THE PREDICTIVE POWER OF NON-PATHOLOGICAL PSYCHOLOGICAL VARIABLES IN WEIGHT LOSS SURGERY

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I HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER MY SUPERVISION BY TIFFANY MILLIGAN ENTITLED THE PREDICTIVE POWER OF NON-PATHOLOGICAL PSYCHOLOGICAL VARIABLES IN WEIGHT LOSS SURGERY BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PSYCHOLOGY.

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Abstract

According to the World Health Organization and National Institutes of Health, obesity is a global health problem. Worldwide, obesity is the fifth-leading cause of death. Weight loss surgeries such as gastric banding, sleeve gastrectomy, and gastric bypass surgery have become increasingly popular methods to manage intractable obesity in the United States. Such surgeries have inherent risks, both medical and psychosocial, and as a result, candidates for weight loss surgery routinely undergo pre-surgical evaluations to determine their suitability for weight loss procedures. The current study was done in partnership with Kettering Bariatrics in Kettering, Ohio, and is an analysis of the ability of their pre-surgical psychological evaluation to predict post-surgical success. In this study, success was defined as percentage of weight lost. Regression analyses examined the predictive ability of six psychological constructs and four demographic variables on weight loss at three post-surgical time points. Different predictor variables were demonstrated to predict weight loss at different post-surgical intervals. The results of this study were interpreted using Prochaska & DiClemente’s Stages of Change as a theoretical framework. The clinical implications for mental health providers working with the weight loss surgery population are discussed, and suggestions for future research are made.
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Chapter I

Obesity is recognized as a health issue by the World Health Organization (WHO) and the National Institutes of Health (NIH; WHO, 2013 and NIH, 2013). Obesity can be defined as the abnormal or excessive accumulation of fat which has the potential to impair health (WHO, 2013). The most common health problems associated with obesity are cardiovascular diseases, diabetes, musculoskeletal disorders (e.g., osteoarthritis) and some cancers. The Centers for Disease Control and Prevention (CDC) report that more than one-third of American adults are obese (CDC, 2013). In addition to health risks, significant medical costs are associated with obesity. Annual medical costs for obese individuals were (on average) $1429 higher in 2008 than for their non-obese counterparts. On a national level, the medical cost in the U.S. was nearly $150 billion that same year (CDC, 2013).

The issue of obesity is not limited to the United States. Globally, it is the fifth-leading cause of death, with at least 2.8 million mortalities each year as a direct result of being overweight or obese (WHO, 2013). In low-income and middle-income countries, where under-nutrition and infectious disease continue to be primary health concerns, obesity is still a significant health issue. Children in these countries are more likely to be exposed to inadequate prenatal care and nutrition, while simultaneously having access to foods that are low in nutrients but high in fat and sugar. These foods
tend to be lower in price, but they are also lower in quality. Combined with a lack of physical activity, consumption of these foods leads to the excessive accumulation of body fat (WHO, 2013).

Both the WHO and the NIH report that obesity is largely preventable, and both agencies make recommendations on the individual and societal levels to facilitate prevention. On the individual level, the WHO (2013) recommends specific dietary changes and increased physical activity. On the societal level, a two-pronged approach is recommended. Firstly, communities should make outdoor recreation a priority and promote the eating of healthy foods with increased education, community gardens, etc. City councils can also incentivize restaurants and other establishments that have a focus on healthy eating to conduct business in their jurisdictions. Secondly, the food industry can impact the rates of obesity by making responsible ingredient choices, using targeted marketing strategies, and pricing healthier food options at a rate comparable to that of less healthy options (NIH, 2013).

While prevention is important to treating obesity, it is not a viable option for those who are already obese. For these individuals, losing the weight can prove to be very challenging. There is a significant societal stigma against those who are overweight. Persecuting the obese has been called the last acceptable social prejudice (Neporent, 2013). For instance, empirical evidence suggests that an overweight woman is more likely to be found guilty in a criminal proceeding than a slimmer defendant. Similarly, heavier executives are considered to be less effective and are judged more harshly by their peers than their thinner counterparts. This judgment extends not only to the person’s professional life, but also is assumed to be true in his or her personal life.
Socially isolated individuals are less likely to stick to a weight loss plan or make lasting lifestyle changes (Neporent, 2013), compounding the overweight individual’s struggle to complete an already difficult task.

Another obstacle that often faces obese individuals seeking to lose weight is their current environments. It is often observed that obesity tends to run in families, but researchers have concluded that genetics only accounts for 1% to 5% of the obesity issue (Williams, 2013). Thus, it would seem that the obesity trend within families has more to do with shared bad habits than with shared genes. In support of this finding is another study which showed that obese pet owners tended to have obese pets, which certainly cannot be explained genetically (Bounds, 2011, as cited in Williams, 2013).

Social stigma and unsupportive environments are significant stressors for the obese person that would like to make a lifestyle change. Yet another common stressor for such an individual is the presence of a mental health issue. One study found that as many as 66% of persons presenting for weight loss surgery were diagnosable with a DSM-IV Axis I disorder (Kalarchian, et al, 2007). The most common of these were mood disorders, with 45% of surgery candidates reporting symptoms consistent with Major Depressive Disorder, Bipolar Disorder, or Dysthymic Disorder. In the nonsurgical population of obese persons, the prevalence of depression has been found to be as high as 10% (Onyike et al., 2003) which is higher than the 6.7% prevalence rate in the general population (NIH). Mood disorders have been shown to slow one’s metabolism (Lutter & Elmquist, 2009), reduce motivation and willpower, and to cause one to crave unhealthy foods (Williams 2013), all of which would undermine one’s ability to lose excess weight.
The presence of such hurdles and the reality of urgent co-morbid health complications lead many obese individuals to consider bariatric surgery. According to the Consumer Guide for Bariatric Surgeries (CGBS), bariatric surgery is a general term used to describe several different types of weight loss surgeries. The three most common types of bariatric surgery are gastric bypass surgery, sleeve gastrectomy (also called gastric sleeve surgery), and gastric banding (also called lap-band surgery). Via different mechanisms, each surgery decreases the size of the stomach and thus the amount of food that is able to be consumed at one time. All of them have been shown to aid in weight loss and the resolution of co-morbid medical conditions, but to differing degrees. Likewise, each surgery has its own set of associated risks (Weight-Control Information Network; WIN, 2011).

There are several reasons that bariatric surgery is only offered to the very obese or those with serious medical conditions. Because bariatric procedures are surgeries like any other, they carry with them the risks of surgical complications and death (U.S. News & World Report; USNWR, 2013). Mortality estimates within the first month post-operatively are between 0.33 to 1.9%. Each surgery also requires different dietary and lifestyle changes on the part of the patient that, if not followed, can have significant consequences. The gradual introduction of physical activity and the monitoring of post-surgical complications are also important for overall health and well-being. As many as 20% of patients will experience some sort of complication following GBS (BSR, 2012).

Given the risks associated with bariatric surgery, the American Society for Metabolic & Bariatric Surgery (ASMBS) developed guidelines for the pre-surgical
assessment of bariatric surgery candidates in 2004. Many bariatric clinics have a multi-disciplinary team on staff – including medical personnel, exercise physiologists, nutritionists, and psychologists – to assess a patient’s physical health, mental health, dietary habits, and activity level (USNWR, 2013). These individuals consult with the surgical candidate and provide their clinical judgments to the surgeon, who ultimately decides whether or not to accept the candidate as a patient.

With regards to the psychological evaluation, no standard battery or assessment procedure currently exists (Eldar et al., 2011). The manner of evaluation is determined by the mental health professional, according to his or her clinical judgment. The goal of the assessment is to determine if there are any contraindications to surgery or if there are mental health issues that should be monitored throughout the surgical process. The most common method of evaluation is a structured clinical interview conducted by the mental health professional. When objective assessment instruments are used, they are typically the Minnesota Multiphasic Personality Inventory (MMPI-2), the Beck Depression Inventory (BDI-II), or the Millon Behavioral Medical Diagnostic (MBMD; Aubert et al., 2010). Typical psychological issues of concern are active psychosis, personality disorders, current substance abuse, uncontrolled bipolar disorder, and intellectual deficits that make the person unable to provide informed consent (Frank & Kaiser, 2008; Eldar et al., 2011; Aubert et al., 2010; Marcangelo, 2013).

A review of the literature today regarding the role of the pre-surgical psychological evaluation yields several studies examining the correlations between certain psychopathologies (e.g. depression, binge eating) and post-surgical success or lack thereof. Very few studies have evaluated the role of motivation, expectations,
knowledge of the surgery, and other less pathological aspects of the patient’s psychological profile. There are many calls in the literature to determine to what extent the pre-surgical psychological evaluation predicts success after surgery, but to date, very little data exists.

**Purpose of the Present Study**

Because of the relative dearth of literature regarding the predictive power of the pre-surgical psychological evaluation – and in particular, the role of less pathological psychological constructs – this study examined the predictive abilities of non-pathological variables. Conducted in partnership with Kettering Bariatrics (KB) in Kettering, Ohio, this study identified six non-pathological psychological variables represented in the literature that were assessed in KB’s pre-surgical psychological assessment.

The first variable was the patient’s pre-surgical amount of research, which was defined broadly as the extent to which the surgery candidate had investigated types of weight loss surgery and seemed to understand the different surgeries and their implications to the candidate’s lifestyle (J. Wade, personal communication, July 24, 2013). The second variable was the patient’s understanding of the procedure he or she wanted to undergo, including the recovery time involved and how it differed from other surgical options. The third variable was the patient’s understanding of the post-surgical lifestyle changes that would be required of him or her. The fourth variable was the patient’s level of motivation, as assessed by the examiner’s clinical impression. The fifth variable was how “reasonable” the examiner found the patient’s expectations to be (i.e., how much and in what domains did the patient expect the surgery to change his or
her life). The sixth and final non-pathological psychological variable was the clinician’s perception of how much personal responsibility the candidate took for his or her weight loss versus expecting the surgery to do all the work of weight loss (J. Wade, personal communication, July 24, 2013). These six variables were examined to see to what extent they were able to predict a reduction in weight. The hypothesis of this research was that one or more of the non-pathological psychological variables would predict post-surgical success. Success was defined in terms of the percentage of weight lost by the patient.
Chapter II

Literature Review

Types of Bariatric Surgery

As previously mentioned, the three most popular bariatric surgeries are gastric bypass surgery (GBS), the sleeve gastrectomy (SG), and gastric banding (GB). GBS is the most commonly performed procedure in the United States today (WIN, 2011). There are variations on the technique, but in general, the surgeon divides the stomach into two pouches, a small one and a large one, and directly attaches the small intestine to the smaller pouch (Kettering Bariatrics; KB, 2012). The smaller stomach limits the amount of food that can be consumed at one time, and because a portion of the small intestine is bypassed, fewer calories are absorbed by the body. The procedure changes the normal way in which the body digests food, and as fewer calories are consumed and absorbed, the body is able to start using the excess fat reserves for energy. Gastric bypass surgery is sometimes referred to as Roux en-Y gastric bypass because the division of the small intestine creates a Y shape, and the outflow of food from the small stomach pouch happens through what is called a “Roux” limb. Another, less common version of the procedure is known as mini-GBS, so-called because of the simplicity of the stomach bypass construction (WIN, 2011). Though it is growing in popularity, it is
not as popular as the Roux en-Y technique, and thus will not be discussed in any further detail.

GBS is the most popular procedure, in part, because there is substantial outcome data which attests to its efficacy for achieving weight loss and the resolution of comorbidities, which makes insurance companies more likely to cover the cost of the procedure (Bariatric Surgery Resource; BSR, 2012). However, because it is an open, surgical procedure, it carries with it more side effects and complications than the non-invasive bariatric procedures. For instance, in the short-term, the patient is at an increased risk for pneumonia, blood clots, infections, and leaking at the site of connection between the small intestine and the small stomach pouch. In the long-term, the patient is more susceptible to gallstones, ulcers, and hernias. Two other potential long-term complications are related to the change in how the body absorbs calories. So-called “dumping” syndrome occurs when food moves too quickly through the small intestine and causes nausea, vomiting, perspiration, and diarrhea. This typically occurs when foods that are high in fat and sugar are consumed, making it necessary for the patient to be more careful about food choices after the procedure. Though this is the most common post-surgical complication, it is also the least dangerous. Also related to the malabsorptive nature of the procedure are nutrient deficiencies, particularly iron. The new digestive process bypasses the duodenum, and it is in the duodenum that iron is absorbed. Generally this problem is avoided by eating iron-rich foods or taking an iron supplement (BSR, 2012).

The second most popular bariatric surgery, and the newest one, is the sleeve gastrectomy (SG; BSR, 2012). Like GBS, it is not reversible. In this procedure, a
series of laparoscopic “staples” are made to reduce the size the stomach by up to 85%. What remains is a thin, vertical sleeve of stomach that is approximately the size of a banana (KB, 2012). The smaller stomach limits the amount of food that can be consumed. With this procedure, the normal digestive process is not altered, and thus the amount of calories which can be absorbed is unchanged. Weight loss is achieved solely through reduction of the stomach size (KB, 2012).

The major advantage of SG is that it is less invasive than GBS since it is not an open procedure, but rather a laparoscopic one (BSR, 2012). This also means that it does not carry any of the risks of an open procedure, such as infections or blood clots. Because the procedure is laparoscopic, it is also an option for extremely obese patients with whom open procedures are more difficult. SG also has the advantages of not requiring a foreign object to be left in the body (as with gastric banding surgery), and the post-surgical diet is not as restrictive since the normal digestive process remains intact. Related to this latter point, there is no risk of the “dumping” syndrome associated with GBS (BSR, 2012).

However, because there is no change in the way in which calories are absorbed, lasting weight loss can only really occur with a fundamental change in the food choices an individual makes (BSR, 2012). Lasting weight loss also has the potential to be compromised by the fact that, over time, the size of the sleeve can expand, increasing the potential for a return to old eating habits. Finally, because SG is one of the newer bariatric surgeries, less data exists on its long-term efficacy, and thus it is the procedure least likely to be covered by insurance.
The third most common bariatric surgery, gastric banding (GB), is the only one of the procedures which is reversible (KB, 2012). As with GBS, two stomach pouches are created, but in GB, it is the band that creates the two pouches. The band is wrapped around the upper part of the stomach, creating the smaller pouch which receives food from the esophagus. The tightness of the band determines how much food can be eaten at one time and the length of time it takes for food to leave the smaller pouch and proceed to the larger one. Again, the mechanism of weight loss is controlling the amount of food that can be consumed at one time, rather than changing the digestive process (BSR, 2012).

Though GB is a newer surgery than GBS, there exists a substantial amount of long-term outcome studies, and thus its cost is as likely to be covered by a patient’s health insurance as GBS (BSR, 2012). These studies have shown that the band is efficacious for weight loss, however, as with SG, since the normal digestive process is unaltered, the onus is largely on the patient to make different food choices and to change his or her eating habits. GB also has the advantages of being a shorter surgery (approximately one hour) with an in-hospital stay of less than 24 hours, and a shorter recovery time of approximately six weeks. This is in contrast to GBS, which has a recovery time of approximately three months. The reversibility of the procedure can be seen as an advantage, since if there are complications, the band can be removed (BSR, 2012).

There are, however, unique complications to the introduction of the band into the body (BSR, 2012). The four most common are band erosion, band rejection, band leakage and band slipping. Erosion occurs when the band migrates in the stomach,
causing discomfort in the patient and possibly fostering bacteria and allowing infection to occur. Rejection occurs when the body simply won’t tolerate a foreign object. The only solution for both of these problems is removal of the band. Band leakage occurs when the band loses its tightness and thus the restrictive function of the band is eliminated. Finally, with band slipping, a portion of the lower stomach is allowed above the band, which typically leads to nausea and vomiting in the patient. In these latter two cases, the patient must follow up with the surgeon to have the band adjusted (BSR, 2012).

Outcome data on weight loss surgery indicates that, depending upon the surgery chosen, the patient will lose an average of 43% to 62% of his or her excess body weight (KB, 2012). Patients can also expect to see improvement or resolution of conditions like Type 2 diabetes, high blood pressure, high cholesterol, and obstructive sleep apnea. A meta-analysis of the different weight loss surgeries found that for those who received the lap-band surgery, 95% of sleep apnea cases were resolved, 78% had lower cholesterol levels, 43% had their high blood pressure resolved, and 80% saw a resolution or improvement in their Type 2 diabetes (Buchwald, 2004). The same meta-analysis showed that for those who received gastric bypass surgery, 87% of sleep apnea cases were resolved, 95% showed an improvement in their blood pressure, 68% saw resolution of their high blood pressure, and 91% had resolution of or improvement in their Type 2 diabetes. Similarly, persons who received the sleeve gastrectomy saw 60% resolution of sleep apnea, 43% resolution of high cholesterol, 49% resolution of high blood pressure, and 56% resolution of Type 2 diabetes (Brethauer, et al, 2009).
Significant changes are typically seen within the first year to 18 months, with rapid weight loss occurring almost immediately (BSR, 2012). However, bariatric surgery is not considered an option for those who simply want to lose weight quickly (U.S. News & World Report; USNWR, 2013). For a person to qualify for bariatric surgery, his or her health must be compromised by their obesity. Typically, patients must have had a BMI of 40 or higher for at least five years, or a BMI of 35-40 with significant medical comorbidities. BMI, or Body Mass Index, is a commonly used figure to determine obesity (WHO, 2006). The number is derived from an equation that takes an individual’s weight and height (and sometimes gender) into account. The BMI has been criticized for overestimating obesity, as it does not consider muscle mass and other variables. Nevertheless, it is a common metric used when determining if an individual is overweight, underweight, average, or obese. Generally, a BMI of <18.5 identifies someone as underweight, a BMI between 18.5 and 25 identifies someone as in the normal range, a BMI of 25-30 qualifies someone as overweight, and a BMI > 30 qualifies someone as obese. Obesity is further subdivided into three classes (Class I = 30 to 34.99, Class II = 35 to 39.99, and Class III ≥ 40; WHO, 2006). Another typical requirement to qualify for surgery is age. Patients must be between the ages of 18 to 65, with anyone outside of this range considered on a case-by-case basis (USNWR, 2013).

**General Recommendations for the Pre-Surgical Assessment**

As previously mentioned, there is no prescribed pre-surgical psychological assessment protocol or set of measures for bariatric surgery (Eldar et al., 2011), but the guidelines developed by the ASMBS are considered a best practices document for the
pre-surgical psychological assessment with bariatric surgery candidates. These guidelines alert mental health professionals to potential psychological issues of interest with this population. These issues fall into five domains (LeMont et al., 2004). Behaviorally, the clinician should assess for previous attempts at weight management, eating style, physical activity, health-related risk-taking behavior, and legal history. Within the cognitive-emotional domain, the person’s knowledge of obesity and the surgical intervention sought are important, as are their coping skills, emotional modulation, and understanding of boundaries. A full developmental history should be obtained, as should an assessment of their current life situation. Current stressors and their access to social support (and ability to utilize it) may impact post-operative success. Finally, the mental health professional should obtain an understanding of what motivates the candidate for surgery, the level of that motivation, and what their expectations are regarding the surgery (LeMont, 2004).

Similar recommendations are found in the writings of researchers and clinicians who have provided rationales for the evaluation procedures used at their clinics and provided broad recommendations to the bariatric surgery industry. For instance, Collazo-Clavell, Clark, McAlpine, and Jensen (2006) advised that the following pieces be incorporated into a pre-surgical assessment: (a) medical assessment, (b) physical exam, (c) laboratory testing, and (d) psychological assessment. The goals of such an evaluation are to perform a risk assessment, identify medical contraindications, and assist the surgical team in maximizing success. Eldar et al. (2011) made similar recommendations by advising that the surgical team consult with a nutritionist, psychologist, and anesthesiologist before performing surgery.
To get an understanding of what bariatric surgery clinics actually do with regards to the psychological portion of the pre-surgical assessment, Bauchowitz et al. (2005) surveyed eighty-one bariatric surgery programs and asked them how important they believed the psychological assessment to be, what kinds of measures they use, and what they considered to be contraindications to surgery. They found that 88% of clinics required patients to undergo a psychological evaluation, and almost half required the use of an objective, standardized measure. Contraindications to surgery varied by clinic, but the most severe contraindications included current illicit drug use, active symptoms of schizophrenia, severe mental retardation (IQ < 50), current heavy drinking, lack of knowledge about the surgery, a history of significant medical non-compliance, unrealistic expectations regarding the surgery, multiple suicide attempts, and active symptoms of bipolar disorder. This list is very consistent with other studies that have examined contraindications of surgery (Ritz, 2006; Eldar, 2010; Tariq & Chand, 2011). Surgery was rarely denied altogether, but rather, it was postponed an average of 12 months while patients fulfilled recommendations made by the surgical team. The most common recommendations included attending support group meetings, increasing their knowledge about the surgery, completing counseling or psychotherapy, implementing dietary changes, pursuing a referral for psychotropic medication, and maintaining a food record (Bauchowitz et al., 2005). Similar practices were reported by Kettering Bariatrics in Dayton, Ohio, where denial of surgery is rare, but the most common psychological factors which delay surgery are the presence of cognitive deficits and current substance abuse (D. Schumacher, personal communication, October 18, 2013).
One of the challenges of creating a list of contraindications to surgery is that a comprehensive personality profile of an obese person does not exist (Ritz, 2006). However, there are several psychosocial variables that tend to co-occur with obesity. The typical surgery-seeking patient has tried and failed countless diets and programs, and has used disordered eating as a coping mechanism for abusive or unstable family situations (Ritz, 2006). One study found that 32% of patients who present for bariatric surgery have a sexual abuse history, and their excess weight provided protection against being sexualized (Grilo, 2005). Because of the history of failure with weight loss programs, surgery is often seen as the last great hope to escape the co-morbid medical problems and societal prejudices associated with being obese. However, the post-surgical life changes are often not well-anticipated by surgery candidates, and may include an intolerance for foods they once enjoyed, altered bodily functions, relationship changes as routines are broken and jealousy arises, the return of old habits, and increased attention and sexual advances (Ritz, 2006). Grilo (2005) found that for those with a history of sexual abuse, their weight loss at the one-year post-operative checkup was on par with other patients, but they tended to have higher levels of depression and some of them experienced a recurrence of trauma-related symptoms that had previously been under control.

Ritz (2006) recommends that a surgical candidate’s level of risk is assessed on a scale, since there is no reliable list of absolute contraindications. He further advises that a comprehensive clinical interview include the following things: a detailed developmental and psychosocial history, especially as it relates to trauma, childhood and adolescent experiences, and the stability of the nuclear family; a review of current
life circumstances, including coping skills and psychological resources, as the inability to effectively manage stressors tends to undermine weight loss; history of suicide or self-harm; addictive behaviors; history of legal issues, which are relevant to impulse control and the quality of one’s judgment; an assessment of social support; the person’s past relationships with food; the onset and development of obesity; a psychiatric history, particularly how well-controlled any symptoms or diagnoses are; an exercise history to determine if the person is willing to do the physical activity required post-operatively; and finally, an understanding of the candidate’s general preparedness for surgery. Ritz (2006) also recommends the inclusion of objective measures to make the assessment domains less dependent upon self-report measures. He makes the observation that which one is chosen is somewhat arbitrary, since there are very few designed and normed specifically for the bariatric surgery-seeking population (Ritz, 2006).

These areas for assessment are largely in accordance with those recommended by Greenberg et al. (2004) and Huberman (2008). Huberman (2008) included greater consideration for motivation and expectation, as he believed it was important to understand the candidates’ rationales for having the surgery, including why they have chosen to do it now, and what they hope to achieve. He also recommended a larger psychoeducational component in which they are provided with information about resources that would assist with the weight loss process, and they are informed about typical biopsychosocial adjustments that come with dramatic weight loss. He outlined these adjustments in a four-stage model: (a) At first, the patients is focused on behavioral compliance and weight loss, then (b) he or she attempts to achieve
maximum weight loss and sees changes, followed by (c) experimentation and punctuation of goal achievement, and finally, (d) the person either successfully or unsuccessfully transitions into his or her new role after weight loss (Huberman, 2008).

Tariq and Chand (2011) made recommendations largely in accord with other researchers regarding important domains of pre-surgical assessment, but they added a few other variables that may impact long-term success. Specifically, they observed that patients who were consistently abusive to staff, missed multiple appointments, were in an excessive rush to undergo surgery, and significantly gained weight while in the evaluation process seemed to be less likely to be successful after surgery (Tariq & Chand, 2011).

The many analyses of how to best assess surgical candidates before surgery indicates consensus in the field that a patient’s psychological characteristics are impactful. Indeed, Pull (2010) summarized the rationale for performing a psychiatric assessment with surgery-seeking candidates as resting on four assumptions: (a) that a significant percentage of individuals who apply for obesity surgery present with psychological disorders or conditions, (b) that mental health improves in patients after surgery, (c) that patients who present with disorders or conditions are at a higher risk for poor post-surgical outcomes and/or an increased number of complications, and (d) surgery candidates with psychological disorders or conditions should be given particular care and follow-up before and after surgery. In his review of articles between August 2006 and August 2009, he found considerable evidence for assumptions a and b, and strong support for assumption d. The result for assumption c was less clear, but he concluded that it warranted additional research and consideration.
The overwhelming conclusion from researchers is that psychological variables are important with the bariatric surgery-seeking population, and thus it seems reasonable to consider their impact on post-surgical success.

**Psychopathology Correlations with Bariatric Surgery Success**

Several studies have examined the psychopathology of bariatric surgery patients. One of the most comprehensive studies to date documented the psychiatric conditions of 288 surgery-seeking individuals and examined the relationship between these conditions and the severity of obesity and their functional health status (Kalarchian et al., 2007). Axis I disorders were diagnosed using the Structured Clinical Interview for DSM-IV (SCID), and Axis II disorders were diagnosed using the SCID-II. Functional health status was assessed with the Medical Outcomes Study 36-item Short-Form Health Survey, which is a self-report measure. The researchers found that 38% of participants met diagnostic criteria for an Axis I disorder at the time of preoperative evaluation, and 66% had a lifetime history of at least one Axis I disorder. The most common disorders present were mood disorders (46% lifetime, 16% current), followed by anxiety disorders (38% lifetime, 24% current), substance use disorders (33% lifetime, 2% current), and, finally, eating disorders (30% lifetime, 16% current). Of the four categories, the most common disorders within them were Major Depressive Disorder, Panic Disorder, Alcohol Abuse, and Binge Eating Disorder, respectively. With regards to Axis II disorders, 29% met criteria, with the most prevalent disorders being Avoidant Personality Disorder (17%), Obsessive-Compulsive Personality Disorder (8%), Paranoid Personality Disorder (5.6%), and Borderline Personality Disorder (5%). Axis I disorders, but not Axis II, were found to positively correlate
with BMI. Both types of disorders were found to negatively correlate with functional health status (Kalarchian et al., 2007).

The types of disorders found to be the most prevalent in the Kalarchian et al. (2007) study are reflective of the available literature regarding psychopathology in the bariatric surgery-seeking population. Of particular interest for this study is how well the presence of certain types of psychopathology correlates with success (or lack thereof) after bariatric surgery. All research in this area defines success in terms of weight, though weight loss is not homogeneously defined. Some use change in BMI, others use percentage of weight lost, and still others use the metric percentage of excess weight lost (EWL). Some studies include changes in medical conditions as part of their success criteria, with very few also considering success in terms of changes in psychosocial variables. As studies are described here, success is defined in terms of weight loss unless otherwise noted.

Depression and anxiety are arguably the most-researched psychiatric conditions in the bariatric surgery-seeking population, yielding somewhat mixed results. Depression and anxiety are considered here together because they often appear in the literature together as a measure of overall distress. In their meta-analysis of two decades of research on the correlation between psychopathology and post-surgical success, Herpetz, Kielmann, and Wolf (2004) found that depressive and anxious symptoms were positively correlated with weight loss after surgery. They concluded that individuals presenting with higher levels of depression and anxiety were more distressed about their health at the time of the pre-surgical evaluation, and thus were more motivated to lose weight after they received the surgery. A meta-analysis conducted by Franks and
Kaiser (2008) found similar results. They examined studies published between 2003 and 2006 and found that anxiety and depression generally did not predict post-surgical weight loss, but that when they were predictive, they appeared to be positive predictors. The most commonly prescribed psychotropic medication for bariatric surgery-seeking individuals is antidepressants, which the researchers acknowledged may have mitigated the effects of depressive symptoms (Franks & Kaiser, 2008). A study by Beck, Mehlsen, and Stoving (2012) found that even during the 18 to 24 month post-operative time frame, when patients are at the greatest risk for weight regain, depression and anxiety do not impact post-surgical success.

Kinzl, Schrattenecker, and Traweger (2008) surveyed 140 post-surgical bariatric patients about their weight loss progress and satisfaction therewith an average of 50 months (range: 30 to 84 months) after surgery. They found slightly different results regarding depression. The results showed that the presence of two or more psychiatric disorders was a negative predictor of post-surgical success. More specifically, the individuals who experienced the least weight loss had diagnoses which included depression, eating disorders, adjustment disorder, and personality disorders. Thus it appears that depression, in conjunction with another disorder, may negatively impact success in the long-term (Kinzl et al., 2008). These results are consistent with those of Rutledge, Groesz, and Savu (2011) who found a significant linear relationship between the number of psychiatric disorders and weight loss at the one-year post-surgical mark. They assessed a population of sixty war veterans, and found that those with two or more disorders were significantly more likely to experience weight loss cessation or weight regain. No other psychiatric or biomedical factors effectively predicted weight
loss in the first year (Rutledge et al., 2011). Pataky et al. (2011) reported similar results when they performed a broad review of the recent literature and could not find a clear correlation between any one psychological condition and weight loss, but they concluded that the presence of multiple psychiatric conditions may play a role.

Another category of disorder which has been heavily researched with the bariatric surgery-seeking population is eating disorders, especially binge eating disorder (BED). In the DSM-IV, Binge Eating Disorder is classified under Eating Disorder Not Otherwise Specified, and it is defined as “recurrent episodes of binge eating in the absence of regular inappropriate compensatory behavior characteristic of Bulimia Nervosa” (DSM-IV-TR, 2000). Binge Eating Disorder has been included in the DSM-V as its own disorder, reflecting its clinical relevance. In the bariatric surgery-seeking population, as high as 68% of individuals were found to experience recurrent episodes of binge eating (Greenberg, Smith, & Rockhart, 2004).

The research regarding BED is relatively homogeneous. It indicates overwhelmingly that the presence of BED at the pre-surgical evaluation negatively predicts post-surgical success. In Beck et al.’s (2012) two-year follow-up study with 45 bariatric patients, 27% of patients reported binge eating symptoms after having the surgery. The instrument used to assess eating disorder symptomatology was the Eating Disorder Inventory (EDI-2), and the most common symptom endorsed was eating portions of food larger than normally recommended. Other scales on that measure that were notably more elevated in the bariatric surgery population than in the non-surgical norm group were ineffectiveness, maturity fears, and social insecurity. The researchers performed a multiple linear regression to see if binge eating, depression, anxiety, or
ineffectiveness predicted weight loss outcomes, and found that binge eating and insecurity were the only two that made significant, independent contributions to the percentage of BMI lost (Beck et al. 2012).

The Beck et al. (2012) study examined eating behavior after surgery. Canetti, Berry, and Elizur’s (2009) study provided important information about psychosocial changes by assessing patients both before and after surgery. They administered multiple self-report questionnaires to 44 surgical patients and a group of 47 dieters shortly before surgery/ start of the diet program, and again one year afterward. They found that a neurotic predisposition (NP; as measured by the NEO Personality Inventory Revised) was a predictor of obesity treatment outcomes. The NP scale includes items regarding anxiety, hostility, depression, self-consciousness, and vulnerability. NP was mediated by the presence of emotional eating (EE; as measured by a seven-item questionnaire created by the study authors), which includes items like whether food offers consolation, relief from worry, and comfort when angry or hopeless. EE was more directly related to less weight lost at the one-year mark (Canetti et al., 2009). Fabricatore et al. (2006; as cited in O’Neil, 2006) described similar eating behaviors endorsed by obese persons as contributing to their obesity. They described five factors, including eating in response to negative emotions, eating in response to positive emotions and social cues, and overeating in response to internal eating cues (O’Neil, 2006).

Greenberg et al. (2005) surveyed the literature regarding binge eating disorder, and found several correlations between the presence of BED and post-surgical success. According to Hsu et al. (1998) and Kalarchian et al. (2002), BED is a factor leading to
poor bariatric surgery outcomes, including weight regain after the surgery (as cited in Greenberg et al., 2005). Green et al. (2004; as cited in Greenberg et al., 2005) found higher levels of hunger and lower levels of psychosocial functioning both before the surgery, and six months after the surgery, in bariatric patients with BED. The patients with BED also had significantly more weight to lose than those without BED. Several researchers acknowledged that treatment of BED before surgery and monitoring of BED symptoms after surgery are crucial to post-surgical success (Hsu et al.; Saunders, 2005; Kalarchian et al., 2002.; Waters et al., 1991; as cited in Greenberg et al., 2005).

**Non-pathological Predictors of Success**

Beyond pathological correlates with success or failure, psychologists have examined non-pathological patient variables to determine their predictive abilities. The variables considered have included demographic information (e.g., age, gender, level of education, socioeconomic status, racial/ethnic identification), motivation for the surgery, expectations of the surgery, knowledge about the surgery, self-esteem, quality of life, and social support.

With regards to demographic variables, Van Hout (2005) performed a literature review that revealed mixed results, but some general conclusions were made. Firstly, younger patients who received the surgery tended to be more successful than older patients, though older patients still benefitted. People who were obese before the age of 18 tended to show more post-operative weight loss; female patients tended to lose more weight than men; and patients of higher socioeconomic status lost more weight than those of a lower socioeconomic status. This final difference may be attributed to
reduced access to healthcare and resources for the individuals of low socioeconomic status (Van Hout, 2005).

Larsen et al. (2004) found similar results in their study with 193 bariatric surgery patients with regards to gender. 168 women and 25 men completed the Dutch Personality Inventory an average of 18 months before surgery, and the researchers then performed an analysis every three months after the surgery to determine if any of the personality scales predicted success in the short-term or the long-term (long-term defined as two years or more after surgery). They, too, found that women tended to lose more weight than men (an average of 1.7 BMI points). They also examined the demographic variable of level of education, and they found that individuals with a lower level of education lost an average of 1.4 BMI points more than individuals with a higher education. One point on which they differed from Van Hout (2005) was the impact of preoperative BMI. In Van Hout’s (2005) literature review, she found that more extremely obese patients tended to remain obese after the surgery, despite losing a great deal of weight. Larsen et al. (2004) found that a higher baseline BMI (approximately 50) lost an average of 1 BMI point more than those with a lower baseline BMI (approximately 40). None of the personality variables that the researchers examined correlated with success in the short-term, but they did find that those who scored high on egoism tended to lose less weight in the long-term (Larsen et al., 2004).

Racial/ethnic identification is a demographic variable that is not as well-represented in the literature as gender and socioeconomic status. However, a large-scale chart review done in an integrated healthcare setting provided some insight into
weight loss differences between White, Black, and non-white Hispanic patients (Coleman et al., 2014). The researchers created a registry that captured all patients who underwent bariatric surgery between 2004 and 2013. A total of 20,296 patients received either Roux-en-Y gastric bypass surgery, sleeve gastrectomy, or banding procedure. There was no difference between groups who received the sleeve gastrectomy procedure, but Whites patients experienced a significantly higher percentage of weight loss than their Black and Hispanic counterparts when they received gastric bypass surgery (Coleman et al., 2014).

A retrospective analysis by Aubert et al. (2010) examined medical charts from 2000 to 2004 and found conflicting demographic results. They analyzed the biometric and psychological assessment data from the charts of 92 female patients and found no correlation between post-surgical weight loss and sociodemographic variables, weight history, or pre-operative weight. They did find other predictors of success, however. They found that 27% of patients were identified as having a “psychological risk factor,” with the three most common risk factors being (1) a psychological “disturbance” or diagnosis, most often Major Depressive Disorder, (2) problematic attitudes toward treatment, and (3) socio-relational difficulties. Ten out of the 92 patients were found to have multiple risk factors. The presence of a psychological disturbance or a problematic attitude toward treatment correlated with higher pre-operative BMI when compared to patients without a psychological risk factor (48.5 versus 45.3), but no such difference was found with regards to the presence of a socio-relational disturbance. Two years after surgery, 16% of people with a psychological risk factor achieved excellent results (defined as a percentage of excess weight lost greater than 75%).
contrast, 39% of those without a risk factor achieved excellent results, indicating that the presence of a psychological risk factor does impact post-surgical success (Aubert et al., 2010).

Larsen et al. (2004) found other non-pathological psychological variables impacted post-surgical success. With regards to motivation, they found that patients with greater physical or psychological problems tended to lose more weight than those experiencing less distress. They attributed this difference, at least partly, to higher levels of motivation in more distressed individuals. Patients with physical impairments tended to show more modest weight loss, but greater improvement on a quality of life measure. Expectations about the surgery were broken down into two parts: (a) the patient’s expectations about their level of responsibility in post-surgical success and (b) the degree of reality to those expectations. Those who experienced adequate post-surgical weight loss entered into the surgery with expectations regarding an increased ability to go out, work out, go on vacation, etc., while those who were less successful had more aesthetic expectations. Perhaps unsurprisingly, those who expected the surgery to do all the work lost less weight than those who expected to play a large role in their post-surgical weight loss. In summary, Larsen et al. (2004) concluded that strong motivation and realistic expectations were reliable predictors of post-surgical success.

Two other dimensions that Larsen et al. (2004) examined were personality characteristics and social support. They found that successful patients tended to have higher self-esteem, greater psychological flexibility, and an active and direct coping
style. High levels of marital satisfaction also correlated with more weight loss after surgery (Larsen et al., 2004).

A more systematic literature review regarding social support as a factor in post-surgical success (Livhits et al., 2009) screened 934 studies conducted between 1988 and 2009 and found that ten explicitly reported on social support. The results regarding marital and/or relationship status was more heterogeneous than in the Larsen et al. (2004) study, with one study indicating that being single was a predictor of success, three others showing non-significant positive trends between social support and weight loss, and another yielding inconclusive results. Five studies reported on the role of support groups, and all five found a positive correlation between weight loss and support group attendance. The researchers concluded that more research needed to be done on less formal versions of support (spouses, families, friends, etc.) to determine the role that those individuals might play in a patient’s success or failure (Livhits et al., 2009).
Chapter III

Methods

In order to test the hypothesis that one or more non-pathological psychological constructs assessed prior to surgery would predict post-surgical success, a chart review was undertaken at Kettering Bariatrics, a bariatric surgery center. At Kettering Bariatrics, patients are required to attend three-month, six-month, and one-year follow-up appointments.

Participants

Participants were 187 adult patients of Kettering Bariatrics, ages 18 to 65, who underwent a weight loss procedure 12 to 18 months prior to the start of data collection. No personally identifiable information was associated with the data collected from charts. Each patient was identified by a code number created for the purpose of this research. There was no compensation given to patients. Patients underwent one of three surgeries: (a) gastric bypass, (b) sleeve gastrectomy (gastric sleeve), or (c) gastric banding (lap-band surgery). The number of patients per surgical group varied slightly ($n_{\text{bypass}} = 69; n_{\text{sleeve}} = 60; n_{\text{band}} = 58$).
Materials

Weight data and pre-surgical psychological evaluation data were obtained from the patients’ medical charts at Kettering Bariatrics. The pre-surgical psychological evaluation used at Kettering Bariatrics is a clinical interview that was created by the on-staff psychologist (Appendix A). The interview is based upon recommendations for the pre-surgical psychological assessment by the American Society for Bariatric Surgery (ASBS, 2004). The psychological data of interest for this study included (a) the amount of research done by the patient, (b) the patient’s understanding of the procedure, (c) the patient’s understanding of the lifestyle changes he or she will have to make, (d) the extent to which the patient takes responsibility for his or her weight problems, (e) the patient’s level of motivation, and (f) the reasonableness of the patient’s expectations. The rating scales for items a, b, c, and f were five-point Likert scales (Extensive; Thorough; Adequate; Minimal; Inadequate). The rating scales for items d and e were four-point Likert scales (Green; Yellow; Orange; Red). The color system in the four-point Likert scale indicates whether the clinician has no reservations about that patient (Green), minimal reservations (Yellow), believes the patient could benefit from further education (Orange), or has significant reservations about that patient (Red). In the interest of uniformity, the Extensive and Thorough ratings on the five-point Likert scale were collapsed into one ranking. Thus, all six questions were considered to be rated on a four-point Likert scale. The same clinician, a psychologist employed by Kettering Bariatrics, conducted all interviews and the scores for the psychological variables were based upon his clinical impression.
Procedure

The researcher and the researcher’s associates collected all data by transcribing them from the medical charts of patients into an Excel spreadsheet. The data was then analyzed as three multiple linear regressions at three different post-surgical time points (first follow-up appointment, second follow-up appointment, third follow-up appointment). All analyses were conducted using the Statistical Package for Social Sciences (SPSS). The six psychological variables listed in the previous section were included as predictor variables. Four demographic variables that have been shown to impact post-surgical weight loss (Van Hout, 2005; Coleman et al., 2014; Rutledge et al., 2011) were collected from patient charts: sex, age, race, and number of premorbid psychological diagnoses. They were also included in each regression analysis as predictor variables. In addition, the number of days after surgery was included in the latter two regression analyses as a predictor due to the variability in the timing of patient follow-up appointments. In summary, there were ten predictor variables included in the first regression analysis, and eleven predictor variables included in the second and third regression analyses. The criterion variable was percentage of weight lost.
Chapter IV

Results

This chapter is divided into two sections. The first provides descriptive statistics for the predictor variables and the criterion variable. The second section presents the results of the regression analyses and answers the primary question posed by this research. All statistical analysis was performed using SPSS and with the assistance of Wright State University’s Statistics Department.

Predictor Variables

Psychological constructs. As previously described, the six psychological predictor variables in this study were constructs rated in the pre-surgical psychological assessment. Each one will hereafter be referred to by the terms in italics: (a) the amount of research done by the patient, (b) the patient’s understanding of the procedure, (c) the patient’s understanding of the lifestyle changes he or she will have to make, (d) the extent to which the patient takes responsibility for his or her weight problems, (e) the patient’s level of motivation, and (f) the reasonableness of the patient’s expectations. For all six constructs, the interviewer rated the patient on a scale of 1 to 4. A lower score indicates that the clinician had fewer concerns about the patient on that construct. Thus, preparedness for surgery is inversely proportional to score.
Of the 187 charts reviewed, none of them included ratings for all six psychological constructs. One-hundred and eighty-six charts included a score for research ($M = 1.80$, $SD = 0.66$, $Mdn = 2.00$); 185 charts included a score for lifestyle ($M = 1.95$, $SD = 0.58$, $Mdn = 2.00$) and motivation ($M = 1.07$, $SD = 0.26$, $Mdn = 1.00$); 183 charts included a score for expectations ($M = 1.18$, $SD = 0.40$, $Mdn = 1.00$); 182 charts included a score for procedure ($M = 1.90$, $SD = 0.65$, $Mdn = 2.00$); and 159 charts included a score for responsibility ($M = 1.50$, $SD = 0.69$, $Mdn = 1.00$).

The distribution of scores was not normal for any of the constructs. Each distribution was negatively skewed, an artifact of the patient sample being composed of surgery completers.

**Demographic predictors.** As previously indicated, four demographic variables were included as predictor variables based upon previous research which indicated that they impacted weight loss: sex, age, race, and number of premorbid psychological diagnoses (Van Hout, 2005; Coleman et al., 2014; Rutledge et al., 2011). Sex and number of diagnoses were available for all 187 participants. Age data was available for 185 participants. Racial identification data was available for 182 participants.

The sample was 81% female and 19% male. No one identified as transgendered or intersexed. The majority of participants (58%) had no psychological diagnosis; 34% had one diagnosis, 7% had two diagnoses, and 2% had three diagnoses. The age distribution was relatively normal. Patient ages ranged from 18 years old to 65 years old, with a mean age of 44 years old ($SD = 11.10$ years). With regards to race, 85% of participants identified as Caucasian, 13% identified as African-American, 2% identified as Hispanic, and 0.5% identified as Native American.
**Days after surgery.** After surgery, patients at Kettering Bariatrics are to be seen at the three-month, six-month, and one-year marks after surgery. How closely patients in this sample adhered to this schedule varied. Patients consistently attended the first follow-up appointment near the three-month mark. For the later appointments, the timing varied more widely. For this reason, the second and third follow-up appointments were analyzed with the predictor variable “days after surgery” included.

Twenty-one patients did not attend the three-month follow-up appointment. For the remaining 166 participants, the mean number of days between surgery and the three-month follow-up was 94 days ($SD = 13$ days). One hundred and sixty patients attended a second follow-up appointment ($M = 202$ days, $SD = 41$ days). The fewest number of days was 120 (or approximately four months); the highest number of days was 361 (or approximately one year). Finally, 160 patients attended a third follow-up appointment ($M = 389$ days, $SD = 74$ days). The fewest number of days was 260 (or approximately nine months); the highest number of days was 674 (or approximately 22 months).

**Criterion Variable**

The variable by which post-surgical “success” was measured was the percentage of weight lost by the participant. At the three-month follow-up appointment, the mean percentage of weight lost for participants was 16% ($SD = 7%$). Two participants were heavier than their start weight at this time point. At the second follow-up, the mean percentage of weight lost was 25% ($SD = 10%$). Three participants were heavier than their start weight at this time point. At the third follow-up, the mean percentage of weight lost was 31% ($SD = 13%$). Four participants were heavier than their start weight at this time point.
Regression Analyses

As previously stated, regression analyses were performed for each of the three time points: at the three-month follow-up, at the second follow-up appointment, and at the third follow-up appointment. All analyses included ten predictor variables (six psychological constructs and four demographic variables). Analyses two and three also included an eleventh predictor variable: number of days after surgery. The criterion variable was percentage of weight lost.

Results at three-month follow-up. The regression equation at this time point was significant, $F(10, 123) = 2.39, p = 0.013$, indicating that at least some of the predictor variables predict percentage of weight lost better than chance alone. The adjusted $R^2$ value of 0.094 indicates that 9.4% of the variability can be accounted for by the ten predictor variables. Three of the ten predictor variables were statistically significant: sex ($p = .005$), lifestyle ($p = .046$), and responsibility ($p = .005$). Men lost more weight at this time point. A better rating on understanding of lifestyle changes predicted success. Finally, a better rating on the extent to which a patient takes responsibility for his or her weight loss predicted success.

Results at second follow-up appointment. The regression equation at this time point was significant, $F(11, 123) = 3.38, p < 0.001$. The adjusted $R^2$ value of 0.163 indicates that 16.3% of the variability in percentage of weight lost can be accounted for by the eleven predictor variables. Three of the eleven predictor variables were statistically significant: age ($p = .002$), expectation ($p = .03$), and number of days after surgery ($p < .001$). Younger patients lost more weight at this time point. A better rating for the patient having reasonable expectations of the surgery predicted success.
Finally, a higher percentage of weight lost was found as the number of days after the surgery increased.

**Results at third follow-up appointment.** The regression equation at this time point was significant, $F(1, 117) = 3.56, \ p < .001$. The adjusted $R^2$ value of 0.25 indicates that 25% of the variability in percentage of weight lost can be accounted for by the eleven predictor variables. Three of the eleven predictor variables were statistically significant: age ($p = .001$), procedure ($p = .007$), and motivation ($p = .048$). Younger patients lost more weight. Better scores on understanding of the procedure predicted success. Finally, better scores on patient’s level of motivation predicted success.
Chapter V

Discussion

This section contains an interpretation of the results and explains the concomitant implications for clinicians. It also includes an examination of the strengths and limitations of this study, and provides suggestions for future research. With regards to the interpretation of results, each significant predictor variable is considered separately, and then these variables are contextualized. This is done by identifying the psychosocial location of patients at the three different post-operative appointments, and relating these locations to Prochaska and DiClemente’s (1986) Stages of Change model. By using the Stages of Change model as a theoretical framework, the differential predictive power of the psychological constructs at the various time points may be understood.

Interpretation of Results

The primary purpose of this research was to examine the predictive validity of six non-pathological psychological variables which are typically assessed in pre-surgical assessments for weight loss surgery. More specifically, the variables evaluated by the semi-structured interview at Kettering Bariatrics were: the patient’s pre-surgical amount of research; understanding of the procedure; understanding of post-surgical
lifestyle changes; level of motivation; reasonableness of expectations; and perception of personal responsibility. The hypothesis of this research was that one or more of the non-pathological psychological variables would predict post-surgical success.

The results of the current study support this hypothesis. At the three different postsurgical time intervals, non-pathological variables predicted the percentage of weight lost, and at each time interval, different variables were significant predictors. Because certain demographic variables – age, sex, race, number of psychological diagnoses – have been shown in the literature to also predict weight loss (Van Hout, 2005; Coleman et al., 2014; Rutledge, Groesz, & Savu, 2011), they were included in the analysis as well.

Two demographic variables did not predict percentage of weight loss at any of the time points: race and number of psychological diagnoses. The literature indicated that African American and Hispanic patients tend to lose less weight than their Caucasian counterparts (Coleman et al., 2014). In this sample, 13% of participants were African American and less than 2% of participants were Hispanic. The underrepresentation of both racial groups likely accounts for this deviation from the literature. With regards to the number of psychological diagnoses, previous research suggested that two or more diagnoses negatively correlated with post-surgical weight loss (Rutledge et al., 2011). In this sample, less than 8% of patients had two or more psychological diagnoses, so again, underrepresentation likely accounts for this variable’s lack of predictive power.

One demographic variable predicted weight loss at only the three-month time point: sex. Men were more likely to have lost weight than women. At the second and third follow-up appointments, sex was no longer significant. Previous studies found that women tended to more successful than men (Van Hout, 2005; Larsen et al., 2004). There
are a few possible explanations for this deviation from the literature. Firstly, the aforementioned previous studies examined weight loss success at later time points. For instance, the Larsen et al. (2004) study used data from 18 months post-surgery. Consistent with the current study’s results, men and women are losing weight at statistically the same rate by the six-month mark (Millward et al., 2014). With regards to weight loss more generally – not limited to bariatric surgery – men are generally more successful than women in the short-term (Millward et al., 2014). This is due to physiological factors like higher levels of testosterone, greater muscle mass, larger builds, and a tendency for men to consume protein rather than carbohydrates when they overeat (Caba, 2015; Tsai, Lv, Xiao, & Ma, 2015).

Another mitigating factor in women’s weight loss is the presence of a traumatic history. Women are especially susceptible to obesity if they have experienced incidents of sexual trauma, and indeed, as many as 32% of female weight loss surgery patients report such a history (Grilo, 2005). When women have experienced sexual trauma, they may gain an excessive amount of weight to function as a shield against unwanted sexual attention (Grilo, 2005). It is possible that during this initial phase of rapid weight loss, women with such a history feel vulnerable as weight is lost and other’s notice and comment upon it. Short-term weight loss among women in this sample may have therefore been undermined by an attempt to adjust to the loss of this trauma-protective factor.

There are also several possible explanations as to why women may be more successful than men in the long-term. Women experience more societal pressure than men to be thin in order to be considered attractive and desirable (Hesse-Biber, Leavy,
Quinn, & Zoino, 2006). Moreover, previous studies have shown that women’s quality of life is more adversely impacted than men’s by being overweight (Hesse-Biber et al., 2006). Women are also more likely to control meal choices in the household, as they continue to disproportionately manage food purchases and food preparation (Walter, 2012). In addition, women are more likely than men to engage in weight loss groups, and supportive networks have been shown to help facilitate and sustain weight loss (Forster & Jeffrey, 1986). It would seem, then, that women have more social incentive than men to maintain weight loss in the long-term, and they are more likely to manage and utilize resources which facilitate sustained weight loss.

One important aspect of the social conventions which compel women to lose weight is the oppressive nature of these conventions. The social concerns cited in the previous section – enhancing attractiveness, increasing quality of life, disproportionately bearing household responsibilities – reflect societal attitudes which restrict women’s choice and agency (Hesse-Biber et al., 2006). As a reaction to the societal demand for thinness, particularly toward women, a social movement known alternatively as fat activism and size acceptance has arisen which challenges the notion that obesity is inextricably linked to health problems (National Association to Advance Fat Acceptance; NAAFA, 2014). Advocates of this movement state that the attention given to obesity as a health concern is reflective of prejudice against fat people; they further assert that women suffer more than men from this conflation of “undesirable” appearance with poor health (NAAFA, 2014). Thus, there is some controversy terming weight loss, particularly women’s weight loss, as “success.”
One other demographic variable in this study predicted the percentage of weight lost. Age was a significant predictor at the second and third follow-ups, but not at the first. Younger people tended to lose more weight at the latter two appointments. This is consistent with previous studies’ findings, which indicated that persons of all ages would benefit from bariatric surgery, but that younger people tended to lose more weight over time (Van Hout, 2005). The lack of significance at the earlier time point is likely attributable to the fact that initial weight loss is rapid for all individuals given the nature of weight loss surgery (BSR, 2012).

There are several possible physiological and social explanations for why younger patients tend to lose more weight than their older counterparts. Physiologically, people lose approximately one pound of muscle every two years after the age of 30 (Dray, 2015). Muscle is critical to weight loss and fat burning as it directly impacts metabolic speed. Therefore, the loss of muscle in older people contributes to a slower metabolism and thus reduced weight loss. Co-morbid health conditions and life stressors also contribute to weight gain, and older people tend to suffer from more of these than younger people (Dray, 2015). Socially, younger people tend to engage in more active hobbies and they indicate different reasons for wanting to lose weight than older adults, both of which would facilitate weight loss (LaRose, Leahey, Hill, & Wing, 2013). In one study of 2,964 participants, younger adults (ages 18-35) were more likely to want to lose weight due to social pressure, a desire to feel better about themselves, a desire to improve their appearance, or in preparation for a social event. Older adults (ages 36-50) were more likely to want to lose weight to improve their health. In this study, younger adults
lost weight faster, but older adults kept the weight off for much longer (LaRose, Leahey, Hill, & Wing, 2013).

The final demographic variable included in the regression analyses in this study was “number of days after surgery.” It was incorporated into the second follow-up and third follow-up appointment regressions due to the wide variability in patient scheduling. Number of days was a significant predictor at the second follow-up appointment, but not at the third follow-up appointment. At the second follow-up appointment, the greater the number of days after the surgery, the higher percentage of weight lost. The number of days after surgery did not predict percentage of weight lost at the third follow-up. It is somewhat surprising that the number of days after surgery was significant in the second follow-up appointment but not the third. This cannot be accounted for by wider variability in second follow-up appointment scheduling. The variability was comparable in both cases, with a standard deviation of 19% at the second follow-up appointment and 20% at the third follow-up appointment. The differential predictive power of this variable is best accounted for by the fact that weight loss tends to slow down as the patient approaches the 18-month mark after surgery; indeed, many patients begin to gain some weight back at this point (Beck et al, 2012). The range for the third follow-up appointment was between nine and 22 months after surgery, with an average of 13 months. Therefore, the third appointment occurred when, statistically, weight loss is slowing or ceasing. As weight loss plateaus over time, time no longer factors into the percentage of weight lost.

Of the non-pathological psychological variables, only one was not significant at any of the time intervals: amount of research done by the patient. The amount of
research was defined by the assessor as the amount of time that the patient had put into basic knowledge-gathering about the surgery, including what the surgery entailed and what he or she would have to do to be successful (J. Wade, personal communication, July 24, 2013). This variable is thus conceptually similar to whether or not the patient understands the procedure and the lifestyle changes he or she will have to make. Moreover, individuals engaging in an extensive amount of research are presumably taking more personal responsibility for their weight loss, and they also likely have a high level of motivation to be successful. The four variables just alluded to – understanding of procedure, understanding of lifestyle changes, level of motivation, and extent to which patient takes personal responsibility – were all separate constructs assessed in the pre-surgical evaluation. Moreover, these four constructs were all significant at different follow-up appointments. Given this overlap in the operational definitions of these variables, it would seem that “research” was an overly broad construct which was absorbed by the more specific ones, which accounts for its lack of significance.

With regards to the five other non-pathological psychological variables, all five were represented exactly once, and they were spread across the three follow-up appointments. No variable was significant more than once. This suggests two things: the first is that each variable is conceptually different; the second is that patients require different psychosocial resources to be successful at different post-surgical time points.

To understand why patients may require different resources to be successful at different time points, it is necessary to consider the psychosocial experiences of patients at each of the three appointments. Huberman (2008) provided a four-stage model of psychosocial adjustment following weight loss surgery. In the first stage, patients are
focused on behavioral compliance and weight loss. In the second stage, patients attempt to achieve maximum weight loss and are positively reinforced by and for their efforts. In the third stage, patients test the limits of what they can do and still maintain success. In the fourth and final stage, patients either successfully or unsuccessfully transition into their new roles after weight loss.

Applying this model to the timeline of the current study, patients can be seen to be in Huberman’s first stage in the months leading up to the three-month follow-up appointment. Behavioral compliance is critical to recover from bariatric surgery. Indeed, recovery from gastric bypass surgery can take up to six weeks if an open surgery is performed rather than a laparoscopic procedure (BSR, 2012). During this first, three-month window, weight loss is happening rapidly as the body responds to the sudden shrinking of the stomach (BSR, 2012). This is similar to the process that occurs when one begins a diet and initially loses weight quickly (Hall et al., 2011). Managing the rapid weight loss and complying with post-surgical orders are thus primary concerns for the patient in this initial timeframe.

Stages two and three of Huberman’s model are operational during the timeframe between the three-month follow-up appointment and the second follow-up appointment. The second follow-up appointment in this study occurred, on average, approximately six-and-a-half months after surgery. At this point, weight loss remains steady, but it is not occurring at the initial rapid rate (Hoffman, 2015). Meanwhile, individuals still have several months until weight loss starts to plateau or reverse (Beck et al., 2012). Thus, nearly all people are losing weight during this time, but individual variability starts to play a larger role in terms of how much weight is ultimately lost. This shift to
intrapsychic resources to lose weight may be likened to the second stage of Huberman’s model, wherein patients are striving to achieve maximum weight loss and are being positively reinforced by and for his or her efforts. Huberman’s third stage, which he characterizes as “experimentation and punctuation” of weight loss, is evident during this middle period as patients explore the different ways in which they can be healthy and continue to live their lives (Hoffman, 2015). Patients experiment with types of foods and exercise and either develop successful strategies to continue losing weight or not.

Finally, the fourth stage of Huberman’s model is active as patients in this study approached their third follow-up appointments. The third appointment occurred an average of 13 months after surgery. At this juncture, the cessation or reversal of weight loss becomes more likely. Weight loss has slowed for all patients, and many are struggling with weight loss maintenance, which has been shown to be more difficult than actively losing weight (Sciamanna et al., 2011). As described by Huberman, this is a time when patients are either successfully or unsuccessfully transitioning into the new lives that have been created by the weight loss.

With this understanding of patients’ psychosocial locations at the three follow-up appointments, it is now necessary to consider the implications of these locations on weight loss. Weight loss is an intrinsically dynamic process of change. One way in which to conceptualize change is by utilizing Prochaska and DiClemente’s Stages of Change, as described in their Transtheoretical Model for Behavioral Change. Briefly, when patients are attempting to make behavioral changes, they find themselves at one of five psychological stages, described below (Prochaska & Diclemente, 1986):
1. Pre-contemplation: patients do not intend to take action to change the behavior in the foreseeable future, which is usually defined as within the next six months.

2. Contemplation: patients at this stage are considering a behavior change and often feel ambivalent about undertaking it. Patients tend to be very aware of both the pros and the cons and often can cite an equal number of each (Hall & Rossi, 2008).

3. Preparation: patients at this stage intend to take action in the immediate future, usually defined as within the next month. They generally have taken some action already (e.g., completed an educational course, done research) and are ready to engage in the major work of the behavior change.

4. Action: patients are making overt modifications in the behavior that they seek to change.

5. Maintenance: patients have successfully changed their behaviors, but they are vigilant about the possibility of relapse and they are still tempted to return to their previous habits.

The patients in this study completed weight loss surgery and thus cannot be considered to be in the Pre-contemplation or Contemplation stages regarding the surgery itself. However, it is important to make a distinction between readiness for surgery and readiness for the changes that happen as a result of the surgery. It is possible that though patients were ready to receive the surgery, they were not as prepared to adhere to the lifestyle changes that accompanied it. For the purposes of this discussion and for the sake
of clarity, however, only the patient’s stage of change regarding the overall surgical process will be considered here.

In the immediate aftermath of the surgery, patients can be located in both the Action stage and the Contemplation stage. They are in the Action stage in terms of their recovery from surgery, as evidenced by their adherence to the surgeon’s post-surgical instructions, and they are changing their eating habits in order to accommodate their altered digestive tracts. At this juncture, patients are also contemplating the long-term practical and psychosocial changes that will occur. Specifically, when obese individuals rapidly lose weight, they often have to contend with loose skin that may or may not need to be surgically removed; they will need to purchase new clothes, respond to other’s reactions to their weight loss, and begin to think about themselves in different ways as the identity of an “obese person” ceases to apply (Ritz, 2006).

At this initial stage, patients are engaging in two simultaneous health processes: surgical recovery and weight loss. Their psychological responses to these two processes may conflict. The inclination once one feels better after surgery is to engage in pleasurable activities and celebration. However, for individuals to be successful in the weight loss process, discipline and some amount of austerity are necessary. For some individuals, the former may interfere with the latter.

As patients move past the initial, rapid weight loss, they remain in the Action phase, but now the focus shifts from compliance with post-surgical instruction to incorporation of lifestyle changes. In order to maximize and sustain weight loss, patients need to be engaged in exercise and healthy eating (Hoffman, 2015). If weight loss begins to plateau and a significant amount of weight remains to be lost, then altering the type of
exercise and modifying diet will become important. Patients are assuming more responsibility for their weight loss during this period and a higher level of vigilance regarding the process is required. As previously stated, the middle stage of the post-surgical process is arguably when dispositional traits become the most critical, because it is at this time that patient action, as opposed to the surgery itself, is the primary driver of weight loss (Hoffman, 2015), and patient action is governed by dispositional traits.

Finally, patients will eventually stop losing weight and possibly regain some weight. After weight loss surgery, this typically occurs at approximately the 18-month mark (Beck et al., 2012). Depending upon the individual’s start weight, the cessation of weight loss could be a function of achieving goal weight, the body adjusting to the surgical changes, the presence of post-surgical complications, or a lack of post-surgical behavioral compliance (Hoffman, 2015). Commensurate with the reason for the cessation of weight loss, some patients may need to remain in the Action stage of change in order to resume weight loss or address barriers thereto. For most patients in this study, however, they were entering into the Maintenance stage by the time they attended their third follow-up appointment. During Maintenance, patients are no longer attempting to lose weight and instead are attempting to sustain previous losses. Maintenance is often a difficult time in the stages of change because the positive reinforcements experienced during rapid weight loss cease (e.g., weight decreasing quickly, other people responding to progress); therefore, patients need other, often more intrinsic, motivations in order to persevere (Williams, Grow, Freedman, Ryan, & Deci, 1996). Moreover, as the weight loss “project” reaches its conclusion, other priorities and struggles reassert themselves.
Trauma triggers may become more problematic and stressors in other domains of life may become more prominent (Grilo, 2005).

In order to contextualize the results of this study, the Stages of Change model may be considered in tandem with the psychosocial locations of patients at the three different follow-up appointments. At the three-month mark, two non-pathological psychological variables significantly predicted success: understanding of the lifestyle changes that need to be undertaken, and amount of personal responsibility assumed for weight loss. As previously explained, in this early stage, patients are taking action to recover from surgery, eat differently, and increase their activity level. They are also preparing to make more permanent changes to their lifestyles. In order to adequately prepare for lifestyle changes, patients would require strong knowledge about postsurgical lifestyle changes. Moreover, a greater sense of personal responsibility would enable the patient to employ this knowledge effectively. Indeed, previous studies have indicated that an internal locus of control correlates with success after weight loss surgery (Wallston & Wallston, 1978). An internal locus of control is conceptually similar to a sense of personal responsibility. It is possible that the construct of personal responsibility in this study is also capturing aspects of self-efficacy, which has been shown to impact success when attempting behavioral changes (Linde, Rothman, Baldwin, & Jeffery, 2006).

At the second follow-up, only one non-pathological variable was significant: reasonableness of expectations of the surgery. This variable was defined in terms of what the patient expected of the surgery. Previous research indicates that people’s expectations tend to fall into one of two categories: aesthetic or lifestyle (Larsen et al.,
Expectations regarding lifestyle are more concrete and are regarded as more reasonable and realistic. They include goals like a greater ability to engage in sports, be active with loved ones, and enjoy overall better health. Aesthetic expectations include goals like being more attractive, obtaining a better mate, and achieving higher social status. Aesthetic expectations are less realistic and reasonable as they are subject to factors outside of the scope of the surgery (Larsen et al., 2004). For example, overall attractiveness, appeal to others, and social status are linked to many things besides weight, including other physical variables, personality variables, type of employment, financial situation, etc.

Recalling the Stage of Change in which patients are likely to be located during this middle weight loss period – Action in terms of lifestyle changes – it seems that reasonable expectations, as defined above, would be critical. Patients with reasonable expectations would have fulfilled some of their expectations, which would positively reinforce the changes they have successfully implemented. Patients with more aesthetic expectations may or may not have realized any of their goals, as their ability to attain their ideals is much less under their control. Unrealized expectations would negatively reinforce behavioral changes, and thus, weight loss would be undermined for the patients with aesthetic expectations. Thus, obtainable goals and ideals would play a pivotal role in encouraging the furtherance of the behavioral changes that patients are endeavoring to integrate into their lives.

At the third follow-up appointment, two non-pathological variables significantly predicted weight loss: understanding of procedure and level of motivation. The latter variable is consistent with the challenge that patients face in this later stage of the
process. Again, at this point, many patients are plateauing in terms of their weight loss. The patient may feel a sense of failure or disappointment as the “rush” of watching pounds fall off the scale ceases (Sciamanna et al., 2011). Individuals who were highly motivated at the start of the process would intuitively be in a better position to persevere as external reinforcements diminish. Said motivation, however, would be less impactful if they did not know when to expect weight loss to slow or cease. This knowledge would be important to normalize the experience and inoculate against the loss of previous indicators of success, which would in turn maintain motivation. In this case, such knowledge is captured solely by the construct patient’s understanding of the procedure.

In summary, five of the six non-pathological psychological variables that were examined were demonstrated to impact the percentage of weight that patients lost. Different variables were impactful at different post-surgical time points, reflecting the unique psychological demands placed on patients at each of those time points. The sixth variable – amount of research that the patient had done – was never significant, likely because it conceptually overlaps with the other variables, which are more specific in nature. Two demographic variables, race and number of psychological diagnoses, were also never significant, likely due to the relative homogeneity of the sample. At the first follow-up appointment, age was not a significant predictor of weight loss, but it became so at the two later time points. In terms of gender, men lost more weight than women at the three-month mark but not at the two later time points, reflecting the fact that men tend to lose weight quicker than women (Caba, 2015). Finally, the number of days after surgery was only significant at the second follow-up appointment, an artifact of weight at the second follow-up being most impacted by individual choices and behaviors.
Implications for Clinical Psychologists

In medical facilities that provide weight loss procedures, there is generally an interdisciplinary team that assesses patient suitability for the surgery. Typically, such teams include the surgeon, nurses, dieticians, behavioral health clinicians, exercise physiologists, and others (USNWR, 2013). The scope of the behavioral health clinician’s role on the team varies by location, but in general, the behavioral health clinician tends to engage in three main tasks: conducting the pre-surgical evaluation and consulting with the medical team regarding patient needs; providing pre-surgical counseling or making recommendations therefor; and more rarely, engaging in post-surgical counseling or making recommendations for patient follow-up (Glinski, Wetzler, & Goodman, 2001).

The results of this study have implications for behavioral health clinicians related to all of these tasks. Firstly, with regards to the pre-surgical evaluation, it appears that there is conceptual overlap between the non-pathological psychological variables assessed and that at least one of them is redundant. As a result, more precise, operational definitions should be considered for all of the variables as a result of this study. Firstly, motivation seems to refer to more long-term, intrinsic motivation akin to perseverance. Secondly, patient understanding of the procedure seems to be most important in terms of how it helps to inoculate against disappointment and normalize the challenges inherent in recovering from bariatric surgery. Thirdly, patient understanding of lifestyle changes seems to be most critical in the short-term as patients recover from surgery and adjust their lives to fit their new bodies. Fourthly, reasonable expectations seem to bridge the gap between short-term action and long-term perseverance. Precise operational definitions of these constructs are important in order to understand the factors that impact
patient success and to meaningfully compare studies which measure them. In doing so, treatment interventions can be more targeted and better informed.

Clarity on what these variables mean and why and when they are important can also guide the pre-surgical counseling process. It is not unusual for patients to be referred to pre-surgical counseling before they are approved for surgery (J. Wade, personal communication, July 24, 2013); despite this, as many as 20% regain all of their weight (Karmali et al., 2013). Oftentimes, pre-surgical counseling focuses on psychoeducation about the medical and physical aspects of the procedure, including exercise, diet changes, and the course of recovery. Less often, pre-surgical counseling focuses on emotional and psychosocial concerns (Glinski et al., 2001). Even rarer is counseling aimed toward addressing the normal (versus pathological) emotional and psychosocial challenges patients face as they recover. Several impactful psychosocial challenges are described in the literature, including difficulty adjusting to other people's reactions; partners feeling threatened by patients' physical changes; and impact to one’s sense of personal identity as physical appearance is significantly altered (Ritz, 2006). Generally, patients are expected to independently manage these challenges unless their reactions become extreme enough to warrant a psychological diagnosis and begin to interfere with compliance with medical directives. The results of this study suggest that it is not necessary for patients to experience psychopathology for their weight loss to be undermined by sub-clinical psychological factors. Indeed, “normal” psychological processes significantly impacted post-surgical success for this patient sample. If pre-surgical counseling focused on inoculating against normal emotional and psychosocial challenges, long-term success may improve. In sum, clinicians can use this data as an indication that pre-surgical
support groups or psychoeducational groups which focus on emotional processes could benefit patients.

Similarly, these results inform a post-surgical counseling process. As previously mentioned, post-surgical counseling is rarely done unless patients are having significant medical issues or complications (Glinski et al., 2001). The assumption seems to be that if patients are losing weight, they are experiencing no emotional or psychosocial challenges. This seems short-sighted however, as nearly all patients will be "successful" in the short-term, given that the natural consequence of the procedure is rapid weight loss (BSR, 2012). In the current study, less than 50% of patients followed up with their bariatric surgeon beyond the two-year mark. Patients are at the highest risk for regaining weight 18 to 36 months after surgery (Beck et al., 2012). Thus, when patients start to struggle, they are typically outside the purview of their medical weight loss team, leaving them vulnerable to relapse. Indeed, current practice means that only the most severe cases – patients who are not losing weight during the first year or who develop serious psychopathology – receive post-surgical behavioral health intervention.

The results of this study suggest that there is an opportunity to proactively identify patients who are struggling before their difficulties become severe. Consistent with newer models of preventative behavioral health intervention such as SBIRT (Screening, Brief Intervention, and Referral to Treatment), patients could be seen when they attend their medical follow-up appointments and brief intervention could be administered as appropriate (SAMHSA, 2011). In order to institute a model such as SBIRT, behavioral health clinicians need to identify the problematic behaviors or symptoms for which they are screening; prepare brief interventions to address any
concerns which may be present; and be prepared to refer patients to longer-term treatment when necessary. The application of the Stages of Change model to the results of this study provides guidance for the screening process that could be used with bariatric surgery patients. Moreover, a method of intervention known as Motivational Interviewing provides specific interventions at each stage of change which are easily applied in a brief format. These interventions are designed to facilitate patient movement along the continuum of the stages of change (Integrated Recovery, 2004).

As previously described in this section, the current study’s data indicated that patients were primarily in the Action and Contemplation stages of change immediately after surgery. They were action-oriented as they recovered from surgery, and contemplation-oriented with regards to impending lifestyle changes. Ideally, patients remain in the Action stage until they reach the cessation of weight loss, at which point they enter into the Maintenance stage. While in the Maintenance stage, the primary task patients are confronted with is sustaining their losses despite the loss of external motivators and previous indicators of success.

When patients are in the Contemplation stage, they are often aware of the pros and cons of making a change but they have not yet discovered a compelling enough reason to make a change (Integrated Recovery, 2004). The clinician’s task is to facilitate the discovery of intrinsic motivators. This is done by evaluating patients’ personal values, clarifying the benefits and costs of maintaining current behaviors, and focusing on self-efficacy so patients feel as if they are able to change when they choose to do so (Integrated Recovery, 2004). In the immediate aftermath of the surgery, bariatric surgery
patients are contemplating the lifestyle changes to come, including increased amounts of exercise and a better managed and healthier diet.

Given the high rate of emotional eating in this population (Canetti et al., 2009), patients may experience fear about being able to maintain a healthier diet and hope that the surgery simply does the work of the weight loss regardless of what they do. In the early stages, such a thought process would not necessarily undermine success, but in the long-term, it could prove quite damaging. If behavioral health clinicians were able to intervene early, they could work with patients to enhance their sense of self-efficacy and thus allay their fears about being unable to maintain the dietary restrictions. In addition, clinicians could assist patients in identifying what values and benefits would motivate them to persevere despite their ambivalence and fear.

In the Action stage, patients have committed to the behavior change and are engaged in the work of that behavior change; the clinician’s task to facilitate continued engagement. Key components of the clinician’s work in this stage are encouraging and reinforcing previous accomplishments; helping patients resolve current barriers and anticipate upcoming challenges; assisting patients in recognizing stressful situations and ensuring they have adequate coping strategies; and collaboratively identifying new positive reinforcements (Integrated Recovery, 2004).

During the middle stage of weight loss, it is critical for patients to remain in Action phase as they fully explore and integrate new aspects of their lifestyle. Patients struggling in this phase might feel thwarted in their efforts by family members who are still accustomed to overeating for comfort or pleasure, or by partners who feel insecure by the attention patients are receiving from others (Ritz, 2006). Inadequate or negative
social support can demoralize patients and significantly hamper weight loss. However, if such barriers were identified early, behavioral health clinicians could help patients in a myriad of ways. Patients could benefit from learning how to communicate with unsupportive persons in their lives; from identifying new places from which to receive support; and from understanding that it may be necessary to develop new rituals with loved ones that do not involve food in order to both maintain relationships and further their weight loss goals.

During the Maintenance stage, patients are working toward integrating their behavioral change into the rest of their lives. By the one year to 18-month mark, patients have experimented with different ways to assimilate healthy food and exercise into their daily existence, and they need to retain those strategies which best accommodate other roles and tasks. For instance, if patients find that parties are a trigger for overeating, they may have avoided them during the first year after the surgery, but it is unlikely that this approach will be sustainable in the long-term. Developing simple strategies to work around such triggers – like bringing their own food to parties or eating ahead of time to minimize temptation – are part of the most important task at this stage: creating relapse prevention plans. Patients need to have an awareness of what their triggers are for returning to their previous behaviors, and they need to be cognizant of how to cope when presented with said triggers. Clinicians can help build patient self-efficacy in this stage by affirming patient resolve and helping them to identify sources of support (Integrating Recovery, 2004).

As previously suggested in the discussion of the SBIRT model, integrating these strategies into the post-surgical recovery process could be done relatively simply. When
patients present for their medical follow-up appointments, brief, 15-minute behavioral health encounters could be incorporated into the follow-up protocol. Behavioral health clinicians would assess where patients are located in the Stages of Change and intervene if patients are struggling. A brief intervention – wherein barriers are processed, coping skills are identified, and values are discussed – could prove very effective to facilitate patient success. If further engagement is required, the behavioral health clinician would be able to recommend such services before patients are having significant medical or mental health difficulties.

Such proactive intervention could also be done in the context of a health habits group that was offered on an as-needed or monthly basis. The results of this study suggest that many patients are in the same psychosocial location at the same time which would lend itself to the group intervention format. In addition to being efficacious, group interventions are cost effective and enhance social support, the latter of which has been shown to increase weight loss success (Forster & Jeffrey, 1986).

In the group modality, the focus of intervention would shift over time. During the first three months, counseling would emphasize recovery and preparation for long-term lifestyle changes. In the four to nine month period, counseling would shift to supporting patients as they continue making changes, with a focus on managing the reasonableness of their expectations. At the end of the first year and entering into the second, counseling would focus on reinforcing knowledge about the slowing of weight loss as patients enter their second year, which would in turn enhance their internal motivation as external reinforcements diminish. Whether in a group or individual format, behavioral health interventions at key post-surgical intervals could be a powerful way to
reduce the possibility of obesity recidivism. As many as 20% of bariatric surgery patients regain a significant amount of weight within the first three years after surgery (Karmali et al., 2013). By engaging with bariatric surgery patients consistently through their post-surgical recovery, negative outcomes could be minimized, and patient health could be enhanced.

**Strengths**

The current study has two key strengths. Firstly, a large data set was available that will facilitate further research into a population that is, in many ways, not fully understood. Secondly, Kettering Bariatrics was engaged throughout this research and demonstrated a commitment to improving patient care. They have served thousands of patients and enjoyed a high rate of success – indeed, a very small percentage of patients gained weight in this sample.

**Limitations & Future Directions**

Several limitations of this study are inherent to the use of archival data and the semi-structured nature of the interview. With regards to the archival data, paper charts were retrospectively evaluated to determine if variables assessed pre-surgically impacted post-surgical weight loss. Only charts that had at least a year's worth of follow-up data and the current version of the pre-surgical evaluation were included. This limited the sample significantly, and thus by definition, it was a sample of convenience. With samples of convenience, ensuring that the sample is representative of the population being studied is more difficult. The sample in this study approximated the gender distribution in the population of weight loss surgery candidates, but it was not representative in terms of racial demographics.
Using archival data also limits the scope of the research. Other factors that could be considered indicators of success after weight loss surgery (e.g., reduction in hypertension, resolution of Type II diabetes) were unable to be included because of incomplete charts. Of the variables that were included in this research, a small percentage of participants were missing data points due to incomplete paperwork. This is a common problem with retrospective studies since they depend upon data that was collected without the intention of doing that particular research project. In addition, the sample of this study was further limited by the lack of access to charts moved off-site, which again, is a common issue with archival data.

Another challenge with a retrospective study related to post-surgical outcomes is that all candidates were obviously ultimately approved for the surgery. Thus, the sample itself is limited to those individuals who obtained clearance. The results, then, are less likely to provide much insight into success or failure; rather, the results provide a picture of more success versus less success.

With regards to the semi-structured interview used by Kettering Bariatrics, it was created according to the best practices of the American Society of Metabolic & Bariatric Surgeries. This theoretical foundation contributes to the utility of the measure. However, the survey has never been evaluated for its validity or reliability, and the constructs assessed are not operationalized or empirically grounded. The measurements of these constructs are based upon clinical judgment, which is subject to bias. Moreover, a single clinician conducts the interview, so there is no opportunity for interrater reliability. The same clinician conducted all interviews for the individuals in this study's sample, which provides some level of comparability between patients.
However, such control is less desirable than the measure itself being tied to more objective standards.

This study provided some important insights into the non-pathological psychological factors that impact success after weight loss surgery. Future research could expand upon these results in several ways.

Each of the six, non-pathological constructs is open to multiple interpretations. Because these constructs are not exclusively psychological terms and have meaning in everyday discourse, there is often a lack of appreciation for the need to evaluate them critically with clinically-driven interpretations. For example, motivation, as a psychological construct, has many facets. It can refer to excitement, resolve, or perseverance; it is influenced by personality variables and environmental variables; it waxes and wanes and can be undermined or enhanced by a variety of factors. This study suggested that the motivational construct assessed by the Kettering Bariatrics evaluation was most conceptually similar to long-term, intrinsic perseverance.

Additional research on the components that comprise each of the six variables, and which aspects of them are the most relevant, would help to guide clinicians on the appropriate timing and application of interventions.

Finally, a model of post-surgical behavioral health intervention for the bariatric surgery population currently does not exist. This study suggests a possible framework for developing such a model, and research on bariatric surgery outcomes (particularly in the long-term) suggests that post-surgical support could significantly enhance the health and well-being of patients.
Conclusion

This study was undertaken to determine to what extent non-pathological psychological variables could predict weight loss success in a bariatric surgery population. As compared to psychopathology, non-pathological constructs are often overlooked in the literature. This seems to reflect the reactive rather than proactive nature of healthcare. It is, indeed, very important to study those factors which contribute to psychopathology. However, perhaps if clinicians were able to apply early intervention to sub-clinical difficulties, incidents of psychopathology could be prevented.

The outcome of this study demonstrated that non-pathological psychological constructs are impactful throughout the post-surgical process, which in this study spanned from three months to approximately 13 months. By examining the significant variables through the theoretical framework of the Stages of Change, the results were given clinical utility. Motivational Interviewing is a model of intervention which allows for targeted clinical engagement along the Stages of Change continuum. Integrative models such as SBIRT provide a structure by which behavioral health services could be provided in tandem with medical services during patients’ follow-up appointments. Patients could be screened to assess their location along the Stages of
Change, and if difficulties were detected, behavioral health clinicians could provide a brief intervention, as suggested by Motivational Interviewing. Such a proactive approach could minimize negative outcomes for this population, which often struggles with a host of psychosocial concerns and long-term weight recidivism.

The hope of this researcher was to provide some insight into the challenges of patients who are endeavoring to make sound decisions regarding their health and well-being. Obese individuals suffer from social stigma and prejudice, and often, they hope that bariatric surgery will give them a new lease on life. Providing compassionate care that maximizes their chances for success honors their struggles, and behavioral health clinicians should play a key role in service to this population.
Appendix

Kettering Health Network
Weight Loss Surgery Psychological Evaluation

Client Name: __________________________ Date of Intake: __________ __________
Time: __________________________ Units: __________________________
Date of birth: __________________________ Age: __________________________

Which procedure are you interested in? Lap-Band Roux-en-y BPD Gastric Sleeve IEG

With which surgeon? Schumacher Brown Fleischer Bruce Other: __________

What was your reason for choosing this procedure over some of the other surgeries offered?

What have you done to learn more about this procedure?
- Seminar (DVD Internet Live) Surgeon P.A. internet Reading material
- Surgery Veteran Friends Co-Workers Family Online Other

Amount of research is: Extensive Thorough Adequate Minimal Inadequate

What do you know about this procedure? What happens during the surgery? How will it help with weight loss?

Understanding of procedure is: Extensive Thorough Adequate Minimal Inadequate

What other meds have you used already (if any)? Exercise 1:1 Nutrition 1:1 Pre-op ins. visits

What are some common lifestyle changes that people are encouraged to make and rules that they should follow to help get healthy results from this tool?

Understanding of changes is: Extensive Thorough Adequate Minimal Inadequate

Rate the patient's level of risk based on their level of understanding and comprehension of the procedure and changes necessary for success: green yellow orange red

* Patient may need further education to maximize benefits of surgery
How long have you been considering weight loss surgery? ________________ ____________
What makes this the right time for you? What is motivating you to do this now?

Rate the patient's risk level based on their level of motivation: green yellow orange red
What do you hope will be different about your life after the surgery? How will this benefit you?

Rate patient's risk level based on their expectations being reasonable and realistic: green yellow orange red

What kind of health problems do you have (patient reported)?
- Hypertension
- High Cholesterol
- Diabetes
- Hygiene issues
- Joint Pain / Arthritis
- Knee Pain
- Hip Pain
- Foot Pain
- Back Pain
- Fibromyalgia
- Other: ____________________________

How old were you when you first started having weight problems?

What do you believe are the reasons for your weight problems?

Does patient take responsibility for weight problems? Full Significant Some Minimal None
Rate patient's level of insight regarding weight problems. 1 _______ 5 _______ 10
How have you tried to lose weight in the past?

<table>
<thead>
<tr>
<th>Diet Workshop</th>
<th>Prescription Medications</th>
<th>OTC Medications</th>
<th>Slim Fast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Watchers</td>
<td>Physicians Weight Loss</td>
<td>Fad Diets</td>
<td>TOPS</td>
</tr>
<tr>
<td>Herbal Life</td>
<td>Nutrisystem</td>
<td>Exercise</td>
<td></td>
</tr>
<tr>
<td>&quot;Cutting back&quot;</td>
<td>High protein/Low carb</td>
<td>Jenny Craig</td>
<td></td>
</tr>
</tbody>
</table>
Describe your eating pattern on a typical day. When is the first time you eat?

Hunger isn’t the only reason we eat. We eat when we’re bored, stressed, lonely, socializing, celebrating and for reward… How do you relate to some of these?

Are there any foods are tempting to you?

<table>
<thead>
<tr>
<th>Chips</th>
<th>Pasta</th>
<th>Bread</th>
<th>Pizza</th>
<th>Fried foods</th>
<th>Sweets</th>
<th>Ice Cream</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Other: ____________________________________________

How much coffee do you drink in a day? How do you sweeten it/what do you put in it?

Soda/Cola? Diet or regular?

Other (juices, sports drinks, milk, tea) ____________________________________________

<table>
<thead>
<tr>
<th>Do you binge eat? (What is that?)</th>
<th>Yes</th>
<th>Some</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you graze? (What is that?)</td>
<td>Yes</td>
<td>Some</td>
<td>No</td>
</tr>
<tr>
<td>Do you feel like your portion sizes are too large?</td>
<td>Yes</td>
<td>Some</td>
<td>No</td>
</tr>
<tr>
<td>How long after you eat before you want to eat again?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you eat or snack late in the evening?</td>
<td>Yes</td>
<td>Some</td>
<td>No</td>
</tr>
<tr>
<td>If you wake up in the middle of the night, do you eat or snack?</td>
<td>Yes</td>
<td>Some</td>
<td>No</td>
</tr>
<tr>
<td>Have you ever tried to control your weight with laxatives, starvation diets, purging, street drugs?</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Rate the patient’s risk level based on history of unhealthy attempts to lose weight (Anorexia, bulimia, starvation diets, etc): green yellow orange red

What kind of changes or adjustments do you anticipate you will need to make to your eating behavior to get the results you want?

Rate the patient’s risk level based on their ability to adapt to new, healthy eating habits: green yellow orange red
Do you Own or Rent [house or apt] your current residence? Who else lives there with you?

Marital History:

Family of Origin:

Has there ever been any drug or alcohol use in your family? __________________________

______________________________

Any M.H. issues: depression, anxiety, "bad nerves"? __________________________

______________________________

Rate the patient's risk level based on their current or historical familial and marital dynamics: green | yellow | orange | red

Vocational and Educational History [Military]:

Is work (or unemployment) a significant source of stress? Yes  Some  No
Drug and Alcohol History:
Do you smoke or have you ever smoked?

How old were you when you first had alcohol:

Tell me about any drug use past or present (marijuana, street drugs, etc.)?

Have you ever had any treatment for drug or alcohol use? Yes No
Describe:

Have you ever been arrested or had any legal trouble? Yes No
Describe:

Rate the patient's risk level based on current or historical substance use/abuse: green yellow orange red
Social Supports / Interests / Daily Activities:
- Do you have many supportive friends?
  - Do you enjoy socializing with people or do you enjoy your time to yourself?
    Not social 1 5 10 Very social
  - How comfortable are you at asking for help when you need it? 1 5 10
  - Who will be supporting you through surgery and the weight loss process?
  - Hobbies or interests or outlets for stress: What do you do for fun?
  - Describe a typical day:

Other support resources: Church Social Clubs Organizations
Rate the patient's risk level based on their support network and their willingness to use it: green yellow orange red
Have you ever been abused physically, sexually or emotionally?

Rate the patient’s risk level based on current or historical physical, sexual or emotional abuse: green yellow orange red
Mental Health History:
Are you taking any psych medications for depression, anxiety, bipolar, ADD or sleep?

What kind of stressful things do you have going on in your life right now (Family, Social, Housing, Finances, Work or School, Health)

Have you ever been in counselling before/current?

Have you ever attempted suicide? Yes No
Describe: ___________________________ ___________________________
_____________________________ ________________________________
_____________________________ ________________________________
Ideation? ____________________________ ___________________________
Do you have a plan? ____________________________ ___________________________
Would you carry out that plan? ____________________________ ___________________________
Have you ever been hospitalized for depression or anxiety or nervous breakdown?

What is your mood usually like?
Are there times where you get depressed, discouraged, irritable, frustrated? What circumstances (current or in the past) contribute to any of these feelings?

Are you a worrier?

How many hrs of sleep do you get at night? ______ Do you feel **rested** or **tired** upon waking?  
Do you have any difficulty sleeping at night?  Onset Insomnia?  Interruption?

Appearance:  Well Groomed  Appropriate to season & occasion  Untempt  Unclean  
Rapport:  Easily Established  Initially Difficult  Never established  Easily Upset  
Interview presentation:  Open/Honest  Friendly Alert  Guarded  Evasive  Passive  
Personality Style:  Outgoing  Assertive  Confident  Reserved  Avoidant  
Cold  Aggressive  Impulsive  Impedant  Intimidating  
Behavioral observations:  Good eye contact  Downcast eyes  Talkative  
Anergetic  Energetic  Fidgeting  Restless  
Voice Tone:  Soft  Loud  Sing-Song  Normal  Pressured  Rapid  Slow  
Affect/Mood:  Euthymic  Cheerful  Depressed  Teartful  Anxious  Angry  Irritable  
Animated  Calm  Grandiose  Bland  Hostile  Labile  Hopeless  
Insight:  Good  Fair  Limited  Impaired (Selectively, Globally)  
Judgment:  Good  Fair  Limited  Impaired (Danger to: Self, Others)  
Thought Flow:  Coherent  Relevant  Delusional  Hallucinating  Paranoid  Tangential  
Esl. Intellectual Functioning:  High  High Average  Average  Low Average  Low  

Rate the patient's risk level based on current or historical psychological functioning and stability:  green  yellow  orange  red  5  4  3  2  1

Rate the patient's risk level based on their potential to be compliant with post-op follow up:  green  yellow  orange  red  5  4  3  2  1
Diagnostic Impressions:

Axis I

Axis II

Axis III  (See list on page 2 for patient reported health concerns)
(See medical chart for diagnosed health conditions)

Axis IV  Family Dynamics  Social Dynamics  Housing  Health
Finances  Work or School  Other: __________________________

Axis V  CAF __________

Overall evaluation of patient:

○ This person exceeds criteria for bariatric surgery and is ready to proceed
○ This person meets criteria for bariatric surgery and is ready to proceed
○ This person does not meet criteria for bariatric surgery at this time due to concerns in the following areas:
  ○ Poor understanding of changes necessary to be successful
  ○ Questionable motivation and/or unrealistic expectations
  ○ Unstable relationships/environment (marital, familial, housing)
  ○ Substance use/abuse
  ○ Poor coping skills / social support / outlets for stress
  ○ Psychological stability

Additional Comments: __________________________________________
________________________________________________________________
________________________________________________________________

Provider Signature: __________________________ Date: ____________
Supervisor’s Signature: __________________________ Date: ____________
References


