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The Relationship Between Weight Locus of Control, Self-Rated Abilities for Health Practices, Selfcompassion and Weight Loss Outcome Among Adults Post-Bariatric Surgery

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a dissertation

by

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Abstract

THE RELATIONSHIP BETWEEN WEIGHT LOCUS OF CONTROL, SELF-RATED ABILITIES FOR HEALTH PRACTICES, SELF-COMPASSION AND WEIGHT LOSS OUTCOME AMONG ADULTS POST-BARIATRIC SURGERY

by

GINA M. KEARNEY, PhD, RN-BC, AHN-BC

Overweight and obesity have become growing threats to our nation's health. Bariatric surgery, although its incidence has been reported to have reached a plateau, remains the most effective weight loss therapy available for the extremely (morbidly) obese. However, significant weight regain is often observed and evidence of weight loss maintenance has not been clearly or consistently demonstrated.

Through the use of Self-Determination Theory as a theoretical underpinning and guiding model, the purpose of this study was to examine the relationship between psychological variables (weight locus of control, self-rated abilities for health practices, and self-compassion) and weight loss outcome (downward change in BMI) among adults following bariatric surgery.

Using a cross-sectional, correlational design, survey data were analyzed from 138 adults across the United States. Descriptive and correlational analyses were used to examine the relationship between the study variables.

The results of the analysis indicated that among patients who underwent Lap-Band surgery for weight loss and those who reported current participation in a structured/formal weight loss program, an internal weight locus of control,

greater levels of self-rated abilities for health practices and self-compassion were positively correlated with BMI change. While sample sizes were small and more sophisticated multivariate statistical analyses were not possible for this study, this research provides foundational quantitative evidence to build upon through replication and further study in order to determine the psychological factors most closely associated with optimal weight loss outcomes for individuals following bariatric surgery so that more appropriate and effective targeted interventions may be developed.

Dedication

To Timmy, my special angel in Heaven—we did it.

Acknowledgments

I would like to express my gratitude to all those who made it possible for me to complete this dissertation. To my family, many friends and colleagues, and of course my classmates in the PhD Cohort of 2010, your unwavering support and encouragement throughout this process has meant the world to me.

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Chapter 1: Statement of the Problem

Introduction

While a steadily growing number of surgical options for the treatment of obesity exist, the incidence of bariatric surgery (2003-2007) has been reported to have stabilized (Livingston, 2010). With that being said, the rates of obesity in the U.S. continue to rise at an alarming rate (American Society for Metabolic & Bariatric Surgery [ASMBS]), 2011d; Mechanick et al., 2013). For extremely obese individuals, bariatric surgery can lead to substantial weight loss and has the ability to result in physical, functional, mental, emotional, and social transformation. A meta-analysis of the surgical treatment of obesity concluded that surgery remains more effective than non-surgical treatment for weight loss among patients who are extremely obese (Maggard et al., 2005). However, for many individuals, significant weight regain often occurs over time (Karlsson, Taft, Ryden, Sjostrom, & Sullivan, 2007; Magro et al., 2008; Shah, Simha, & Garg, 2006), and research has shown discouraging estimates as only 20% of overweight or obese persons are successful at significant long-term weight loss (Sarwer, Wadden, & Fabricatore, 2005; Grief & Miranda, 2010). All individuals' post-surgical weight loss experiences are unique and many are life-altering. Some regain weight, and some continue to maintain their weight loss. But what accounts for this difference?

Despite the number and cost of bariatric surgical procedures performed, evidence of long-term weight loss success has not been clearly and consistently demonstrated. A systematic review and meta-analysis of 136 studies which included 5 randomized controlled trials (RCT) was conducted by Buchwald et al. (2004) to determine the impact

of bariatric surgery on weight loss, operative mortality outcomes, and selected obesity comorbidities. Their findings indicated effective weight loss and substantial resolution of diabetes, hyperlipidemia, hypertension, and obstructive sleep apnea were realized for a large proportion of patients; however among the RCTs, the duration of follow-up for nearly half of the studies was 6 months and ranged to only 36 months, which limits the ability to draw long-term conclusions. Due to the complexity of changes that often occur in patients losing significant amounts of weight after surgical intervention, it is important to identify and better understand, from a patient's perspective, factors and processes that may be associated with post-bariatric surgery weight loss outcomes, particularly over a longer period of time following bariatric surgery.

In order to maximize benefits of surgical intervention and to assist patients in achieving and maintaining weight loss, the current body of knowledge must be expanded. By identifying factors related to successful outcomes, future patients and health care providers alike will benefit. Therefore, the purpose of this study was to examine and describe selected factors and their relationship with weight loss outcome among adults 2-10 years post-bariatric surgery.

Statement of the Research Problem

Weight loss following bariatric surgery can be excellent for some, but for a significant proportion of patients, the amount of weight loss over time is insufficient (Bueter et al., 2008). The most common bariatric surgeries lead to substantial weight loss with morbid obesity but significant weight regain occurs over the long term (Shah, Simha, & Garg, 2006). According to Magro et al. (2008), weight regain was observed within 24 months in approximately 50% of patients studied. Lillis, Hayes, Bunting, and

Masuda (2009) reported similar findings where most weight was regained within 3 years. Although surgical treatment for obesity remains steady in terms of frequency of occurrence, there is still much to be determined about the specific factors that predict sustained weight loss (Stubbs et al., 2011) and promote patient adherence to the post-surgical guidelines and subsequent adoption of healthier habits (Boeka, Prentice-Dunn, & Lokken, 2010). In a qualitative study conducted by Berry (2004), individual patterns for participants who maintained weight loss revealed a "personal journey of self-discovery and control with initial chaos, choice, and then emergence of behaviors reflecting expanded consciousness." Stuckey et al. (2011) identified 5 primary themes from 36 strategies that helped 61 study participants maintain long-term weight loss based on a positive deviance model (examining the practices of successful individuals). These themes included weight control practices related to nutrition, physical activity, restraint, self-monitoring and motivation. However, Stuckey et al. (2011) and Berry (2004) studied individuals who used a non-surgical approach to weight loss. It is not clear whether such findings are generalizable to a surgical weight loss population.

Beck, Mehlsen, and Stoving (2012) studied psychological characteristics and weight outcomes in 45 patients in Denmark two years after having gastric bypass surgery. The study was based on a combination of chart reviews and questionnaires and found that post-operative eating disorder symptoms of binge eating and ineffectiveness such as disinhibition (instances of out of control eating) or lack of control over eating behavior, were significantly associated and negatively influenced weight loss outcomes. Boeka et al. (2010) tested a psychosocial intervention based on protection motivation theory (PMT) and concluded from their pilot study of 82 adults seeking gastric bypass surgery

that perceived self-efficacy and perceived threat of not following guidelines predicted patients' intentions to comply with post-surgical guidelines. In a systematic review of psychosocial predictors of weight loss and mental health after bariatric surgery, Herpertz, Kielmann, Wolf, Hebebrand, and Senf (2004) concluded that personality traits and psychiatric comorbidity had no predictive value. However, the mean follow-up period reported in the studies reviewed was highly variable, ranging from 6 months to more than 15 years, and assessment methods and measures were also highly variable with several studies reporting the use of self-made questionnaires. There is a need for further study in a bariatric population over a longer period of time whereby additional psychological characteristics and their potential association with weight loss outcomes can be examined.

Knowledge Gaps and the Relationship with the Research

The variability of weight loss outcomes following bariatric surgery is considerable. While attending regular follow-up visits after surgery has been associated with better weight loss, assessment of a patient's motivation level and readiness to change prior to surgery does not appear to have the same predictive ability for bariatric surgical outcomes (Dixon et al., 2009). Poole et al. (2005) conducted a case study of 18 adults who underwent laparoscopic adjustable banding and reported that unrealistic expectations and anxiety predicted non-adherence to recommended surgical after-care. Further, in a retrospective study of patients' behavioral factors associated with weight loss after gastric bypass (N=148), surgeon follow-up, social support, self-esteem, and physical activity were found to be the strongest predictors of weight loss success (Livhits et al., 2010). Ogden et al. (2011) studied patients' experience of failed weight loss

surgery qualitatively (N=10) and concluded that failure can be attributed to struggles with (self-) control and responsibility and a division between mind and body, whereas success was associated with a perception of the surgical procedure as a "tool to be worked with" whereby mind and body work together. Ohsiek and Williams (2011) conducted an integrative literature review (2003-2009) of psychological factors influencing weight loss maintenance and found that unrealistic weight loss expectations, failure to achieve weight loss goals, dichotomous thinking style, eating to regulate mood, disinhibition vs. dietary restraint, perceived cost vs. benefit, depression and body image were cited most frequently. However, studies investigating weight loss through surgical or pharmacological means were excluded from this review.

Bariatric surgery paired with healthy eating behaviors/food choices and exercise is frequently cited in the literature as influencing positive weight loss outcomes, but this presents an incomplete picture as the influence of psychological characteristics on weight loss outcome is much less clearly understood. No single factor, but rather a combination of factors is responsible for weight loss outcomes. A crucial step in maximizing patient outcomes following bariatric surgery is to recognize psychological characteristics and thought patterns governing behavior in people who have maintained weight loss as well as those who have regained weight.

Strategic directions and priorities contained within the *National Prevention Strategy* (National Prevention Council, 2011) are aimed at empowering people to take an active role in their health by making healthy choices which include healthy eating and active living. *Healthy People 2020* (HP2020) (US Department of Health and Human Services (USDHHS), 2010) is a tool that has been used for setting goals and objectives,

within a ten-year target, for guiding national health promotion and disease prevention efforts to improve the health of all people in the United States. Within identified high-priority health issues that represent significant threats to the public's health are the topic areas of nutrition, physical activity and obesity. Two overarching goals of HP2020 are to: 1) attain high quality, longer lives free of preventable disease, disability, injury, and premature death; and 2) promote quality of life, healthy development, and healthy behaviors across all life stages (USDHHS, 2010). Also a stated goal in HP2020 under the topic area of nutrition and weight status is promoting and reducing chronic disease risk through the consumption of healthful diets and achievement and maintenance of healthy body weights (USDHHS, 2010). HP2020 recognizes that as new and innovative interventions to support diet/weight status are implemented, their effectiveness will also need to be examined to better understand how to predict unhealthy weight/weight gain (USDHHS, 2010). With that in mind, the NIH Strategic Plan for Obesity Research (USDHHS/NIH, 2011) calls for research to study enhancing adherence behaviors, approaches to improve maintenance of successful weight loss over time, determining short- and long-term effectiveness of bariatric surgery, and testing prevention or treatment approaches to inform policy decisions. Similarly, the Agency for Healthcare Research and Quality [AHRQ] (2006) has identified as a priority focus area, overweight/obesity and chronic illness and evaluation of self-management support programs.

Based on the identified gaps in the current body of knowledge regarding weight loss outcomes after surgery, this research is both timely and relevant. This study offers further insight into psychological factors and their relationship with weight loss outcome

(change in BMI), determining long term-effectiveness in particular among post-surgical bariatric patients.

Study Aim

While some studies have focused on the relationship between certain psychological and/or behavioral characteristics and weight loss, there is a dearth of such research as it pertains to weight loss following bariatric surgery, particularly over a longer duration of time. A study that focuses on individual characteristics as well as their degree of influence on weight loss outcomes following bariatric surgery will provide nurses and other healthcare professionals with ways to tailor interventions designed to facilitate individuals' optimal post-operative success.

Therefore, the aim of the proposed study was to explore the relationships between selected psychological characteristics (weight locus of control, self-rated abilities for health practices, and self-compassion) and weight loss outcome (downward change in BMI) among adults post-bariatric surgery. The guiding theoretical foundation for this research was Self-Determination Theory and its Model of Health Behavior Change (Ryan, Patrick, Deci & Williams, 2008). Quantitative analysis assisted the researcher in determining whether potential relationships among the study variables were positive or negative and to what extent (strength of the relationship in either direction).

Conceptual and Operational Variables Definitions

There are three independent variables included in the study: 1) weight locus of control; 2) self-rated abilities for health practices; and 3) self-compassion. The dependent variable in this proposed study is weight loss outcome (downward change in BMI). Table 1 summarizes the conceptual and operational definitions of the primary study variables.

Table 1

Conceptual and Operational Definitions/Instruments of Primary Study Variables

Variable of Interest	Conceptual Definition	Operational Definition / Instrument
Weight Locus of Control *(Autonomy)*	The expectancy that one can affect or control, at least in part, one's own weight (Stotland & Zuroff, 1990). *Internal weight locus of control* is defined as the belief that one's own behavior and attributes determine one's weight. *External weight locus of control* is defined as the belief that one's weight is due to factors outside one's control.	Weight locus of control is operationally defined through the use of the Weight Locus of Control (WLOC) scale developed by Saltzer (1982). An additional investigator-developed Weight Locus of Control Semantic Differential Scale (WLOC SDS) is also included as a second measure.
Self-Rated Abilities for Health Practices *(Competence)*	One's self-perception of the ability to perform health promoting practices in the domains of nutrition, physical activity/exercise, psychological well-being and responsible health practices.	Self-rated abilities for health practices is operationally defined through the use of the Self-Rated Abilities for Health Practices (SRAHP) scale developed by Becker et al. (1993).
Self-Compassion *(Relatedness)*	An expression of one's understanding and acceptance of personal behaviors that limit self-criticism while promoting self-esteem.	Self-compassion is operationally defined by the Self-Compassion Scale-Short Form (SCS-SF) created by Raes et al. (2011).
Weight Loss Outcome *(Downward change in BMI)*	The degree of BMI change from an individual's maximum (pre-bariatric surgery) to their current BMI (time of survey completion).	Researcher calculated change in BMI based on participants' self-reported height, weight at time of surgery (Pre_BMI) and current weight (Post_BMI).

Theoretical Framework: Self-Determination Theory

General Description

Bariatric patients are at risk for regaining weight after surgery if old patterns of behavior are not identified and subsequently altered. A theoretical basis for understanding predictors of behavioral change (weight loss/BMI change) following bariatric surgery is needed. Grounded in psychology, Self-Determination Theory (SDT) is an empirically-based theory of human motivation, development, and wellness (Deci & Ryan, 2008a) and served as the theoretical underpinning for this research. SDT attempts to explain the process through which a person acquires the motivation for initiating new health-related behaviors and subsequently maintains them over time. In order to self-regulate and sustain behaviors conducive to health and well-being, a sense of autonomy, competence and relatedness must be perceived by an individual for internalization and integration of new behavior to occur (Ryan, Patrick, Deci, and Williams, 2008) (see Figure 1). When individuals have their psychological needs for autonomy, competence, and relatedness supported/met during the process of health care interactions, they become more volitionally engaged in their treatment and are able to maintain outcomes better over time.

Theory Concepts and Definitions

Autonomy

Behavior change is thought to be a function of *autonomous motivation* of which there are two forms: 1) *identified regulation* whereby one personally endorses or identifies with values or importance of a behavior or health practice; and 2) *integrated regulation* which becomes evident when a person not only values a behavior but has

incorporated it into other central values and life patterns (Ryan et al., 2008). This is in contrast to *controlled motivation* which also is expressed in two forms: 1) *external regulation* whereby one acts only to get an external reward, avoid punishment, or to comply with social pressure; and 2) *introjection* in which one acts to receive approval or praise or to avoid disapproval or feelings of guilt. According to SDT (Ryan et al., 2008), identified and integrated regulations are autonomous and associated with enhanced maintenance and transfer of a change while both forms of controlled motivation (external regulation and introjection) are unrelated to long term behavior change and adherence. This is reflective of the differences in the health care climate, individual personality, and subsequent patient outcomes which will be described further in the next chapter.

Competence

When one possesses a sense of autonomy/autonomous motivation and is engaged in the process of health behavior change, competence is facilitated and individual mastery of health behavior change can be realized. According to SDT, when self-determined, individuals experience a greater sense of choice about their actions and act intentionally without perceived conflict or pressure (Deci & Ryan, 1987). Competence requires that a person experience confidence while possessing the knowledge, tools and skills required for change in desired health behavior.

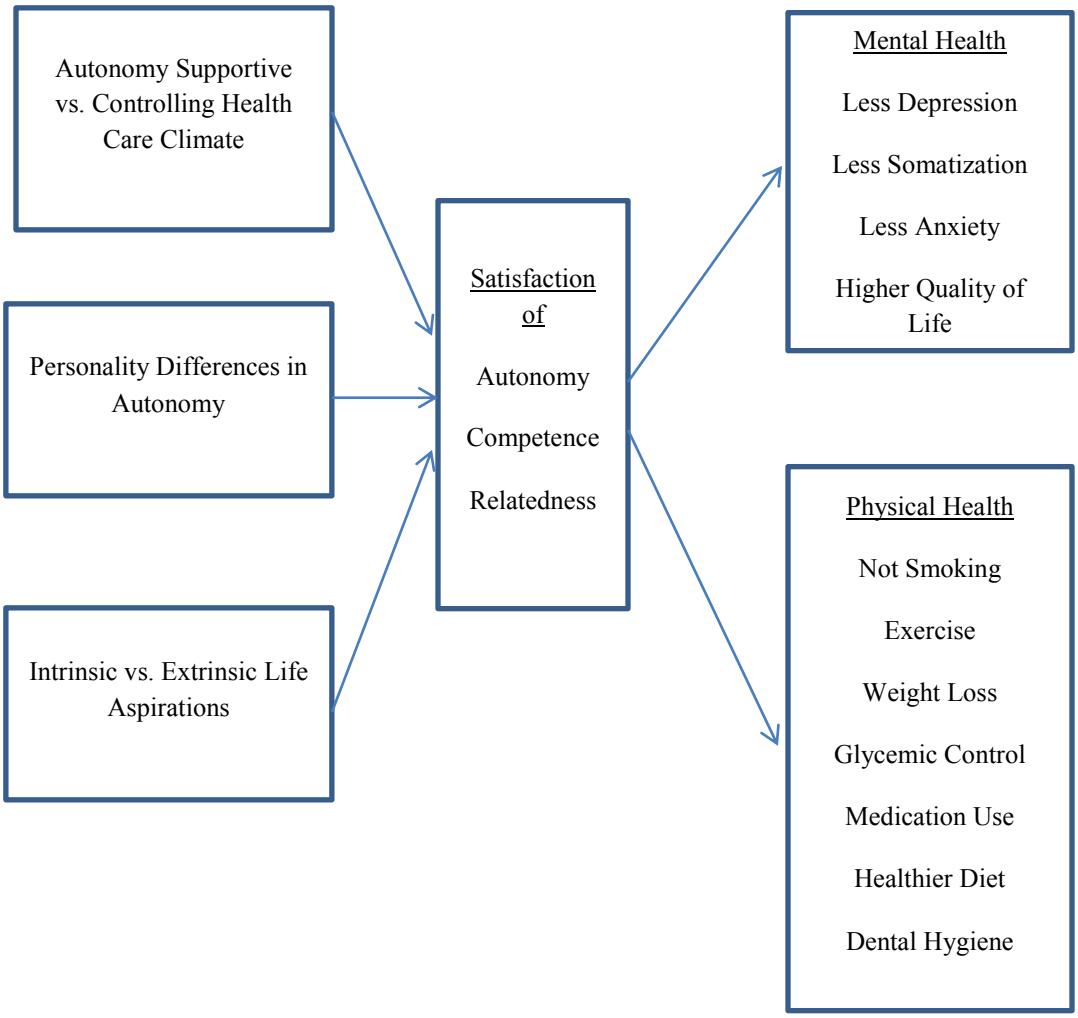
Relatedness

The concept of relatedness describes the interpersonal aspect of SDT. The importance of connection and trust between a patient and health care provider are central to the process of goal setting and achievement and ultimately internalization/integration of behavior change. According to Ryan et al. (2008), the way in which goals are formed

has implications for health care interventions as well as outcomes. When applied in the context of psychotherapy, SDT is observed as a basis for supporting clients to explore, identify, initiate and sustain a process of change (Ryan & Deci, 2008). The inward-focused processes of exploration, identification, and reflection not only constitute important vehicles for change (Ryan, Lynch, Vansteenkiste, & Deci, 2011) but they can also foster relatedness with one's self and personal knowing, which may happen individually or as facilitated by a trusted health care provider as mentioned above. In essence, it is important to know oneself and be keenly aware of personal tendencies that may help as well as hinder behavior change. According to Deci and Ryan (2008a) the development of integrated, autonomous functioning is dependent on cultivation of awareness or mindfulness which can also be facilitated by a trusted health care provider and patient-centered intervention.

Deci and Ryan's SDT (2008b) proposes that when basic psychological needs for autonomy, competence and relatedness are supported, autonomous motivation is cultivated and improved performance and psychological health within multiple applied domains (work, relationships, parenting, education, virtual environments, sport, sustainability, health care, and psychotherapy) can be realized. Within the domain of health care, the application of SDT in the context of weight loss outcomes following bariatric surgery is under-studied and highlights a gap in the literature. For this study, the researcher hypothesized that patients' capacity of autonomous motivation, degree of self-rated competence for health behaviors and level of ability to relate to one's self and others would be significant, positive predictors of their weight loss outcome (change in BMI) following bariatric surgery.

Figure 1. Self-Determination Theory (SDT) Model of Behavior Change



Research Questions

This study was designed to answer seven quantitative questions classified as descriptive and correlational. Using Self-Determination Theory to guide the formation of the research model in the current study, SDT's theoretical concepts of autonomy, competence, and relatedness are represented by three independent variables: weight locus of control; self-rated abilities for health practices; and self-compassion. The hypothesized relations among these variables are fully described in the next chapter.

Descriptive Questions

1. What is the mean and individual variation of reported weight locus of control among adults post-bariatric surgery?
2. What is the mean and individual variation of reported self-rated abilities for health practices among adults post-bariatric surgery?
3. What is the mean and individual variation of reported self-compassion among adults post-bariatric surgery?
4. What is the mean change in BMI among adults post-bariatric surgery?

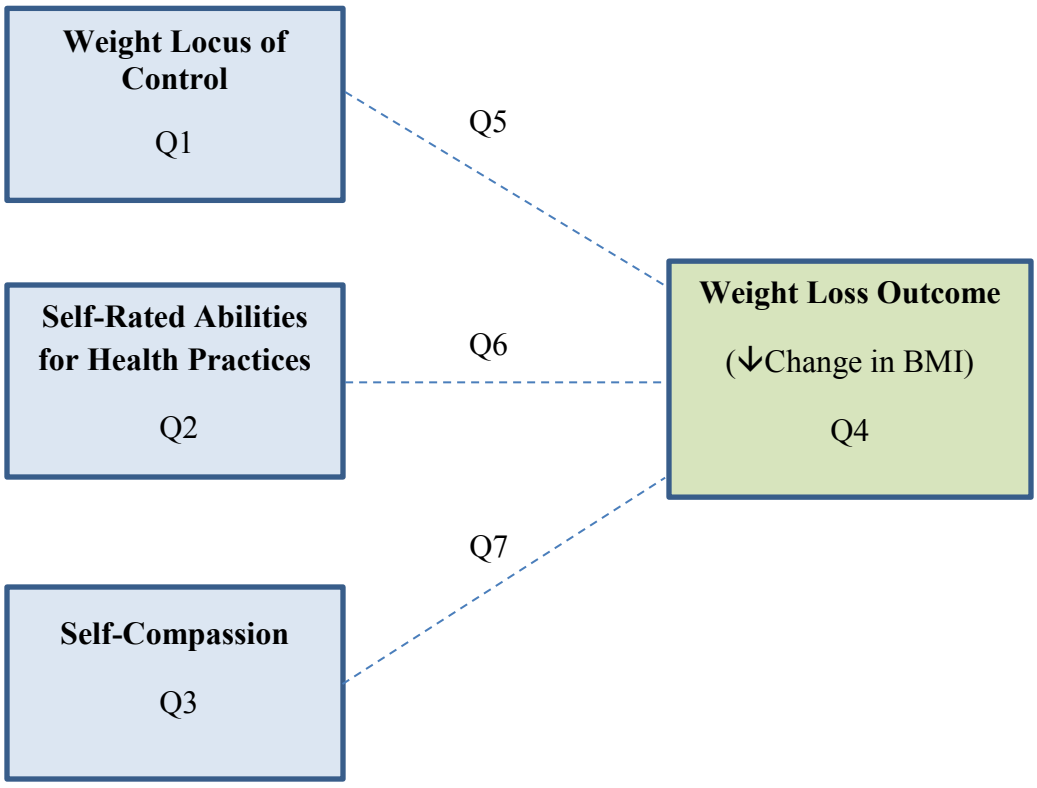
Correlational Questions

5. What is the relationship between (internal) weight locus of control and weight loss outcome (downward change in BMI) among adults post-bariatric surgery?
6. What is the relationship between self-rated abilities for health practices and weight loss outcome (downward change in BMI) among adults post-bariatric surgery?
7. What is the relationship between self-compassion and weight loss outcome (downward change in BMI) among adults post-bariatric surgery?

Among the concepts studied, determinations were made as to which one(s) had the strongest/weakest association with weight loss outcome (downward change in BMI) following bariatric surgery. The analytic plan included appropriate descriptive and bivariate statistical analyses to assess the correlations between the independent and dependent variables (see Figure 2 for Research Model).

Figure 2

Research Model



Research Hypotheses

As the presence of autonomy, competence and relatedness collectively influences optimal, self-determined health behavior change according to SDT (Ryan et al., 2008), it was hypothesized that weight locus of control (internally-oriented), self-rated abilities for health practices and self-compassion have a similar influence on weight loss outcomes (downward change in BMI) following bariatric surgery. The objective of the study was to test the conceptual research model as a whole, and the theoretical perspective of the model's hypothesized relationships.

Hypotheses:

I. Participants with a more internally-oriented weight locus of control will exhibit better weight loss outcomes (greater downward change in BMI) following bariatric surgery.

II. Participants with higher self-rated abilities for health practices will exhibit better weight loss outcomes (greater downward change in BMI) following bariatric surgery.

III. Participants with a greater level of self-compassion will exhibit better weight loss outcomes (greater downward change in BMI) following bariatric surgery.

Summary

This chapter illustrates the variability within the research literature and resulting challenge of elucidating best practices and/or predictive factors for reaching desired outcomes following bariatric surgery. Therefore, the need to understand factors that contribute to success following bariatric surgery warrants careful and timely consideration with quantitative study designed to clarify an unclear and inconsistent landscape surrounding post-surgical weight loss outcomes.

Chapter 2: Literature Review

The Obesity Epidemic

Definitions

Overweight and Obesity

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health (WHO, 2013) and are used as labels to identify ranges of weight that are greater than what is generally considered healthy for a given height (CDC, 2013a).

Body Mass Index (BMI)

First introduced in 1832 by Belgian statistician Adolphe Quetelet, body mass index (BMI) is a measure of body fat based on the ratio of weight in relation to height (Brewster, 2009; NHLBI, 2014). Calling it an arbitrary measure, some have questioned the utility of using BMI as a means for reporting weight loss stating that it is inaccurate when compared to selected biomarkers (insulin and leptin) or dual-energy x-ray absorptiometry (DXA) (Shah & Braverman, 2012), and others have commented that BMI should not be considered a full assessment of patients' health (Lewis, 2009). In the context of vascular screening and screening for cardiovascular risk and metabolic syndrome, waist circumference is the preferred measurement indicator (Conferencereport, 2006; Cressey, 2006; Brewster, 2009).

In the context of bariatric surgery, parameters including the ideal body weight (IBW), the excess body weight (preoperative weight – IBW), the percent excess weight loss (%EWL), the body mass index (BMI), the predicted BMI and the final BMI all represent different methods for reporting weight loss, and researchers have yet to agree

on the outcome measure that best defines success (Baltasar, et al., 2011, Deitel & Greenstein, 2003; Dixon et al., 2005; Lutfl, Torquati, Sekhar, & Richards, 2006; Snyder, Nguyen, Scarbourough, Yu, & Wilson, 2009). According to Junior, do Amaral, and Nonino-Borges (2011), the way of reporting post-operative weight loss should be reevaluated, and they caution others as reporting excess weight loss may lead to inappropriate conclusions. In order to lessen the complexity and confusion regarding some of these calculations, BMI was the indicator chosen for this study. BMI is considered the most useful population assessment measure of overweight and obesity (NHLBI, 2014; CDC, 2013b), and according to Baltasar (2011), BMI is one of the most accurate methods for comparing obesity after bariatric surgery.

The formula for calculating BMI when using pounds and inches is: weight (lbs) / [height (in)]^2 X 703 (CDC, 2013b). BMI is interpreted using standard weight status categories that are the same for all ages and for both men and women and should be used to assess overweight and obesity (NIH, 1998). These classifications of overweight and obesity are presented in Table 2. All overweight and obese adults (age 18 years of age or older) with a BMI of $\geq$25 are considered at risk for developing co-morbidities or diseases such as hypertension, dyslipidemia including high total cholesterol, type 2 diabetes, and coronary heart disease among others (NIH, 1998; NIH, 2010). According to the American Society for Metabolic and Bariatric Surgery (2011d), individuals with a BMI>30 have increased risk of premature death compared to those with a healthy weight.

Table 2

Classification of Overweight and Obesity by BMI

Body Mass Index (BMI)	Weight status
<18.5	Underweight
18.5-24.9	Normal weight
25.0-29.9	Overweight
30.0-34.9	Obesity – Class I
35.0-39.9	Obesity – Class II
40.0 and above	Extreme obesity – Class III

Rates and Trends

Since the 1970s, overweight and obesity have become growing threats to our nation's health and are becoming increasingly costly conditions to manage. It has long been known that obesity increases the risk of a number of health conditions as stated above. The *2004 Consensus Panel's Statement on Bariatric Surgery for Morbid Obesity* first called for obesity to be classified as a chronic disease that has significant health consequences (Buchwald, 2005). In May of 2013, nearly a decade later, the American Medical Association's (AMA, 2013) House of Delegates formally recognized obesity as a disease. While some recent reports indicate that obesity rates remain high but are holding steady (Buchwald et al., 2004; Trust for America's Health [TFAH] and Robert Wood Johnson Foundation [RWJF], 2013), others are forecasting a 33% increase in

obesity prevalence and a 130% increase in severe obesity prevalence over the next 2 decades (Finkelstein et al., 2012).

The prevalence of obesity has risen considerably and consistently for more than a decade. In 2000, the prevalence of obesity in the U.S. was 20% and 64% of the population was overweight (Centers for Disease Control and Prevention [CDC], 2010). In 2001, the U.S. Surgeon General issued a *Call to Action to Prevent and Decrease Overweight and Obesity*, but between 2000 and 2005, obesity (Class I) increased by 24%, morbid obesity (Class II) increased by 50% and super-obesity (Class III) increased by 75% (Sturm, 2007). In 2007-2008, approximately 72.5 million adults in the U.S. were obese, and by 2009, no state had met the *Healthy People 2010* objective to reduce obesity prevalence among adults to 15% (USDHHS, 2000). In 2009-2010, over 78 million U.S. adults were obese and another 77 million were overweight, and the 2009 Behavioral Risk Factor Surveillance System (BRFSS) found at least 30% of adults were obese in nine states, compared to no states in 2000 (Centers for Disease Control and Prevention [CDC], 2010). In 2013, thirteen states have an adult obesity rate greater than 30%, 41 states have rates of at least 25%, and every state has a rate above 20% (TFAH, RWJF, 2013). According to Finkelstein et al. (2012), linear time trend forecasts suggest that by 2030, 51% of the population will be obese.

There are a number of contributing factors to obesity including genetic predisposition, metabolism, culture, illness, environment/lifestyle and psychological factors (American Society for Metabolic and Bariatric Surgery, 2011d). While obesity may not be preventable in all cases, it is associated with over 112,000 excess U.S. deaths each year including 15,000 excess deaths due to cancer, and over 35,000 excess deaths

due to non-cancer, non-cardiovascular disease causes (Flegal, Graubard, & Williamson, 2007). Obese individuals have a 10 to 50% increased risk of death compared to those of healthy weight (American Society for Metabolic and Bariatric Surgery, 2011d).

Costs

There are more than 30 illnesses and conditions associated with obesity/morbid obesity (American Society for Metabolic and Bariatric Surgery, 2011c), resulting in detrimental effects to essentially every organ system in the body (Buchwald, 2005). The psychological, social and economic impact, however, must not be overlooked. Overweight and obesity cost an estimated $117 billion annually in the U.S. and accounted for over one-quarter of the increases in medical costs since 1987 (American Society for Metabolic and Bariatric Surgery, 2011d). For each obese insurance beneficiary, payments are an estimated $1,140 to $1,723 higher than those paid for normal-weight beneficiaries (National Institutes of Health, 2010). Obese individuals spend 36% more on health care costs and 77% more on medications annually than individuals of normal weight; and lost productivity related to obesity among Americans age 17-64 costs $3.9 billion a year (American Society for Metabolic and Bariatric Surgery, 2011d).

Bariatric Surgery

Trends and Costs

There has been a continuing, upward trend in the number of individuals opting for surgical intervention for weight loss since the early 1990s. According to the American Society for Metabolic and Bariatric Surgery (ASMBS), in 2008, a total of 220,000 people with morbid obesity had bariatric surgery compared to: 177,000 people in 2006; 140,640

people in 2004; and 16,200 people in 1992 (American Society for Metabolic and Bariatric Surgery, 2011c; Ochner, Puma, Raevuori, Teixeira, & Geliebter, 2010).

Bariatric surgery on average costs between $18,000 and $30,000 depending on the type of procedure and patient's geographic location (Mann, 2011). Private insurance and Medicaid coverage for bariatric surgery is widely variable between states and among insurance providers and Medicare will cover three types of weight loss surgery when certain conditions are met (Mann, 2011). Research shows that it can take two to four years for insurers to recover their costs for bariatric surgery and an estimated 25% of patients considering bariatric surgery are denied insurance coverage three times before getting approval (American Society for Metabolic and Bariatric Surgery, 2011b).

Pre-Surgical Evaluation and Eligibility

According to the American Society for Metabolic and Bariatric Surgery (ASMBS), qualifications for bariatric surgery include: 1) BMI $\geq$40 or more than 100 pounds overweight; 2) BMI $\geq$35 with at least one obesity-related co-morbidity such as type 2 diabetes (T2DM), hypertension, sleep apnea and other respiratory disorders, non-alcoholic fatty liver disease, osteoarthritis, lipid abnormalities, gastrointestinal disorders, or heart disease; and 3) inability to achieve a healthy weight loss sustained for a period of time with prior weight loss efforts (ASMBS, 2013). The American College of Surgeons Bariatric Surgery Center Network (ACS BSCN) Accreditation Standards (ACS BSCN, 2011) further require that a multidisciplinary group of clinicians must review potential surgical candidates to evaluate indications and contraindications for surgery, comorbidities and operative risks. Clinical practice guidelines for nutritional, metabolic and non-surgical support include the following summarized recommendations for

preoperative management of potential bariatric surgery candidates: 1) preoperative evaluation for obesity-related co-morbidities and causes of obesity; 2) comprehensive medical and psychosocial history; 3) cardiopulmonary evaluation with sleep apnea screening; 4) GI evaluation; 5) endocrine evaluation; 6) clinical nutrition evaluation by a registered dietician; 7) psychosocial-behavioral evaluation; 8) documented medical necessity for bariatric surgery and informed consent; 9) education and patient support to provide relevant financial information regarding costs before and after surgery, to continue efforts for pre-operative weight loss and to optimize glycemic control; and 10) counseling regarding pregnancy and smoking cessation as appropriate (Mechanick et al., 2013).

When surgeons assess potential candidates for bariatric surgery, they attempt to determine a general sense of the individuals' health, identify conditions that need to be treated, stabilized or managed, and whether or not the surgery has benefits that may supersede any risks. However, with all this data in mind, they have no reliable method to determine whether or not patients will be successful maintaining weight loss after surgery. Appropriate patient selection is important for achieving optimal outcomes following bariatric surgery (Collazo-Clavell, Clark, McAlpine, & Jensen, 2006). Behavioral specialists may also play a key role in pre-surgical assessment but have not demonstrated a greater predictive ability to determine psychosocial/behavioral outcomes than their medical counterparts and suggest that a better understanding of psychological variables and their influence on weight loss success needs to be determined (Abiles et al., 2010; Greenberg, Sogg, & Perna, 2009; Leombruni, et al, 2007; Rosik, 2005; Rutledge, Groesz, & Savu, 2011; Thonney, Pataky, Badel, Bobbioni-Harsch & Golay, 2010; van

Hout, Hagendoren, Verschure & van Heck, 2009; van Hout, Verschure, & van Heck, 2005). While they are being currently revised by ASMBS, suggestions for the pre-surgical psychological assessment of potential bariatric surgery candidates include behavioral, cognitive and emotional components as well as one's current life situation, motivation and expectations.

Components of behavioral assessment are questions regarding previous attempts at weight management, eating and dietary styles, physical activity/inactivity, substance use, and health-related risk-taking behavior (LeMont, Moorehead, Parish, Reto, & Ritz, 2004). Cognitive and emotional assessments include determining one's level of cognitive functioning, knowledge of obesity and surgical intervention, coping skills, emotional modulation and boundaries. Of particular interest is to determine whether or not the potential surgical candidate is demoralized over "failed" non-surgical attempts at weight loss or if they equate their obesity to a "personal defect." Also important is to identify the extent to which the potential surgical candidate can control his/her environment as feeling helpless or unable to control one's environment can increase the risk for depression and non-adherence to treatment (LeMont et al., 2004). In terms of one's current life situation, stressors and a chaotic lifestyle can have a negative influence on post-operative adjustment while utilization of social support such as attending support groups can be positively associated with faster recovery and successful weight loss and maintenance after surgery (LeMont et al., 2004). Patient motivation, reasons for pursuing and expectations of surgery are critical to assess pre-operatively as unrealistic expectations may lead to a perception of failure when expectations cannot be met (LeMont et al., 2004).

From both medical and psychosocial standpoints, the goals of the pre-surgical assessment are to identify risk factors and make recommendations to both the patient and health care team that are aimed at facilitating the best possible outcome for the patient (LeMont et al., 2004). While importance of the preoperative psychosocial evaluation can be easily understood, a particular limitation is the lack of its predictive ability for post-operative weight loss success. Pre-treatment predictors of weight loss and weight maintenance are relatively few in number, can be weak in terms of their predictive ability, and many that intuitively seem like they would predict weight loss actually do not (Stubbs et al., 2011). Rather, it is a combination of factors that correlate with weight loss success. Predictive models have been difficult to develop due to their complexity and heterogeneity among psychological constructs and few longitudinal studies exist (Stubbs et al., 2011). Another important consideration is the understanding that patients may hold private motivations or certain expectations from the evaluator, and patients often figure out what they think health care providers want to hear by providing what they think are the "right answers." Evaluation of psychological characteristics post-operatively should be viewed as equally important. Even with comprehensive evaluation before surgery, one's post-surgical psychological and behavioral profile may reveal unanticipated perceptions and abilities that can only be measured as they are occurring in their post-surgical lived experiences.

Procedural Options

While there are numerous non-surgical treatment options for patients with extreme obesity, bariatric surgery, involving either open or laparoscopic techniques, has been determined to be the most effective weight loss therapy available for patients with

extreme obesity. According to Buchwald (2005), this type of surgical treatment results in weight loss and improvement or elimination of most obesity-related medical complications and improves quality of life. All of the current surgical procedures alter the digestive process and involve mild to radical changes in the anatomy of the gastrointestinal tract (Hydock, 2005). There is no single standard procedure for management of morbid obesity (Buchwald, 2005), but there are three basic ways in which bariatric surgery works to help patients lose weight and improve or resolve co-morbidities. These three types of surgical procedures are categorized as restrictive, malabsorptive, and combined restrictive/malabsorptive. These traditional classifications are less widely used now as a result of increased understanding of the metabolic effects of bariatric surgery (Mechanick et al, 2013). However, they will be used here for descriptive purposes in order to explain the specific types and options for bariatric surgery.

Restrictive surgery limits the amount of food patients can eat (Gagnon & Karwacki Sheff, 2012; Mayo Clinic, 2014; McLaren Bariatric Institute, 2011; Obesityhelp.com, 2013). This is accomplished by creating a narrow passage from the upper to lower portions of the stomach which reduces the amount of food the stomach can hold and slows the passage of food through the stomach. Examples of restrictive weight loss surgery include adjustable gastric banding (AGB) (also known as Lap-Band), and vertical banded gastroplasty (VBG) (also known as "stomach stapling), the latter of which is not often used (Gagnon & Karwacki Sheff, 2012; Mayo Clinic, 2014; Obesityhelp.com, 2013). A major advantage of the Lap-Band procedure is that it is both adjustable and reversible due to the fact there has been no stomach cutting or stapling and

no intestinal cutting or re-routing (Mayo Clinic, 2014). It is the second most commonly performed bariatric procedure in the US (Gagnon & Karwacki Sheff, 2012).

Malabsorptive surgeries, rather than limiting food intake, impede the body's ability to absorb calories and nutrients from food by excluding most of the small intestine from the digestive tract. However, this type of weight loss surgery, which is also known as intestinal bypass surgery, is no longer recommended because of the severe nutritional deficiencies that often result (Gagnon & Karwacki Sheff, 2012; Obesityhelp.com, 2013).

The most common surgical approach is the gastric bypass which combines restrictive and malabsorptive techniques in order to restrict food intake and the amount of calories and nutrients that can be absorbed (Gagnon & Karwacki Sheff, 2012). Examples of the combined restrictive/malabsorptive weight loss surgery include the Roux-en-Y Gastric Bypass (RYGB), vertical sleeve gastrectomy (VSG) (also known as gastric sleeve), duodenal switch (DS), and biliopancreatic diversion (BPD), the latter of which is no longer commonly performed (Gagnon & Karwacki Sheff, 2012; Obesityhelp.com, 2013). These procedures involve more complex restructuring and re-routing of the stomach and intestines and are not considered to be reversible. According to O'Brien, McPhail, Chaston and Dixon (2006), all bariatric operations lead to major weight loss in the short- to medium-term, and while RYGB is the most common gastric bypass procedure, Mechanick et al. (2013) reported that approximately one-third of these patients experience relapse.

Post-Surgical Recommendations and Outcomes

As stated by Shea, Diamandis, Sharma, Despres, Ezzat and Greenway (2012), obesity should be viewed as a complex, multifaceted, chronic, and often progressive

disorder with a high relapse rate and that all treatments, regardless of type, should be sustainable. Recommendations contained within the *Clinical Guidelines* and *Practical Guide for the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* (USDHHS, 1998; USDHHS, 2000) suggest that an integrated, lifelong program should be in place to provide guidance on diet, physical activity, and behavioral and social support beginning prior to and continuing after weight loss surgery. Adherence to scheduled follow-up visits, periodic screenings, individualized interdisciplinary care and behavior modification have also been advised in order to promote success and prevent weight regain after bariatric surgery (Kruseman et al., 2010; Malterud & Tonstad, 2009; McMahon et al., 2006; Pontiroli et al., 2007; Zalesin et al, 2010). Weight loss surgery can facilitate significant, sustained weight loss for more than 5 years in most patients (USDHHS, 2000), and while depression, anxiety or binge eating can be associated with suboptimal weight loss or wait regain (Elfhag & Rossner, 2005), findings are often contradictory. Similarly, measures of readiness or motivation to lose weight have also failed to predict outcome. However, self-efficacy or "a patient's report that she or he can perform the behaviors required for weight loss"—is a modest but consistent predictor of success (USDHHS, 2000, p.21).

In a systematic review of factors associated with weight loss maintenance and weight regain, Elfhag and Rossner (2005) found that successful maintenance is associated with more initial weight loss, reaching a self-determined goal weight, being physically active, eating healthfully, controlling over-eating, and self-monitoring behaviors. Further, weight maintenance is associated with an internal motivation to lose weight, social support, better coping and ability to handle stress, self-efficacy, possessing a

higher level of autonomy, assuming responsibility in life and overall psychological strength and stability (Elfhag & Rossner, 2005). Their resulting profile of a "weight maintainer" also accounts for individuals who may experience a relapse (weight regain after loss) in that they have been found to handle such occurrences in a balanced way "without exaggerating this as a detrimental failure" by being flexible, self-sufficient and autonomous (Elfhag & Rossner, p. 77). While only 2 of the 57 studies Elfhag and Rossner (2005) reviewed specify surgical weight loss methods, it is expected that these findings may be applicable to all weight loss methods, particularly those opting for surgical intervention for weight loss. Additionally, in another review studying predictors and correlates of weight loss and maintenance, shame, self-criticism and experiences of stigma were found to affect one's mental health and coping, and although they have been less studied in obese populations the authors suggest that we may not always be looking at the right psychological processes to increase our understanding (Stubbs et al., 2011).

Grave, Calugi, Corica, DiDomizio and Marchesini (2009) noted that increased dietary restraint and decreased disinhibition were independent predictors of BMI change after 12 months of treatment, but the population did not receive surgical intervention. A meta-analysis of 117 varying weight loss treatment types showed that weight loss treatment was associated with decreased depression and increased self-esteem (Blaine, Rodman, & Newman, 2007) and Simon et al. (2010) noted depression to be lowered among women who have lost weight after a behavioral weight loss program. In a retrospective case study of 18 adults post-bariatric surgery, unrealistic expectations and anxiety were associated with poor adherence to post-surgical aftercare compliance (Poole, 2005). Van Buren and Sinton (2009) concluded that psychological distress

symptoms such as depression, anxiety, emotional eating and constructs such as self-efficacy, self-determination, and self-esteem are potentially modifiable variables that are often correlated with body weight and may predict or indicate successful completion of weight loss treatment, however again, their findings did not include patients who have undergone bariatric surgery, thus emphasizing the need for study in this population.

Conceptual and Theoretical Linkages

There are related concepts that may influence weight loss outcomes but they have not been studied previously in the current study context. These concepts include: 1) weight locus of control; 2) self-rated abilities for health care practices; and 3) self-compassion. Each concept is linked to a major tenet of the theoretical underpinning of the Self-Determination Theory (SDT) Model of Health Behavior Change (Ryan et al., 2008).

Weight Locus of Control

Locus of control is a construct derived from social learning theory. In an attempt to predict and explain health-related behaviors, locus of control has been the focus of research since the 1950s, gaining particular popularity in the 1970s. In a review of the literature conducted by Wallston and Wallston (1978), locus of control studies regarding smoking, birth control, weight loss, information-seeking, adherence to medication regimens and other health or sick role behaviors were reported. Findings indicated that those with internal locus of control generally showed more positive health behaviors. Others have found similar results when studying weight-related attitudes and weight reduction (Balch & Ross, 1975; Holt, Clark, & Kreuter, 2001; Adolfsson, Andersson, Elofsson, Rossner, & Unden, 2005). This is consistent with the SDT concept of autonomous motivation characterized by identified and integrated regulation facilitating

health behavior change (Ryan et al., 2008). SDT also distinguishes between intrinsic and extrinsic goals and research has shown that having extrinsic goals is associated with more risky, less healthy behaviors (Ryan et al., 2008).

However, findings from Wallston and Wallston's (1978) review as well as other research in the literature show a lack of consistent findings which may, in part, result from reported difficulties in measuring the construct of locus of control. Weight locus of control is distinct from other measures of locus of control. It pertains to prediction of behaviors, specifically related to weight reduction, that are influenced either internally or externally.

Internal and/or external locus of control, particularly as it relates to individual weight was pertinent to include in this study and Saltzer's (1982) Weight Locus of Control Scale served as a proxy measure of the degree of autonomy and type of motivation (controlling/external vs. autonomous/internal) as described in SDT (Ryan et al., 2008). Bariatric surgical procedures may have an influence on perceived locus of control as an "external" intervention applied for assisting with weight loss. While there are "internal" components as well relating to potential lifestyle and behavioral adjustments after bariatric surgery, WLOC was an important concept to measure and to determine its degree of relevance to sustained weight loss within the study population and among the other concepts measured as well.

Self-Rated Abilities for Health Practices

Self-efficacy has been noted in the literature to be a strong predictor of various health behaviors including weight loss; however, self-rated abilities for health practices and the scale developed by Becker, Stuifbergen, Oh and Hall (1993) differs from other

health self-efficacy measures. While other measures typically have been designed to be sensitive to specific health-related interventions such as smoking cessation and weight control programs, the Self-Rated Abilities for Health Practices (SRAHP) Scale has the ability to measure outcomes aimed at self-perceptions about one's ability to engage in health practices and to identify general health promoting areas in which they may need additional resources, support, or training (Becker et al., 1993). The health-promoting practice domains measured by SRAHP include nutrition, physical activity/exercise, psychological well-being, and responsible health practices (Becker et al., 1993; Stuifbergen & Becker, 1994). One's self-perception of the ability to perform health promoting practices as described above is relevant in the context of weight loss after surgery, particularly when looking for successful weight loss outcomes. As confidence/competence in one's ability to prevent relapse or weight regain increases, positive, sustained weight loss outcomes are more likely to be seen.

Facilitated by an increased orientation of autonomous regulation/motivation, competence in SDT was examined empirically in this study by using a proxy measure of one's self-rated abilities for health practices (Self-Rated Abilities for Health Practices [SRAHP] Scale) (Becker et al., 1993).

Self-Compassion

Self-compassion was defined by Neff (2003) as a characteristic and personal practice that encompasses the experience of being kind and understanding toward oneself in instances of pain or failure rather than being harshly self-critical; perceiving one's experiences as part of the larger human experience rather than seeing them as isolating; and holding painful thoughts and feelings in mindful awareness rather than over-

identifying with them. Self-compassion is a concept experienced after suffering which may be experienced in six possible realms: an event, situation, emotional response, psychological state, spiritual alienation, or a physical response to illness or pain (Reyes, 2011). This suffering manifests as a pattern of decreased self-care, decreased ability to relate to others and diminished autonomy. Attributes are self-kindness, mindfulness, commonality and wisdom. Consequences of self-compassion include self-care capabilities, compassion for others, increased relatedness, autonomy and sense of self (Reyes, 2011).

As weight loss for obese individuals often includes successes as well as failures, feelings and perceptions of isolation, and in some cases potential guilt and shame for having had a surgical procedure to lose weight, self-compassion was thought to be a relevant concept to assess in the study population. An important factor for weight loss maintenance, self-compassion may also attenuate the tendency among restrained eaters to overeat after "going off the plan" (known as the disinhibition effect) (Adams & Leary, 2007). In other words, patients are able to acknowledge their slip in behavior but do not allow it to become a relapse. With the high rates of relapse (weight regain) after bariatric surgery, this concept has particular relevance in the proposed study population.

Relatedness, which comprises the third critical attribute in SDT (Ryan et al., 2008) whereby individuals become more responsible for their own health-related behavior through a supportive patient-health care provider relationship. This connection fosters increased self-esteem and sense that one is respected, understood and cared for. These characteristics are essential for the process of internalization/integration of health behavior change as described in SDT (Ryan et al., 2008). As it may be influenced by the

interpersonal interaction of SDT, Self-Compassion (Neff, 2003) served as a proxy measure for SDT's attribute of relatedness. Working and connecting with a trusted health care provider who can teach patients how to recognize their personal values, to harness their inner strengths, and to become more mindful and aware of their choices is the key for the desired outcome of health behavior change. Self-compassion allows individuals an opportunity to accept personal experiences in a gentle, forgiving manner without any implied guilt or judgment. In the context of weight loss and weight loss maintenance, self-compassion would support one's acknowledgement that for many, weight loss is often a journey that occurs over a long period of time with many ups and downs over time—and that's OK. As a patient, to embrace that notion, and to know that a trusted health care provider is there to offer autonomy support, one is more likely to be successful in the long term in reaching the desired health behavior goal. It has also been noted in the literature that facilitating the development of personal insight, promoting mindfulness and teaching acceptance have been associated with improved functioning, quality of life and weight control efforts (Lillis, Hayes, Bunting, & Masuda, 2009; Sogg & Mori, 2009).

Self-Determination Theory

In order to lay the groundwork for satisfying one's needs for autonomy, competence, and relatedness, certain contextual factors are considered in the SDT Model of Behavior Change (See Figure 1) as described by Williams et al. (1996) and Ryan et al. (2008). The first such contextual factor is that of the health care climate, which plays a significant role in a patient's experience and is characterized by the interpersonal style used by health care providers (Williams, Grow, Freedman, Ryan, & Deci, 1996; Williams

et al., 2002a). An *autonomy supportive* patient-provider interaction is observed when a health care provider takes into account the patient's perspective, encourages and answers the patient's questions, supports the patient's initiatives and offers them options/choices regarding treatment while, at the same time, minimizes their own control as a health care provider. This is in direct contrast to a health care climate that is considered to be *controlling* whereby there is little choice or input by the patient and prescribed or expected behaviors are presented to patients as elements of their care to which they must comply. It is not surprising that health care providers' support for patients' autonomy is an important, and requisite, factor for fostering autonomous motivation and ultimately patients' long term health behavior change (Williams et al., 2002b; Ryan et al., 2008).

Additional contextual factors also considered requisite for facilitating self-regulation in the SDT Model of Health Behavior Change include individual differences in one's personality and life aspirations to the extent that patients can express their own needs and feelings as well as to experience a sense of choice in regulating their own behavior. These individual personality variations may be explained by *causality orientations* which are general motivational orientations that refer to the way people orient to their environment and information related to the initiation and regulation of behavior and the extent to which they are self-determined in general (Deci & Ryan, 1987; Deci & Ryan, 2008a). There are three such causality orientations including *autonomous* (self-aware of feelings and sense of choice regarding behavior and satisfaction of all three basic needs of autonomy, competence, and relatedness), *controlled* (some satisfaction of competence and relatedness), and *impersonal* (none of the three basic needs of autonomy, competence, and relatedness are satisfied) (Deci & Ryan, 2008a). An autonomous

causality orientation would be the preferred trait among individuals and the one most likely to foster self-determined, sustained health behavior change.

Variations among individuals' life aspirations may be considered intrinsic or extrinsic. Deci and Ryan (2008b) concluded that when the basic needs of autonomy, competence, and relatedness are not fulfilled, individuals tend to adopt more extrinsic goals that lead to external indicators of worth rather than the internal feelings of worth that result when these needs are satisfied. When extrinsic goals are pursued, they often overshadow the pursuit of basic need satisfaction. Intrinsic aspirations include life goals that may include affiliation, generativity and personal development whereas extrinsic aspirations may cause one to seek life goals such as wealth, fame and/or attractiveness (Deci & Ryan, 2008b). An increased focus on intrinsic goals is associated with greater health, well-being and performance (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004), deeper processing and conceptual understanding of learning material with greater persistence at learning tasks (Vansteenkiste, Lens & Deci, 2006), and maintenance of weight loss over time (Vansteenkiste, Simons, Braet, Bachman, & Deci, 2007 as cited in Ryan et al., 2008).

In prior SDT research applied to the context of weight loss, Williams, Grow, Freedman, Ryan and Deci (1996) concluded that participants whose motivation for weight loss was more autonomous and those who perceived to have an autonomy-supportive interpersonal relationship with health care staff had predictive ability for improved outcomes including program compliance, and greater weight loss and maintenance in a sample of severely or morbidly obese adults participating in a 6-month, medically-supervised low-calorie weight loss regimen. Williams, Gagne, Ryan and Deci

(2002b) found in a study of physicians who used either an autonomy-supportive or controlling interpersonal style to counsel smokers that autonomy support predicted autonomous motivation which predicted smoking cessation at 6, 12, and 30 months among the 239 patients who participated in the study. Williams, Minicucci, Kouides, Levesque, Chirkov, Ryan and Deci (2002a) conducted a clinical trial to test a model of maintained smoking cessation and diet improvement and reported that internalizing the regulation of behavior is highly relevant for both. Their findings were consistent with previous research indicating that only when health behavior regulation is internalized/integrated will patients accept responsibility for their health-related behaviors and become self-determined in carrying them out. When applying Self-Determination Theory to physical activity, sport and health, Ryan, Williams, Patrick and Deci (2009) again concluded that internalization and integration of motivation for physical activities is fostered by supporting basic needs for relatedness, competence and autonomy and that by facilitating patients' autonomy and competence in the process of change, behavior change can be maintained over time. Most recently, in the context of weight control, increased self-determination and internal exercise motivation was reported to facilitate improvements in eating self-regulation during weight control in a 1-year randomized controlled trial among overweight/obese women (N=239) (Mata, Silva, Vieira, Carraca, Andrade, Coutinho, Sardinha & Teixeira, 2011), and in another randomized controlled trial of behaviorally-based lifestyle interventions, Gorin, Koestner, Powers, Wing and Raynor (2013) concluded that autonomy support (perceived support for weight loss) predicted better weight loss outcomes among adults they studied (N=201). Teixeira, Silva, Mata, Palmeira and Markland (2012) have also suggested that

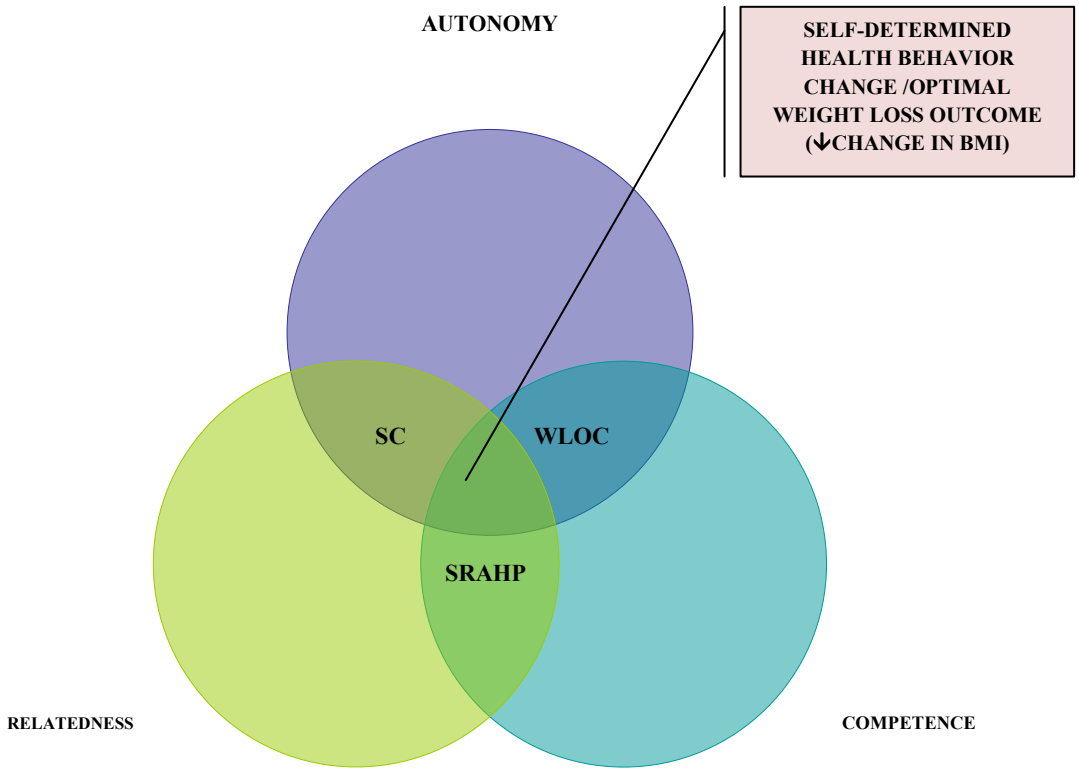
as individuals fully endorse weight loss behavioral goals and feel competent and autonomous in reaching them, they are more likely to experience long-term weight control.

Conceptual Model

Figure 3 illustrates the interrelationships between the independent and dependent variables with the desired outcome (achievement of self-directed behavior change/optimal weight loss outcome). While this model does not illustrate the directional relationships among the variables, it was hypothesized that as one possesses greater autonomy, competence and relatedness, self-determined behavior change can be realized. Thus, as each of the independent variable measures increase (or decrease in the case of weight locus of control), they were expected to correlate with each other and be increasingly associated with the desired change in the dependent variable of (downward) change in BMI following bariatric surgery.

Figure 3

Conceptual Model of Self-Determination Theory (SDT) and Weight Loss Outcome Following Bariatric Surgery



Summary

Sustained behavior change and optimal weight loss outcomes following bariatric surgery are significant concerns. Greater understanding of psychological and behavioral factors that positively influence such outcomes can be gained through the conduct of theoretically and methodologically sound research. The existing knowledge of SDT as a Model for Health Behavior Change demonstrates the validity, viability and significance of its application in the context of research designed to study predictive factors that may foster optimal weight loss outcomes following bariatric surgery. Although extensive literature is available for non-surgical weight loss approaches/programs, additional research is needed to assess the application of SDT and related psychological/behavioral factors among adults post-bariatric surgery.

Chapter 3: Methods

This chapter describes the research methodology that was used to describe the relationships between weight locus of control, self-compassion, self-rated abilities for health practices and weight loss outcome among adults following bariatric surgery. The study was designed to test the fitness of a conceptual model using correlation analyses. The discussion of the methodology begins with a description of the research design and includes a description of the sample size and characteristics, the research settings, the procedures for sample recruitment, data collection and protection of human subjects. Lastly, this chapter describes the instruments as well as data analysis procedures used.

Research Methodology and Design

The purpose of this study was to explore the relationships between weight locus of control, self-rated abilities for health practices, self-compassion, and weight loss outcome (downward change in BMI) among adults 2-10 years post-bariatric surgery. This research was designed to attempt to describe these variables, from a patient's perspective, as potential influencing factors related to weight loss outcome following bariatric surgery. For the identification and description of potential relationships between the independent and dependent variables, numerical data were collected through the use of valid and reliable survey instruments. The subsequent manipulation of numeric data using statistical procedures to describe phenomena and to assess the magnitude and reliability of the relationships among them characterizes the methods contained within quantitative analysis according to Polit and Beck (2012).

This study was non-experimental, using a descriptive, cross-sectional correlational design. Descriptive studies examine one or more characteristics of a

population and while there may be literature on the variables, they may not have been studied in the population of interest (Wood & Ross-Kerr, 2011). A cross-sectional research design indicates that data are collected at a single point in time, and according to Polit and Beck (2012), correlational studies examine the inter-relationships between variables of interest that have not undergone intervention by the researcher. While descriptive correlational research examines relationships among variables, it does not establish causality (Polit & Beck, 2012). However, causal modeling can be conducted to test hypothesized causal explanations of a phenomenon when studying non-experimental data. In a causal model, the researcher makes an a priori hypothesis regarding the causal link among three or more variables and then tests whether or not the hypothesized pathways from the causes to the effect are consistent with the data (Polit & Beck, 2012). A causal modeling approach using path analysis and structural equation modeling (SEM) was originally considered for the data analyses; however, these techniques were not used in this study due to study limitations (sample size) which will be discussed further in Chapter 5.

Participants

This study used a non-probability, convenience sample of adult men and women who had undergone bariatric surgery at least 2 years prior up to a period of ten years post-surgery. The lower limit of the timeframe was chosen as the period of time that it takes for bariatric patients to reach their goal weight is understandably variable, and can take 12-24 months in some instances, depending on numerous factors which include the amount of weight to be lost. As seen in the literature, weight may be regained for many

patients within 3-4 years post-bariatric surgery, and it is recommended that patients remain under the care of their surgeons for 5 years after surgery. In order to allow for maximum variation and to be able to compare outcomes for a longer period of time when patients may no longer receive routine follow-up from their surgeon, the upper limit of 10 years was selected.

The inclusion criteria for study participation specified that eligible participants would be: adults age 18 years and older, able to read and write in English, and adults who have undergone a single bariatric surgical procedure of any type (for example: lap band, gastric bypass, gastric sleeve) within the last 2-10 years. Criteria for exclusion from study participation included a history of having more than one bariatric surgical procedure (repeat or revision of original procedure), and/or personal health history of hospitalization for a psychiatric disorder. The rationale for studying adults over the age of 18 years was based on the understanding that children and adolescents' participation in the study would require parental consent and could affect recruitment of a sufficient sample. Additionally, the post-bariatric surgical experience may be drastically different for children and adolescents than adults, thereby potentially confounding study findings. Multiple bariatric surgeries for weight loss may also confound the results by having a cumulative rather than single effect, therefore, studying the outcome after only one weight loss surgery was preferred. Finally, while depression is often linked with obesity, participants who have had a personal history of hospitalization for a psychiatric disorder may fall into a category of patient whose comorbidities may negatively influence their weight loss outcome while presenting a highly complex clinical picture that lies beyond the scope of the researcher and current study. In order to measure the potential covariates

of depression and anxiety which are often associated with overweight and obesity, an additional screening measure, the Patient Health Questionnaire (PHQ-4) was used to determine the likelihood of the presence of an underlying depressive or anxiety disorder (Kroenke, Spitzer, Williams & Lowe, 2009).

Sample Size

The research questions required correlation analyses to examine potential relationship(s) between the variables of interest (weight locus of control, self-compassion, self-rated abilities for health practices and weight loss outcome [downward change in BMI]). There are many rules for calculating sample size for regression/correlation analysis. According to Polit and Beck (2012), one of the most common rules is 20 cases for each predictor in the research model. Based on this rule, to obtain statistical significance, the sample size for this study with three predictors would have been 60. Tabachnick and Fidell as stated in Polit and Beck (2012) present another guideline suggesting that the total sample population (N) should be 50 + 8 times the number of predictors. So, in this study with three predictors the sample size would have been at least 74 (50 + [8 X 3]). After conducting a power analysis, which is recommended as a better way to estimate sample size needs, a minimum of 77 participants was recommended to enroll in the study (3 potential predictors, moderate effect size [R^2=.13]), power =.80 and level of significance alpha = .05 (from Power Analysis Table for Multiple Regression in Polit & Beck, 2012, p. 442). In order to increase power further, the researcher planned to oversample and attempted to achieve a

target sample size of 100 to potentially account for the noted covariates of depression/anxiety and time since bariatric surgery.

Setting

Potential study participants were recruited through private bariatric surgeons' offices with American Society for Metabolic and Bariatric Surgery (ASMBS) "Center of Excellence" designation in the New York metropolitan area and their affiliated local support groups, as well as online web forums/blogs/discussion boards for bariatric patients. The decision to select surgeons who are affiliated with ASMBS Centers of Excellence was based on the fact that in order to receive such designation, physicians/surgeons must adhere to standards of care and practice with demonstrated high quality care and patient outcomes, thus eliminating any potential study effects that may be attributed to variations among surgeons' practices that may not, as a group, hold the same standards or produce equally consistent, high quality patient care outcomes. Bariatric support groups are offered at several local hospitals and meet regularly, often with guest speakers who provide information and resources on a wide range of topics relevant to an adult, post-bariatric surgery population. Online web forums/blogs/discussion boards offered the opportunity for study participation to a wide range of individuals without geographical limitations or boundaries.

Human Subjects Protection

Study approval was obtained from the Institutional Review Board (IRB) at Molloy College in compliance with institutional ethical standards and federal regulations designed to protect human subjects (see Appendix A). Explanation and purpose of the research study was provided to all eligible study participants on a recruitment flyer (see

Appendix B) and through a study information sheet which was the first page on the survey instrument (see Appendix C). Eligibility criteria for participation, the anticipated time required to complete the survey and study incentives for participants were discussed. Participation in a random drawing for one of ten (10) $20 Amazon.com gift cards was offered by the researcher. No separate consent form was used as completion of the online or written paper survey provided participants' implied consent to participate.

To protect individuals' anonymity and confidentiality of information, all data were numerically coded with a respondent ID number only. No name or identifying information was collected on the survey. If participants wished to be included in the random drawing for one of the ten incentives, or if participants desired to receive a summary of the research findings, he/she was asked to email or call the researcher separately so their name or identifying information would not be associated with their individual survey data. All data were entered into Statistical Package for Social Sciences (SPSS) statistical software, Version 22, exclusively by the researcher. Printed data reports and completed surveys were kept in a secure, locked location in the researcher's home.

Participant Recruitment

A flyer, which contained information about the purpose of the study, criteria for participation as well as the researcher's contact information, was used for participant recruitment in private bariatric surgeons' offices (see Appendix B). Surgeons who agreed to allow the researcher to recruit patients from their private offices signed a letter of approval allowing posting and distribution of flyers to their patients as they were seen for follow-up visits (see Appendix D). The bariatric coordinator and/or other appropriate

office staff posted the flyer, discussed the study with appropriate/eligible patients and had hardcopies of the survey for those who wanted to participate. After potential participants had the opportunity to read the flyer and/or survey, they were given the option to complete the survey during the time of their visit or they were given the web link to complete the survey online via Survey Monkey. If individuals were not interested, they did not complete the survey.

Local bariatric support groups were contacted to request permission to attend a meeting in order to introduce this study and explain its purpose and to invite eligible attendees to participate.

For online, web-based recruitment, the researcher posted information consistent with other recruitment settings on relevant bariatric patient-focused blogs and discussion boards which provided the link to the online survey. Once individuals clicked on the survey link, they were able to read information about the study, eligibility criteria for participation, options for being included in a random drawing and/or receiving a summary of study results and contact information for the researcher. After indicating that they had read and understood their role as a participant and that they met all eligibility criteria, they were able to continue to the survey.

Data Collection Procedure

The researcher collected data from participants attending a local bariatric support group and online through Survey Monkey between January 23, 2014 and February 23, 2014. For both settings, there was a single point of data collection and the researcher recorded the survey format of each participant. No surveys were completed in private surgeon's offices as a very small number of individuals were eligible to participate since

they did not meet the criteria for having had bariatric surgery 2-10 years ago (most were only 6 months to a year post-surgery and many had more than one weight loss surgery). The researcher was granted permission to attend only one local bariatric support group meeting in New York. At that meeting, the researcher provided an overview of the study and distributed paper copies of the survey to all that were interested. Time was provided during the meeting to complete the survey, and the researcher collected all completed surveys at the end of the meeting (N=10). For those who desired more time or wanted to complete the survey at a later time, the researcher provided the web link to complete the survey online.

Most study participants completed the survey online (N=264) and data were collected through a secure website, Survey Monkey. Online participants who contacted the researcher to be included in the random drawing or to receive a summary of the study findings or those who responded to the researcher's posts represented 15 states from across the nation including California, New York, North Carolina, Nebraska, Kentucky, Oklahoma, Washington, West Virginia, Louisiana, Delaware, Florida, Michigan, Arkansas, New Jersey, and Maine. Additional states may have been represented in the sample, but this information was not obtained from all study participants as geographic location was not included in the demographic questions.

Once the data collection period ended, the researcher randomly selected 10 participants (from email addresses) who indicated they wished to be included in the drawing, and those individuals received an electronic $20 Amazon.com gift card delivered to the email address they provided.

Measurements

The survey instrument (*Survey of Adults 2-10 Years Post-Bariatric Surgery*, see Appendix C) contained several existing instruments including the Patient Health Questionnaire (PHQ-4), the Weight Locus of Control (WLOC) Scale, the investigator-developed Weight Locus of Control Semantic Differential Scale (WLOC SDS), the Self-Rated Abilities for Health Practices (SRAHP) Scale, and the Self-Compassion Scale-Short Form (SCS-SF) which are summarized in Table 3. An investigator-developed attestation statement and demographic data questions were also included in the Survey.

Permission was obtained to use the SRAHP Scale (see Appendix E) and SCS-SF (via the researcher's personal email communication with the author). No permission was required for using the PHQ-4, and while multiple reasonable attempts were made to locate/contact the author of the WLOC, this was not accomplished.

Table 3

Summary of the Instruments

Instrument [Concept]	Asking participants to rate:	Scale/Score
PHQ-4 [Depression screen]	Feelings of depression or anxiety. Example: Over the last 2 weeks, I have felt down, depressed or hopeless…	Likert-type Scale 0-3 Total score of 4 items
WLOC [Autonomy]	How much control they feel they have over their weight. Example: Being the right weight is largely a matter of good fortune.	Likert-type Scale 1-6 Total score of 4 items (2 items are reverse scored)
WLOC SDS [Autonomy]	Degree of control over maintaining weight Example: Maintaining my weight is totally OUTSIDE my control.	Semantic Differential Scale Single rating between 1-10
SRAHP [Competence]	Ability to perform various health practices. Example: I am able to eat a balanced diet.	Likert-type Scale 0-4 Total score of 28 items
SCS-SF [Relatedness]	Typical actions towards yourself in difficult times. Example: I like to see my failings as part of the human condition.	Likert-type Scale 1-5 Total score of 12 items (6 items are reverse scored)

Patient Health Questionnaire (PHQ-4)

According to Haslam (2009), long-term complications of bariatric surgery can often result from pre-existing depression disorders not being identified. The Patient Health Questionnaire (PHQ-4) was selected for use in this study as it has been identified as an ultra-brief tool used for detecting anxiety and depressive disorders in the general population with demonstrated reliability and validity (Lowe et al., 2010). The PHQ-4 is a 4-item self-report tool that consists of a 2-item depression scale (PHQ-2) and a 2-item anxiety scale (GAD-2). Respondents are asked to rate the frequency of having feelings of depression and/or anxiety over the last two weeks on a scale of 0 "not at all" to 3 "nearly every day." Validated individually as abbreviated screeners for depression and anxiety, when combined, the PHQ-4 has also been validated in large clinical (N=2149) (Kroenke, Spitzer, Williams & Lowe, 2009) and population (N=5030) (Lowe, et al., 2010) samples with Cronbach alphas of 0.85 and 0.82 respectively. Factorial validity of the PHQ-4 was demonstrated through a principal-component analysis of four items (the two depression items of the PHQ-2 and the two anxiety items of the GAD-2) indicated that 84% of the total variance was explained by the first two factors. The total score is determined by adding together the scores for each of the 4 items. Scores are rated as normal (0-2), mild (3-5), moderate (6-8), and severe (9-12). The PHQ-4 is considered the shortest validated composite measure currently available for assessing depression and anxiety disorders. Increased anxiety and depression as seen with higher PHQ-4 scores is strongly associated with functional impairment, disability days, and healthcare use (Kroenke, Spitzer, Williams & Lowe, 2009).

Weight Locus of Control Scale (WLOC) and WLOC Semantic Differential Scale

Individual weight locus of control, as a proxy measure for SDT's attribute of *autonomy*, was measured by the Weight Locus of Control (WLOC) scale, a 4-item specific measure of expectancies for locus of control with respect to personal weight developed for the prediction of behaviors in relation to weight reduction (Saltzer, 1982). This was the first scale designed specifically to measure weight locus of control as opposed to health locus of control in general. Using a 6-point Likert-type scale, respondents are asked to rate the extent to which they agree (6 = "strongly agree") or disagree (1 = "strongly disagree") with four statements regarding their personal weight control/maintenance. Two scale items are internally worded and the other two are externally worded. The WLOC is scored in the external direction, and the Likert-type format is reverse-scored for the internally worded items. The possible range for the scale is 4-24 with the lowest numbers indicating a more internal orientation. While it has reported statistically significant test-retest reliability, internal consistency measures were low with Cronbach's alpha of .58 (N = 116) and .56 (N = 115) in two administrations of the scale to college undergraduate volunteers (Saltzer, 1982). Holt, Clark and Kreuter (2001) also used Saltzer's WLOC in a study that was part of a randomized trial that examined the effectiveness of three types of health education material on weight loss provided to 198 adults who responded to a newspaper ad regarding the study. Participants had to be 18 or older with a BMI of 27 or more, an interest in losing weight and no use of prescription weight loss medications in the last six months. Holt, Clark and Kreuter's (2001) study yielded findings comparable to Salter's (1982) with low internal reliability as well (alpha = .49).

In an attempt to strengthen the WLOC's low internal consistency, an investigator-developed semantic differential scale (WLOC SDS) was included and asked study participants to indicate their response to "maintaining my weight is…" by making a selection on a 10-point scale between the two anchor points "totally OUTSIDE my control" and "totally WITHIN my control" as another measure of the degree of internal vs. external locus of control related to weight. These anchor points are referred to as *bipolar adjectives* by Polit and Beck (2012) and signify the response scale through which participant attitudes can be measured. Responses are summed across the bipolar scales to yield a total score. Scoring for WLOC SDS is similar to Likert-type scales in that higher scores are generally associated with the positively worded adjective (totally WITHIN my control) as in this study. Inclusion of the WLOC SDS assisted the researcher in determining convergent validity with the WLOC Scale (Saltzer, 1982) described above. In order to claim that both scales are consistent with each other in their measurement of participants' weight locus of control orientation, a higher score on the WLOC SDS would be expected to be consistent with a lower score on Saltzer's (1982) WLOC Scale.

Self-Rated Abilities for Health Practices Scale (SRAHP)

Competence, the second attribute of SDT, was measured by proxy using the Self-Rated Abilities for Health Practices (SRAHP) Scale developed by Becker, Stuifbergen, Oh, and Hall (1993). The SRAHP is a 28-item instrument that is designed to measure beliefs about one's ability to perform health-promoting practices in domains of nutrition, physical activity/exercise, psychological well-being and responsible health practices. Respondents are asked to rate their ability to perform 28 health behaviors on a 5-point

Likert-type scale from 0 “not at all” to 4 “completely.” Ratings for the 28 items are added to produce a total score.

In order to examine internal consistency, Cronbach’s alpha was calculated and found to be .94 for the total scale when studied in an adult population of 188 adults ranging in age from 17 to 80 years. One sample consisted of undergraduate students enrolled in a university class on health promotion, and a second sample consisted of adults with disabilities (Becker, et al., 1993). When calculated for each of the four domains, alphas ranged from .81-.92. Principal components factor analysis with varimax rotation was performed to examine the factor structure of the SRAHP. A four-factor structure, consistent with the instrument’s four domains emerged, accounting for 61% of the variance (Becker, et al., 1993). In another study conducted by the researchers with persons with disabilities, reliability of the instrument was also high (coefficient alpha = .94 and test-retest reliability = .70) (Stuifbergen & Becker, 1994).

The SRAHP Scale was developed originally for individuals with disabilities or other life conditions that would limit their ability to perform health-promoting behaviors. While a ceiling effect was noted when the scale was used with non-impaired adults, it is believed that this instrument has relevance to the current study population. As obesity is now considered a chronic disease (American Medical Association [AMA], 2013) and perhaps a disability as well by some, the SRAHP Scale has the ability to assist the researcher in the identification of personal characteristics that may affect one’s capacity to perform health-promoting behaviors which may lead to weight loss maintenance following bariatric surgery.

Self-Compassion Scale—Short Form (SCS-SF)

The third and final attribute of SDT, *relatedness*, was measured by proxy using the Self-Compassion Scale (SCS), a 26-item self-report measure created by Kristin Neff in 2003. There are three major components of self-compassion including self-kindness (the ability to be kind and understanding toward oneself rather than harshly judging or criticizing), common humanity (recognizing that imperfection is a shared aspect of the human experience rather than feeling isolated by one's failures) and mindfulness (holding one's experiences in balanced perspective rather than exaggerating them or over-identifying with them) (Neff, 2003; Raes, Pommier, Neff, & Van Gucht, 2011). With the heading of "How I Typically Act Towards Myself In Difficult Times," the scale consists of questions representing 6 subscales which include self-kindness, self-judgment, common humanity, isolation, mindfulness and over-identification (Neff, 2003). Respondents are asked to rate the frequency of the stated reactions using a Likert-type scale of 1 "almost never" to 5 "almost always." Its reported use in three studies has deemed it a psychometrically sound and theoretically valid measure of self-compassion which is linked to psychological well-being as construct, content and convergent validity were all demonstrated (Neff, 2003).

Neff and colleagues also constructed a short-form version of the Self-Compassion Scale (SCS-SF) to offer a reliable, valid and economical alternative to the original, long form of the original instrument (Raes et al., 2011). As with the original SCS instrument (Neff, 2003), respondents are asked to rate the frequency of the stated reactions using a Likert-type scale of 1 "almost never" to 5 "almost always." The SCS-SF consists of 12 items with a total score calculated by reversing the score of the negative subscale items

(self-judgment, isolation, and over-identification) and then adding all the item scores together. Subscales are computed by calculating the mean of the subscale item responses (Raes et al., 2011). The SCS-SF was determined to be reliable with adequate internal consistency (Cronbach's alpha $\geq$ .86) when tested with each of three samples: Two Dutch samples, one with 271 first-year psychology students at a university in Belgium and a second with 185 adults recruited via email snowball sampling; and a third English sample of 415 students at the University of Texas at Austin (Raes et al., 2011). Additionally, the SCS-SF had a near perfect correlation with the original, long form of the SCS ($r \geq .97$ each of three samples). For the purposes of this study, the SCS-SF was used as the researcher will only use a total self-compassion score and will not be using subscale scores, which are more reliable when using the original long form of the SCS. The shorter form of the SCS also aided in reducing the burden on research participants, particularly since there are other instruments contained in the survey.

Attestation and Demographic Data Questions

The first item on the survey asked participants to verify that they had read and understood the information provided to them about the study and their role as a participant, and that they met all eligibility criteria for study inclusion/participation. Through investigator-developed demographic questions, additional data were collected to identify potential covariates. According to Polit and Beck (2012), covariates are variables suspected to be correlated with the dependent variable. Selected covariates were included in the model so that existing potential correlations between variables other than the independent variables could be assessed. Questions included asked participants to identify the following: age and birth year, gender, race, ethnicity, highest education

level, marital status, employment status, and annual household income. According to the NIH (1998), overweight and obesity are noted to be especially evident in some minority groups as well as those with lower incomes and less education. Additional questions related to health history queried presence of physician-diagnosed co-morbidities at the time of surgery and present (depression, diabetes, high blood pressure), type of bariatric surgical procedure performed, month and year when bariatric surgery was performed (to determine years post-op), whether or not the individual was currently under care of a bariatric surgeon, if they currently used or participated in a structured/formal non-surgical weight loss method or program and if they currently attended a bariatric support group.

Body Mass Index (BMI)

Based on height and reported weight, the researcher calculated participants' current BMI (Post-BMI) and BMI at the time of surgery (Pre-BMI) using the formula (weight (lbs) / [height (in)]^2) X 703 (CDC, 2013). The researcher then calculated individual BMI change by subtracting the Post-BMI from the Pre-BMI. This calculation produced a number used to illustrate the downward change (reduction) in BMI. Any negative numbers resulting from the calculation represented an individual's increasing BMI from the time of surgery to present.

Data Analysis

The data analysis was performed according to the research questions (descriptive and correlational). Descriptive statistics were used to answer descriptive questions. Mean and standard deviation were calculated to describe the levels of weight locus of control, self-compassion, self-rated abilities for health practices and weight loss outcome (downward change in BMI). For two of the measures, it was noted that total scores were

not computed due to random missing data. Prior to assessing the reliability of the tools and performing any statistical analyses, the technique of mean replacement was used. Mean replacement or mean substitution involves calculating mean values from available data on a particular variable (in this case the mean of the same subscale items as the missing data) and using them to replace missing values prior to analysis. According to Munro (2005), this is considered to be a conservative procedure because the distribution of the mean as a whole does not change, and the researcher does not have to guess at missing values to account for the missing information. This allowed all cases to then have complete data to be analyzed. Internal consistency for each of the instruments used (PHQ-4, Weight Locus of Control Scale, Self-Rated Abilities for Health Practices Scale, and Self-Compassion Scale-Short Form) was analyzed by calculating alpha coefficients (Cronbach's alpha). Convergent validity between the investigator-developed Weight Locus of Control Semantic Differential Scale and the Weight Locus of Control Scale was also assessed.

The associations between weight locus of control, self-compassion, self-rated abilities for health practices and weight loss outcome (change in BMI) were evaluated to determine the direction and magnitude of the relationships. Pearson product moment correlation analyses were conducted to identify which variables were significantly related/correlated with the dependent variable ($p < .05$). This assisted the researcher in determining the extent to which weight locus of control, self-rated abilities for health practices, and self-compassion were associated with one's weight loss outcome (downward change in BMI) after bariatric surgery. By including potential covariates in the correlation analyses, the researcher was able to have a modest degree of statistical

control for identifying relationships that existed in addition to those considered when looking at the primary study variables alone.

Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS), version 22.0. Alpha and power levels were set at the traditional values for social science research (.05; .80) with the goal of achieving good statistical power and statistical significance.

Summary

This chapter presented the descriptive correlational design that was used to explore the relationships between weight locus of control, self-compassion, self-rated abilities for health practices and weight loss outcome among adults following bariatric surgery. Sample characteristics, settings, participant recruitment, data collection procedures, including human subjects protection were discussed. The survey instruments were described along with data analysis procedures.

Chapter 4: Findings

This chapter presents the sample characteristics and results of data analysis. The purpose of this descriptive, cross-sectional correlational study was to explore the relationships between weight locus of control, self-rated abilities for health practices, self-compassion, and weight loss outcome (downward change in BMI) among adults 2-10 years post-bariatric surgery using Self-Determination Theory as a guiding framework. The results of the descriptive correlational study are presented according to the research questions (descriptive and correlational).

Sample Characteristics

A convenience sample of 274 adults consented to participate in the study. The first question on the survey was the attestation which had to be checked before proceeding to the survey questions. For the online surveys, all respondents completed this item, but after looking at the survey, a large number decided not to complete it, leaving all of the remaining items blank. Additionally, many respondents did not meet the eligibility criteria of having their surgery 2-10 years prior. As a result, missing cases (n=86) and cases that were less than 2 years post-bariatric surgery (n=48) were removed from the data set. Cases that did not indicate their surgery year were also removed (n=2). There were 11 cases that were greater than 10 years post-bariatric surgery, however, the researcher retained these in the data set to identify further any potential significant relationships between the study variables as the total number of years post-op increased. A total of 138 cases comprised the final data set and were included in the data analyses. Descriptive characteristics of the study sample are presented in Table 4.

Table 4

Sample Characteristics

Age, mean (SD), range	49.57 (9.1), 23 – 67 years	
	Frequency = N	Percentage
Gender		
Female	128	93%
Male	10	7%
Race		
American Indian or Alaska Native	1	<1%
Black or African American	9	7%
Native Hawaiian or Other Pacific Islander	1	<1%
White or Caucasian	127	92%
Ethnicity		
Non-Hispanic/Latino	130	94%
Hispanic/Latino (missing data)	8	6%

Table 4

Sample Characteristics (continued)

	Frequency = N	Percentage
Education level		
Did not graduate from high school	1	<1%
High school diploma or equivalent	9	7%
Some college but no degree	26	19%
Associate degree	14	10%
Bachelor's degree	52	38%
Master's degree	28	20%
Doctoral degree	8	6%
Marital status		
Married/partnered	101	73%
Widowed	3	2%
Divorced	11	8%
Separated	7	5%
Single (never married/partnered)	16	12%

Table 4

Sample Characteristics (continued)

	Frequency = N	Percentage
Employment status		
Employed/self-employed	112	81%
Out of work and looking for work	5	4%
Out of work and not currently looking for work	5	4%
Retired	9	7%
Unable to work	5	4%
Missing	2	<1%
Annual household income		
Less than $40,000	13	9%
Between $40,000-$74,999	33	24%
Between $75,000-$109,999	40	29%
Between $110,000-$144,999	20	15%
$145,000 or more	27	20%
Missing	5	3%

Table 4

Sample Characteristics (continued)

Weight (time of surgery), mean (SD), range	288.88 (55.47), 185-432 pounds	
Weight (current), mean (SD), range	180.71 (45.94), 101-367 pounds	
Change in BMI, mean (SD), range	18.13 (8.18), -3 – 48	
	Frequency = N	Percentage
Health issues/comorbidities (time of surgery)		
Depression	56	41%
Diabetes	35	25%
High blood pressure	74	54%
Other	67	49%
Arthritis/joint pain	11	16%
Asthma/breathing problems	4	6%
High cholesterol	18	27%
Reflux/GERD	5	7%
Sleep apnea	26	39%
Not specified	3	4%

Table 4

Sample Characteristics (continued)

	Frequency = N	Percentage
Health issues/comorbidities (current)		
Depression	28	20%
Diabetes	9	7%
High blood pressure	22	16%
Other	34	25%
Alcoholic	1	<1%
Arthritis	5	15%
Sleep apnea	9	26%
Not specified	19	59%
Bariatric/weight loss surgery type		
Gastric bypass	53	38%
Gastric sleeve/vertical sleeve gastrectomy	39	28%
Lap band	23	17%
Other	23	17%
Duodenal switch	22	96%
Not specified	1	4%

Table 4

Sample Characteristics (continued)

Years post-bariatric surgery, mean (SD), range	5 (3.91), 2-32 years	
	Frequency = N	Percentage
Currently under the care of bariatric surgeon		
No	68	49%
Yes	70	51%
Reason for no longer being under the care of bariatric surgeon		
No insurance/health coverage/unable to afford	5	7%
No longer needed/indicated	26	38%
Other	37	54%
Access to/location of surgeon	20	54%
Seeing alternate provider	8	22%
Unhappy with post-op care/surgeon	7	19%
Had band removed	1	3%
Just stopped going	1	3%

Table 4

Sample Characteristics (continued)

	Frequency = N	Percentage
Currently participate in a structured/formal weight loss program		
No	122	88%
Yes	16	12%
Currently attend a support group for bariatric patients		
No	97	70%
Yes	41	30%
Data collection sites/survey format		
Support group/paper copy	6	4%
Online	132	96%

Participants' age ranged from 23 to 67 years, with a mean of 49.57 years (SD=9.06). The majority of the participants (93%, n=128) were female. Most participants (92%, n=127) identified their race as "White or Caucasian" and their ethnicity as "non-Hispanic/Latino (94%, n=130). Most participants indicated having a Bachelor's degree as their highest level of education completed (38%, n=52).

The majority of participants were "married/partnered" (73%, n=101). The majority of participants indicated they were "employed/self-employed" (81%, n=112) and had an annual household income between $75,000 and $109,999 (29%, n=40).

The average current weight among the participants was 181 pounds and the mean BMI change was 18 (representing the degree of downward change in BMI) with a range of -3 to 48. The negative number representing BMI change indicated an increase in BMI from pre- to post-surgery for one participant. Participants reported the presence of health issues at the time of their surgery as well as currently. The most commonly referenced comorbidities at the time of surgery were depression (41%, n=56), diabetes (25%, n=35), high blood pressure (54%, n=74), and "other" (49%, n=67). Among the "other" health issues reported at the time of surgery, the most frequently mentioned was sleep apnea (38%, n=26), high cholesterol (26%, n=18), arthritis/joint pain (16%, n=11), reflux/GERD (7%, n=5), and asthma/breathing problems (6%, n=4). The presence of *current* comorbidities was also reported by participants as follows: depression (20%, n=28); diabetes (7%, n=9); high blood pressure (16%, n=22), and "other" (25%, n=34). The most commonly cited "other" current health issues among participants included sleep apnea (26%, n=9) and arthritis (15%, n=5). One individual reported a current, new health issue as "alcoholic."

The most common procedure undergone among participants was gastric bypass (38%, n=53) and the mean time since surgery was 5.3 years (with a range of 2-32 years). Approximately half of the participants (51%, n=70) reported they were still under the care of their bariatric surgeon. For those who were no longer under the care of their bariatric surgeon, the most commonly cited reasons included "no longer

needed/indicated" (38%, n=26), "no insurance/unable to afford" (7%, n=5) and "other" (54%, n=37). The location of the surgeon (too far or had moved/closed practice/retired) was the most commonly mentioned "other" reason for no longer being under the care of their bariatric surgeon. Several participants indicated that they had their surgery in Mexico. Among participants, most indicated that they were not currently participating in a structured/formal weight loss program (88%, n=122) and 30% (n=41) indicated that they currently attend a support group for bariatric patients.

While the majority of participants (96%) completed the survey online (N=132) without interaction with the researcher, among those who completed the paper copy of the survey in the presence of the researcher (4%, N=6), no one verbalized any reading or comprehension challenges during or after the administration of the survey. The results of the internal consistency analysis for scales used in the survey are presented in the following section.

Reliability of the Measurement Instruments

Reliability refers to the degree of consistency and/or dependability with which an instrument measures an attribute (Polit & Beck, 2012). The most commonly reported estimate of reliability is Cronbach's coefficient alpha (α). The coefficient alpha represents a quantitative index (usually ranging from .00 to1.00) whereby alpha values around .90 are considered to be "excellent", values around .80 are "very good", and values around .70 are "adequate" (Kline, 2011).

In order to ensure internal reliability of the measurement instruments used in this study sample, the Cronbach's alpha values (α) obtained from the collected data were compared to those in previously published studies in Table 5.

Table 5

Reliability of the Measurement Instruments

Instruments	Cronbach's alpha (α) in Published studies	Current study
Patient Health Questionnaire (PHQ-4)	.82 - .84	.79
Anxiety subscale (GAD-2)	.75 - .82	.74
Depression subscale (PHQ-2)	.78 - .81	.84
Weight Locus of Control Scale (WLOC)	.49 - .58	.63
Self-Rated Abilities for Health Practices (SRAHP)	.91 - .94	.90
Nutrition subscale	.76 - .81	.70
Psychological wellbeing subscale	.86 - .90	.87
Exercise subscale	.89 - .92	.90
Responsible health practices subscale	.77 - .88	.77
Self-Compassion Scale—Short Form (SCS-SF)	.86 - .87	.88

When compared to published studies, internal consistencies of the instruments used in this study were demonstrated with nearly all of the scales and subscales presenting alpha values at or above values reported from previous research. Convergent validity between the WLOC Scale and the WLOC SDS was demonstrated and is presented in Table 6.

Table 6

Pearson's Correlation Coefficients between the WLOC and WLOC SDS

Instrument	WLOC	WLOC SDS
WLOC	1.00	-.661**
WLOC SDS	-.661**	1.00

**p < .01, two-tailed.

Note: WLOC = Weight Locus of Control Scale, N = 137; WLOC SDS = Weight Locus of Control Semantic Differential Scale, N = 138.

Descriptive Correlational Study (Descriptive Questions)

This section details the descriptive results of the principal study variables: weight locus of control, self-compassion, self-rated abilities for health practices and weight loss outcome (downward change in BMI) among the sample of adults following bariatric surgery. The section begins with the descriptive results for the depression/anxiety screen. Descriptive statistics for study measurement instruments are presented in Table 7.

Patient Health Questionnaire (PHQ-4)

The average score of the PHQ-4 was 1.39 (SD=1.90, range 0-12). When looking at the two subscales, the anxiety subscale (GAD-2) had an average score of .85 (SD=1.22, range 0-6) and the depression subscale (PHQ-2) had a mean score of .56 (SD=1.02, range 0-6) indicating a very low prevalence of anxiety and depression among study participants. As a result, depression and/or anxiety do not appear to be confounding variables in this study although the PHQ-4 was used in the correlation analyses.

Weight Locus of Control

The average total WLOC score among study participants (N=137) was 8.52 (SD=3.44, range 4-24) with a mean of 2 for each of the four individual items. As the scale is scored in the external direction, this represents a sample that has an overall internal weight locus of control orientation. A second measure of weight locus of control used was the investigator-developed WLOC Semantic Differential Scale (WLOC SDS) which yielded a mean score of 8.25 (SD=1.98, range 1-10). While the WLOC SDS is scored in the internal direction (a greater number represents a more internal orientation), when compared to the WLOC, the results are consistent with one another and again

represents a sample population that is internally oriented in terms of their weight maintenance. In other words, participants generally view their weight and its maintenance as something that is within their own control rather than being determined by other external forces or good fortune.

Self-Rated Abilities for Health Practices

Among the study sample, most participants were confident in their ability to perform selected health practices. The mean score for the SRAHP was 88.76 (SD=13.01, range 0-112) out of a total score of 112 for the scale's 28 items. When looking at the subscales for nutrition, psychological wellbeing, exercise, and responsible health practices, the average scores were 24.12 (SD=3.24, range 0-28), 20.40 (SD=4.57, range 0-28), 20.01 (SD=5.95, range 0-28), and 24.23 (SD=3.47, range 0-28) respectively, which further indicated a relatively consistent level of confidence in one's self-rated ability to perform health practices when they are separated into the four stated individual domains.

Self-Compassion

While the study sample was internally oriented and mostly confident in their abilities, they did not exhibit the same level of self-compassion as a group with an average SCS-SF score of 39.81 (SD=8.83, range 12-60) out of a possible total self-compassion score of 60. Subscale scores were not assessed as they are not recommended for use when using the short form of the SCS since they are not as reliable as they are when using the original form of the SCS according to the authors (Raes et al., 2011).

Table 7

Descriptive Statistics for Measurement Instruments

Instruments	Mean	SD	Items/Range
Patient Health Questionnaire (PHQ-4)	1.39	1.90	4/0-12
Anxiety subscale (GAD-2)	.85	1.22	2/0-6
Depression subscale (PHQ-2)	.56	1.02	2/0-6
Weight Locus of Control Scale (WLOC)	8.52	3.44	4/4-24
Weight Locus of Control Semantic Differential	8.25	1.98	1/1-10
Self-Rated Abilities for Health Practices (SRAHP)	88.76	13.01	28/0-112
Nutrition subscale	24.12	3.24	7/0-28
Psychological wellbeing subscale	20.40	4.57	7/0-28
Exercise subscale	20.01	5.95	7/0-28
Responsible health practices subscale	24.23	3.47	7/0-28
Self-Compassion Scale—Short Form (SCS-SF)	39.81	8.83	12/12-60

Weight Loss Outcome

The outcome variable for weight loss in this study was measured as change in body mass index (BMI), calculated by subtracting the post-surgical BMI from the pre-surgical BMI to represent the degree of downward change in BMI. The average change in BMI among the study sample was 18.13 (SD=8.18, range -3 to 48). The -3 indicates that an increase in BMI by 3 was found for one individual.

Associations between Principal Study Variables (Correlational Questions)

The contribution of psychological factors (weight locus of control, self-rated abilities for health practices, and self-compassion) to weight loss outcome (downward change in BMI) was explored. Frequencies of scores and histograms were examined to assess normality for all variables. Each of the assumptions for the correlations was met with the data: the study sample was representative of the population; the variables were normally distributed and had linear relationships; and there was equal variability between the variables (homoscedasticity). Pearson's correlation coefficients (r) between variables were then examined. Bivariate correlations between the measured variables are presented in table format within this section.

The internal consistencies between the measurement instruments were first assessed to determine if their interrelationships were appropriate and "fit" as proxy measures for the elements of autonomy, competence, and relatedness within SDT. When looking at the depression/anxiety screen (PHQ-4), significant negative correlations were found between self-rated abilities for health practices ($r = -.361$, $p < .01$) and self-compassion ($r = -.510$, $p < .01$) indicating increased self-rated abilities and increased self-compassion was associated with decreased depression/anxiety. A non-significant positive correlation was found between depression/anxiety and weight locus of control ($r = .064$) meaning depression/anxiety increased slightly as weight locus of control became more externally oriented. Weight locus of control was found to have a significant negative correlation with self-rated abilities for health practices ($r = -.331$, $p < .01$) and a weaker negative correlation with self-compassion ($r = -.138$). This indicates that individuals in the study sample who were more internally-oriented

(autonomous) in their weight control/maintenance were also more confident in their health practice abilities (competent) and more self-compassionate (greater relatedness) in their experience of weight loss. Self-rated abilities for health practices was found to be significantly and positively correlated with self-compassion ($r = .432$, $p < .01$). This supports good internal consistency among the measures in describing the study sample characteristics.

While the measurements were consistent with each other and their relationships formed the basis that would lead toward self-determined behavior change, among the overall study sample, non-significant negative correlations were found between the outcome variable of (downward) BMI change and weight locus of control ($r = -.052$), self-rated abilities for health practices ($r = -.011$) and self-compassion ($r = -.058$). None of these correlations were statistically significant as seen in Table 8.

Table 8

Pearson's Correlation Coefficients between the Measured Variables (N=138)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	.064	-.361**	-.510**	.006
WLOC	.064	1.00	-.331**	-.138	-.052
SRAHP	-.361**	-.331**	1.00	.432**	-.011
SC	-.510**	-.138	.432**	1.00	-.058
BMI Change	.006	-.052	-.011	-.058	1.00

**p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Although non-significant, the hypothesized direction of the relationship between weight locus of control (greater internal orientation) and BMI change was supported in that a more internal orientation would be associated with greater BMI change. However, the hypothesized relationships between self-rated abilities for health practices, self-compassion, and BMI change were not supported. While not statistically significant, increased self-rated abilities for health practices and self-compassion did not correlate with a greater downward change in BMI. Based on these findings within the overall study sample, the conceptual and research models were not supported.

Since the correlations between variables when looking at the sample as a whole were weak/flat at best, the contributions of demographic factors of the sample were also examined. There were no significant relationships with BMI change based on gender, race, ethnicity, education level, marital status, employment status or annual household income. There were, however, notable changes in health issues following surgery. At the time of surgery, more than 40% of participants reported having depression, high blood pressure or other health issues/comorbidities while 25% reported having diabetes. The self-reported prevalence of the same health issues at the current time decreased for the overall study population by 50% or more: depression decreased from 40% to 20%; diabetes decreased from 25% to 7%; high blood pressure decreased from 54% to 16%; and "other" reported comorbidities decreased from 49% to 25%. Among the "other" category, sleep apnea remained the most commonly reported health issue but decreased from 38% at the time of surgery to 26% currently among participants. Similar improvements and/or elimination of comorbidities after bariatric surgery have been reported consistently in the literature (Buchwald, 2005; Gagnon & Karwacki Sheff,

2012). While high cholesterol was reported as a health issue by 26% of participants at the time of surgery, this was not cited as an issue at the current time for anyone (although 59% of those indicating "other" health issues at the current time did not provide specific examples indicating what the health issue was). Consistently, arthritis was reported to be an issue at the time of surgery (16%) as well as the current time (15%) among participants. Asthma/breathing problems and reflux/GERD were present for 6% and 7% respectively at the time of surgery, but neither was mentioned as a current health issue. One individual reported a current health issue of "alcoholic" which was not mentioned among participants as an issue at the time of surgery. Health issues reported at the time of surgery did not correlate with BMI change: however, those who reported having diabetes at the current time had less weight loss although not to a statistically significant degree. Approximately half of the study population reported still being under the care of their bariatric surgeon and 30% indicated they were currently attending a support group for bariatric patients: however, neither of these factors was correlated with weight loss outcome.

Data were then sorted and subgroups of the sample were created based on the time since bariatric surgery, participants' ages, whether or not participants were currently participating in a structured/formal weight loss program, whether or not participants currently attended a support group for bariatric patients, and the type of bariatric/weight loss surgery (WLS). In the overall study sample, time since bariatric surgery (computed as years post-op) was not significantly correlated with any of the study variables. Subgroups of data for years post-op were created to compare participants who were 2-4 years post-op (see Table 9), those who were 5-9 years post-op (see Table 10), and those

who were 10 years or more post-bariatric surgery (see Table 11). Among these three subcategories for years post-op, there was no notable difference in correlations between BMI change and study variables except for the 10 years or more group in which there was a moderate positive correlation between self-rated abilities for health practices and BMI change ($r = .396$) and a strong, significant correlation between BMI change and self-compassion ($r = .600$, $p < .01$) (see Table 11).

Table 9

Pearson's Correlation Coefficients between Years Post-Op (2-4 years) and BMI Change (N=75)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	.099	-.434**	-.508**	-.008
WLOC	.099	1.00	-.201	-.127	-.079
SRAHP	-.434**	-.201	1.00	.488**	-.020
SC	-.508**	-.127	.488**	1.00	-.048
BMI Change	-.008	-.079	-.020	-.048	1.00

**p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 10

Pearson's Correlation Coefficients between Years Post-Op (5-9 years) and BMI Change (N=45)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	.021	-.209	-.546**	.100
WLOC	.021	1.00	-.489**	-.149	-.052
SRAHP	-.209	-.489**	1.00	.402**	-.072
SC	-.546**	-.149	.402**	1.00	-.198
BMI Change	.100	-.052	-.072	-.198	1.00

**p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 11

Pearson's Correlation Coefficients between Years Post-Op (10 years or more) and BMI Change (N=18)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	.073	-.436	-.385	-.380
WLOC	.073	1.00	-.435	-.212	.051
SRAHP	-.436	-.435	1.00	.294	.396
SC	-.385	-.212	.294	1.00	.600**
BMI Change	-.380	.051	.396	.600**	1.00

**p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

When looking at participants' age among the overall study sample, as age increased, there was a non-significant negative correlation with BMI change (r = -.089). Data were sorted to create subgroups by age (40 years and under, 41-49 years, 50-59 years, and 60 years and older). Across these subgroups, measures were again well correlated with each other, but there were no significant correlations between any of the measures and BMI change in any age category (see Tables 12-15).

Table 12

Pearson's Correlation Coefficients between Age (40 years and under) and BMI Change (N=21)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	.137	-.698**	-.501*	.423
WLOC	.137	1.00	-.214	-.289	-.312
SRAHP	-.698**	-.214	1.00	.455*	-.279
SC	-.501*	-.289	.455*	1.00	-.319
BMI Change	.423	-.312	-.279	-.319	1.00

*p < .05, two-tailed. **p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 13

Pearson's Correlation Coefficients between Age (41-49 years) and BMI Change (N=47)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	-.055	-.311*	-.425**	-.016
WLOC	-.055	1.00	-.191	.055	.201
SRAHP	-.311*	-.191	1.00	.347*	.058
SC	-.425**	.055	.347*	1.00	.030
BMI Change	-.016	.201	.058	.030	1.00

*p < .05, two-tailed. **p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 14

Pearson's Correlation Coefficients between Age (50-59 years) and BMI Change (N=50)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	-.019	-.307*	-.513**	-.173
WLOC	-.019	1.00	-.282*	-.140	.000
SRAHP	-.307*	-.282*	1.00	.415**	.129
SC	-.513**	-.140	.415**	1.00	.126
BMI Change	-.173	.000	.129	.126	1.00

*p < .05, two-tailed. **p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 15

Pearson's Correlation Coefficients between Age (60 years and older) and BMI Change (N=20)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	.308	-.341	-.671**	-.008
WLOC	.308	1.00	-.597**	-.260	-.176
SRAHP	-.341	-.597**	1.00	.630**	-.075
SC	-.671**	-.260	.630**	1.00	-.254
BMI Change	-.008	-.176	-.075	-.254	1.00

**p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

In terms of current participation in a structured/formal weight loss program or current participation in a support group for bariatric patients, there was only one subgroup whose results supported the conceptual/research model (see Tables 16-19). There were no significant correlations found between current support group participation (yes or no) and BMI change. Among those who indicated they currently participated in a structured/formal weight loss program, self-compassion ($r = .569$, $p < .05$) was significantly correlated with the outcome variable of (downward) BMI change (see Table 16).

Table 16

Pearson's Correlation Coefficients between Current WLP Participation (Yes) and BMI Change (N=16)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	-.453	-.387	-.384	-.300
WLOC	-.453	1.00	-.338	-.407	-.098
SRAHP	-.387	-.338	1.00	.485	.233
SC	-.384	-.407	.485	1.00	.569*
BMI Change	-.300	-.098	.233	.569*	1.00

*$p < .05$, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 17

Pearson's Correlation Coefficients between Current WLP Participation (No) and BMI Change (N=122)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	.096	-.362**	-.521**	.018
WLOC	.096	1.00	-.334**	-.107	-.053
SRAHP	-.362**	-.334**	1.00	.429**	-.039
SC	-.521**	-.107	.429**	1.00	-.102
BMI Change	.018	-.053	-.039	-.102	1.00

**p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 18

Pearson's Correlation Coefficients between Current SG Participation (Yes) and BMI Change (N=41)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	-.114	-.420**	-.228	-.157
WLOC	-.114	1.00	-.307	-.141	.257
SRAHP	-.420**	-.307	1.00	.500**	.049
SC	-.228	-.141	.500**	1.00	.000
BMI Change	-.157	.257	.049	.000	1.00

**p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 19

Pearson's Correlation Coefficients between Current SG Participation (No) and BMI Change (N=97)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	.051	-.344**	-.564**	.039
WLOC	.051	1.00	-.318**	-.106	-.143
SRAHP	-.344**	-.318**	1.00	.395**	-.036
SC	-.564**	-.106	.395**	1.00	-.079
BMI Change	.039	-.143	-.036	-.079	1.00

**p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

With regard to type of bariatric/weight loss surgery (WLS) performed, overall, there was no significant correlation with weight loss outcome. Four subgroups were then created from the study sample based on the type of WLS, and among those groups, only one type of surgery fit the conceptual/research models and hypotheses (see Tables 20-23). While they comprised only 17% of the study sample, data from participants who underwent Lap Band surgery supported the model whereby internal weight locus of control, self-rated abilities for health practices and self-compassion were all moderately correlated with BMI change. However, these correlations were not statistically significant. Curiously, for those who had gastric bypass, there was a positive and significant correlation between BMI change and depression/anxiety. The same positive, but not statistically significant finding was noted in the group that had the duodenal switch procedure. It is unclear for these two groups why they would be more depressed/anxious as their BMI change increased since decreased depression is often reported as a resulting outcome of weight loss (Blaine, Rodman, & Newman, 2007). For those who underwent the gastric sleeve or Lap-Band procedures, less depression/anxiety was associated with greater BMI change. For the Lap-Band participants, this association was statistically significant ($r = -.539$, $p < .05$). Also of interest for the duodenal switch group was the association between WLOC and BMI change; as individuals were more externally-oriented, they experienced a greater BMI change. Among the duodenal switch group, it was noted that self-rated abilities for health practices and self-compassion were negatively correlated with BMI change, which is contrary to the hypothesized relationships in the conceptual and research models.

Table 20

Pearson's Correlation Coefficients between WLS Type (Gastric Bypass only) and BMI Change (N=53)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	.152	-.342*	-.566**	.274*
WLOC	.152	1.00	-.367**	-.204	-.075
SRAHP	-.342*	-.367**	1.00	.547**	.074
SC	-.566**	-.204	.547**	1.00	-.028
BMI Change	.274*	-.075	.074	-.028	1.00

*p < .05, two-tailed. **p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 21

Pearson's Correlation Coefficients between WLS Type (Gastric Sleeve only) and BMI Change (N=39)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	.173	-.430**	-.444**	-.175
WLOC	.173	1.00	-.242	-.383*	.111
SRAHP	-.430*	-.242	1.00	.292	-.188
SC	-.444**	-.383*	.292	1.00	-.299
BMI Change	-.175	.111	-.188	-.299	1.00

*p < .05, two-tailed. **p < .01, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 22

Pearson's Correlation Coefficients between WLS Type (Lap Band only) and BMI Change (N=23)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	-.008	-.187	-.494*	-.539*
WLOC	-.008	1.00	-.439*	.027	-.360
SRAHP	-.187	-.439*	1.00	.331	.411
SC	-.494*	.027	.331	1.00	.381
BMI Change	-.539*	-.360	.411	.381	1.00

*p < .05, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Table 23

Pearson's Correlation Coefficients between WLS Type (Duodenal Switch only) and BMI Change (N=22)

Variable	PHQ-4	WLOC	SRAHP	SC	BMI Change
PHQ-4	1.00	-.136	-.544*	-.503*	.258
WLOC	-.136	1.00	-.103	.064	.497*
SRAHP	-.544*	-.103	1.00	.412	-.287
SC	-.503*	.064	.412	1.00	-.335
BMI Change	.258	.497*	-.287	-.335	1.00

*p < .05, two-tailed.

Note: PHQ-4 = Patient Health Questionnaire (PHQ-4), WLOC = Weight Locus of Control Scale, SRAHP = Self-Rated Abilities for Health Practices, SC = Self-Compassion.

Chapter 5: Discussion and Recommendations

The purpose of this study was to test a conceptual research model which hypothesized that internally-oriented weight locus of control, increased self-rated abilities for health practices, and a higher degree of self-compassion would positively affect adults' weight loss outcome (a greater downward change in BMI) following bariatric surgery. The results of the study offered limited support for the fit between the survey data collected and the hypothesized relationships between variables contained in the research and conceptual model based on Self-Determination Theory. This chapter presents a discussion of the research findings, conclusions, and study limitations. Implications for nursing and recommendations for future research are also presented.

Sample Demographics

Population-based studies suggest that bariatric surgery patients are disproportionally privately insured, middle-aged white women, although the reasons for the noted disparities are uncertain (Santry, Lauderdale, Cagney, Rathouz, Alverdy & Chin, 2007). While detailed information was not asked about health insurance coverage, the study sample is consistent with this population-based description. The majority of the study sample was well-educated with 64% of the respondents holding a bachelor's degree or higher and most were married/partnered (73%). Most were employed (81%) and 64% reported an annual household income of $75,000 or more. One might expect from this data that the study population would be highly competent and self-compassionate due to their education and having the support of a partner or possibly co-workers, and in addition would have the financial means to employ strategies that could potentially contribute to individual weight loss success. However, employment status and annual

household income, along with the other demographic characteristics did not appear to be associated with the outcome variable of BMI change. However, of potential interest is the geographic location noted by some participants through communication with the researcher. Of the 15 states that were known to be represented in the study sample, 6 states fall within the top 10 and another 3 fall within the top 20 when ranking rates of adult obesity from highest to lowest (TFAH, RWJF, 2013). It is possible that this may offer an explanation, in part, for less favorable weight loss outcomes among the overall study sample since they may have higher prevalence of obesity which could skew the study sample overall.

The average weight among the sample at the time of surgery was nearly 300 pounds (range of 185-432) and the average BMI (pre-BMI) was 47. The average reported current weight of study participants was 181 (range 101-367) with a post-BMI average of 28. While the average downward change in BMI was 18, according to the current reported weights, many participants would still be considered overweight or obese. Those with higher pre-BMI scores may have had difficulty reaching an ideal weight/BMI and may have experienced less favorable weight loss outcomes simply because of the amount of weight to be lost, which has been discussed in the literature (Chen et al., 2009; Coupaye, Sabate, Castel, Jouet, Clerici, Msika, & Ledoux, 2010; Snyder, Nguyen, Scarbourough, Yu & Wilson, 2009). This may be due to the fact that they have not reached their goal, or while they may have lost weight, the amount lost may have decreased over time as well (meaning they weigh less than they did at the time of surgery, but they have regained some of the weight). Timing of WLS has also been suggested as a possible influence on weight loss (Ortega, Morinigo, Flores, Moize, Rios,

Lacy, & Vidal, 2012). Another point to consider is the fact that many individuals may have lost pounds from fat but gained muscle, which weighs more, thus making it more challenging to assess true outcomes based on weight/BMI in the absence of other anthropometric measures.

With potential limitations in assessing weight loss outcome based on BMI change alone, the reduction in self-reported health issues/comorbidities noted among the sample is worth noting. From the time of surgery to present, participants reported a 51% decrease in depression, a 72% decrease in diabetes, a 70% decrease in high blood pressure, and a 49% reduction in "other" health issues, which included a 32% decrease in sleep apnea. With that being said, regardless of change in BMI, the study sample overall experienced a sizeable degree of improvement in their health and reported comorbidities since their weight loss surgery, which is commonly reported as a positive outcome of bariatric surgery (Buchwald, 2005; Gagnon & Karwacki Sheff, 2012; Picot, Jones, Colquitt, Gospodarevskaya, Loveman, Baxter, & Clegg, 2009). One participant indicated a new health issue (not reported at the time of surgery) of "alcoholic." This may indicate a propensity for developing a new maladaptive behavior or "addiction" thus replacing food with alcohol. This would be a worthwhile area to pursue further as food addiction has been thought to resemble other substance use disorders (Ifland et al., 2009). Similarly, Grimaldi and Van Etten (2010) reported that psychiatric disorders are often less prevalent at the time of pre-surgical evaluation and they found that the largest disparity was noted for substance abuse disorders.

Self-Determination Theory

According to Ryan et al. (2008), patients experience more volitional engagement in their treatment and maintain outcomes better over time when patients have their psychological needs for autonomy, competence and relatedness supported. This proposition constitutes the foundational and conceptual basis of Self-Determination Theory (SDT). In this study, which used SDT as the guiding framework to answer the primary research hypotheses, these psychological needs were measured by proxy using three reliable and valid instruments which included the Weight Locus of Control (WLOC) Scale (Saltzer, 1982), the Self-Rated Abilities for Health Practices (SRAHP) Scale (Becker et al., 2003) and the Self-Compassion Scale-Short Form (SCS-SF) (Raes et al., 2011). These measures were assessed for internal consistency and fit based on the conceptual model of SDT and were found to be appropriate. In this study, autonomy was expressed as an internally-oriented weight locus of control, competence was quantified by one's increasing self-rated abilities for health practices, and relatedness was illustrated by the presence of a higher degree of self-compassion. As these three psychological needs were met, the resulting self-determined behavior change of greater downward change in BMI was observed, but only for two subpopulations of participants: those who underwent Lap Band surgery, and those who reported current participation in a structured/formal weight loss program. A closer look at the individual measures provides some understanding as to why study findings may have been limited to these two subgroups of the study sample.

Depression and Anxiety: The PHQ-4

Overall, the study sample had a very low prevalence of depression and anxiety. This was determined based the Patient Health Questionnaire (PHQ-4), a screening tool used to assess presence of these symptoms over the last 2 weeks. When looking at the number of years post-op, as BMI change increased, PHQ-4 scores decreased, particularly among those who were 10 years or more post-op indicating even less depression/anxiety among this subgroup. While it was not statistically significant, among the younger participants in the study sample (40 years and under), PHQ-4 scores were positively correlated with BMI change; as depression/anxiety increased, so did BMI change. This could indicate that their depression/anxiety was, to a certain extent, a motivating factor to lose weight. This association was not seen in any of the other age groups. Participation in a structured/formal weight loss program or support group illustrated a negative correlation between BMI change and PHQ-4 indicating that participation in such programs showed some association between less depression/anxiety and BMI change, but not significantly. This was surprising in that participation in a support group would have been expected to show a greater BMI change as has been previously reported (Livhits et al., 2010) with less depression/anxiety. When looking at subgroups of the study sample based on the type of weight loss surgery undergone, two groups (gastric bypass and duodenal switch) had positive correlations between PHQ-4 and BMI change, with a statistically significant correlation among the gastric bypass group. It is thought that this may be related to the fact that GBP and DS are irreversible procedures. Weight loss did occur within these groups, but such loss may have also been accompanied by negative side effects or other unanticipated outcomes specific to these procedures. This notion,

along with the reality of not being able to have further surgical options to overcome issues may contribute to a sense of regret and could potentially be associated with greater levels of depression/anxiety for these two subgroups. As seen in the 40 years and under group, presence of greater levels of depression/anxiety was associated with increased BMI change. Conversely, according to Junior, do Amaral, and Nonino-Borges (2011), depression was found to be one of two of the most important factors for the characterization of insufficient weight loss. Among the patients who had Lap-Band surgery, the association was opposite: as BMI change increased, depression/anxiety decreased to a significant extent. While this negative association would have been anticipated for all groups, the contradictory findings in this study make it difficult to determine if the level of depression/anxiety can be viewed as a motivating/predictive factor for BMI change or a consequence of BMI change. Additionally, the researcher notes that the PHQ-4 used in this study measures two different factors, depression and anxiety. Assessing these two factors as separate and distinct from one another is recommended for future study and may, as a result, yield more specific information to offer greater understanding.

Weight Locus of Control

Most discussions regarding locus of control have emphasized that an internally-oriented locus of control has been associated with more positive health behaviors and similar associations have been noted when studying weight-related attitudes and weight reduction (Balch & Ross, 1975; Holt, Clark, & Kreuter, 2001; Adolfsson, Andersson, Elofsson, Rossner, & Unden, 2005). Such perspectives are consistent with SDT and formed the first of three hypotheses in the current study: participants with a more

internally-oriented weight locus of control will exhibit better weight loss outcomes (greater downward change in BMI) following bariatric surgery. However, the measure of an internally-oriented weight locus of control was positively correlated with a downward BMI change (while at the same time BMI change was positively correlated with SRAHP and SC as in the conceptual model) only in participants who had Lap-Band surgery and among those who were currently participating in a structured/formal weight loss program. For those patients who underwent Lap-Band surgery, the difference between this subgroup and the others who had gastric bypass, gastric sleeve, or duodenal switch may be related to the fact that adjustable gastric banding (or the Lap-Band) is reversible, thereby allowing this group of participants to remain in control. Patients who have had the Lap-Band also have the ability to have the band adjusted to increase or decrease the restriction, and they can ultimately make their own decisions whether they keep or remove the band over time. This notion is also consistent with SDT in that an autonomous causality orientation allows an individual to experience a sense of choice in their health behaviors. Those who have had a WLS procedure that is not considered reversible and have a more externally-oriented weight locus of control may view their WLS as something that will accomplish the "work" of weight loss/weight loss maintenance *for* them and attribute their results (particularly if outcomes are less positive) to the procedure itself rather than the notion of using the procedure as a tool to be used in order to assist them in their weight loss efforts.

Self-Rated Abilities for Health Practices

Self-efficacy has been noted in the literature to be a strong predictor of various health behaviors including weight loss; however, the Self-Rated Abilities for Health

Practices (SRAHP) Scale differs from other health self-efficacy measures. Other self-efficacy measures were mostly designed to address specific health-related interventions such as smoking cessation or weight control programs and often consist of only a few items, whereas the SRAHP Scale provides a more general screening assessment that covers a variety of good health practices based on a more holistic definition of health promotion and health-promoting lifestyle (Becker et al., 1993). The SRAHP Scale measures self-perceptions about one's ability to engage in health practices with regard to nutrition, exercise, psychological well-being and health responsibility while identifying the general health promoting areas in which a person may need additional resources, support, or training (Becker et al., 1993). This exemplifies the psychological need for competence in SDT and is facilitated by autonomy as described above in terms of internally-oriented weight locus of control. The second research hypothesis was that participants with higher self-rated abilities for health practices would exhibit better weight loss outcomes (greater downward change in BMI) following bariatric surgery: however, this was not found in the current study with the exception of three subgroups of the sample population. While it was not statistically significant, participants who were 10 years or more post-op demonstrated a moderate association between SRAHP and BMI change, perhaps simply because they have more practical experience and are more knowledgeable about what they need to do following their surgery. This was also seen to a moderate extent in the subgroups of Lap-Band WLS and study participants who indicated they currently participate in a structured/formal weight loss program (WLP). A possible explanation may be attributed to the possession of skills and information which has been associated with long-term weight loss following GBP surgery (Lanyon,

Maxwell, & Kraft, 2009). The follow-up adjustments that Lap-Band patients undergo are ultimately gauged by the patient and provide ongoing interaction with their surgeon, and among those that participate in a WLP, findings may suggest that competence can be facilitated by the structure and guidelines contained within such a program while at the same time maintaining their sense of having a choice of options from which to choose. Examples of such WLPs provided by study participants included guidelines from a nutritionist, a medical weight management program, and most frequently cited, "Weight Watchers." In either case, findings may support the continued notion that close follow-up is necessary for long-term compliance and avoidance of weight regain (Wolf, Kortner, & Kuhlmann, 2001).

Self-Compassion

The third psychological need to be fulfilled in SDT is that of relatedness. As the interpersonal aspect of SDT, this encompasses the nature of a patient-provider relationship that is open, trusting and one that allows for self-reflection and awareness. Through such an interaction, patients can learn to accept their circumstances and see them as part of the overall human condition rather than over-identifying with them and being overly critical of oneself. In other words, patients who experience such interactions as a result become more self-compassionate. This is of particular importance in the context of weight loss which is often marked with both success and failure over time. Rather than giving up hope and reverting back to previous unhealthy behaviors, one learns to "get back on track" and keep moving forward in a positive direction when small failures or relapses occur. Individual choice is preserved, and having the knowledge that one can keep going and still reach a positive outcome when setbacks

occur promotes competence in both self-knowing/awareness and resulting health behavior. While study participants were mostly autonomous (internally-oriented WLOC) and competent (confident in their health practice abilities), as a group, they did not seem to possess quite the same level of self-compassion. The researcher had expected all three measures to together form the basis of self-directed behavior change as expressed by downward change in BMI, but this was not supported by the overall data. Interestingly, when looking at the overall sample, as well as the majority of the subgroups, increased self-compassion was associated (often with statistical significance) with less depression/anxiety, internally-oriented WLOC, and greater self-rated abilities for health practices—just not BMI change. It may be that self-reflection, awareness, and acceptance are good and important abilities for an individual to possess, but they alone may not be enough to translate into behavior change. As an example, individuals often acknowledge and know the "right" behavior choice but often choose not to follow it. As practitioners faced with this dilemma, this can become both a struggle and frustration for both the patient as well as the provider.

However, there were three groups where all measures did come together and were associated with BMI change; those who were: 10 years or more post-op; currently participating in a structured/formal weight loss program; Lap Band patients. Among those study participants who were 10 years or more post-op, self-compassion was significantly and positively associated with BMI change. It is proposed that as an individual experiences the highs and potential lows of weight loss following WLS, eventually one's perception widens so that any periods of success/failure are modulated over time. Additionally, having the choice to make adjustments or to reverse a WLS

procedure as in the Lap-Band can be a function of such self-awareness and can lead to acceptance of what is right or not for that individual. Among the group of Lap-Band participants who may comprise the majority of those still receiving regular follow-up care, the resulting discussion that follows with a trusted healthcare provider promotes relatedness as the decisions are mutually agreed upon as to how an individual will proceed and facilitates a positive outcome as described in the study's conceptual model. Based on SDT, it is the illustration and coming together of autonomy (internally-oriented weight locus of control), competence (increased SRAHP), and relatedness (self-compassion) that facilitates health behavior change (downward change in BMI). In the group that was participating in a WLP such as Weight Watchers, it is also evident, as self-compassion was significantly associated with BMI change. It is proposed that this association is fostered through the interactions that occur in structured programs between the provider/leader/facilitator and the participant. Autonomy and choice (as expressed by options for what one *can* versus *cannot* do), information and ability to make sound decisions with confidence/competence, and support/relatedness with others may be the key to forming the complete picture of successful weight loss outcomes for bariatric patients. The researcher suggests that self-compassion may be more of a dynamic, rather than static, measure which would be an important key for developing ongoing interventions for a patient. To this point, one might consider having self-compassion measured at each encounter as a point of "check-in" to see where the patient is physically as well as emotionally, and using that as a guide for instruction and recommendations. It may be necessary to adjust recommendations during each encounter, realizing that fostering self-compassion may not always be a linear and progressive phenomenon. As

seen with the three groups where self-compassion and the other measures were noted to fit the hypothesized research model, self-compassion was the independent variable most significantly related to the dependent variable of BMI change. A key question then becomes how to facilitate and harness the power of self-compassion in order to translate this into desired behavior change. This is an area that should be studied further, and one that could play a critical role in developing future nursing interventions.

Study Limitations

While this study design allowed the researcher to explore if variables were related (a strength), causality cannot be inferred (a weakness). Bivariate correlations among the study variables provided preliminary support for the hypothesized relationships in some cases, but the correlations were not statistically significant due to the limited sample size resulting from the sorting of data and creation of subgroups. Results from this study are descriptive in nature as variables could not be controlled and there was no intervention. External validity may be threatened as generalizability is limited and may or may not be useful in populations other than those studied. Men, diverse racial groups and individuals with lower annual household incomes may be considered minority populations and were under-represented in this study and should be the focus of additional research in this area. Selection bias is a potential threat due to study subjects' being "self-selected" for participation, and as reported, a large number consented to participate (online) but did not complete the study survey for reasons that are not known by the researcher. Another potential threat is due to the use of data collection tools that are all self-report measures whereby the participants may not be entirely honest, complete, or accurate in their responses.

Sampling

This study used a convenience sampling method and relied upon voluntary participation among adults attending a local bariatric support group and members of online web forums/discussion groups. Using a convenience sampling technique indicates that the study findings cannot be generalized to all adults post-bariatric surgery. However, participants in the study sample represented wide geographical variability from across the United States which strengthens external validity. Additionally, as the data were cross-sectional versus longitudinal in nature, comparisons between pre- and post-measures except for BMI were not possible to assess.

Instruments

While surveys were completed via two methods (online and paper copy) Ritter (2004) found in a study of 16 survey instruments that the instruments administered via the internet appear to be reliable, and to be answered similarly to the way they are answered when administered via traditional mailed, paper questionnaires. While the survey took approximately 10-15 minutes to complete, the survey consisted of 70 items which could have influenced the time taken to carefully consider one's answers and may have contributed to some of the missing data. It is also interesting to note that one of the study participants commented (when emailing the researcher to be included in the random drawing) that the SRAHP questions were "difficult to answer because what is considered healthy eating for most people may not be the case for some bariatric patients who are unable to eat certain fruits/vegetables, grains or proteins." Another comment received via email from one of the study participants who had just completed the survey

stated “that was actually kind of fun, and it’s always interesting when something makes you take a look at yourself.” While the instruments that were selected for use in this study were well correlated with each other and appeared to fit the theoretical model of SDT, the researcher acknowledges the possibility that they may have not been the best or most accurate proxy measures for testing the conceptual research model. Additionally, there was little variability among the independent variables in the study as seen by relatively small standard deviations on scale scores, and this may have impacted the degree to which the conceptual research model was supported.

Data Analyses

As a result of the weak correlations overall and the limited size of the resulting subgroups that showed moderate correlations, the study was underpowered and further statistical analysis such as causal modeling by path analysis or structural equation modeling was not possible.

Although this study includes limitations, the results and conclusions can still provide useful information for supporting patients in their weight loss efforts following bariatric surgery.

Nursing Implications

This study contributes to the knowledge base of post-bariatric surgical outcomes, but it also further highlights the challenge and importance of continued exploration to gain greater and deeper understanding of personal psychological factors that contribute to weight loss success following weight loss surgery. While the study results indicate correlations among some of the study variables without establishing causality, current

study findings can prepare nurses to assist bariatric patients in the identification and exploration of potential factors that relate and enhance their ability to sustain weight loss post-operatively. Several practical implications emerged based on this study.

For the management of obesity, researchers agree that patients need regular follow-up care to provide motivation and encouragement for making lifestyle changes (Ajayi, Fatiregun, Ladipo, & Ogunbode, 2011). But how and with whom this follow-up is conducted may become the critical factor for patients' success (or failure). Healthcare providers often tell patients what they *cannot* do rather than providing options from which to choose based on what they *can* do. When the rules are violated or the guidelines are not followed to the letter as presented, patients are often hastily labeled as "non-compliant." The importance of supporting autonomy through individual choice cannot be underestimated and needs to be promoted whenever possible. Additionally, patients need to become competent and confident in their abilities while maintaining a sense of self-compassion which can be well-facilitated by a strong and positive relationship with a trusted and knowledgeable health care provider. Nurses are particularly suited for such interactions with patients and have a unique ability to help patients reflect and discover inner insights, strengths and feelings that can be harnessed to set realistic, individualized goals and promote healthy behaviors. When providing holistic, patient-centered care, nurses can facilitate self-awareness by using (and teaching) techniques with patients such as guided imagery, journaling, mindfulness, and motivational interviewing (Williams et al., 2002a; Williams et al., 2002b) whereby providers acknowledge patients' thoughts, beliefs and perceptions while encouraging them to become more responsible for their health-related behavior.

Studies such as this will empower nurses and other members of the healthcare team to be better informed and engaged with patients so that more realistic and effective interventions for post-bariatric surgical patients can be designed. These should support individual weight locus of control, bolster one's ability to select and perform positive health practices, and facilitate self-compassion. Greater understanding and enhanced knowledge will not only serve as the genesis for new, targeted interventions designed to help individuals achieve optimal post-surgical weight loss outcomes, but will also in turn, guide policy and practice standards thus having the ability to improve both individual and population health status. Additionally, a closer look at pre-surgical screening and interview techniques may be warranted. The researcher proposes that screening should include an assessment of weight locus of control as this may provide simple but useful information that can guide patients in their decisions to have WLS as well as the particular type of WLS that would be best suited for them. As an example, individuals who have an internally-oriented weight locus of control may be advised against selecting a non-reversible procedure as they have fewer options over time if they wish to reconsider or alter their weight loss strategies.

This dissertation was only a first step in an attempt to better understand the factors contributing to successful weight loss outcomes among adults following bariatric surgery. This study offers preliminary support and direction for utilizing SDT to further define indicators that support the realization of self-determined behavior change in the context of weight loss surgery. Studies that apply SDT when developing instruments and/or targeted interventions can help assess the utility and application of SDT in a nursing

context while forming and evaluating evidence-based clinical practices for bariatric patients.

Recommendations for Future Research

The landscape for research regarding weight loss outcomes following bariatric surgery remains vast and open for further study. Variables such as weight locus of control need to be explored further to develop a greater understanding of its role pre-operatively as well as post-operatively and whether or not one's locus of control changes. It would be important to know whether or not weight locus of control measured pre-operatively could indicate one's readiness to change when considering bariatric surgery and whether or not it would have predictive ability for post-operative success. Or, does WLOC orientation change based on weight loss outcome? Among the small subgroups of bariatric patients where correlations were found to be supportive of the research model in this study, the next phase of research should include replication with larger sample sizes to better determine the appropriateness of the model for use in developing targeted interventions and clinical practices. Larger sample sizes would allow for more sophisticated statistical analyses such as path analysis and structural equation modeling for testing the conceptual model. While this study sample was comprised of mostly non-Hispanic, middle-aged White women (consistent with other study populations found in the literature), further exploration in under-represented or minority populations is warranted. While they were not correlated with weight loss outcome in this study, the influence of education level, marital status, employment status and annual household income may also be studied further to see if there is a relationship to weight loss outcome in larger samples. For those who indicated they were no longer under the care of their

surgeon, further exploration with individuals as to the reasons why is also recommended as many commented they were unhappy with their post-operative care and/or surgeon. Qualitative study would also be beneficial for identifying other considerations that may positively or negative influence weight loss outcomes among adults post-bariatric surgery. Such information could provide useful information for the development of screening and/or other tools that would be more appropriate and sensitive to bariatric patients and their experiences thus improving their accuracy as measures of health perceptions and behavior. Another area of study should also focus on the role of the nurse in caring for bariatric patients and determination whether bariatric certification for nurses has an influence on patient perceptions and/or weight loss outcomes following weight loss surgery.

Summary

Sustained behavior change and optimal weight loss outcomes following bariatric surgery are significant concerns. Greater understanding of psychological and behavioral factors that positively influence such outcomes can be gained through the conduct of theoretically and methodologically sound research. The existing knowledge of SDT as a Model for Health Behavior Change demonstrates the validity, viability and significance of its application in the context of research designed to study predictive factors that may foster optimal weight loss outcomes following bariatric surgery. Although extensive literature is available for non-surgical weight loss approaches/programs, it is hoped that this study will begin to set a course for nurses and other healthcare providers to conduct additional research to assess the application of SDT and related psychological/behavioral factors among adults post-bariatric surgery.

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Appendix A

Letter of Approval from Molloy College IRB

Molloy College

1000 Hempstead Avenue
Rockville Centre, NY 11571
www.molloy.edu

Tel. 516.323.3653
Tel. 516.323.3801

Date: January 13, 2014
To: Gina Kearney
From: Kathleen Maurer Smith, PhD
Co-Chair, Molloy College Institutional Review Board
Veronica D. Feeg, PhD, RN, FAAN
Co-Chair, Molloy College Institutional Review Board

SUBJECT: **MOLLOY IRB REVIEW AND DETERMINATION OF EXEMPT STATUS**
Study Title: The Relationship Between Weight Locus of Control, Self-Rated Abilities for Health Practices, Self-Compassion and Weight Loss Among Adults 2-10 Years Post-Bariatric Surgery
Approved: **January 13, 2014**

Dear Ms. Kearney:

The Institutional Review Board (IRB) of Molloy College has reviewed the above-mentioned research proposal and determined that this proposal is approved by the committee. It is EXEMPT from the requirements of Department of Health and Human Services (DHHS) regulations for the protection of human subjects as defined in 45CFR46.101(b).

You may proceed with your research. Please submit a report to the committee at the conclusion of your project.

Changes to the Research: It is the responsibility of the Principal Investigator to inform the Molloy College IRB of any changes to this research. A change in the research may disqualify the project from exempt status.

Sincerely,

Kathleen Maurer Smith

Kathleen Maurer Smith, PhD

Veronica D. Feeg

Veronica D. Feeg, PhD, RN, FAAN

Appendix B

Recruitment Flyer

Molloy College

Volunteers Needed for Research Study

Molloy College, Doctoral Nursing Program

If you have any questions or would like to participate please contact:
Gina Kearney, RN at
Phone: 516-660-0633 or
Email:
gkearney@lions.molloy.edu

Brief Explanation of Study: This study is being conducted to better understand selected personal characteristics and beliefs about health practices and weight loss following weight loss (bariatric) surgery. It is believed that potential study findings will assist healthcare providers in developing targeted interventions and best practices to facilitate optimal weight loss outcomes in adults post-bariatric surgery.

Who is Eligible? Adults age 18 years and older who have had only one weight loss surgery and have never been hospitalized for a psychiatric disorder.

What will you be asked to do? You will be asked to complete an anonymous online or paper survey which should take about 15 minutes of your time. You will not be paid for your participation but you will have the option to be included in a random drawing for one of ten (10) $20 Amazon.com gift cards. Only the researcher will have access to the information collected and survey responses will not be used in any way to identify individuals who participate in the study. You may contact the researcher if you would like to receive a summary of the study results.

Gina Kearney, RN
Phone: 516-660-0633 or Email:
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Appendix C

Survey Instrument

Survey of Adults 2-10 Years Post-Bariatric Surgery

Study Information for Participants

This study is being conducted to better understand selected personal characteristics and beliefs about health practices and weight loss following weight loss surgery. It is believed that potential study findings will assist healthcare providers in developing targeted interventions and best practices to facilitate optimal weight loss outcomes in adults post-bariatric surgery.

You are eligible to participate if you:
1) are over the age of 18 years;
2) have had only one weight loss surgery; and
3) have never been hospitalized for a psychiatric disorder.

The researcher asks you to complete this survey online or if you are completing a paper copy to return/mail it directly to the researcher in the self-addressed stamped envelope provided. Your participation is voluntary and anonymous. By completing the survey, you are giving consent to participate and permission for the investigator to use your information for research purposes. If you choose not to participate, do not complete the questionnaire. Your decision will not affect your medical care in any way.

There are no known risks or benefits associated with participation in this study. There is no cost to you except for approximately 15 minutes of your time. You will not be paid for your participation but you will have the option to be included in a random drawing for one of ten (10) $20 Amazon.com gift cards.

Only the principal investigator of this study will have access to the information collected. Survey responses will not be used in any way to identify individuals who participate in this study.

You can obtain further information from the principal investigator. The Principal Investigator for this study is Gina Kearney, MSN, RN-BC, AHN-BC who is a PhD candidate in nursing at Molloy College in Rockville Centre, New York. If you have questions, comments and/or would like a summary of the study findings once the research is completed you may contact her via telephone: 516.660.0633 or email: gkearney@lions.molloy.edu.

***1. I have read the information provided to me about this study and understand my role as a participant. I attest that I am over 18 years of age, have had only one weight loss surgery and have never been hospitalized for a psychiatric disorder.**

◯ Yes

Survey of Adults 2-10 Years Post-Bariatric Surgery

The following items are intended to assess feelings of depression and/or anxiety. Please select one response for each listed problem to indicate how often it has bothered you recently.

2. Over the last 2 weeks, I have felt nervous, anxious or on edge...

Not at all ○ Several days ○ More than half the days ○ Nearly every day ○

3. Over the last 2 weeks, I have not been able to stop or control worrying...

Not at all ○ Several days ○ More than half the days ○ Nearly every day ○

4. Over the last 2 weeks, I have had little interest or pleasure in doing things...

Not at all ○ Several days ○ More than half the days ○ Nearly every day ○

5. Over the last 2 weeks, I have felt down, depressed, or hopeless...

Not at all ○ Several days ○ More than half the days ○ Nearly every day ○

The following items are intended to assess how much control you feel you have over your weight. Please indicate for each item the extent to which you agree or disagree with the statement.

6. Whether I gain, lose, or maintain my weight is entirely up to me.

Strongly Disagree ○ ○ ○ ○ ○ ○ Strongly Agree

7. Being the right weight is largely a matter of good fortune.

Strongly Disagree ○ ○ ○ ○ ○ ○ Strongly Agree

8. No matter what I intend to do, if I gain or lose weight, or stay the same in the near future, it is just going to happen.

Strongly Disagree ○ ○ ○ ○ ○ ○ Strongly Agree

9. If I eat properly, and get enough exercise and rest, I can control my weight in the way I desire.

Strongly Disagree ○ ○ ○ ○ ○ ○ Strongly Agree

Survey of Adults 2-10 Years Post-Bariatric Surgery

10. Maintaining my weight is:

Totally OUTSIDE my control ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Totally WITHIN my control

The following items are intended to assess your ability to perform various health practices within the context of your lifestyle. There are no right or wrong answers. Read each statement and select the rating that best reflects your ability to do each health practice, not how often you actually do it. On items 11, 18, 25, and 32, please list what you are able to do.

11. I am able to find healthy foods that are within my budget.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

Example (please specify)

12. I am able to eat a balanced diet.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

13. I am able to figure out how much I should weigh to be healthy.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

14. I am able to brush my teeth regularly.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

15. I am able to tell which foods are higher in fiber content.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

16. I am able to figure out from labels what foods are good for me.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

17. I am able to drink as much water as I need to drink every day.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

18. I am able to figure out things I can do to help me relax.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

Example (please specify)

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19. I am able to keep myself from feeling lonely.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

20. I am able to do things that make me feel good about myself.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

21. I am able to avoid being bored.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

22. I am able to talk to friends and family about the things that are bothering me.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

23. I am able to figure out how I respond to stress.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

24. I am able to change things in my life to reduce my stress.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

25. I am able to do exercises that are good for me.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

Example (please specify)

26. I am able to fit exercise into my regular routine.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

27. I am able to find ways to exercise that I enjoy.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

28. I am able to find accessible places for me to exercise in the community.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

29. I am able to know when to quit exercising.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

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30. I am able to do stretching exercises.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

31. I am able to keep from getting hurt when I exercise.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

32. I am able to figure out where to get information on how to take care of my health.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

Example (please specify)

33. I am able to watch the negative changes in my body's condition (example: pressure sores, breathing problems).

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

34. I am able to recognize what symptoms should be reported to a doctor or nurse.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

35. I am able to use medication correctly.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

36. I am able to find a doctor or nurse who gives me good advice about how to stay healthy.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

37. I am able to know my rights and stand up for myself effectively.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

38. I am able to get help from others when I need it.

Not at all ○ A little ○ Somewhat ○ Mostly ○ Completely ○

The following items are intended to assess how you typically act towards yourself in difficult times. Please read each statement carefully before answering. For each item, indicate how often you behave in the stated manner by selecting the response that best reflects your actions.

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39. When I fail at something important to me I become consumed by feelings of inadequacy.

Almost Never ○ ○ ○ ○ ○ Almost Always

40. I try to be understanding and patient towards those aspects of my personality I don't like.

Almost Never ○ ○ ○ ○ ○ Almost Always

41. When something painful happens I try to take a balanced view of the situation.

Almost Never ○ ○ ○ ○ ○ Almost Always

42. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

Almost Never ○ ○ ○ ○ ○ Almost Always

43. I like to see my failings as part of the human condition.

Almost Never ○ ○ ○ ○ ○ Almost Always

44. When I'm going through a very hard time, I give myself the caring and tenderness I need.

Almost Never ○ ○ ○ ○ ○ Almost Always

45. When something upsets me I try to keep my emotions in balance.

Almost Never ○ ○ ○ ○ ○ Almost Always

46. When I fail at something that's important to me, I tend to feel alone in my failure.

Almost Never ○ ○ ○ ○ ○ Almost Always

47. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

Almost Never ○ ○ ○ ○ ○ Almost Always

48. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

Almost Never ○ ○ ○ ○ ○ Almost Always

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49. I'm disapproving and judgmental about my own flaws and inadequacies.

Almost Never ○ ○ ○ ○ ○ Almost Always

50. I'm intolerant and impatient towards those aspects of my personality I don't like.

Almost Never ○ ○ ○ ○ ○ Almost Always

The following questions are intended to assist the researcher with additional background about you and your health history. Please read and answer each question by selecting the appropriate response or typing/writing your response in the area provided.

51. How old are you?

Please enter your age in years _____

52. In what year were you born?

Please enter your four-digit birth year (example 1961) _____

53. What is your gender?

○ Male

○ Female

54. What is your race?

○ American Indian or Alaska Native

○ Asian

○ Black or African American

○ Native Hawaiian or Other Pacific Islander

○ White or Caucasian

55. What is your ethnicity?

○ Hispanic/Latino

○ Non-Hispanic/Latino

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56. What is the highest degree or level of school you have completed? (If currently enrolled, mark the previous grade or highest degree received)

- ◯ Did not graduate from high school
- ◯ High school diploma or equivalent (for example: GED)
- ◯ Some college credit but no degree
- ◯ Associate degree (for example: AA, AS)
- ◯ Bachelor's degree (for example: BA, AB, BS)
- ◯ Master's degree (for example: MA, MS, MEng, MSW, MBA)
- ◯ Doctoral degree (for example: PhD, EdD, PsyD, JD, MD)

57. What is your current marital status?

- ◯ Married/partnered
- ◯ Widowed
- ◯ Divorced
- ◯ Separated
- ◯ Single (never married/partnered)

58. What is your employment status?

- ◯ Employed/self-employed
- ◯ Out of work and looking for work
- ◯ Out of work and not currently looking for work
- ◯ Retired
- ◯ Unable to work

59. What is your annual household income?

- ◯ Less than $40,000
- ◯ Between $40,000-$74,999
- ◯ Between $75,000-109,999
- ◯ Between $110,000-$144,999
- ◯ $145,000 or more

60. How much you you currently weigh?

Please enter your current weight in pounds ☐

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61. How tall are you?

Feet

Inches

62. How much did you weigh at the time of your bariatric/weight loss surgery?

Please enter your previous weight in pounds

63. Did you have any of the following health issues at the time of your bariatric/weight loss surgery? (Please check all that apply)

- ☐ Depression
- ☐ Diabetes ("sugar")
- ☐ High blood pressure
- ☐ Other (please specify)

64. Do you have any of the following health issues now? (Please check all that apply)

- ☐ Depression
- ☐ Diabetes ("sugar")
- ☐ High blood pressure
- ☐ Other (please specify)

65. What type of bariatric/weight loss surgery did you have?

- ○ Gastric bypass
- ○ Gastric sleeve
- ○ Lap band
- ○ Other (please specify)

66. When did you have your bariatric/weight loss surgery?

Month (enter as a number for example December=12)

Year

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67. Are you still under the care of your bariatric surgeon?

- ◯ No
- ◯ Yes

68. If you answered "No" to question #67 above, please indicate the reason:

- ◯ No insurance/health coverage/unable to afford
- ◯ No longer needed/indicated
- ◯ Other (please specify)

69. Are you currently participating in a structured/formal weight loss program?

- ◯ No
- ◯ Yes (please specify)

70. Do you currently attend a support group for bariatric patients?

- ◯ No
- ◯ Yes

You're done! Thank you for taking the time to complete this survey.

If you would like to be entered into a random drawing for one of ten (10) $20 Amazon.com gift cards as a thank you for your participation and/or if you would like to receive a summary of the results once the study is completed, please contact the researcher by telephone: 516-660-0633 or email: gkearney@lions.molloy.edu.

Appendix D

Private Bariatric Surgeon's Approval and Agreement to Participate

Private Bariatric Surgeon's Approval and Agreement to Participate

Dear Ms. Kearney,

I have read the abstract and survey instruments and am pleased to support your study entitled: THE RELATIONSHIP BETWEEN WEIGHT LOCUS OF CONTROL, SELF-RATED ABILITIES FOR HEALTH PRACTICES, SELF-COMPASSION AND WEIGHT LOSS OUTCOME AMONG ADULTS 2-10 YEARS POST-BARIATRIC SURGERY. Your request to use my private clinical office as a research or recruitment site is granted.

The study will include offering eligible patients from my private practice the opportunity to participate in your study by completing a written or online survey containing several instruments. The participants will be patients who are over the age of 18 who have had only one bariatric surgical procedure and have no history of hospitalization for a major psychiatric/depressive disorder or mental illness. They may be patients who arrive at my office or those who attend a support group affiliated with my practice. Appropriate staff in my private office will be able to give a recruitment flyer to patients arriving for appointments and they will inform you if any of my patients agree to receive more information about the study and wish to participate. We will also post a flyer/poster in an area visible to my patients.

Upon completion of the study, I would like to receive a summary of the results:
✓ Yes ____ No

Signed,

[signature] Rajeev Vohra 12.6.13
Physician/Surgeon | Print Name | Date

New York Bariatrics + Laparoscopy P.C.
Practice/Group Name

1420 Broadway Hewlett, NY 11557
Address | City | State | Zip

516-374-8631 516-374-8675
Telephone | FAX

drvohral @ gmail.com
Email

Appendix E

Permission to Use the Self-Rated Abilities for Health Practices (SRAHP) Scale

BMDS Behavioral **Measurement** Database Services

Health and Psychosocial Instruments (HaPI)

Date: September 10, 2013

To: Gina Kearney

From: Evelyn Perloff, PhD

Enclosed is the:

Self-Rated Abilities for Health Practices Scale
Heather A. Becker and Alexas K. Stuifbergen

As I have indicated authors like to receive feedback on your study. All that is asked is that you provide a brief summary of your findings upon completion of your study/project. In addition, we encourage you to send a full report which we will consider for inclusion in Health and Psychosocial Instruments (HaPI) and which you may list on your vita/resume.

You have the author's permission to use the above instrument.

Please note that the instruments are for a single study only. It is, of course, necessary to provide the appropriate title and author credit in reproduced material and in your report.

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