, respectively. The first motivational style is 'external' which is the least autonomous and the same motivational style of operant theorist Skinner (Ryan & Deci, 2000). Skinner used reward in order to increase desired behavior. Rewarding behavior impedes intrinsic motivation because choice is needed to increase feelings of autonomy (Ryan & Deci, 2000). The second motivational style is 'introjected' and is ego-based, meaning individuals behave in order to maintain feelings of self-worth and to avoid guilt. The introjected style is related to increased anxiety and decreased coping skills (Ryan & Deci, 2000). The third motivational style is 'identified' and reflects a conscious value of the behavior, meaning the behavior is personally important. This is associated with positive coping skills (Ryan & Deci, 2000). The fourth motivational style is 'integrated' and the least extrinsic. Behaviors assimilated to self to achieve specific outcomes but not performed for their inherent enjoyment are considered integrated (Ryan & Deci, 2000).

The right side of the continuum is intrinsic or authentic motivation. One will maintain intrinsic motivation for attractive or challenging behaviors (Ryan & Deci, 2000). SDT is concerned with the conditions that elicit and sustain intrinsic motivation and does not examine the causes of intrinsic motivation. Furthermore, SDT is not concerned with what diminishes or subdues extrinsic motivation (Deci & Ryan, 2000). For behavior to be adopted long term, the goal is to move externally-motivated behaviors to intrinsically-motivated behaviors through the influence of the social environment (Ryan & Deci, 2000). When the three basic psychological needs of autonomy, competence, and relatedness are met, behavior moves from external to

intrinsic (Deci & Ryan, 2000). Maintenance of supportive conditions is required for healthy eating and exercise behavior (Deci & Ryan, 2000).

### Conceptual Model

The six motivational styles of OIT are used to help predict non-obese and obese status in young adults. The conceptual model is as follows (Figure 1).

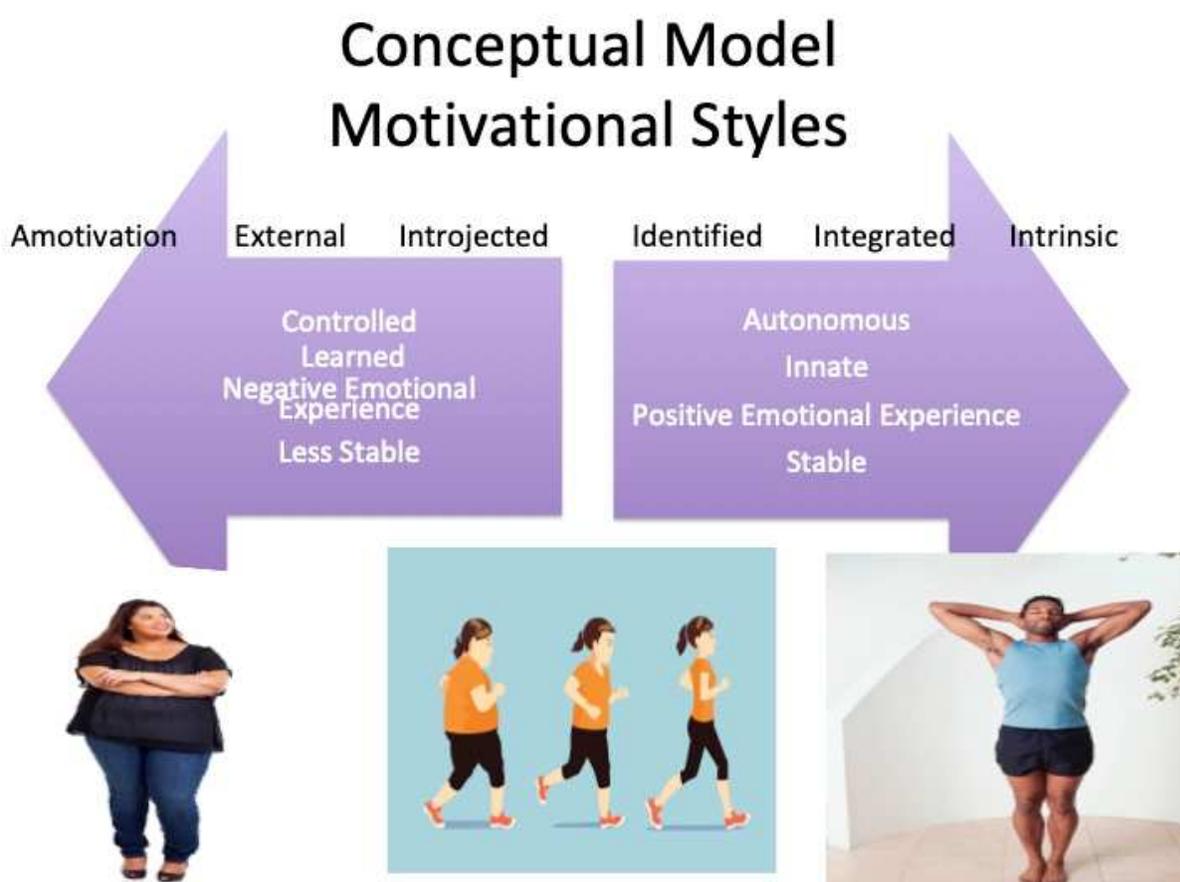


FIGURE 1. Conceptual model.

### State of the Science of Motivational Styles

The following section provides examples from the literature of eating and exercise behaviors that correspond to different motivational styles.

### **External Motivation**

A group of adults with metabolic syndrome were more likely to participate in a weight management program if their insurance plan would pay the cost and provide financial incentives (Arterburn et al., 2008). This demonstrates external motivation because of the external reward considered in order to work towards the goal of non-obese status. According to SDT, external motivation is less stable than intrinsic motivation. A randomized trial of two groups of obese adults in a weight management study found the incentivized group ranked their extrinsic and intrinsic motivation higher than the non-incentivized group after three months. However, the intrinsic motivation decreased over 12 months. Furthermore, there was no difference in weight loss between both groups, incentivized and non-incentivized (Leahey, LaRose, Lanoye, Fava, & Wing, 2017). This supports SDT and OIT in that monetary incentives became less effective over time to motivate obese people who were considered extrinsically motivated.

### **Introjected Motivation**

The first example of introjected motivation found a large group of young adults, aged 18-35 years was also motivated to lose weight for appearance and social motivations. This same group was less motivated by health than older adults aged 36 to 50 years. However, the younger group did not maintain their weight loss as older adults (LaRose, Leahey, Hill, & Wing, 2013). The focus on appearance as a source of motivation for weight loss is congruent with introjected motivation due to ego involvement. The inability to maintain weight loss supports the instability of introjected motivation. Introjected motivation may be based on negative emotional experiences than intrinsic motivation. Negative emotional experiences may be compulsion, pride, ego involvement, avoid guilt or shame, or 'should-based' behavior. 'Should-based'

behavior is internalized pressure to perform an action in order to feel like a good person without believing the benefit of the recommended behavior (Deci & Ryan, 2000). Ultimately, knowing the focus of weight loss in this group of adults may be beneficial in planning intervention strategies to reach or maintain non-obese status.

The second example of introjected motivation is a group of young women aged 18 to 30 years who initially reported participating in physical activity (PA) due to feeling obligated to a study but continued PA for three months because it made them feel better. This demonstrates introjected motivation shifting towards more intrinsic motivation (O'Dougherty, Kurzer, & Schmitz, 2010). More introjected feelings of guilt and should-based behavior of introjected transitioned into identified or integrated motivation with the sensation of improved health and needing support to exercise.

### **Identified Motivation**

An example of identified motivation is a group of obese adolescents who received one 45-minute supervised exercise session per week for 11 weeks (Gourlan, Sant, & Boiche, 2014). Investigators found that not only did the adolescents' levels of intrinsic motivation increase and their extrinsic motivation decrease, but also their level of autonomy increased. However, BMI was not measured after the intervention (Gourlan et al., 2014), so the effect of their motivation on obesity status is unknown. Either way, this study demonstrates a shift from less stable introjected motivation to more stable identified or integrated motivation. Furthermore, the emphasis of autonomy is important to shift from extrinsic to intrinsic motivation.

### **Integrated Motivation**

Current research measuring motivation and physical activity (PA) in adolescents found external motivation is weakly related to PA and autonomous motivation was positively related to PA (Lonsdale, Owen, Smith, & Lubans, 2013; Owen, Smith, Lubans, Ng, & Lonsdale, 2014). These findings are congruent and support SDT and OIT; increased extrinsic motivation decreases the likelihood obese adolescents will exercise.

### **Intrinsic Motivation**

One example of intrinsic motivation is a group of undergraduate female students, mean age 19 years, who were more likely to participate in regular PA for pleasure when they reported intrinsically motivated healthy eating behavior. These women had significantly lower BMI than those reporting controlled motivation (Gast, Campbell Nielson, Hunt, & Leiker, 2015). Intrinsic motivation is innate and stable due to its positive emotional experience. Those who demonstrate intrinsic motivation are more likely to enjoy and are interested in their fully volitional choices in healthy eating and exercise. Intrinsic motivation has been positively associated with long-term weight loss using physical exercise in morbidly obese patients (Ryan & Deci, 2000). SDT is useful in predicting participation in health promotion therapy and maintaining the desired behavior change in adults (Williams, Grow, Freedman, Ryan, & Deci, 1996).

### **Research Gap**

Obesity has been the focus of many studies for decades using different approaches. However, in searching relevant literature, a comparative descriptive study examining the motivation styles of non-obese and obese young adults with respect to their diet and exercise behavior was not found. A study using OIT to identify motivation styles in young adults will

help further understand the obesity epidemic. This study may lead to future interventional research to ultimately provide treatment guidelines for health care providers in the primary care setting. Health care providers serve as social support in the primary care setting when treating obese young adults. The major tenet of this model is that those who receive social support from their health care provider, family, and/or friends, are more likely to transition from obese to non-obese status (Deci & Ryan, 2000). This social support is congruent with SDT.

### **Anticipated Results of this Comparative Descriptive Study – Hypotheses**

Anticipated results were that motivational styles of eating and exercise behavior predict obesity status in a group of non-obese and obese young adults. Those who rate their intrinsic motivation styles low and external motivation high are more likely to be obese; conversely, those who rate their intrinsic motivation high and external motivational low are less likely to be obese.

### **Conclusion**

Prevention and treatment studies of obesity lack the incorporation of psychological behavioral changes thus resulting in no universal prevention program to reduce the rate of obesity. In addition, treatment using interventional therapy has not been strongly linked with long-term weight loss. This literature review demonstrates how motivation styles are associated with obesity status and that in order for nurse practitioners to assist obese young adult patients to non-obese status, motivation needs to be examined. Intrinsic motivation is more likely to occur when ones' healthy eating and exercise behavior is supported socially. This study wishes to identify what motivational styles non-obese and obese young adults have in relation to eating and exercise behavior. As was presented in this chapter the source of ones' intrinsic motivation increases or decreases the likelihood to be obese.

Given the nature of non-observable self-reported motivation, this is a weakness of studies using SDT and OIT as the theoretical base in quantitative studies. Motivational behavior is non-observed and subjective. For example, autonomy, is an abstract construct unless observed on the job such as functioning independently (Keenan, 1999). The mechanistic nursing paradigm is based on observable non-abstract constructs. However, the majority of the studies reported here show similar positive results with intrinsic motivation decreasing the likelihood of obesity status. Finally, the strength of this study is the use of theory-based research.

## **CHAPTER 3: METHODOLOGY**

### **Introduction**

Chapter 3 discusses the study design, setting, and sample along with inclusion and exclusion criteria of the sample. Sample size and recruitment strategies in order to reach adequate statistical power are also presented. The data collection plan is discussed and measures that were used are placed in appendices. Finally, data analysis procedures are presented.

### **Study Design**

A comparative descriptive design was used to identify motivational styles of two groups of young adults, one group non-obese and one group obese. Data was collected using a digital format from young adults who receive their primary care at a chosen community health clinic. Participants who met inclusion criteria (young adults 20 to 25) and agreed to take approximately 15 minutes to complete a survey were included. Human subjects' approval was obtained from the University of Arizona Institutional Review Board (Appendix H) and the local community health center Patient Safety and Therapeutics Committee.

### **Setting**

The setting was a large community health care clinic, which serves approximately 100,000 patients in a large metropolitan city in the Southwestern United States. There are twelve satellite clinic sites located throughout the city. Patients were recruited from the lobbies of these clinics. These clinics contain several practices such as primary care, obstetrics and gynecology, psychiatry, same-day clinic, dental, pediatrics, as well as radiology, pharmacy, and laboratory services. Patients who appeared obviously pregnant were not asked to participate. Patients who met the criteria were asked to participate and completed a survey either electronically or on

paper. Consent was obtained before allowing the participant to proceed to the survey. The survey consisted of demographic questions and three surveys measuring motivational styles regarding diet, exercise, and life in general (Appendices B, C, D, & E).

### **Sample**

Individuals who met inclusion criteria of young adulthood aged 20 to 25 years were asked to participate in the study; criterion sampling ensured the population of interest was included in the study (Polit, 2012). The representativeness of this non-probability sample to the population of the clinic and the metropolitan city at large in relation to cultural, environmental, and socioeconomic characteristics is presented in chapter four.

### **Inclusion and Exclusion Criteria**

Potential subjects were queried from their clinic lobby in order to participate. The main inclusion criterion was age, as only young adults aged 20 to 25 were sought. Completing all questionnaires took approximately 15 minutes; therefore, those who were unwilling to spend this time were self-excluded. Further exclusion criteria included inability to read and speak English was included due to the primary investigator (PI) reads and speaks only English and the measures chosen are not available in other languages. Also, developmental delay, physical disability that prevented one from completing the questionnaires, and obvious pregnancy were exclusion criteria.

### **Sample Size**

A standard a-priori sample calculator was used to compute the size of the needed sample for a logistic regression model. First, the demographic questionnaire included 13 questions, and the motivational styles of OIT included six variables (intrinsic, integrated, identified, introjected,

external, and amotivation). The calculation consisted of desired power of 0.8, probability level 0.05, number of predictors 6, and anticipated effect size of 0.3, using Green's equation  $N \geq 50 + 8(k)$  where  $k$  is the number of variables, resulted in a minimum sample size of 98 participants (Green, 1991). This anticipated effect size is based on a mean effect size found in a systematic review examining physical activity and eating in obese adults (Samdal, Eide, Barth, Williams, & Meland, 2017). A modest effect size in this study was anticipated due to differences of motivational styles of eating and exercise behaviors between non-obese and obese young adults. To ensure statistical significance and to avoid Type II error, recruitment aimed for 135 participants for a sample size.

### **Recruitment and Consent Process**

Patients who met inclusion criteria were invited to participate in this study. Consent was obtained using an electronic tablet or paper format before the participant was allowed to proceed to the survey. This proposal and the inclusion criteria were presented to the providers, faculty and staff of the clinics to help increase response rate and recruitment. Flyers were posted at the satellite clinic lobbies describing the study with the primary investigator (PI)'s contact information provided. Funding was obtained for the purpose of this study: participants were provided a \$10 gift card for participating. (Appendix B for recruitment materials and Appendix C for consent forms.)

### **Data Collection Plan**

REDCap (Research Electronic Data Capture) was utilized to capture data in a digital format in order for participants to complete the surveys. However, if the computer tablet was

being used by a participant, then a paper format was provided and data was manually inputted into REDCap by the PI.

Demographic characteristics including height and weight as well as motivational data were collected from the two groups. Three questionnaires measuring motivational styles in relation to life in general, diet, and exercise were administered. Participants independently completed the questionnaires using self-report. Completion of survey was verified using the REDCap program before the \$10 gift card was provided.

### **Measures**

Four questionnaires were used. First, the demographic questionnaire consisted of 13 questions topics, including: age, height, weight, sex, marital status, ethnicity, race, education, if they weighed more or less as an adolescent, if they have obese family members, and medical conditions, medications, or procedures influencing weight (Appendix D). Questionnaires measuring motivational styles in relation to eating, exercise behavior, and life in general were also given. The three questionnaires used to measure motivation were, The General (Global) Motivational Scale (GMS) (Appendix E), Regulation of Eating Behavior (REBS) (Appendix F), and Exercise Regulations Questionnaire (BREQ-3) (Appendix G). (Table 1). All measures utilized Likert scales except for the demographic survey (Appendix D).

TABLE 1. *Measures.*

Measure	Concepts/ independent variables (IV's) measured	Questions, scale, and scoring	Reliability and validity	Author, year, and permission
<b>General (Global) Motivation Scale (GMS)</b>	Intrinsic motivation, integration, identification, introjection, external, and amotivation.	18 questions, Likert Scale IVs and their questions: intrinsic: 2, 5, 9 integrated: 7, 17, 18 identified: 1, 4, 11 introjected: 6, 12, 16 external: 3, 10, 14 amotivation: 8, 13, 15	Internal consistency > .73 and reliability .72 in a study of adults at risk for CAD examining eating regulation (Pelletier, 2004).	(L. G. Pelletier, Dion, Slovinec-D'Angelo, & Reid, 2004). Permission obtained.
<b>Regulation of Eating Behavior Scale (REBS)</b>	Intrinsic, integrated, identified, interjected, external, and amotivation	24 questions, Likert Scale, IVs and their questions: intrinsic: 2, 4, 11, 24 integrated: 10, 17, 20, 21 identified: 5, 16, 22, 23 introjected: 7, 8, 12, 18 external: 3, 9, 13, 15 amotivation: 1, 6, 14, 19	Adequate internal consistency reliability in a group of female students mean age 21 years examining eating regulation (Pelletier et al, 2004).	(L. G. Pelletier et al., 2004). Permission obtained.
<b>Exercise Regulation Questionnaire (BREQ-3)</b>	Intrinsic, integrated, identified, introjected, external, and amotivation.	24 items on 5 point Likert Scale, IVs and their questions: Intrinsic: 3, 9, 15, 21 integrated: 5, 11, 17, 23 Identified: 1, 7, 13, 19 Introjected: 4, 10, 16, 22 External: 6, 12, 18, 24 Amotivation: 2, 8, 14, 20	Reliability ranges from .76 - .90 in a study of adults to evaluate exercise moderators (Berry, Rodgers, Markland, & Hall, 2016).	(Berry, Rodgers, Markland, & Hall, 2016). Permission obtained.
<b>Body Mass Index (BMI)</b>	Height and weight	Weight in kilograms divided by height in meters squared $BMI = Kg/meters^2$	Reasonable sensitivity.	(Daniels, 2009). No permission needed.

Questionnaires were administered and results were analyzed per the original design of the questionnaires. All three measures, GMS, REBS, and BREQ-3 in their corresponding studies

were found to use computed composite scores with the mean of each composite question in their data analysis (Berry et al., 2016; Pelletier & Dion, 2007; Pelletier et al., 2004). Therefore, composite scores with the means of each composite question were calculated in this study, (Chapter 4). All six motivational styles (intrinsic, integrated, identified, introjected, external and amotivation) are assessed in all three measures (GMS, REBS, and BREQ-3).

### **General (Global) Motivational Scale (GMS)**

First, GMS was created by L. G. Pelletier Ph.D from the University of Ottawa School of Psychology to examine motivation of various life behaviors such as making discoveries and to attain objectives (Pelletier, Blanchard, Sharp, Otis, Vallerand, & Guay, 2004). Previously, the GMS was used in a study examining eating regulation in a group of adults mean age 54 years who were found to be at risk of coronary artery disease (Pelletier et al., 2004). The internal consistency of GMS was found to be  $> 0.73$  and reliability 0.72 (Pelletier et al., 2004). (Pelletier granted permission for the use of the measure in this study.) (Appendix E).

The GMS included 18 items on a 7-point Likert scale where a value of '1' indicated 'not agree at all' to the question statement and '7' 'completely agree.' Each motivational style is addressed by three of the 18 statements in the GMS. Intrinsic motivation is considered the most autonomous of the motivational styles and is assessed in statements 2, 5, and 9, with statements such as, 'in general, I do things for the pleasure of acquiring new knowledge.' Using a Likert scale of 1-7, lower scores are considered less intrinsically motivated in the pleasure of acquiring new knowledge and higher scores are considered more intrinsically motivated in the pleasure of learning new knowledge. Integrated motivation is considered less volitional than intrinsic motivational style and is assessed in statements 7, 17, and 18 with statements such as, 'in

general, I do things because they reflect what I value most,' with lower scores reflecting less motivation of integration and higher scores more motivation of integration. Identified motivation is considered less stable than integrated motivational style and is assessed in statements 1, 4, and 11 with statements such as 'in general, I do things because I choose them as a means to attain my objectives,' with lower scores reflecting less identified motivation and higher scores reflecting more identified motivation. Introjected motivation is considered the 'should-based' motivational style and is assessed in statements 6, 12, and 16 with statements such as, 'in general, I do things because otherwise I would feel guilty for not doing them,' with lower scores reflecting lower introjected motivation and higher scores reflecting higher introjected motivation. External motivation is considered most similar to BF Skinner Operant Theory motivational style and is assessed in statements 3, 10, and 14 with statements such as, 'in general, I do things because I want to be viewed more positively by certain people,' with lower scores reflecting lower external motivation and higher scores reflecting higher external motivation. Finally, amotivation is considered the complete lack of self-determined motivational style and is assessed in statements 8, 13, and 15 with statements such as, 'in general, I do things although it does not make a difference if I do them or not,' with lower scores reflecting less amotivation and higher scores reflecting higher amotivation. The measure contains no reverse scoring.

### **Regulation of Eating Behavior Scale (REBS)**

Second, the Regulation of Eating Behavior Scale (REBS) was also created by Dr. Pelletier to examine why some individuals are successful at regulating their eating behavior while others are not (Pelletier et al., 2004). REBS was used in a study examining the regulation of eating behavior in female students mean age 21 years and found to have adequate internal

consistency reliability (Pelletier et al., 2004). (Permission was granted by Dr. Pelletier to use REBS in this study.) (Appendix F).

REBS includes 24 items also using a 7-point Likert scale where a value of '1' indicated 'does not correspond at all' to the statement and 7 'corresponds exactly.' Each motivational style is assessed by four questions, using Likert scale 1-7. Intrinsic motivation is assessed in statements 2, 4, 11, and 24 with statements such as, 'I take pleasure in fixing healthy meals,' with higher scores reflecting higher intrinsic motivation and lower scores reflecting lower intrinsic motivation in taking pleasure fixing healthy meals. Integrated motivation is assessed in statements 10, 17, 20, and 21 with statements such as 'eating healthy is an integral part of my lifestyle,' with higher scores reflecting higher integrated motivation and lower scores reflecting lower scores integrated motivation. Identified motivation is assessed in statements 5, 16, 22, and 23 with statements such as, 'eating healthy is a way to ensure long-term health benefits,' with higher scores reflecting higher identified motivation and lower scores reflecting lower identified motivation. Introjected motivation is evaluated in statements 7, 8, 12, and 18 with statements such as 'I must absolutely be thin,' with higher scores reflecting higher introjected motivation and lower scores reflecting lower introjected motivation. External motivation is evaluated in statements 3, 9, 13, and 15 with statements such as 'regulating my eating behavior is expected of me,' with higher scores reflecting higher external motivation and lower scores reflecting less external motivation. Amotivation is evaluated in statements 1, 6, 14, and 19 with statements such as 'don't know why I bother regulating my eating behavior,' with higher scores with these types of statements reflect higher amotivation and lower scores reflect lower amotivation. No items are reverse scored.

### **Behavioral Regulation Exercise Questionnaire (BREQ-3)**

The third measure is the Behavioral Regulation Exercise Questionnaire (BREQ-3) which is the current version of the BREQ originally created by D. Markland PhD from Bangor University at the School of Sport, Health & Exercise Sciences (Berry et al., 2016). BREQ-3 was used to evaluate exercise moderators in a large group of adults mean age 48 years with reliability reported (Berry et al., 2016). Reliability for all six of the motivation regulations was amotivation = 0.82, external = 0.82, introjected = 0.76, identified = 0.79, integrated = 0.90, and intrinsic = 0.89. (Permission was granted to use BREQ-3 in this study.) (Appendix G)

The BREQ-3 included 24 items using a 5-point Likert scale where a value of '0' indicated 'not true for me' and '4' 'very true for me.' The measure also has 24 questions with four statements evaluating six motivational styles using Likert scale 0-4. Intrinsic motivation is assessed in statements 3, 9, 15, and 21 with statements such as, 'I exercise because it's fun,' with higher scores reflective of higher intrinsic motivation and lower scores reflective of lower intrinsic motivation. Integrated motivation is assessed in statements 5, 11, 17, and 23 with statements such as, 'I exercise because it is consistent with my life goals,' with higher scores reflective of higher integrated motivation and lower scores reflective of lower integrated motivation. Identified motivation is evaluated in statements 1, 7, 13, and 19 with statements such as, 'it's important to me to exercise regularly,' with higher scores reflecting higher identified motivation and lower scores reflecting lower identified motivation. Introjected motivation is evaluated in statements 4, 10, 16, and 22 with statements such as, 'I feel guilty when I don't exercise,' with higher scores reflective of higher introjected motivation and lower scores reflective of lower introjected motivation. External motivation is evaluated in statements 6, 12,

18, and 24 with statements such as, 'I exercise because other people say I should,' with higher scores reflective of higher external motivation and lower scores reflective of lower external motivation. Amotivation is evaluated in statements 2, 8, 14, and 20 with statements such as, 'I don't see why I should have to exercise,' with higher scores reflective of more amotivation and lower score reflective of lower amotivation. No items are reverse scored.

**BMI.** The participant's current height and weight were reported via self-report. BMI is recommended as the unit of measure in the clinical setting due to the correlation between BMI, obesity, and cardiovascular risks (Daniels, 2009). Height was reported in inches and weight was reported in pounds and converted to meters and kilograms respectively. BMI was calculated in REDCap using the equation weight in kilograms divided by height in meters squared; ( $BMI = Kg/m^2$ ). After BMI was calculated, BMI was categorized as 'non-obese,' for those with  $BMI < 30$ , and 'obese' for those with  $BMI \geq 30$ .

### **Statistical Analysis, Methods and Procedures**

Demographic data was analyzed descriptively and examined for distribution, central tendency, and dispersion (Trochim & Donnelly, 2008). Outliers were double checked to ensure correct data entry and evaluated for inclusion or exclusion for data analysis. After consulting with advising team, one outlier was unexplainable and was excluded and one was explainable and was included. For example, height was recorded in inches and one entry was 50 inches, so it was decided to change this entry from 4 feet to 5 feet. T-tests were used to compare statistical significance between two groups of young adults, non-obese and obese. To decrease the risk of missing or double entered data, the primary investigator verified completion of all questionnaires using REDCap. When the computer tablet was occupied by another participant, paper formats

were used and also checked for completion by the PI. When missing or double entries were noted, the PI requested the participant complete or choose one entry. Unfortunately, some missing data and double entries were discovered upon inputting data electronically into REDCap. The PI consulted with the committee about missing data and double entries when it was decided to eliminate some and to correct others. Double entries were discovered on three paper format forms and were eliminated. Statistical Package for the Social Sciences (SPSS) was used for data analysis.

The comparison between non-obese and obese young adults was analyzed using several different descriptive statistical models: chi-square, t-tests, simple and multiple logistic regression. T-tests were used to analyze differences of mean scores of age, BMI, height, weight, and motivational styles. Chi-square tests were used to analyze categorical demographic data by obesity status, non-obese and obese. Simple and multiple regression were used to examine motivational styles and demographic data as significant predictors of obesity. Dependent variables used in this model were categorical, non-obese and obese. Logistic regression analysis allows to predict the probability a dichotomous event occurs for a specific participant based on observation (Field, 2009). The independent variables are the six motivational styles. Univariate analyses were conducted first followed by multiple logistic models. Logistic regression was used to calculate probability of motivation scores to predict obesity status. Finally, odds ratios were calculated and interpreted. Logistic regression uses a calculation to convert the probability of risk, in this case non-obese or obese (Beck, 2012; Polit, 2012). The odds ratio indicates any change from the predictor (Field, 2009) and the predictors in this case are the six motivation styles.

Logistic regression models were the descriptive statistical model used in Aim 1 and Aim 2 to examine the association between motivational styles and obesity status. In order to identify relationships between the six motivational styles it is best to use the least amount of predictors to place into model (Polit, 2012). Logistic regression allows for examination of the relationships between the six motivation styles and obesity status.

### **Privacy and Storage of Data**

All participant information such as demographic data and questionnaires included non-identifiable personal information. Consent was obtained electronically when using the digital format. If a hard copy of the consent was requested for PI contact information with the study information, it was provided. When a participant signed a hard copy of the consent form, it was provided to the participant. All paper surveys are stored with the PI in a locked office. Paper format data and digital data will be destroyed five years after study findings have been published.

### **Conclusion**

The study design, setting, and sample along with inclusion and exclusion criteria of the sample were discussed. Anticipated sample size and recruitment strategies in order to reach adequate statistical power were presented. The data collection procedure was discussed and measures that were used are placed in appendices. Methods used were surveys in digital and paper formats. Statistical models used were t-test, chi-square tests, logistic, and univariate analysis. In summary, the methods and models used in this study were relevant in order to identify what demographic data and motivational styles are likely to influence and predict obesity status respectively.

## **CHAPTER 4: RESULTS**

### **Introduction**

The purpose of this comparative descriptive study was to identify motivational styles of eating and exercise behaviors in obese and non-obese young adults aged 20 to 25 years.

The aims of this study were to:

- 1) Compare differences in motivational styles between non-obese (BMI < 30) and group obese (BMI ≥ 30) participants.
- 2) Compare motivational styles between obese and non-obese participants controlling for eating behaviors and exercise behaviors that could confound the relationship between motivational styles and BMI.

Aim 1 introduces three research questions: Are the motivational style score of the General Motivational Scale, Regulation of Eating Behavior Scale, and Behavioral Regulation for Exercise Questionnaire-3 significant predictors of obesity status? Aim 2 introduces the fourth research question: Are the motivational styles significant predictors of obesity status after controlling for the significant predictors of the initial analysis?

This chapter presents findings from the data analysis. A description of the sample and demographic data with a detailed report of the data analysis is presented. Preliminary and primary analysis results were guided by the research questions, and a summary of the results is presented.

### **Data Collection**

Data collection was initiated February 18, 2019 and was completed April 22, 2019.

Participants were recruited from a large community federally qualified health care center with 10

satellite clinics located throughout this large Southwestern metropolitan city. Participants were recruited from seven of the clinics. Potential participants were asked to complete a survey that would take approximately 15 minutes to complete and offered a \$10 gift card to a department store retailer upon completion.

REDCap (Research Electronic Data Capture) was utilized in order to collect data electronically. A computer tablet was used for this; however, if the tablet was being used by another participant, paper surveys were provided and then manually inputted into REDCap by the PI. Once data was completely placed into REDCap, it was then transferred to SPSS version 26 for data analysis.

### **Preliminary Analyses**

Data from 126 responses were collected. However, preliminary analyses found 14 participants were not able to or did not disclose their height in inches, and thus, BMI was not computed for these participants. Additionally two participants electronically entered ages over 25 years that were outside the inclusion criteria, and were therefore considered ineligible. The primary investigator (PI) subsequently placed limits in the REDCap survey to prevent participants from entering ages outside of the desired range (20 to 25 years of age). While manually inputting three of the paper surveys into REDCap, the PI observed that three participants provided two or more answers on one or more questions. It was decided to consider these as missing data and these three were removed from inclusion. The final sample size was comprised of 108 participants.

## Summary of Results

### Sample Size and Demographics

The final sample consisted of 108 respondents of which 80 (74%) were female, and 27 (25%) were male, and one participant chose 'prefer not to answer' for gender. Of this, 66.6% were white, 74% were Hispanic, and 86% were not married. Just over half of the respondents (57%) had some college education. Some 72% stated that they weighed less as an adolescent. Just over half of participants 52% do not have an obese family member. Many (81%) had not taken medication to influence their weight. Very similarly, 80% had no medical condition that influenced their weight. A number (94%) had no surgical procedures that influenced their weight and 93% had no eating disorders. Descriptive statistics for the obese and non-obese groups are seen below in Table 2.

Due to smaller numbers of responses in some categories, demographic variables in Table 2 were collapsed. For gender and ethnicity, one participant chose 'preferred not to say,' therefore, an asterisk was placed to explain that the total does not equal 100%. For race, American Indian and African American were categorized with Non-white, and more than one race and Unknown were categorized together with Other. Marital status was collapsed into two categories, married and not married; divorced and single were grouped with not married. Education level was collapsed into two categories, high school or less and some college or more; high school or GED was placed into high school or less and bachelor's degree was placed into some college or more. (Table 2)

TABLE 2. *Demographic descriptive statistics.*

<b>Gender*</b>	<b>Total</b>	<b>Total</b>	<b>Non-obese</b>	<b>Non-obese</b>	<b>Obese</b>	<b>Obese</b>	<b>P-value</b>
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	
Female	80	74%*	47	58.80%	33	41.30%	0.55
Male	27	25%	18	66.70%	9	33.30%	
<b>Race</b>							
Non-white	13	12%	6	46.20%	7	53.80%	0.11
White	72	66.60%	49	68.10%	23	31.90%	
Other	23	21%	11	47.80%	12	52.20%	
<b>Ethnicity*</b>							
Hispanic or Latino	80	74%	47	58.80%	33	41.30%	0.255
Not Hispanic or Latino	27	25%	19	70.40%	8	29.60%	
<b>Marital Status</b>							
Not married	93	86%	57	61.30%	36	38.70%	0.92
Married	15	14%	9	60%	6	40%	
<b>Education</b>							
High-school or less	46	43%	23	50%	23	50%	0.04
Some college or more	62	57%	43	69.40%	19	30.60%	
<b>Weigh &gt;/&lt; As a Teen</b>							
More	23	21%	10	43.50%	13	56.50%	0.079
Less	78	72%	50	64.10%	28	35.90%	
Same	7	6%	6	85.70%	1	14.30%	
<b>Obese Family Members</b>							
No	56	52%	40	71.60%	16	28.60%	0.02
Yes	52	48%	26	50%	26	50%	
<b>Meds Influence Wt</b>							
No	88	81%	57	64.80%	31	35.20%	0.1
Yes	20	19%	9	45%	11	55%	
<b>Med Cond Influence Wt</b>							
No	86	80%	57	66.30%	29	33.70%	0.029
Yes	22%	20%	9	40.90%	13	59.10%	
<b>Surg Proc Influence Wt</b>							
No	102	94%	62	60.80%	40	39.20%	0.77
Yes	6	6%	4	66.70%	2	33.30%	
<b>Eating Disorder</b>							
No	100	93%	62	62%	38	38%	0.5
Yes	8	7%	4	50%	4	50%	

\* Does not equal 100%

The mean age of non-obese respondents was 22.94 years (SD=2.346) and 22.64 years (SD=1.764) for obese respondents. The mean BMI in the non-obese group was 24.38 (SD= 3.24) and the mean BMI in the obese group was 36.97 (SD=7.21). The computation of BMI was completed using the equation weight in kilograms divided by height in meters squared;

BMI=Kg/m<sup>2</sup>. For the purpose of this study, BMI was placed into two categories, non-obese (BMI<30) and obese (BMI≥30). The mean height of the non-obese group was 64 inches (SD=4.13) and the obese group 61 inches (SD=4.64). Mean weight of the non-obese group was 142.68 pounds (SD=20.39) and 196.74 pounds (SD=32.84) in the obese group. Descriptive statistics for the obese and non-obese groups are below (Table 3).

TABLE 3. *Demographic age and BMI.*

	N		Mean		Std. Dev.		p-value
	Non-obese	Obese	Non-obese	Obese	Non-obese	Obese	
Age	66	42	22.94	22.64	2.346	1.764	0.48
BMI	66	42	24.38	36.74	3.24846	7.20503	<.001
Height (in)	66	42	64.24	61.4048	4.12918	4.64369	0.001
Weight (lbs)	66	42	142.68	196.74	20.389	32.838	<.001

Chi-square tests were conducted to determine if there were significant differences in obesity status among the independent variables: ethnicity, gender, race, weighing more or less as a teen, marital status, education level, obese family members, medication influenced weight, medical condition that influenced weight, surgical procedure that influenced weight, and respondent had an eating disorder. Results indicated that there was a significant difference between level of education and obesity  $\chi^2(1, N=108) = 4.16, p = .04$ . Over half (69.4%), or 43 non-obese participants, and 30.6% or 19 obese participants attended some college or more. Results also found significant difference between obese family members  $\chi^2(1, N=108) = 5.21, p = .02$ . Over half (71.6%) or 40 non-obese participants and 28.6% or 16 obese participants do not have obese family members. Finally, results found a significant difference between medical condition that influenced their weight  $\chi^2(1, N=108) = 4.75, p = .03$ . Over half (66.3%), or 57 non-obese participants, and 33.7% or 29 obese participants did not have a medical condition that influenced their weight. Additional results indicated that there were no significant obesity status

differences among all the remaining independent variables. (Table 2 for percentage comparisons.)

To determine if there were significant differences between the non-obese and obese participants on age, BMI, height, and weight, independent samples t-test were conducted. The first statistical test compared ages between non-obese ( $M = 22.94$ ,  $SD = 2.35$ ) and obese ( $M = 22.64$ ,  $SD = 1.76$ ) groups. There was no significant difference between the two groups,  $t(106) = .702$ ,  $p = .190$ . A significant difference in ages was not anticipated with the age range of participants, 20 to 25 years. The second analysis examined if there was a significant difference in BMI between non-obese ( $M=24.38$ ,  $SD = 3.24$ ) and obese ( $M = 36.97$ ,  $SD = 7.21$ ). The results indicated that there was a significant difference between the two groups  $t(106)= -12.38$ ,  $p <.001$ . This finding was anticipated due to the fact that two groups were examined, non-obese and obese young adults. The third analysis compared height (in inches) between non-obese ( $M = 64.24$ ,  $SD 4.13$ ) and obese ( $M = 64.24$ ,  $SD 4.64$ ). The results indicated that there was a significant difference of height between the two groups  $t(106) = 3.31$ ,  $p = .001$ . This finding is explained with the formula that calculates BMI and the use of height and the difference of two groups non-obese and obese young adults. The last t-test compared weight (in pounds) between non-obese ( $M = 142.68$ ,  $SD 20.39$ ) and obese ( $M = 196.74$ ,  $SD 32.84$ ). A significant difference in weight was found between these two groups,  $t(106) = -10.56$ ,  $p = <.001$ . This finding was also anticipated due to the use of weight used in the BMI calculation (Table 3).

## Results

### Primary Analysis Phase

**Research question 1.** Asked if motivational styles of GMS were significant predictors of obesity status. The alternative hypothesis states the motivational styles of GMS are significant predictors of obesity status. Obesity status in relation to this study consists of two categories, non-obese and obese. Mean composite scores were computed using each motivational style of the GMS to create six independent variables. A binomial logistic regression model was used to answer the research question. Binomial logistic regression is used when the dependent variable is dichotomous (non-obese & obese) and the independent variables (IVs) are categorical and/or continuous (Field, 2009). IVs of the GMS include intrinsic, integrated, identified, introjected, external, and amotivation. Results of the binomial logistic regression indicated that the model containing all predictors was not a significant predictor of obesity status,  $\chi^2(6, N=108) = 5.73$ ,  $p=.45$ . As a result, the alternative hypothesis, that motivation style of the GMS would be a significant predictor of obesity, was not supported (Table 4).

TABLE 4. *Predicting non-obese/obese status – Logistic regression coefficients table – GMS.*

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
GMS_Intrinsic	.142	.287	.245	1	.620	1.153	.657	2.023
GMS_Integrated	-.341	.269	1.608	1	.205	.711	.420	1.204
GMS_Identified	-.318	.301	1.115	1	.291	.728	.403	1.313
GMS_Introjected	.069	.188	.135	1	.713	1.071	.741	1.548
GMS_External	.332	.249	1.787	1	.181	1.394	.856	2.270
GMS_Amotivation	.095	.149	.404	1	.525	1.099	.821	1.473
Constant	-.012	.927	.000	1	.990	.762		

A t-test reveals no significant difference in means in motivational styles of GMS between non-obese and obese participants. The GMS used a Likert scale ranging from 1-7 with one reflecting 'does not agree at all' and seven reflecting 'completely agree' (Table 5).

TABLE 5. *GMS t-test mean scores.*

	N		Mean		Std. Dev.		p-value
	Non-obese	Obese	Non-obese	Obese	Non-obese	Obese	
GMS-Intrinsic	66	42	5.1111	4.9603	1.08657	1.47095	0.542
GMS-Integrated	66	42	4.9141	4.6349	1.36414	1.47942	0.318
GMS-Identified	66	42	5.3434	5.0476	1.18822	1.34863	0.234
GMS-Introjected	66	42	4.0758	4.1984	1.44978	1.62644	0.684
GMS-External	66	42	4.4949	4.6032	1.29462	1.52883	0.694
GMS-Amotivation	66	42	3.2778	3.4921	1.58366	1.59307	0.496

Univariate models were also examined. Each independent variable was analyzed separately. None of the variables were found to be significant predictors of obesity status.

**Research question 2.** The second research question asked whether motivational styles of REBS were significant predictors of obesity status. The alternative hypothesis states that the motivational styles of REBS are significant predictors of obesity status. Obesity status in relation to this study consists of two categories, non-obese and obese. Mean composite scores were computed using each motivational style of REBS to create six independent variables. A binomial logistic regression model was used to answer this research question. Binomial logistic regression is used when the dependent variable is dichotomous (non-obese and obese) and the IVs are categorical and/or continuous (Field, 2009). IVs of the REBS are intrinsic, integrated, identified, introjected, external, and amotivation. Results of the binomial logistic regression indicated that the model including all predictors were significant predictors of obesity status,  $\chi^2(6, N=108) = 14.63, p = .02$ . However, a review of the coefficients table indicated no variables were found to be a significant contribution in variance in obese status. As a result, the alternative hypothesis was accepted (Table 6).

TABLE 6. *Predicting non-obese/obese status – Logistic regression coefficients table – REBS.*

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
REBS Intrinsic	.231	.228	1.127	1	.288	1.278	.813	2.010
REBS Integrated	-.440	.226	3.785	1	.052	.644	.414	1.003
REBS Identified	-.024	.221	.011	1	.915	.997	.633	1.507
REBS Introjected	.080	.196	.167	1	.683	1.083	.738	1.591
REBS External	.371	.211	3.090	1	.079	1.449	.958	2.192
REBS Amotivation	.080	.212	.144	1	.704	1.084	.716	1.641
Constant	-1.195	.893	1.792	1	.181	.303		

A t-test reveals a significant difference in mean score with external motivational style of REBS between non-obese and obese participants,  $t(106) = -3.13$ ,  $p = .002$ , with a small effect size of .20. REBS used a Likert scale ranging from 1-7 with one reflecting ‘does not correspond at all’ and seven reflecting ‘corresponds exactly.’ All other motivational styles of REBS were found not to be significant (Table 7).

TABLE 7. *REBS t-test mean scores.*

	N		Mean		Std. Dev.		p-value
	Non-obese	Obese	Non-obese	Obese	Non-obese	Obese	
REBS Intrinsic	66	42	4.5795	4.381	1.61255	1.81478	0.554
REBS Integrated	66	42	4.3447	3.8214	1.67088	1.75937	0.123
REBS Identified	66	42	5.178	4.9702	1.47398	1.664	0.499
REBS Introjected	66	42	3.0455	3.631	1.37904	1.82817	0.061
REBS External	66	42	2.5417	3.4643	1.23147	1.83427	0.002
REBS Amotivation	66	42	2.1061	2.5357	1.08047	1.40727	0.077

Univariate models were also examined. Each independent variable was selected to analyze separately and it was found that external motivation was a significant predictor of obesity status  $\chi^2(1, N=108) = 9.208$ ,  $p = .002$ . All other variables were not found to be significant predictors of obesity status.

**Research question 3.** The third research question asked whether motivational styles using BREQ-3 were significant predictors of obesity status. The alternative hypothesis states that motivational styles of BREQ-3 are significant predictors of obesity status. Obesity status in

relation to this study consists of two categories, non-obese and obese. Mean composite scores were computed using each motivational style of BREQ-3 to create six independent variables. A binomial logistic regression model was used to answer this research question. Binomial logistic regression is used when the dependent variable is dichotomous (non-obese and obese) and the IVs are categorical and/or continuous (Field, 2009). IVs of the BREQ-3 include intrinsic, integrated, identified, introjected, external, and amotivation. Results of the binomial logistic regression indicated that the model as a whole was a significant predictor of obesity status  $\chi^2(6, N=108) = 20.58, p = .002$ . A review of the coefficients table revealed that two of the six independent variables made a significant contribution to the model, external motivation and integrated motivation. External motivation had an odds ratio of 2.41 ( $p = .003$ ), indicating that for every additional unit increase in external motivation scores, there is a 2.41 likelihood of the respondent being obese. Integrated motivation had an odds ratio of .41 ( $p = .01$ ). This indicates that for every unit increase in integrated motivation scores, respondents were .46 less likely to be obese. Based on the results, the alternative hypothesis was accepted (Table 8).

TABLE 8. *Predicting non-obese/obese status – Logistic regression coefficients table – BREQ-3.*

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
BREQ Intrinsic	.362	.357	1.025	1	.311	1.436	.713	2.892
BREQ Integrated	-.892	.358	6.201	1	.013	.410	.203	.827
BREQ Identified	.020	.046	.184	1	.668	1.020	.932	1.116
BREQ Introjected	-.049	.232	.044	1	.834	.953	.604	1.502
BREQ External	.880	.296	8.819	1	.003	2.411	1.349	4.310
BREQ Amotivation	-.200	.327	.374	1	.541	.819	.432	1.553
Constant	-.283	.643	.193	1	.660	.754		

A t-test of BREQ-3 reveals significant differences in means with external motivation,  $t(106) = -3, p = .003$ , resulting in a small effect size of .13 and integrated motivation,  $t(106) = 2.101, p = .038$ , resulting in a small effect size of .17 in non-obese and obese participants. BREQ-3

used a Likert scale from 0-4 with 0 indicating ‘not true for me’ and 4 indicating ‘very true for me’. All other motivational styles of BREQ-3 were found to be not significant (Table 9).

TABLE 9. *BREQ-3 t-test mean scores.*

	N		Mean		Std. Dev.		p-value
	Non-obese	Obese	Non-obese	Obese	Non-obese	Obese	
BREQ Intrinsic	66	42	2.5871	2.3452	0.97615	1.12882	0.24
BREQ Integrated	66	42	2.2652	1.8155	1.06146	1.11948	0.038
BREQ Identified	66	42	2.7197	8.3333	0.91727	38.40953	0.237
BREQ Introjected	66	42	5.6894	1.9107	30.5255	1.22949	0.425
BREQ Extrinsic	66	42	0.7273	1.3036	0.84549	1.15365	0.003
BREQ Amotivation	66	42	0.4318	0.619	0.77279	0.79487	0.227

Univariate models were also examined. Each independent variable was analyzed separately and it was found that integrated motivation was a significant predictor in obesity status  $\chi^2(1, N=108) = 4.41, p = .04$ . All other independent variables were found to be non-significant predictors in obesity status.

**Research question 4.** The fourth research question asked if motivational styles are significant predictors of obesity status after controlling for motivational styles of the REBS, BREQ-3, and demographic variables that were found to be significant on initial analysis. The alternative hypothesis states motivational styles and demographic variables are significant predictors of obesity status after controlling for REBS, BREQ-3. A binomial logistic regression model was used to answer this question. Mean composite scores were computed using the initial significant predictors: external motivational style of REBS, external motivational style of BREQ-3, and integrated motivational style of BREQ-3. The six independent variables included the three motivational style variables and three demographic independent variables and were entered in this manner respectively, obese family members, medical condition that has influenced weight, level of education, extrinsic motivation of REBS and BREQ-3, and integrated motivation of

BREQ-3. The rationale for entering these six variables is due to the significant differences between non-obese and obese groups. Results of the binomial logistic regression indicated that after entering the variables the model was a significant predictor of obesity status,  $\chi^2(6, N=108) = 28.79, p = <.001$ . A review of the coefficients table revealed that three of the six independent variables made a significant contribution to the model: obese family member, level of education, and integrated motivational style of exercise. Having an obese family member had an odds ratio of 3.39 ( $p=.015$ ), indicating a 3.39 likelihood of having an obese family member and being obese. Level of education had an odds ratio of 0.286 ( $p=.013$ ), indicating a 0.286 likelihood of being obese respondents had an education level of college or more. Integrated motivational style of exercise had an odds ratio of .620 ( $p=0.043$ ), indicating that for every unit increase in integrated motivation score of exercise, respondents were 0.620 less likely to be obese. As a result, the alternative hypothesis was accepted (Table 10).

TABLE 10. *Predicting non-obese/obese status – Logistic regression coefficients table – Significant variables.*

	B	S.E.	Wald	df	p.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Obese Family	1.221	.502	5.902	1	.015	3.389	1.266	9.074
Medical Condition	.585	.569	1.058	1	.304	1.795	.589	5.472
Level of Education	-1.25	.503	1.058	1	.013	.286	.107	.765
REBS External	.118	.175	.454	1	.500	1.125	.798	1.586
BREQ External	.556	.286	3.766	1	.052	1.743	.995	3.055
BREQ Integrated	-.478	.236	4.112	1	.043	.620	.391	.984
Constant	-.441	.709	.386	1	.534	.643		

Research question four t-tests reveals significant differences in means of all variables; obese family member,  $t(106)=-2.318, p = .022$ ; medical condition,  $t(106)= -2.207, p= .029$ ; level of education,  $t(106)=2.061, p = .042$ ; extrinsic motivation REBS,  $t(106)=-3.129, p = .002$ ; extrinsic BREQ-3,  $t(106)=-2.991, p=.003$ ; integrated BREQ-3,  $t(106)= 2.1.1, p = .038$ . All

calculated effect sizes were medium, 0.47, 0.41, 0.036, 0.64, 0.57, and 0.41 respectively (Table 11).

TABLE 11. *Significant variables t-test mean scores.*

	N		Mean		Std. Dev		p-value
	Non-obese	Obese	Non-obese	Obese	Non-obese	Obese	
Obese Family Member	66	42	0.39	0.62	0.492	0.492	0.022
Medical Cond	66	42	0.14	0.31	0.346	0.468	0.029
Level of Ed	66	42	0.6515	0.4524	0.48014	0.50376	0.042
REBS External	66	42	2.5417	3.4643	1.23147	1.83427	0.002
BREQ External	66	42	0.7273	1.3036	0.84549	1.15365	0.003
BREQ Integrated	66	42	2.2652	1.8155	1.06146	1.11948	0.038

Univariate models were also examined. Each independent variable was analyzed separately and it was found that all six independent variables were significant predictors in obesity status (Table 10).

### **Assumptions**

Assumptions of logistic regression were met. Independence of errors was met because participants were only included in one group, non-obese or obese. Finally, linearity was violated because dichotomous dependent variables were used, non-obese and obese. Obesity is a complex condition and there are many factors related to obesity status; multicollinearity explains this violation of assumption of linearity. The significant findings in this study, or predictors, are not highly correlated (Field, 2009). Meaning that motivational styles for eating and exercise are very different as indicated with large differences of the smallest eigenvalue; eigenvalue .062 = REBS external mean 67%, BREQ-3 external mean 23%, and BREQ-3 integrated mean 48%.

### **Summary**

There were 108 participants in this study. Data for the four research questions were analyzed. Research question one found motivational styles of the GMS not to be a significant

predictor of obesity status. Results of the binomial logistic regression indicated that the model containing all predictors was not a significant predictor of obesity status,  $\chi^2(6, N=108) = 5.73$ ,  $p = .45$ . The second research question found motivational styles of the REBS were significant predictors of obesity status. Results of the binomial logistic regression indicated that the model including all predictors was a significant predictor of obesity status,  $\chi^2(6, N=108) = 14.63$ ,  $p = .02$ . The third research question found the motivational styles of the BREQ-3 were significant predictors of obesity status  $\chi^2(6, N=108) = 20.58$ ,  $p = .002$ . External motivation and integrated motivation made a significant contribution to the model. The fourth research question used the variables found to be significant in the initial analysis for this final analysis. Results of the binary logistic regression indicated that after entering the significant variables (obese family members, level of education, and integrated motivational style of BREQ-3), the model was a significant predictor of obesity status,  $\chi^2(6, N=108) = 28.79$ ,  $p = <.001$ , specifically, obese family members, level of education, and integrated motivational style of BREQ-3.

In the next chapter, the results of the study will be examined and interpreted in the context of previous research and the theoretical framework. Additionally limitations of the study and recommendations for future research are reviewed in Chapter 5.

## CHAPTER 5: DISCUSSION

### Summary

Obesity rates have quadrupled over the last four decades with severe obesity increasing in certain populations and becoming a worldwide epidemic. Consequences of obesity range from chronic conditions such as diabetes and hypertension (Pulgarón, 2013) to increased disability pension (Reilly & Kelly, 2011). This increased disability leads to burdens to the economy and health care. The economic burden of obesity to the U.S. economy is in excess of \$215 billion annually (Hammond & Levine, 2010). The average annual medical cost per obese person is \$1723 compared to annual medical cost for an overweight person (BMI 25-29.9) is \$266 (Tsai, Williamson, & Glick, 2011). Obese young adults are less likely to advance their careers or education during adolescence leading to increased unemployment rates in this population (Merten et al., 2008). This decrease in earnings and employment increases likelihood of depressive symptoms with co-morbidities such as attention deficit hyperactivity disorder (ADHD), behavioral problems, and impaired sleep (Merten et al., 2008). The findings of this study may be used to increase motivation and subsequently decrease obesity rates.

Motivation exists on a continuum from extrinsic to intrinsic. Six motivational styles were examined: intrinsic, integrated, identified, introjected, external, and amotivation. In order to coach obese individuals to non-obese status, motivational styles in relation to eating and exercise behaviors need to be identified. Once an individual's motivational style has been identified, coaching and support can be customized.

The purpose of this study was to identify motivational styles of eating and exercise behaviors in non-obese and obese young adults. The aims were 1) to compare differences in

motivational styles of eating and exercise behavior in two groups of young adults, non-obese and obese, and 2) compare motivational styles controlling for eating and exercise behaviors that moderate the relationship between motivational styles and BMI.

### **Key Findings**

Data analysis began with a thorough examination of the demographic data. It was found that non-obese young adults obtained more education (N=43, 69.4%), than obese young adults (N=19, 30.6%), and non-obese young adults are less likely not have an obese family member (N=40, 71.6%) than obese young adults who are more likely to have an obese family member (N=26, 50%). Obese adolescents are less likely to advance their education compared to their non-obese peers (Merten, 2010; Merten et al., 2008). These findings parallel current CDC data that obese youth are more likely to have head of households with a high school degree or less and living within the federal poverty level (Ogden, Carroll, et al., 2018). These findings are congruent with Organismic Integration Theory (OIT), the motivational model used in this study. Young adults emulate what eating behavior is modeled during their youth (Larsen et al., 2015). Non-obese young adults who live with or are supported by their non-obese family members may be exposed to less food abundance and increased physical activity. Behaviors such as healthy eating and exercise modeled by parents are more likely to be emulated by their children.

Another significant finding in the demographic analysis found non-obese (N=9, 40.9%) and obese (N=13, 59.1%) had an undetermined medical condition that influenced their weight. The questionnaire asked if participants have a history of a medical condition, including pregnancy that influenced their weight. However, the only options to answer were either 'yes' or 'no,' without an option to describe the medical condition. Also, there were significant differences

between non-obese and obese in BMI, height in inches, and weight in pounds. Differences of height, weight, and BMI between non-obese and obese groups were expected. Extra pounds and shorter stature increase the likelihood of obesity.

Examination of the Regulation of Eating Behavior Scale (REBS) (Appendix F) motivational style data with logistic regression analysis found the model as a whole was a significant predictor of obesity status. Specifically, external motivation of eating behavior between both groups of young adults was significantly different. Those who ranked their external motivation high were nearly 1.5 times more likely to be obese. Also, univariate examination found external motivation to be a significant predictor of obesity status. OIT supports this; those who are extrinsically motivated are less likely to maintain long-term weight loss in the presence of reward of avoiding punishment (Deci & Ryan, 2000).

Examination of the Exercise Regulation Questionnaire (BREQ-3) (Appendix G) motivational data found the model as a whole was a significant predictor of obesity status. Specifically, integrated and external motivational styles were significant predictors of non-obese and obese status respectively. This indicated that for every increase in external motivation score, the respondent is 2.4 times more likely to be obese. On the other hand, for every increase in integrated motivation scores, the respondent is a 0.41 less likely to be obese. This parallels OIT; those who rank their integrated motivation high are those who have assimilated exercise behavior internally in order for goal attainment but do not perform the activities for the enjoyment of exercise and those who rank their extrinsic motivation high are more likely to be motivated with monetary reward to exercise (Deci & Ryan, 2000). According to OIT, external motivation is controlled externally for reward or to avoid punishment but is not lasting when

rewards are withdrawn (Deci & Ryan, 2000). In other words, externally motivated people are more likely to stop going to a gym to exercise if their employer or insurance company stop paying for it but may have acquired some enjoyment from exercise therefore adjusting their external motivation to more intrinsic motivation.

To summarize the key findings of the demographic data, obese participants obtain less education than non-obese participants and obese participants are more likely to have an obese family member than non-obese participants. In summary of the key findings of the motivational styles, external motivation of eating and exercise behavior was a significant predictor of obesity status and integrated motivation styles of exercise behavior were significant predictors of non-obese status.

### **Implications for Practice**

#### **Autonomous Support**

Autonomous social support can increase success with obese patients who desire non-obese status (Deci & Ryan, 2000). An autonomously supportive NP begins a relationship with an obese young adult patient by evaluating obesity status with discussion of risks by, ‘is now a good time to discuss your weight’? An initial assessment of readiness for change and motivational style of eating and exercise behavior can assist with further evaluation and the patient plan to reach non-obese status. Examples of how an NP can maintain an autonomously supportive patient relationship are to have the patient autonomously choose which diet and exercise behavioral changes they feel confident in making. Depending on which motivation style the patient corresponds with drives recommendations made by the NP using shared decision-making. Obese young adults who rank their extrinsic motivation high may benefit from financial

incentives to increase desired behavior for lasting change. For example, some employers provide incentives to their employees for those who maintain annual wellness visits with their NP.

Annual well visits provide opportunities to discuss weight loss or other behavior changes needed to improve wellness. Also, employers and/or insurance companies may provide discounts for gym membership to their employees/customers. These financial incentives may attract externally motivated obese young adults to perform the recommended 150-300 minutes per week of moderate intensity exercise or 75-150 minutes of vigorous intensity aerobic exercise per week (Piercy et al., 2018).

Autonomous support also includes self-referrals to gym membership or weight management classes that include behavioral health support. Self-referrals are completed by the patient reaching out and making appointments independently. Those who are motivated will more likely contact the provided number for desired classes. Weight management classes can influence behaviors with the use of a socially supportive environment (Deci & Ryan, 2000). According to Arterburn et al., (2008) adults with metabolic syndrome were more likely to participate in weight management programs if their insurance plan would pay the cost (2008). However, financial incentives are a form of extrinsic motivation that is less stable for lasting change. Furthermore, behavior rewards impede intrinsic motivation because choice is needed to increase feelings of autonomy in order to increase intrinsic motivation (Deci & Ryan, 2000). Accordingly, rewards can be temporary in order for patients to learn desired behavior, but with repeated temporary learned behavior, individuals can place these learned behaviors into long-term innate behavior for lasting change and non-obesity status.

Parents are instrumental in their child's weight. This may be due to their role modeling behavior, food restriction, or concern for weight. It was found that mothers who lost weight had influenced their children who also lost weight and conversely, mothers who gained weight influenced their children who gained weight (Andriani, Liao, & Kuo, 2015). Due to emulating and modeling healthy eating and exercise behavior for others in the household, inviting family members and friends to the patient's NP visits, weight management classes, and gym membership is recommended. Educating young adults that they are role models for their children who may emulate healthy eating and exercise behaviors. However, if after discussion of obesity risk and evaluating motivational style, the patient chooses not to make behavioral changes, the NP needs to accept and support the patient's choice. At subsequent visits, patient motivation may change from extrinsic to intrinsic through the supportive relationship.

### **Motivational Interviewing**

Motivational interviewing (MI) can occur through change talk facilitated by NP's in an autonomous supportive manner in order for effective change (Deci & Ryan, 2012). Change talk is practiced using statements discussing a problem based on the patient's perspective in the present tense. The patient provides the problem, and if a behavior change is desired, then the ability to change behavior is then discussed. This involves providing the patient with the information needed in order for them to make choices with eating and exercise behavior and respecting the choices made (Deci & Ryan, 2012). Questions such as "How does it feel when you overeat or do not exercise?" or "What is your breaking point in order to change your behavior?" should be asked in a non-judgmental manner. Rephrasing their responses and providing feedback with phrases such as 'keeping on track' and staying 'consistent' further

emphasizes the autonomously supportive relationship between patient and NP. Throughout this change talk, NPs ask permission to make suggestions or go into new territory while always acknowledging patient accomplishments. “Integrating elements from SDT, motivational interviewing is a counseling style that promotes autonomous motivation and self-initiated behavioral change through techniques such as shared decision-making and reflective listening” (Wilson et al., 2017).

Autonomously supportive NP/patient relationships are further emphasized while providing empathy; this is a form of relatedness in order for further support. NPs may make statements such as “It must be difficult” after obese patients share their experiences of what it is like to overeat or not exercise. For those obese young adults who rank their external motivation high with eating behavior, MI can consist of asking patients what they think about diets, over-eating, feasting, or what they like about food. After listening to their responses, NPs can reflect about what they have tried in the past to change their behavior, how confident they feel about changing their behavior, and readiness for change. The NP can emphasize how important it is for them to change their eating behavior. Finally, the NP can express confidence in the patient’s ability to make change due to their commitment.

MI for obese young adults who rank their external motivation high with exercise behavior consists of asking patients what they think about exercise and different forms of exercise such as walking, hiking, running, swimming, yoga, strength training, cycling, or attending a gym for other forms of exercise. Similar to MI with eating behavior, NPs may explore what the patient has tried in the past, how confident they feel with different forms of exercise, and their readiness for change. The NP can emphasize how important it is for the

patient to change their exercise behavior, and again express confidence in the patient's ability to make changes based on their commitment. Obese young adults may initially lack the self-esteem necessary to make behavioral changes for lasting change. When NPs create an autonomous, supportive relationship with their patients, it can be motivating. The MI proceeds with an agreement between the NP and the patient instead of assumptions or expectations made by the NP.

### **Implications for Education**

Nurse Practitioners would benefit from coaching or MI training, especially those who specialize in weight management. This approach facilitates analysis of readiness for change and thus can be time saving as counseling is not pursued in individuals lacking readiness. Depending on the setting the NP practices in, the NP can use MI with the patient, or refer to a behavioral health specialist who practices MI. Primary care NPs are less likely to have the time for effective MI, but having the resources to know where to refer their obese patients is beneficial.

### **Implications of Policy**

The multidimensional complexity of obesity requires multidisciplinary involvement. Policy in order to assist patients to reach or maintain non-obesity status can be implemented at the local and national level. Implementing policy that increases responsibility of behavior onto the patient but recommends providing an autonomously supportive patient/NP relationship may assist with lasting change in obese young adults.

At the high school level, policy to decrease or prevent obesity can be implemented with health classes to discuss motivation with diet and exercise. Adolescents can be informed that they most likely emulate eating and exercise behavior modeled in the home. Therefore, if they

desire to change their obesity status, it is recommended that they surround themselves with others who model healthy eating and exercise behavior. Nutritional cooking classes can teach how to read nutritional labels, use fresh fruits and vegetables in recipes, and shop on a budget as shopping and cooking meals at home is a healthier and more economical choice. Culinary classes in high school can involve preparing healthy meals for not only the class but the entire school as well. School culinary classes can increase student competence with healthy food preparation.

Policy changes can be made with regard to exercise as well. Physical education classes can incorporate a variety of exercises that are not only held within the school grounds but also explore other options such as biking, hiking, commercial gym attendance, dancing, and yoga classes. Schools can map out safe walking routes to and from school to encourage increased activity. In addition, physical education classes can teach students more about the recommended moderate to vigorous exercise. For example, when experiencing moderate to vigorous exercise, one may have difficulty saying an entire sentence due to difficulty breathing and increased heart rate. One may also sweat and have some muscle soreness the next day. In addition to these measures for students, healthy eating and exercise behavior can be modeled by the faculty and teaching staff at the schools in order for the students to emulate.

At the university level, policy can be implemented to mandate physical education (PE) classes for freshmen and possibly throughout their college education. Classes can include 1-credit courses such as tennis, hiking, and yoga or group sports such as soccer and basketball. Young adulthood is a time of relationship building and team sports can enable a social environment in order for relationship building that this population may be lacking. Obese students who have not established relationships or are lacking in relationships may be at

increased risk of isolation, loneliness, or depression. Due to the bi-directional association between depression and obesity (Mannan et al., 2016), more social support in order for lasting change to reach non-obese status is needed. Social support and daily PE classes can increase success with obese patients who desire non-obese status.

### **Implications for Research**

Adolescent obesity increases the risk of young adult obesity. Consequently, future research needs be increased in the young in order to decrease adult obesity. It is during youth that independence is acquired and people begin making food purchases independent of their parents. It is also during this stage that choices about exercise routines are made and adopted into adulthood.

### **Theoretical Framework**

One strength of this study was the use of theory-based research. The theoretical framework used to guide this analysis was Self-Determination Theory (SDT), which has been found pertinent in healthcare due to exploring autonomy using empirical methods (Deci & Ryan, 2012). The autonomously supportive NP/patient relationship is one example that reinforces the three basic psychological needs of SDT: autonomy, competence, and relatedness. Autonomy is supported by providing the patient an opportunity to autonomously choose an eating and/or exercise behavior to change, competence is complete when discussing options of behavioral modifications the patient is able to perform, and relatedness is supported with the NP/patient relationship. When all three of these needs are met, self or intrinsic motivation is supported (Ryan & Deci, 2000).

According to OIT and the six motivational styles, intrinsic motivation influences non-obesity status and external motivation influences obesity status (Deci & Ryan, 2000). Therefore, the statistical models used in this study were used to analyze differences in both groups, non-obese and obese young adults. The findings of this study confirm the hypothesis that those who rank their external motivation of diet and exercise high are more likely to be obese and those who rank their integrated motivation high are less likely to be obese. The conceptual model reflects this; integrated motivation is nearest to intrinsic motivation and external motivation is the furthest. Integrated motivation is more autonomous, innate, and stable, and those who rank this higher are more likely to have positive emotional experiences with diet and exercise. External motivation is more controlled, learned, and less stable, and those who rank their external motivation high are more likely to have negative emotional experiences with diet and exercise (Deci & Ryan, 2000).

A study from a primary care setting examined BMI over two years in overweight or obese children age 2 to 8, and found significant improvement of BMI in the group that was provided MI by both a PCP and a registered dietician to the parents of the children (Resnicow et al., 2015). Another study from Iran found a group of overweight women who participated in MI ranked their 'weight efficacy lifestyle' (a rank of their ability to resist eating in different situations) higher than the control group who participated in nutritional education only (Mirkarimi, Kabir, Honarvar, Ozouni-Davaji, & Eri, 2017). Increasing competence with eating well and/or exercising, may lead to decreased weight (Quick et al., 2015). The findings of these studies validate that MI provides autonomous support in order for patients to examine their

motivation for healthy eating and exercise behavior. Motivational styles need to be assessed by NPs in order to coach obese patients to non-obese status.

### **Future Research**

Further research needs to consist of larger sample sizes of non-obese and obese young adult when examining motivational styles. This PI originally attempted to identify motivational styles of former obese young adults who were currently non-obese but the numbers were so few a qualitative study was indicated. A possibility for further studies can examine the motivational styles of formerly obese youth and apply them to obese young adults for lasting behavior change. Finally, examining motivational styles in obese young adult patients by providing an autonomously supportive relationship and using MI may help patients maintain or reach non-obese status.

### **Limitations**

One limitation of this study was the sample size of 108 that produced small effect sizes. A larger sample size is needed to detect differences in eating and exercise behavior in non-obese and obese young adults that may produce sufficient effect sizes. A larger sample size may allow for an increase of categories instead of collapsing categories, as was performed in this study. Normal weight and overweight young adults were categorized together as non-obese and obese and morbidly obese were categorized as obese. The choice to use this pragmatic approach and collapse groups into less categories may have decreased sensitivity.

Other limitation is that obesity is a complex condition and not caused by motivational styles. Numerous factors may influence obesity status in this population. Potential factors consist of but are not limited to a significant life changing event, financial income, sleep, psychological

conditions, medical conditions, medications, and surgical history. Some, but not all, of these factors were included in the demographic questionnaire but all were not. Finally, the concepts of OIT are non-observable and subjective, which may limit a quantitative descriptive study that has origins in a mechanistic nursing paradigm.

### **Bias**

Patients were recruited from the lobbies of clinics that contain several different practices such as primary care, obstetrics and gynecology, psychiatry, same-day clinic, dentistry, and pediatrics, as well as laboratory, radiology, and pharmacy services. Women who appeared obviously pregnant were not invited to participate but some women may have been pregnant and reported yes to, 'do you have a medical condition that has influenced your weight (include pregnancy),' which was a significant finding in the demographic data analysis. This therefore was not controlled for during recruitment, as the PI did not know participants' pregnancy status. Furthermore, the medical condition was not specified and may have been another medical condition other than pregnancy.

### **Setting**

Young adults 20 to 25 years of age are less frequent users of healthcare. This population is generally healthier than an older population such as seniors who may have more chronic conditions requiring medical management and more frequent visits. This population is also less likely to have health insurance, decreasing their likelihood of using the healthcare system. Young adults using the healthcare system at their age may already have a medical condition, such as one that influences weight (an item on the demographic questionnaire). A more appropriate setting

for this study may be at a site that young adults visit more frequently, such as a shopping mall or coffee house.

### **Final Sample**

In this study, most participants were female (74%). However, recruitment took place in a health clinic that serves 58.5% female patients (62,648 out of 106,920 patients as of 2018) (Haro, 2019). This is not reflective of the clinic's demographic characteristics because women are over-represented.

### **Generalizability**

This study is generalizable to young adults who were motivated to earn \$10 to complete a survey about their motivation in relation to diet and exercise.

### **Reliability and Validity**

The measures used in this study were found to have adequate reliability and validity (Berry et al., 2016; Daniels, 2009; Pelletier, Blanchard, Sharp, Otis, Vallerand, & Guay, 2004; Pelletier et al., 2004). However, the non-specific and vague questions in General (Global) Motivational Scale (GMS) inquired about life in general. Considering the age of this study, 20-25 years, participants may not be able to effectively consider things like 'the person I aim to be;' this may have been an inappropriate choice of measure. The answers provided by these participants reflect the vague questions meaning this population provided an array of answers to these questions about motivation of life in general producing non-significant findings.

### **Conclusion**

Obesity has become a worldwide epidemic without adequate prevention or treatment. Consequences are physiologic and psychologic long-term sequelae with hundreds of billions of

dollars in economic burden to healthcare and society (Kim & Basu, 2016). Obese adolescents are at increased risk of becoming obese young adults; therefore, examination of motivational styles should focus on the young. It is critical to intervene during this time of transition from adolescence to young adulthood, as habits initiated at a young age are likely adopted into adulthood. Obese young adults who overeat are at increased risk of impulsivity therefore reducing their regulation of eating and exercise behavior (Chamberlain et al., 2015). Intense diet and exercise interventions with behavioral therapy decreases obesity in youth (Kirschenbaum & Gierut, 2013).

It is predicted that future generations of obese will have shorter life expectancies than current generations (Olshansky et al., 2005). The purpose of this study was to identify motivational styles of eating and exercise behavior in non-obese and obese young adults in order to achieve successful coaching, a form of autonomous support. Motivational styles of obese young adult patients need to be evaluated in primary care promoting a better understanding of individual obesogenic behavior. NPs can establish a more informed supportive relationship with their patients incorporating their motivational style. It is through this autonomously supportive relationship that the patients may be coached from external to internal motivation in relation to diet and exercise behavior. OIT, a sub-theory of SDT, is increasingly used in health promotion, and is the theoretical framework used in this study to identify motivational styles.

In this group of 108 young adults, both demographic and motivational variables were found to influence obesity. Having an obese family member rendered one more likely to be obese, and a higher level of education left one less likely to be obese. In terms of motivation, an external motivational style of eating behavior predicted one would more likely be obese, whereas

an integrated motivational style of exercise behavior predicted one would likely be non-obese. In conclusion, NPs need to identify motivational styles of young adults in order to coach them to non-obese status by providing an autonomously supportive relationship. Due to the complexity of obesity, a multidisciplinary approach is needed to create and implement prevention and treatment programs. A variety of possible settings to treat and prevent obesity are indicated, such as the home, school, primary care, and weight management programs. The findings of this study including a better understanding of the impact intrinsic and extrinsic motivational styles on obesity may be used to inform further studies to eventually provide adequate prevention and treatment of obesity.

APPENDIX A:  
LETTER OF SUPPORT

# EL RIO

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## COMMUNITY HEALTH CENTER

March 31, 2017

Shawn Siqueiros  
University of Arizona  
College of Nursing  
PO Box 210203  
Tucson, Arizona 85721

Dear Shawn,

Your request to conduct research at El Rio Community Health Center is enthusiastically supported. It will help to further other research and program development that is currently in place at El Rio around the topic of obesity prevention and treatment. El Rio supports your research with the understanding that:

- El Rio will identify patients meeting study criteria (querying adolescents and adult BMI).
- The investigator and El Rio support team will mail the initial letter to patients identified to fit the criteria.
- This letter will describe your study and provide patients with your contact information. Interested patients can then contact you directly.

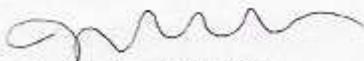
Upon completion of your program, please provide a final written summary report of the study and significant findings to El Rio. Electronic submission of the report is preferable and may be sent to my e-mail address.

Finally, please know this is a letter of support only and that final approval needs to be completed through the El Rio Pharmacy, Safety, and Therapeutics Subcommittee on Research Study Review.

Best wishes on your project. We look forward to reviewing your summary.

Please contact me if you have any questions.

Sincerely yours,



Joy Mockbee M.D., MPH  
[JoyM@elrio.org](mailto:JoyM@elrio.org)

839 West Congress Street  
Tucson, Arizona 85745

APPENDIX B:  
RECRUITMENT FLYER



## Have you lost weight and kept it off for 1 year or more or

I would like to know what motivates you to lose weight or not. If you have been successful with weight loss or if you have been heavy since you were a teen, please contact me to participate in this study.

Shawn Siqueiros  
520-360-3931

*Shawn Siqueiros*  
520-360-3931

APPENDIX C:  
CONSENT FORM

### Consent to Participate in Research

You are being asked to voluntarily participate in a research study.

**Purpose:** The purpose of this study is to identify motivational factors and psychological needs important for weight loss in obese adolescents who transition into normal weight young adults.

**Selection Criteria:** Young adults 20 – 25 years of age with a BMI 18.5 – 24.9 with history of obesity during adolescence and BMI 30 and > also with a history of obesity during adolescence. English fluency is required as well as not be pregnant and no history of taking medications or having a procedure that would influence your weight.

**Procedure:** Attend a 1-hour session at the El Rio clinic of your choice to answer 5 questionnaires and have your height and weight measured privately. It is requested you answer the questionnaires completely and honestly. Any concerns or questions you have will be answered.

**Benefit:** The benefit of participating in this study is knowing adolescents and young adults with similar experiences may benefit from the results of this study.

**Risks:** There is minimal risk for participating in this study. The risk consists of possibly experiencing emotions obesity may trigger. If at any time you change your mind and wish not to participate you can withdraw from the study at any time. Your decision to participate in this study will not influence your care at El Rio Community Health Center.

**Confidentiality:** All of the information you provide for this study will be kept confidential. No identifying name or date of birth will be tracked.

**Participant costs and compensation:** There is no cost to participate except your time. Transportation to your El Rio clinic will need to be arranged. You may receive a \$10 gift card for your participation if funding is available.

**Contact information:** For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact the Human Subjects Protection Program at [520-626-6721](tel:520-626-6721) or online at <http://rgw.arizona.edu/compliance/human-subjects-protection-program>

If you would like to contact the principal investigator in this study, please contact Shawn Siqueiros NP-C, PhD Candidate at 520-360-3931 or [semurray@email.arizona.edu](mailto:semurray@email.arizona.edu)

If you agree to participate in this study, you must receive a copy of this consent form and a written summary of the research. You will not give up any legal rights by signing this consent form.

Your participation in this study is voluntary and you will not be penalized if you refuse to participate or decide to stop.

Signing this document means that you voluntarily agree to participate in this research study.

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Signature of participant

---

Date

---

Signature of witness

Date

If at any time you need to reach The University of Arizona College of Nursing, please feel free to do so at 1305 N. Martin PO Box 210203 in Tucson, AZ 85721-0203. The phone number is (520) 626-6154.

My committee members are: Ki Moore, PhD, RN, FAAN, Patricia Daly, PhD, RN, FNP-BC and Graciela E. Silva Torres, PhD, MPH

Permission to conduct this study was received through the University of Arizona Institutional Review Board

520-621-3513

[VPR-IRB@email.arizona.edu](mailto:VPR-IRB@email.arizona.edu)

1618 E. Helen Street (Street address)

Tucson, AZ 85721

PO Box 210409 (Mailing address)

Tucson, AZ 85721

APPENDIX D:  
DEMOGRAPHIC QUESTIONNAIRE

**Participant Demographic Questionnaire**

1. Today's date: \_\_\_\_\_
2. Your current age: \_\_\_\_\_
3. Sex
  - \_\_\_\_\_ Female
  - \_\_\_\_\_ Male
  - \_\_\_\_\_ Transgender
4. Marital status
  - \_\_\_\_\_ Single
  - \_\_\_\_\_ Married
  - \_\_\_\_\_ Divorced
  - \_\_\_\_\_ Separated
5. Ethnicity
  - \_\_\_\_\_ Hispanic/ Latino
  - \_\_\_\_\_ Non-Hispanic
6. Race
  - \_\_\_\_\_ American Indian or Alaskan Native
  - \_\_\_\_\_ Asian
  - \_\_\_\_\_ Black or African American
  - \_\_\_\_\_ Native Hawaiian or Other Pacific Islander
  - \_\_\_\_\_ White
  - \_\_\_\_\_ Other
7. Highest level of education completed?
  - \_\_\_\_\_ Less than high school
  - \_\_\_\_\_ High school
  - \_\_\_\_\_ Some college
  - \_\_\_\_\_ Bachelor's degree
  - \_\_\_\_\_ Master's degree or higher

8. Are any of your family members obese or overweight?

\_\_\_\_\_ NO

\_\_\_\_\_ YES – include or not, if so do I want to also include mode of transportation, etc.

9. Do you or have you taken medication that has influenced your weight?

\_\_\_\_\_ NO

\_\_\_\_\_ YES Name of medication:

\_\_\_\_\_

10. Are you aware you may have a medical condition that has influenced your weight?

\_\_\_\_\_ NO

\_\_\_\_\_ YES Name of the condition?

\_\_\_\_\_

11. Have you had a surgical procedure that has influenced your weight?

\_\_\_\_\_ NO

\_\_\_\_\_ YES What procedure?

12. Do you have or have you had an eating disorder?

\_\_\_\_\_ NO

\_\_\_\_\_ YES What type of eating disorder?

\_\_\_\_\_

For investigator use only:

Current height \_\_\_\_\_ Weight \_\_\_\_\_ BMI \_\_\_\_\_

APPENDIX E:  
GENERAL (GLOBAL) MOTIVATION SCALE (GMS)

### Global Motivation Scale (GMS)

Please indicate to what extent each of the following statements corresponds to the reasons why you do generally different things in your life.

<b>Not agree at all</b>	<b>Very slightly agree</b>	<b>Slightly agree</b>	<b>Moderately agree</b>	<b>Mostly agree</b>	<b>Strongly agree</b>	<b>Completely agree</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>

In general, I do things...

- 1) ...in order to help myself become the person I am to be. \_\_\_\_\_
- 2) ...because I like making interesting discoveries. \_\_\_\_\_
- 3) ...because I want to be viewed more positively by certain people. \_\_\_\_\_
- 4) ...because I choose them as means to attain my objectives. \_\_\_\_\_
- 5) ...for the pleasure of acquiring new knowledge. \_\_\_\_\_
- 6) ...because otherwise I would feel guilty for not doing them. \_\_\_\_\_
- 7) ...because by doing them I am living in line with my deepest principles. \_\_\_\_\_
- 8) ...although it does not make a difference whether I do them or not. \_\_\_\_\_
- 9) ...for the pleasant sensations I feel while I am doing them. \_\_\_\_\_
- 10) ...in order to show others what I am capable of. \_\_\_\_\_
- 11) ...because I choose them in order to attain what I desire. \_\_\_\_\_
- 12) ...because I would beat myself up for not doing them. \_\_\_\_\_
- 13) ...even though I do not have a good reason for doing them. \_\_\_\_\_
- 14) ...in order to attain prestige. \_\_\_\_\_
- 15) ...even though I believe they are not worth the trouble. \_\_\_\_\_
- 16) ...because I would feel bad if I do not do them. \_\_\_\_\_
- 17) ...because by doing them I am fully expressing my deepest values. \_\_\_\_\_
- 18) ...because they reflect what I value the most in life. \_\_\_\_\_

APPENDIX F:  
REGULATION OF EATING BEHAVIOR SCALE (REBS)

### WHY ARE YOU TRYING TO REGULATE YOUR EATING BEHAVIORS?

Listed below are several statements concerning possible reasons why people might try to regulate their eating behaviors. Using the scale from 1-7 below, please indicate the degree to which the proposed reasons correspond to your reasons for regulating your eating behaviors. Circle the appropriate number.

	Does not correspond at all				Corresponds moderately		Corresponds exactly
1. I don't know why I bother.	1	2	3	4	5	6	7
2. Because I take pleasure in fixing healthy meals.	1	2	3	4	5	6	7
3. Because it is expected of me.	1	2	3	4	5	6	7
4. Because I like to find new ways to create meals that are healthy.	1	2	3	4	5	6	7
5. Because eating healthy is a way to ensure long-term health benefits.	1	2	3	4	5	6	7
6. I don't know. I can't see how my efforts to eat healthy are helping my health situation.	1	2	3	4	5	6	7
7. Because I feel I must absolutely be thin.	1	2	3	4	5	6	7
8. Because I don't want to be ashamed of how I look.	1	2	3	4	5	6	7
9. Because other people insist that I do.	1	2	3	4	5	6	7
10. Because eating healthy is an integral part of my lifestyle.	1	2	3	4	5	6	7
11. For the satisfaction of eating healthy.	1	2	3	4	5	6	7
12. Because I would feel ashamed of myself if I was not eating healthy.	1	2	3	4	5	6	7
13. Because other people close to me (e.g. partner or parents) will be upset if I don't.	1	2	3	4	5	6	7
14. Honestly, I don't know. I can't see what I'm getting out of it.	1	2	3	4	5	6	7
15. Because people around me nag me to do it.	1	2	3	4	5	6	7
16. Because I think it's a good idea to try and regulate my eating behaviors.	1	2	3	4	5	6	7
17. Because eating healthy is part of the way I've chosen to live my life.	1	2	3	4	5	6	7
18. Because I would be humiliated if people thought I wasn't in control of my eating behaviors.	1	2	3	4	5	6	7
19. I don't really know; I truly have the impression that I'm wasting my time trying to regulate my eating behaviors.	1	2	3	4	5	6	7
20. Because regulating my eating behaviors has become a fundamental part of who I am.	1	2	3	4	5	6	7
21. Because eating healthy is congruent with other aspects of myself.	1	2	3	4	5	6	7

- |  |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|
| 22. Because I believe that eventually it will allow me to feel better.                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 23. Because I believe it's a good thing I can do to feel better about myself in general. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 24. Because it's fun to create meals that are good for my health.                        | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

APPENDIX G:

BEHAVIORAL REGULATION IN EXERCISE QUESTIONNAIRE (BREQ-3)

### BEHAVIORAL REGULATION IN EXERCISE QUESTIONNAIRE (BREQ-3)

#### Why do you engage in exercise?

We are interested in the reasons underlying peoples' decision to engage or not engage in physical exercise. Using the scale below, please indicate to what extent each of the following items is true for you. Please note that there are no right or wrong answers and no trick questions. We simply want to know how you personally feel about exercise. Your responses will be held in confidence and only used for our research purposes.

	<b>Not true for me</b>		<b>Sometimes true for me</b>		<b>Very true for me</b>
1. It's important to me to exercise regularly.	0	1	2	3	4
2. I don't see why I should have to exercise.	0	1	2	3	4
3. I exercise because it's fun.	0	1	2	3	4
4. I feel guilty when I don't exercise.	0	1	2	3	4
5. I exercise because it is consistent with my life goals.	0	1	2	3	4
6. I exercise because other people say I should.	0	1	2	3	4
7. I value the benefits of exercise.	0	1	2	3	4
8. I can't see why I should bother exercising.	0	1	2	3	4
9. I enjoy my exercise sessions.	0	1	2	3	4
10. I feel ashamed when I miss an exercise session.	0	1	2	3	4
11. I consider exercise part of my identity.	0	1	2	3	4
12. I take part in exercise because my friends/family/partner say I should.	0	1	2	3	4
13. I think it is important to make the effort to exercise regularly.	0	1	2	3	4
14. I don't see the point in exercising.	0	1	2	3	4
15. I find exercise a pleasurable activity.	0	1	2	3	4
16. I feel like a failure when I haven't exercising in awhile.	0	1	2	3	4
17. I consider exercise a fundamental part of who I am.	0	1	2	3	4
18. I exercise because others will not be pleased with me if I don't.	0	1	2	3	4
19. I get restless if I don't exercise regularly.	0	1	2	3	4
20. I think exercising is a waste of time.	0	1	2	3	4
21. I get pleasure and satisfaction from participating in exercise.	0	1	2	3	4
22. I would feel bad about myself if I was not making time to exercise.	0	1	2	3	4
23. I consider exercise consistent with my values.	0	1	2	3	4
24. I feel under pressure from my friends/family to exercise.	0	1	2	3	4

APPENDIX H:  
THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD APPROVAL  
LETTER



Human Subjects  
Protection Program

1618 E. Helen St.  
P.O. Box 245137  
Tucson, AZ 85724-5137  
Tel: (520) 626-6721  
<http://hgw.arizona.edu/compliance/home>

**Date:** February 22, 2018  
**Principal Investigator:** Shawn Elizabeth Siqueiros  
**Protocol Number:** 1802287118  
**Protocol Title:** Motivational Factors Influencing Weight Loss in Formerly Obese Adolescents.

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**Determination:** Approved  
**Expiration Date:** February 21, 2023

**Documents Reviewed Concurrently:**

**Data Collection Tools:** *Questionnaires 8-1-17.docx*  
**HSPF Forms/Correspondence:** *Advisor Signature.pdf*  
**HSPF Forms/Correspondence:** *appendix\_waiver 2-21-18.pdf*  
**HSPF Forms/Correspondence:** *Scientific Review\_Department Signature.pdf*  
**HSPF Forms/Correspondence:** *Siqueiros application\_v2018\_2(2).pdf*  
**HSPF Forms/Correspondence:** *Siqueiros list\_of\_research\_personnel\_v2018 2-3-18.pdf*  
**Informed Consent/PHI Forms:** *UAIRBconsent 10-23-17-1-1.docx*  
**Informed Consent/PHI Forms:** *UAIRBconsent 10-23-17-1-1.pdf*  
**Other Approvals and Authorizations:** *El Rio Letter of Support.pdf*  
**Recruitment Material:** *recruit letter on El Rio letterhead 10-23-17-1-1.doc*  
**Recruitment Material:** *recruitment flyer 10-23-17-1-1.docx*  
**Recruitment Material:** *Telephone script 10-23-17-1-1.docx*

**Regulatory Determinations:**

- The project is not federally funded or supported and has been deemed to be no more than minimal risk.
- The project listed is required to update the HSPP on the status of the research in 5 years. A reminder notice will be sent 60 days prior to the expiration noted to submit a 'Project Update' form.
- Waiver of PHI Authorization (45 CFR 164.512(i)(2)(ii)): As documented in the file, the use or disclosure of protected health information involves no more than minimal risk to the individuals ; the research could not practicably be conducted without the alteration or waiver ;the research could not practicably be conducted without access to and use of the protected health information ; there is an adequate plan to protect the identifiers from improper use and disclosure ; there is an adequate plan to destroy the identifiers at the earliest opportunity consistent with conduct of the research, unless there is a health or research justification for retaining the identifiers, or such retention is otherwise required by law ; and there are adequate written assurances that the protected health information will not be reused or disclosed to any other person or entity, except as required by law, for authorized oversight of the research project, or for other research for which the use or disclosure of protected health information would be permitted by this subpart.

This project has been reviewed and approved by an IRB Chair or designee.

- The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
- All research procedures should be conducted according to the approved protocol and the policies and guidance of the IRB.
- The Principal Investigator should notify the IRB immediately of any proposed changes that affect the protocol and report any unanticipated problems involving risks to participants or others. Please refer to Guidance Investigators Responsibility after IRB Approval, Reporting Local Information and Minimal Risk or Exempt Research.
- All documents referenced in this submission have been reviewed and approved. Documents are filed with the HSPP Office.

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