THE RELATIONSHIP BETWEEN BINGE EATING AND PSYCHOPATHOLOGY IN OBESE ADULTS SEEKING BARIATRIC SURGERY

BY

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Submitted to the Department of Psychology and Research in Education and the Faculty of the Graduate School of the University of Kansas

In partial fulfillment of the requirement for the degree of

Doctor of Philosophy.

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DEDICATION

This is dedicated to the following important people:

To my Uncle Steve who knew I could before I had the notion.

To my grand and great grandparents for the lessons they taught me early in life.

To my parents who provided doors to opportunities.

To my husband for all of his unending encouragement, support, and love.

ACKNOWLEDGEMENTS

I would first like to thank everyone who provided support, well-wishes, and laughter through the dissertation and graduate school process, you made this an amazing journey! A big thank you to my academic advisor and dissertation chair, Dr. Karen Multon, for her guidance throughout my doctoral program. I would also like to thank the members of my committee, Dr. James Lichtenberg, Dr. Julia Shaftel, Dr. Robert Twillman, and Dr. Kristen Hensley, for their feedback and willingness to commit to this endeavor.

A special thank you to Dr. Julia Shaftel, Dr. Thomas Krieshok, and my practicum cohort. Dr. Shaftel you have made graduate school a wonderful learning experience, for which I will never forget. I developed a framework to conceptualize in a more holistic manner, and grew personally, while working with you at CPS and learning from you in Italy. I can only say grazie for the indelible impression you have left on me. Dr. Krieshok, the knowledge and wisdom you imparted during practicum classes helped to build my professional armamentarium. The manner with which you approached practicum made it an open process to learn and grow as a psychologist and as a person. Not only did your approach make the class an unforgettable experience, but my practicum cohort enriched my graduate school experience. The ups and downs shared between my cohort, as well as the laughter and comprehensive exam shirts are memories I will cherish.

The most profound thank you to my family and friends, who have been my biggest cheerleaders on the path to completing this degree. The relationships I have developed during internship at KUMC has provided encouragement beyond my internship. Ayanna, Erin, and Shayla thank you for the support and friendship you have provided since the day I met you. Thank you to my mother-in-law, Opal, who always asked about school and understood how busy

I had been over the past 4 years. To my brothers Jaron and Havis and my parents, Havis and Chonita, thank you for your frequent check ups throughout graduate school and encouragement leading to the completion of the dissertation. I end by saying thank you to the person who has not only watched me, but walked this path with me, my husband Corey. Without your love and support this process would have been unbearable and incomplete. You have made this accomplishment a celebration and I thank you for standing by my side all those long nights and early mornings. I can't believe we are here and cannot wait to see where we go next, you are forever my love!

Abstract

The United States is in the midst of an obesity epidemic of epic proportions. A growing number of adults are pursuing bariatric surgery to cure their obesity, which has proven successful for many individuals. A component of the evaluative process for bariatric surgery includes a psychological evaluation. The goal of the evaluation is to identify any psychological variables that would negatively impact an individual's ability to successfully adhere to the pre and post surgical requirements. There are inconsistent research findings of the rate of psychopathology in the obese population. However, there are research findings to indicate that binge eating accounts for much of the psychopathology in the obese population. As there is evidence in the literature to support a relationship between binge eating and psychopathology, the purpose of this study is to examine that relationship in a group of adults seeking bariatric surgery. Adults seeking bariatric surgery completed a comprehensive set of questionnaires assessing levels of depression, anxiety, anxiety spectrum disorders, stress, support, interpersonal functioning, disability, and knowledge related to obesity and weight loss. Another purpose of this study was to evaluate the psychometric properties of the Revised Master Questionnaire. Results confirmed earlier indications of increased rates of psychopathology in obese adults who have moderate to severe levels of binge eating. Additionally, those with moderate and severe rates of binge eating endorsed higher rates of disability than those with no binge eating. The analysis of the Revised Master Questionnaire revealed acceptable internal consistency, but poor theoretical correlation between the factors of the questionnaire.

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Introduction

Research indicates that between 66-75% of the adult population in the United States is at least overweight(CDC 2007; National Health and Nutrition Examination Survey [NHANES], 2004). Results from a survey completed by NHANES (2008), indicated that 34.3 % of the American adult population meet the criteria for being obese, and 5.9% are extremely obese, as measured by an individual's Body Mass Index (BMI). BMI calculates weight after accounting for a person's height. That is, kilograms divided by height in meters squared. The index of being overweight is defined by a BMI of 25.0-29.9, in which a person has excess body weight comprised of muscle, bone, fat, and water (Weight-control Information Network [WIN], 2008). A BMI of 30 and over is defined as obese, which refers to an excess of body fat (WIN). The World Health Organization (WHO, 2006) and the National Institutes of Health/National Heart Lung, and Blood Institute (NIH/NHLBI, 1998) denote obesity as a BMI over 30, due to the strength of the relationship between BMI of 30 and early mortality. Manson et al. (1995) studied a cohort of women for the association between BMI and death, and found the risk of early mortality increased by 30% at a BMI over 25, while the risk for early mortality increased to 100% at a BMI over 30.

While obesity was once thought to be a disease of excess only found in industrialized nations, the epidemic of obesity is one that has reached global proportions. The most recent figures from the WHO (2006) estimated that world-wide, 1.6 billion adults (ages 16 and up) were overweight and at least 400 million were obese. Further global projections estimate that by the year 2015, 2.3 billion adults will be overweight and 700 million adults will be obese. In the United States over the course of 26 years (1980-2006), the prevalence of obesity has more than

doubled from 15% to over 30% , while the rate of adults who are overweight has remained relatively stable at 32% (National Center for Health Statistics [NCHS], 2008). The rate of obesity in the United States has reached epidemic proportions, most notably among minority women (Flegal, Carroll, Ogden, & Curtin, 2010; WIN, 2010). An alarming aspect is that research does not indicate stabilization in the growing waistband of America, which has major medical and mortality implications.

According to the Weight-Control Information Network (WIN, 2010) the medical risks associated with being obese include type II diabetes, high cholesterol, hypertension, coronary heart disease, stroke, nonalcoholic fatty liver disease, gallbladder disease, osteoarthritis, sleep apnea, cancers of the breast, colorectal, kidney, and endometriosis. Related to the medical risks, this population is at an increased risk of disability. Reuser, Bonneux, and Willekens (2009) found a positive relationship between obesity and disability; as the level of obesity increases, so does the occurrence of disability. Reuser et al. found that men whose BMI was between 30 and 34.9, would spend two years of their life expectancy disabled, while women of the same BMI would spend 3.2 years of their life expectancy disabled. The total cost of healthcare dollars attributable to obesity was 99.2 billion dollars in 1995 (National Institutes of Health, 1998). Strum (2002) estimated the impact of health care costs for obese adults was 36% higher, while medication costs were 77% higher than normal weight adults. The culmination of the health risks associated with obesity also greatly impacts the mortality rate of obese adults.

Flegal, Graubard, Williamson, and Gail (2005) provided a comprehensive estimation of mortality utilizing longitudinal data and relative risks, finding 111,909 deaths associated with obesity (BMI ≥ 30) in adults. Of the 111,909 deaths attributable to obesity, 82,066 of those deaths were in adults whose BMI was ≥ 35 (Flegal et al., 2005). While being obese is a risk

factor for early death, the incidence of death in an obese individual increases with weight, especially those with a BMI over 35. Utilizing information from the Centers for Disease Control and Prevention, Mokdad, Marks, Stroup, and Gerberding (2004) found poor diet and physical inactivity to be the second leading cause of death in the US in 2000, behind tobacco. The incidence of death due to obesity increased from 300,000 in 1990 to 400,000 in 2000; meanwhile, the rate of change in deaths attributable to tobacco increased by 35,000 in the same 10 year time span (Mokdad et al., 2004). Although mortality rates are higher for tobacco use than obesity, Sturm (2002) found obesity to be the cause of more chronic health conditions than both smoking and drinking combined.

While there is a clear association between obesity and health and financial costs, the relationship between obesity and psychopathology is an area in which the association is less clear. Over the last 3 decades, studies have reached opposing conclusions, that there is both a positive relationship between BMI and psychopathology, and that no significant relationship exists between obesity and psychopathology. Stunkard and Wadden (1992) found no difference in rates of psychopathology between mildly obese and non-obese adults. Friedman and Brownell (1995) provided a review of the early literature which held the position that no relationship exists between obesity and mental health functioning. Friedman and Brownell point out the limitations of early research methodology, which attempted to identify personality and psychopathological traits that caused obesity by comparing obese versus non-obese adults. They posited this method did not allow for interpretation of the research findings, but instead allowed for a descriptive analysis of the data. Another flaw of early research was the attempt to provide causal inferences of psychopathology and the etiology of obesity, as opposed to examining the relationship of psychopathology and obesity. Although early research denied a positive relationship between

psychopathology and obesity, more recent research has indicated that a positive relationship exists between obesity and mental health.

Recent research has placed more emphasis on "within group differences" of obese adults rather than "between group differences" of obese and non-obese adults, and additional focus has been placed on the social consequences of obesity which impact the type and level of psychopathology (Friedman & Brownell, 1995). This recent research has concluded obese adults are more likely than normal weight adults to have increased rates of depression, suicidal ideation, suicidal attempts, binge eating, substance use, eating disorders, and anxiety spectrum disorders (Carpenter, Hasin, Allison, & Faith, 2000; Castellini et al., 2008; Dingemans, Bruna, & Van Furth, 2002; Hasler et al., 2004; Kalarchian et al., 2007; Pickering, Grant, Chou, & Compton, 2007). Black, Goldstein, and Mason (1992) found higher rates of mood, anxiety, and eating disorders in obese adults than same-sex and normal-weight matched comparison group. Further delineation of the relationship between psychopathology and obesity is made by Higgs et al. (1997) who suggests those who seek medical treatment for obesity are more likely to have a history of depression and anxiety after controlling for BMI. Although this finding helps to clarify the within group differences and sheds some light on the propensity of psychopathology in obese adults who seek medical intervention for their obesity status, the inconsistencies in the literature regarding the relationship between obesity and psychopathology persist. Nonetheless, there is one area of obesity literature which supports a relationship between psychopathology within the obese population.

The relationship between obesity and psychopathology appears the strongest in those who engage in binge eating and may account for a significant proportion of the psychopathology found in obese adults (Yanovski, Nelson, Dubbert, & Spitzer, 1993). Binge eating is

characterized by eating a large amount of food in a discrete period of time with a sense of loss of control over eating and distress regarding binge eating (Diagnostic and Statistical Manual of Mental Disorders Fourth Edition-Text Revision [DSM-IV TR], 2000). The occurrence of binge eating in the obese population is estimated to be between 24%-34%, while the occurrence of binge eating in the normal BMI population is 2.5% (Castellini et al., 2008; Spitzer et al., 1993; Yanovski et al., 1993). When compared with obese individuals who do not engage in binge eating, those who engage in binge eating have higher and more severe rates of depression (Fassino et al., 2002), engage in higher rates of emotional eating (Ricca et al., 2009), exhibit psychological distress which prompts professional help and increased rates of social phobia (Ramacciotti et al., 2008), and have higher rates of negative affect and personality disorders (Masheb & Grilo, 2008). The occurrence of elevated rates of psychopathology in obese individuals who engage in binge eating underscores the intricacies of the etiology of obesity.

The incidence of psychopathology was originally thought to have a causal relationship with obesity, it is now understood that the cause of obesity is the consistent consumption of more calories from food than the amount of calories burned (WIN, 2008). Although the practice of consuming the same amount of calories than calories burned would resolve the issue of obesity, obesity is far more complicated than calorie consumption. The more accurate etiology of obesity is seated in the confluence of genetic, environmental, and social factors. Genes are thought to account for 25-40% of the variance in BMI, accounting for such aspects of the rate of metabolism, the accumulation and location of fat storage, and weight gain during periods of excess calorie consumption (Bouchard, 1994). Although well understood, the influence of genes on obesity is widely believed to not be the dominant factor for most obese individuals. Hill and Trowbridge (1998) succinctly summarized the role of genes on obesity, "Despite obesity having

strong genetic determinants, the genetic composition of the population does not change rapidly. Therefore, the large increase in the prevalence of obesity, seen over the past two decades, must reflect major changes in nongenetic factors" (p. 571). The impact of the non-genetic factors, including the environmental and social aspects of modern society, seems to account for a larger portion of the variance in obesity.

Research has established that genetic variables cannot account for the rise in obesity over the last 30 years and more specifically, for the percentage of obese individuals who binge eat. Fortunately, the psychological literature has proposed variables to account for etiological and maintenance factors of binge eating. The two most notable factors to account for the initiation and maintenance of binge eating are negative affect regulation and dieting.

Heatherton and Baumeister (1991) and Stice (1999) have suggested that binge eating is born out of an attempt to regulate negative affect. Those who have elevated negative affect binge eat to gain comfort and distraction from negative emotions. Heatherton and Baumeister stipulate that binge eaters measure themselves against high standards which create an awareness of their shortcomings which creates negative affect. As a result, they are motivated to escape their self-awareness of not meeting standards and the resulting depression or anxiety by binge eating. It is in the moments of awareness or shortly thereafter in which the binge eating episodes occur. The moments of self-awareness are heightened and frequently encountered in a society in which so much emphasis is placed on physical appearance and thinness. Heatherton and Baumeister postulate that dieting is often motivated by societal messages of thinness and not being thin is undesirable, which creates a stigma. The social stigma affiliated with obese adults is one in which we view a stigmatized person as "reduced in our minds from a whole and usual person to a tainted, discounted one" (Goffman, 1963, p.3). Obese individuals are often thought of as lazy

or gluttonous, and not compliant with the social norms of the U.S. in which beauty is equated to thinness (WIN, 2008). This stigma impacts the way in which obese adults are treated and often leads to discriminatory practices. Such discriminatory practices reported by obese adults include denied access in employment, housing, and customer service in stores, clothing options, and mistreatment by health care providers (Carr, & Friedman, 2005; Drury & Louis, 2002; Kristeller & Hoerr, 1997; Myers & Rosen, 1999; Olson, Schumaker, & Yawn, 1994). When an obese individual regularly encounters reminders of not meeting standards, a self-awareness of deficiency can quickly be reached. The resulting binge eating can cause the one thing they work against, additional weight gain.

To clarify the relationship between binge eating and affect, Jansen, Havermans, Nederkoorn, and Roef (2008) examined dimensions of affect (high versus low) in overweight and obese women and found that BMI and binge eating did not predict negative effect. Additional findings from Jansen et al. include those high in negative affect had more incidents of binge eating and depressive symptomology than those low in negative affect. Although Jansen and colleagues did not find a difference in BMI between low and high affect, they found women high in negative affect showed significantly more body-related worrying than those low in negative affect. These findings support the role of negative affect in binge eating and the relationship to psychopathology. The work of Henderson and Huon (2002) examined the relationship between affect, binge eating, and coping style, finding a significant relationship between negative affect on the severity of binge eating when moderated by coping style. Henderson and Huon's results indicate the intricacies of the relationship between affect and binge eating. The literature on the role of dieting and binge eating has yielded similar results as the research on negative affect.

It is theorized that dieting triggers or increases binge eating episodes in an attempt to counteract the effects of calorie deprivation that is utilized while dieting (Heatherton, Polivy, & Peter, 1990; Stice, 1999). The breach in the diet may also contribute to binge eating because of the abstinence-violation effect. Once the diet has been broken, there is no need to exhibit self control. One theory that provides a detailed explanation for the diet aspect of binge eating is the "false hope syndrome" (Polivy & Herman, 1999). The "false hope syndrome" states that people embark on a difficult self-change task (i.e., dieting), in which they have initial success, but they are eventually met with failure to maintain self-control. In the face of failure, an interpretation is made that with some adjustments they can succeed at the desired self-change task. Coupled with the interpretation is the idea that additional attempts are worth the success of self-change.

Additional attempts are made, prompted by memories of past initial successes and/or positive expectations for the future. This cycle is evident in the weight loss attempts, via dieting, of obese individuals. Polivy and Herman (2002) found four sources of failure of self-change: amount, speed, ease, and the effects of the self-change, in which people were unrealistic in their expectations in one or more of the four areas. Individuals thought their level of dieting could change more than was reasonable (e.g., only eating lettuce), that they would lose weight more quickly (e.g., drop one clothing size weekly), that it would be easy (e.g., lose weight with minimal lifestyle changes), and that dieting would improve their lives beyond a reasonable expectation (e.g.,. all of their dreams would come true upon losing the weight). The unrealistic expectations promote a commitment to self-change and when faced with repeated failures, they began to make attributions that shift blame away from the unrealistic goals which allow for continued commitment towards weight loss. The negative psychological consequences of repeated self-change attempts are indicated as a cause of emotional distress, which can further

disinhibit eating in people who are trying to lose weight. Polivy and Herman suggests at the core of the false hope theory is the overconfidence that continues the cycle of failure. They suggest without the level of overconfidence, the hope would not be false. While not a major tenet of this theory, there is a suggestion that overconfidence can be seen as an avenue to control negative affect and the continued control of negative affect explains the cycle of repeated failures that some people are unable to escape.

Although initially examined separately, Stice (2001) has suggested a dual pathway model that involves both dieting and negative affect in binge eating. This model infers that the cultural ideal to be thin and the internalization of that societal norm lead to body dissatisfaction. This dissatisfaction is fostered by continued messages received from family, friends, advertising, etc., which promote the discontent. This dissatisfaction stimulates an atmosphere of dieting, in an attempt to control weight and meet the ideal. This dissatisfaction also contributes to negative affect as a coping mechanism of continued awareness of weight shortcomings. In testing the dual pathway model, Stice found a marginally significant relationship between dieting and growth in negative affect, and negative affect predicted growth in binge eating symptoms. The research conclusions reached by Stice support the notion for the dual pathway model. Separately, the models of dieting and negative affect have been verified in the literature (Gagnon-Girouard et al., 2009; Jansen, et al., 2008; Heatherton & Baumeister 1991; Polivy & Herman 2002; Stice et al., 2001), but the research of Stice was the first successful attempt to meld the two theories together to have a more comprehensive understanding of the etiology and maintenance of binge eating.

Given the theoretical implications of binge eating, the assumption is made that the desire to balance negative affect with cultural pressures would result in an increased level of impression management. Unfortunately, little research has been done on the impression management style of

individuals who engage in binge eating. Impression management is the manner which people outwardly portray themselves, which can have a negative connotation (i.e., extreme negative impression or malingering) or positive connotation (i.e., extreme positive impression in which there is denial of minor problems) (Morey, 1991). Vitousek, Daly, and Heiser (1990) used the term denial, which they defined as "any consciously or unconsciously motivated omission, concealment, or misrepresentation of behavior or internal experience" (p.648), when discussing the accuracy of self-reports in women with anorexia nervosa and bulimia nervosa. Vitousek et al. described those with anorexia as more likely to admit to faults, whereas those with bulimia are more likely to acknowledge problematic behavior. Findings by Raymond, Mussell, Mitchell, de Zwaan, and Crosby et al. (1995) noted similar findings within the category of eating disorders. Those with binge eating disorders display lower rates of psychopathology relative to those with anorexia or bulimia. However, there is little information on impression management independent of comparing eating disorders.

The incidence of psychiatric co-morbidities including binge eating, has become especially important as an increasing number of adults seek surgical intervention for weight loss. The use of surgery to reduce weight has the potential to produce profound weight loss, but only in conjunction with behavioral changes. The incidence of surgical intervention to treat obesity has grown, from 20,000 surgeries performed in 1993 to 120,000 surgeries performed in 2003, to an estimated 177,600 surgeries performed in 2006 (American Society for Metabolic & Bariatric Surgery [ASMBS], 2007; Pope, Birkmeyer, & Finlayson, 2002). The NIH (1998) recommends surgery to treat obesity in individuals whose BMI is over 35 with co-morbid medical disorders or those individuals whose BMI is over 40. The surgical techniques, known as bariatric surgery, used to promote weight loss are categorized as restrictive, malabsorptive, or a combination of

restrictive and malabsorptive. While individuals who have received surgical intervention have lowered or eliminated medical comorbities associated with obesity, research indicates the weight loss is not always sustained long-term. The findings of a 10-year prospective study by Karlsson, Taft, Ryden, Sjostrom, and Sullivan (2007) found individuals who had bariatric surgery regained one-third of the weight they lost 6 years after surgery.

The long-term outcomes for bariatric surgery suggest weight regain for some individuals, which confirms the importance of psychological evaluation in the surgical process for obesity (Bond et al., 2008; Hsu et al., 1998; Karlsson et al., 2007). Pre-surgical evaluations are utilized to understand the psychological and behavioral factors in an individual's ability to have short- and long-term weight loss from eating behaviors after surgery. According to the NIH Consensus Panel (1991), the recommendation of a multi-disciplinary approach in selecting surgical candidates should be utilized. However, an NIH advisory panel (Buchwald, 2005) concluded that a psychological evaluation "is not routinely needed but should be available if indicated" (p.593). The NIH does not provide clarification of the "indications" of psychological evaluation, although many major insurance carriers mandate a psychological evaluation be completed as a component of the evaluative process for bariatric surgery (Bean, Stewart, & Olbrisch, 2008).The importance of the evaluation is illustrated in the findings of Kalarchian and colleagues who estimated that 66% of surgical candidates have had at least one Axis I diagnosis and 29% had at least one Axis II diagnosis in their lifetime.

Given the elevated rates of binge eating in the population of obese adults who seek medical treatment for their weight, it is paramount to understand the rates of psychopathology in the context of binge eating. Therefore, the purpose of this study is to examine the relationship between binge eating and psychopathology in adults who are seeking bariatric surgery for weight

loss. An additional purpose of the study will be to evaluate one relatively unused assessment, the Revised Master Questionnaire (RMQ), which is utilized in the psychological battery of a bariatric surgery center affiliated with a medical center in the Midwest, from which this study data was collected. Examining the rates of binge eating and level of depression, anxiety, impression management and affective instability will provide information to better understand if the psychological components in the pre-surgical evaluation can identify aspects of an individual which can be remediated to improve the psychological functioning and long-term weight-loss outcomes of bariatric surgery. Gathering psychometric information, an assessment that has limited psychometric data, would help to provide a better understanding of the utility of the measurements being utilized. The RMQ was developed in the context of weight loss using behavioral intervention and there is no published data on its use in the surgery-seeking population. Gaining further information can inform the utility of its use in the psychological battery already in use. The following hypotheses guide this study:

Hypotheses

Hypothesis 1. Obese adults seeking weight loss surgery who have mild to severe problems with binge eating will have higher rates of psychopathology than obese adults who do not binge eat.

Hypothesis 1a. Obese adults seeking weight loss surgery who have mild to severe problems with binge eating will have higher rates of depression than obese adults who do not binge eat.

Hypothesis 1b. Obese adults seeking weight loss surgery who have mild to severe problems with binge eating will have higher rates of anxiety than obese adults who do not binge eat.

Hypothesis 1c. Obese adults seeking weight loss surgery who have mild to severe problems with binge eating will have higher rates of interpersonal difficulties than obese adults who do not binge eat

Hypothesis 1d. Obese adults seeking weight loss surgery who have mild to severe problems with binge eating will have higher rates of stress than obese adults who do not binge eat.

Hypothesis 2. Obese adults seeking weight loss surgery who have mild to severe problems with binge eating will have higher rates of positive impression management and lower rates of negative impression management than obese adults who do not binge eat.

Hypothesis 3. The presence of binge eating will have no significant impact on the rates of self-reported levels of disability in obese adults seeking weight loss surgery.

In addition to testing the above hypotheses, an evaluation of the psychometric properties of the Revised Master Questionnaire will be completed.

Summary

The incidence of obesity has increased dramatically in recent decades with limited long-term success in weight loss interventions. Surgical intervention has shown promise in providing long-term solution for obesity, but the lack of consistency within the field of psychology in how adults are evaluated from a psychological perspective has raised concerns. A complicating factor within the obesity research is the incidence of increased rates of psychopathology, including binge eating. Research indicates the presence of binge eating as a linking factor for psychopathology in obese adults. Stice's (2001) dual pathway theory suggests that people binge eat due to a reaction of restrictive eating habits common in dieting, and as a coping mechanism to combat the negative affect created by not meeting societal standards of thinness. Therefore,

this study will explore the relationship between binge eating and psychopathology in an obese surgery-seeking population, as well as evaluate a measure used to assess the psychological appropriateness of surgery for obese adults.

Chapter II

Literature Review

This chapter begins with a review of the literature with a historical perspective of the theoretical constructs psychology has implemented in the research and treatment of weight loss. The discussion will then move to the history and current understanding of binge eating disorder. Relevant literature in the areas of current weight loss treatment modalities of lifestyle modifications, psychotherapy, and pharmacotherapy are discussed. This is followed by a review of the surgical methods utilized in bariatric surgery procedures, with a conclusion reviewing the literature related to the current psychological evaluative process in bariatric surgery.

Psychological Role In Weight Loss

The United States has seen an explosion in the number of obese adults in the last 30 years. With the ever increasing obesity rates, there has been an evolution in the type of obesity treatments. One constant in obesity treatment has been the role of psychology in both the research and treatment aspects. In early attempts to understand obesity, it was realized that obesity has a psychological component. An early pioneer in the field of obesity and weight loss, Albert J. Stunkard, realized the difficulty in treating obese individuals as indicated by a statement he made in 1958, "Most obese persons will not stay in treatment of obesity. Of those who stay in treatment most will not lose weight and of those who do lose weight, most will regain it" (Stunkard, 1958, p.79). Given the refractory nature of weight loss treatment, a discussion of the psychological evolution of weight loss treatment will be provided.

The psychological conceptualization of the obese has often been linked to the psychological theory de jour of that particular time period. Prior to the advent of health psychology or behavioral medicine, the field of psychosomatic medicine developed in the 1930's

in response to the impersonal delivery of medicine. According to Stunkard (1975), psychosomatic medicine sought to "restore respect for the psychological, to humanize medicine in order to improve the care of patients" (p. 195). It is under the purview of psychosomatic medicine in which the treatment of obesity melded psychology and medicine. In fact, Wooley, Wooley, and Dyrenforth (1979) referred to obesity treatment as the first and the largest excursion of psychologists into the medical field. Initially, psychoanalysis was the theory on the forefront providing the psychological origins of obesity. Psychoanalysis placed emphasis on neurosis, personality disturbances, rejection of parental love, and oral fixation to explain the etiology of obesity (Conrad, 1954; Gilman, 2006; Richardson, 1946).

Psychoanalytic Influence.

According to Glucksman, Rand, and Stunkard (1978), the psychoanalytic theory posited emotional disturbances due to a disruption during the oral stage of psychosexual development. The disturbance during the oral stage of development resulted in the inability to be fully sexually gratified, which transferred to an oral gratification, resulting in obesity (Areton, 2002). The disturbance in development during the oral stage allowed for gratification via food, as well as the expression of hostility (Conrad, 1954). The disturbance in the psychosexual development provided the foundation for psychoanalysis to flourish as a treatment approach, and findings from medicine provided additional support to treat obesity from a psychological perspective.

The interpretation of obesity with a psychoanalytic and medical lens juxtaposed to the endogenous (internal cause) versus the exogenous (external cause) view of obesity. Richardson (1946) reported the "vast majority" (p. 1187) of obese individuals manifest no metabolic or endocrine disturbance (or endogenous cause), and described obese women as unhappy and suffering from neuroses (exogenous cause). Richardson explored the neurosis of obese women,

concluding obese women ate to relieve their anxious, guilty, and self-depreciating feelings. As psychoanalysis became further entrenched in the research and treatment of obesity, the trend within the field moved towards the identification of overeating as the marker of emotional problems. Work by Conrad (1954) in which he explained that overeating will assist in the therapists understanding of the clients underlying emotional disturbances reified the exogenous cause of obesity. Obesity was seen as the effect, caused by the retarded psychosexual development occurring in childhood, with much support behind it.

The work of Harold Kaplan, a psychiatrist, and Helen Kaplan, a clinical psychologist, culminated in a compendium of analytic theories on psychosomatic origins of obesity which encapsulated many of the psychoanalytical aspects of obesity (as cited in Areton, 2002). The compendium composed by Kaplan and Kaplan (1957; as cited in Areton, 2002) included:

> Overeating may be:
>
> a means of diminishing anxiety, insecurity, tension, worry, indecision.
>
> a means of achieving pleasure, gratification, success....
>
> a means of relieving frustration, deprivation and discouragement.
>
> a means of expressing hostility, which hostility may be conscious, unconscious, denied, or repressed...
>
> a means of diminishing feelings of insecurity and inferiority
>
> a means of rewarding oneself for some task accomplished...
>
> a means of diminishing guilt, which guilt may itself be due to overeating.
>
> a type of defiance, rebellion against authority and control, an attempt at independence.
>
> a means of proving inferiority and justifying self-depreciation.

a means of avoiding maturity.

a means of handling anxiety from infantile oral frustration.

Overeating may serve:

as a substitute for love and affection

for showing love and affection

for pregnancy

for protection against men and marriage.

Overeating or food may be symbolically:

a representative of pre-Oedipal mother conflict.

a type of alimentary orgasm.

expression of unsatisfied sexual craving.

expression of destructive sadistic impulses.

expression of penis envy and a wish to deprive the male of his penis.

expression of a fantasy where overeating results in impregnation.

pathologically strong oral libido being gratified in an unsublimated way.

a means of possessing a "part-object" like a penis or breast.

a defense against threatening unconscious feminine or masculine wishes.

an indication of an early disturbed mother-child relationship. (pp. 195-196)

As can be seen in the listing of psychoanalytic causes of obesity, all things were causes of obesity. This exogenic view of obesity as extolled by psychoanalysts soon gave way to an evolution in the approach by psychologist in the treatment of obesity. The paradigm shift in psychological approaches occurred during a shift in the medical approach. Stunkard (1975), a proponent of psychosomatic medicine in the 1950's, confessed that psychosomatic medicine did

not provide effective treatments. In fact, Stunkard stated that psychosomatic medicine "…attempted to fill the void with explanations-of the meaning of symptoms we could not control and of the psychophysiological relationships of the diseases we could not treat" (p. 195). Stunkard's quote provided a rich illustration of the refractory nature encountered by early obesity treatment providers. Although many of the psychoanalytic principles used to explain the cause of obesity were later found to be ineffective in psychotherapy, the identification of anxiety as a component of overeating seen in obesity has been a principle that has been utilized by other theories in relationship to obesity.

Behavioral Influence.

The theory pendulum swung in the 1960's from a psychoanalytic perspective to a behavioral approach in the research and treatment of obesity. While the psychoanalytical perspective focused on eating as psychopathology caused by a disturbance in psychosexual development, the behavioral approach focused on modifying problematic behaviors. Although there was a psychological shift in the approach to obesity, the medical world continued to deny that obesity had endogenous determinants (Wooley, Wooley, & Dyrenforth, 1979). The stagnation in the medical field did not stand in the way of the progression made by the behavioral theorists in working to treat obesity.

Early behavioral techniques were characterized by the extinction of faulty learned behaviors that promoted excessive eating via positive and negative reinforcements, which focused on the learning of new eating behaviors (Wooley, Wooley, & Dyrenforth, 1979). The research of Penick, Filion, Fox and Stunkard (1971) was one of the initial studies utilizing behavioral interventions in obese adults, which were accepted as standard techniques. The techniques employed by Penick et al. were: keeping a record of the time and conditions of food

consumed, restricting the location of food consumed (usually to their home), the use of techniques to decrease the rate of eating (e.g., counting mouthfuls of food at each meal, putting utensil on plate after every third mouthful), and the use of a behavioral reinforcement schedule. The reinforcement included both positive and negative reinforcement, with separate reinforcement schedules for self-control and exercise.

The control group in the study received the treatment of nutritional education, supportive group therapy, and appetite suppressants when requested by the individual. Penick and his colleagues (1971) hypothesized the development of self-control behaviors would result in the loss of weight and the acquisition of adaptive behaviors. Results following the three-month intervention by Penick at el. revealed comparable weight loss in the control group as reported in the medical literature, with 24% of the control group losing more than 20 pounds. However, 53% lost 20 or more pounds, 33% lost 30 or more pounds, and 13% lost 40 or more pounds in the behavioral modification treatment group. The 30 pounds or more weight loss between the behavioral modification and control was statistically significant at $p = .015$. The findings seemed to be supported by a three and six month follow-up in which both groups maintained and some improved upon the weight loss. A one-year follow-up by Stunkard and Penick (1979) found continued weight loss maintenance in both groups, but at a five-year follow-up there was weight regain in both groups. The one-year paradoxical finding from Stunkard and Penick was the inverse relationship, $r = -.49$, $p < .1$, between weight loss during treatment and subsequent weight gain during follow-up. Those that lost the most weight were in the behavioral modification group and were the subjects to regain the weight. The same paradoxical finding was evident in the five-year follow up of both the treatment group, $r = -.26$, $p < .1$, and the control group $r = -.76$, $p < .01$ (Stunkard & Penick).

In the same follow-up study, Stunkard and Penick (1979) went on to report similar findings from nine other follow-up studies, which corroborated findings from other early behavioral interventions by Brownell (1982); Jeffery, Vender, and Wing (1978); and Wooley, Wooley, and Dyrenforth (1979). It appears the behavioral techniques were able to produce weight loss, but only while the participants were still engaged with the resources of the study. In the pursuit of understanding why the new behavioral approaches were not sustained long-term, the role of physiology was introduced and helped to expand how psychological interventions were utilized in obesity treatment.

Physiological Influence

A component of the evolution of behavioral techniques can be found in the greater understanding of the physiological principles of obesity. One such physiological principle developed by Nisbett (1972), termed the set-point theory, theorized that some individuals are "biologically programmed to be fat" (p. 433). Looking at the genetic and early nutritional experience, Nisbettt was able to identify that obese individuals have more fat cells than a normal weight group. One important aspect of Nisbett's findings is that the adipose (or fat) tissue possessed by an adult is viewed as stable and fixed. As a result, the hypothalamus (which regulates satiety) regulates food intake to maintain the fat stores at the baseline or set point. Animal studies by Hoebel and Teitelbaum (1966) in which neural lesions were created on animals, resulted in weight regulation at a higher level.

Brownell (1982) in discussing the set point theory, clarified that fat cell size may set how much weight can be lost, whereas the number of fat cells may determine the limit at which weight loss occurs. The inclusion of physiological aspects of obesity, in addition to the integration of diet and exercise, and the examination of thoughts about food and feelings related

to overeating (Jeffery, Vender, & Wing, 1978) in behavioral therapeutic approaches helped to set this therapy apart from other psychological therapies. The evolution of behavioral psychology into a more complex and integrated approached mirrored the evolution of understanding of obesity as a more complex disease (Brownell). The integration of treatment modalities discussed by Brownell has had staying power and resembles the current obesity treatment methods. In fact, the National Institutes of Health/National Heart Lung Blood Institute (NIH/NHLBI, 1998) encompassing report on the guidelines on the identification, evaluation and treatment of overweight and obesity in adults recommended the adjunctive use of behavior therapy in weight loss treatment.

Binge Eating Disorder (BED)

Binge Eating Disorder was first introduced in 1959 by Albert Stunkard, after he observed three different eating habits in obese mice. He described binge eating as irregular episodes in which one consumes a large amount of food in an unrestrained manner (Stunkard, 1959). Since that time, there has been much conversation about binge eating, which has culminated in a formal recognition of binge eating as a disorder. In the fourth edition of the DSM (APA, 1994), BED was introduced as a proposed diagnosis for inclusion, but was not included due to insufficient information. The tradition of BED being proposed as a diagnosis but not included has continued in the text revision of the DSM in 2000, but is proposed to be an actual diagnosis in the upcoming DSM-V (APA, 2000).

The actual criteria of BED were developed in studies by Spitzer and colleagues (1992, 1993) and the proposed diagnostic criteria remain unchanged. BED involves recurrent episodes of binge eating which is characterized by eating a larger amount of food in a discrete period of time (e.g. any 2 hour time frame) than most other people would in the same time frame.

Additionally, a lack of control over eating occurs during the binge. The binge episode is associated with at least three of the following: 1) eating more quickly than usual, 2) feeling uncomfortably full after binge episode, 3) eating large amounts when not hungry, 4) eating alone due to embarrassment about the amount of food consumed, 5) having feelings of disgust , depression, or guilt after binge episode. Additionally marked distress related to binging, and the episodes occur at least two days a week for six months, are required criteria (APA, 2000).

The psychological theories of cognitive-behavior therapy and interpersonal psychotherapy have displayed effectiveness in reducing the number of binge episodes from 48-96%, but that did not necessarily translate into weight loss (Stunkard & Allison, 2003). A modest outcome meta-analysis by Stunkard and Allison found mixed results in terms of weight loss following psychotherapeutic intervention for BED. Although each study reported a reduction in binge episodes, five of the studies reported a weight gain, two studies reported no weight change, and seven studies reported a weight loss. Pharmacologic intervention has yielded positive results in reducing binge eating, but it has often done so in conjunction with a strong placebo response. A review of recent literature by Stunkard and Allison found a high response rate using pharmacologic intervention for binge eating. The summarized findings of their review indicate a 57-94% decrease in binges per week for the treatment group versus 0-68% decrease in the placebo group. The incidence of decreased binges seen both with pharmacology and placebo calls into question the actual mechanism that positively impacted the decrease in the incidence of binge episodes. The placebo results of the Stunkard and Allision study may display the strong behavioral aspect of binge eating episodes.

As stated earlier, the prevalence of BED ranges from 2% in the general population, up to 47% in the population of those seeking weight loss surgery (Stunkard & Allison, 2003). In a

sample of adults in a weight control programs, prevalence rates of BED ranged from 15-50%, with females approximately 1.5 times more likely than males to have BED (APA, 2000). Similar ranges have also been reported for the incidence of binge eating disorder and other psychiatric co-morbidities. Although it is unclear if BED preceded other mental health problems, it is clear that additional screening needs to be done for those who are diagnosed with BED. Bulik, Sullivan, and Kendler (2002) found that obese women who binge eat reported higher levels of health dissatisfaction and medical disorders than their non-binge-eating counterparts. In this study, binge eating was also associated with higher lifetime prevalence of depression, alcohol dependence, and phobias (Bulik et al.).

Given the mixed results of studies in reducing the weight of those who binge eat, the question of the effectiveness of a surgical intervention is raised. Malone and Alger-Mayer (2003) found no difference in weight loss at 12 months between no, moderate, and severe binge eaters who had undergone gastric bypass surgery. Severe binge eaters had a higher baseline depression scores than their counterparts, however there was an improvement in depression and binge eating scores regardless of their binge eating score. Latner, Wetzler, Goodman, and Glinski (2004) had similar findings when they examined weight loss and psychiatric conditions after 65 women underwent gastric bypass. Their results indicated no change in psychiatric conditions after the surgery, with the exception of binge eating; it dropped from a pre-surgical rate of 41% to 0% after surgery. In fact, more frequent pre-operative binge eating, along with higher pre-operative BMI and post-operative exercise, predicted greater weight loss. This seems to suggest that surgical intervention may impose a physical limit on binge eating and reduce binge eating episodes.

Although BED appears to be a chronic condition in those who seek treatment (APA, 2000), there is evidence to indicate variability in binge eating and spontaneous remission without treatment. One study displayed a 34% reduction in binges in a 12-week wait-list control group of 24 adults (Carter & Fairburn, 1998), whereas a study by Peterson (1998) found a 14% increase in binge eating during an 8-week wait-list control group in 11 adults. Latner and Wilson (2002) found symptom fluctuations in a week-long trial in which 28% of the subjects abstained from binge eating. Given the variance in response for those who binge eat, that variance is just as evident in the treatment of obesity.

Current Treatment Modalities

The treatment mainstay for a disorder that is as serious and refractory as obesity has evolved and is currently attacked from a combination of modalities. Just as the etiology of obesity in a combination of factors, the treatment for obesity is a combination of medical and psychological intervention. The areas of treatment include nutritional and exercise regimens, pharmacotherapy, psychotherapy, and surgery.

Nutritional Interventions

Within the nutrition-only focus of weight loss, there are a number of diets which promote weight loss including very low calorie diets (Scientific Cooperation (SCOOP), 2002; Tsai & Wadden, 2006), high protein/low carbohydrate/low calorie diet (Atkinson, 1995), low calorie diet (Atkinson), and liquid diets (Atkinson). Very low calorie diets (VLCD), which is the consumption of less than 800 calories per day, originated in the 1970's as a method to produce rapid weight loss while maintaining lean body mass. In contrast, low calorie diets (LCDs) consist of the consumption of 1,000-1,200 calories for women and 1,200-1,500 calories for men. In reducing calories, emphasis is placed on the intake of high protein, low fat and carbohydrate

food sources. Both LCDs and VLCDs are considered safe when administered under the supervision of a physician, which for a 6 month program can cost up to $3500.00 (Tsai & Wadden). Physician oversight is necessary to monitor the possible side effects of "gallstones, cold intolerance, hair loss, headache…muscle cramps, and constipation" (Tsai & Wadden, p. 1284) associated with rapid weight loss. According to Tsai & Wadden there were a number of deaths attributed to VLCDs, mostly occurring in the 1970's, due to deficiencies in vitamins and minerals, or cardiac complications after an approximate weight loss of 30% from initial weight.

The use of reduced calorie diets are recommended for those whose BMI is 30 or greater and has been shown to produce weight loss, but long-term outcome studies have not yielded the same results. Tsai and Wadden (2006) completed a meta-analysis of randomized trials comparing the long-term efficacy of VLCD's and LCD's. Their meta-analysis produced 6 randomized studies which concluded that VLCDs induced significantly greater weight-loss in the short-term than LCDs, 16.1 lbs vs. 9.7 lbs. Although there was a significant difference in short-term weight loss, the difference between long-term weight loss (long-term was a range of 1-5 years) was not significant, VLCD had a weight loss of 6.3 lbs while LCD had a weight loss of 5.0 lbs. The research of Pinto et al. (2008) reached similar conclusions regarding the effectiveness of VLCDs.

The research of Pinto et al. (2008) examined the relationship between method of weight-loss and long-term weight loss maintenance. In this study subjects had lost 10% of their body weight in the past 2 years using a VLCD, on their own using a non-published diet, or by using a commercial program (e.g., Weight Watchers, Nutrisystem, or Jenny Craig). Participants were randomly assigned into intervention (frequent self-weighing, self-reinforcement for weight maintenance, and urgent action to reverse weight gains) delivered face-to-face or via the internet,

and the control group received a newsletter about diet and exercise. The conclusions reached by Pinto et al. included the VLCD had achieved a higher amount of weight loss than the other two methods, but had regained significantly more weight than the other 2 groups after 6 months. Additionally, those that used their own approach had maintained their weight loss 18 months from study baseline. In agreement with conclusions reached by the literature, the NHLBI expert panel (1998) recommended that LCD be used in lieu of VLCD.

Although LCD has produced better outcomes than VLCD, the long-term effectiveness of calorie restriction on weight loss has been questioned. Mann et al. (2007) evaluated long term weight-loss studies in which calorie restriction was included as one of the methods for weight loss. Their overall conclusion was that although 30% - 60% of study participants regain more weight than they had originally lost, that estimation is underrepresented due to low follow-up rates, the incidence of participant self-reporting their weight, and the incidence of other weight-loss attempts between the periods of follow-up.

Lifestyle Techniques

The nutritional and exercise based treatments, also known as lifestyle modifications when combined, promote daily monitoring of caloric intake and consistent engagement in physical activity (Wadden et al., 2005). The lifestyle modifications are steeped in behavioral principles in which the lifestyle changes that are made are not viewed as a diet, but instead are lifelong behavioral habits to replace ineffective old food and exercise habits (Carels, et al., 2007). Within the purview of lifestyle modifications, psychotherapy is utilized to reinforce the weight-loss principles, promote adherence, and teach relapse prevention techniques (Holt, Warren, & Wallace, 2006).

A number of studies have shown success in changing health behaviors, via the use of the Transtheoretical Model of Health Behavior Change (TTM) and a multi-disciplinary treatment team to reinforce the concept of lifestyle changes over dieting. TTM's central construct, stage of change, integrates other behavior change concepts in an integrative fashion to produce positive changes in health behaviors. A component of the stage of change model is the Maintenance stage and TTM has utilized maintenance interventions in weight loss studies to promote maintenance of weight loss during clinical interventions.

One TTM study by Johnson and colleagues (2007) examined the effects of a home based multiple weight management intervention in overweight and obese adults. All participants completed at least 4 assessments, measuring their height and weight, the stage of change for the three target health behaviors (exercise, healthy eating, and management of emotional distress) and a measure of stage of change for fruit and vegetable intake. The treatment group received 4 TTM stage-matched, individualized reports on TTM constructs and methods to engage in the three target health behaviors for change. Findings included a significant treatment effect on progression from Action to Maintenance stage for all three targeted health behaviors among those in the pre-action stage at 12 months post intervention. The three target behaviors were significant at 6 months, while weight loss for the treatment group was not significant until the 24 month follow-up. This may suggest that weight loss is not a single behavior but a combination of multiple behaviors that interact to promote weight loss. It may also display the difference in time it takes to lose a significant amount of weight, given the stage of change one is in when they start a weight loss program.

An earlier TTM study found effectiveness using the TTM model, but the results were not as striking as Johnson and colleagues (2007). Riebe et al. (2003) delivered a clinical weight

management program to adults whose BMI ranged between 27- 40. The core components enforced during the clinical intervention were aerobic exercise, nutritional education focused on healthy food choices as opposed to dietary restrictions, and behavioral therapy using the TTM approach to modify food choices and exercise habits. Participants were engaged in a clinic-based intervention on a weekly or bi-weekly basis for 6 months, at which point they received reports on their status in the aforementioned core components at baseline, 3, 6, 12, and 24 months via mail. Half of the participants were randomly assigned to an extended intervention in which they received two additional personalized reports, while the control group received generic reports on exercise and nutrition. Results of the study found that the 6-month clinical program yielded an overall average weight loss of 10% . At 12 months there was a 61% weight loss maintenance and at 24 months there was a 48% weight loss maintenance. Riebe et al. (2003) found no difference in weight loss maintenance between the post clinic intervention control and treatment groups. Although no difference was found between treatment and control groups, a level of weight loss was maintained 2 years after face-to-face intervention utilizing the TTM method.

Another study promoting lifestyle changes by Keranen and colleagues (2009) focused on changes in eating behaviors in the weight loss of obese adults whose BMI was over 27. Subjects were randomly assigned to receive either 10 sessions over 20 weeks of individual and group intensive dietary counseling (by a clinical nutritionist) or 2 individual sessions over 2 weeks provided by a nurse specializing in obesity. All subjects' eating behaviors were measured using the Three Factor Eating Questionnaire, which measures cognitive restraint, uncontrolled eating, and emotional eating, and the Binge Eating Scale (BES). The findings of the study suggested that those who received intensive dietary counseling lost a significant amount of weight at 6 months versus those in the control group. Although weight loss difference at 18 months was non-

significant between the two groups, the study concluded those subjects who had the lowest scores on binge, emotional, and uncontrolled eating were the most successful in maintaining weight loss at 18 months.

Psychotherapy

In examining the role of psychotherapy in current weight loss treatments, psychotherapy is most often used in conjunction with other lifestyle interventions. As stated earlier, behavioral techniques are the standard of psychological treatment in weight loss studies, but other approaches have been used as well. The behavioral approaches are utilized as the primary treatment of obesity, as behaviors are seen as a mechanism of weight loss via changes in such things as diet and activity level. Hence the use of behavioral techniques that are goal-directed, focused on the reduction of unhealthy behaviors (overeating, emotional eating, or sedentary lifestyle) and increasing healthy behaviors (balanced diet, regular exercise, or limited snacking), via identifying cues that trigger unhealthy habits and cues that promote healthy habits (Foster, 2006). Of the studies in which behavioral approaches were utilized, success has been shown.

Wing and Marcus (1991) examined the efficacy of behavioral therapy alone versus behavioral therapy in conjunction with specific diet changes (using grocery lists, meal plans, reduction in fat intake) in 163 subjects. They found after one year, those who had behavior therapy with specific diet changes lost significantly more weight than those who had behavior therapy alone (6.9 kg versus 3.3 kg). As indicated in the literature, the incidence of weight regain is very common once the intervention ends, so it is important to look at the effects of maintenance programs and outcome studies after the therapy has ceased. Jeffrey and colleagues (2004) conceptualized weight regain after treatment as a form of habituation or boredom with the weight loss strategies they had learned during treatment. A concerted effort has been made to

develop a weight loss maintenance program to battle the weight regain seen after treatment ceases.

Jeffrey et al. (2010) compared the effectiveness of a maintenance tailored therapy versus standard behavior therapy with 213 adults whose BMI ranged between thirty and thirty-nine. Both treatment groups were to weigh and record daily food and exercise activity, while trying to meet personalized exercise and diet goals. Both groups met weekly for 6 months, biweekly for months 6-12, and monthly for months 12-18, with the goals of the group to discuss lifestyle changes, behavioral goals and strategies, and homework. The maintenance tailored group had a separate component, offering a variety of weight control strategies throughout the group therapies, specifically designed to address the theory that habituation and boredom often lead to weight regain. The standard group received weight control strategies that were constant throughout the treatment. The results of the study by Jeffrey and colleagues found both groups lost a similar amount of weight at 6 and 12 months, but the maintenance group had stable weight between 12 and 18 months, during which the standard group experienced significant weight gain. Although the maintenance group displayed stability in their weight loss, follow-up studies after the therapy intervention ended would help clarify the true effects of the intervention for weight loss maintenance.

Another study by Cooper et al. (2010), examined the maintenance efficacy of a cognitive-behavioral (CB) treatment for obesity. One hundred and fifty female subjects were randomized to either CB, behavioral, or guided self-help group. The CB therapy was designed with the understanding that weight regain is caused by an individual's belief that they cannot control their weight, and as a result return to old eating and exercise habits. The goal of the new treatment was to adapt a more modest goal of weight loss and acquire weight loss maintenance skills. The

behavior group was focused on changing their eating habits and activity level with some emphasis on weight maintenance. The self-help group focused on changing lifestyle with limited interaction with therapists and lasted 24 weeks. The two treatment groups lasted 44 weeks and consisted of 24 individual therapy sessions. Cooper and colleagues (2010) found that the behavioral treatment group lost the most weight from baseline at study conclusion (-12%) and maintained the most weight lost at the three-year follow-up (-3%). While the CB group lost weight at study conclusion (-9%), but the weight lost was almost negligible at the three-year follow-up (-0.44%).

Similar to early findings in the 1970's, it appears that in midst of treatment, weight loss is achieved and maintained, but once treatment ends, another obstacle is presented, weight maintenance. The field of psychology continues its efforts to find effective long-term treatments for obesity and understanding the pitfalls of weight loss and subsequent weight gain. Additionally there are efforts to look at obesity prevention in the face of what one cited as the "long odds" of the development of more effective obesity treatments (Brownell, 2010). With much evidence of the treatment resistant nature of obesity, the use of medications has been introduced to reduce the risks associated with obesity.

Pharmacotherapy.

Within the field of pharmacotherapy, there is an array of over-the-counter medications that is not regulated by the Food and Drug Administration (FDA), all of which promote and promise dramatic weight loss with no side effects or behavioral changes. As those medications have not been regulated by the FDA, and coupled with the history of both non-prescription and prescription medications that have caused a number of deleterious side effects including pulmonary hypertension and vascular heart disease, the outcome data is limited (Yanovski,

2005). One of the most prominent weight loss drugs approved by the FDA and marketed was the combination of fenfluramine and phentermine (Fen-phen), prescribed from 1995-1997, which was eventually recalled due to association between its use and cardiovascular events (Yanovski).

As for the medications which have gone through clinical trials for their effectiveness and safety, there are currently three medications. The two prescription medications are Xenical (generic name is orlistat) and Meridia (generic name is sibutramine), and are indicated for use with adults whose BMI is over 27 with at least one health risk factor (Padwal, Li, & Lau, 2003; Schwartz, Bansal, Hale, Rossi, & Engle, 2008). The over-the-counter medication Alli (generic name is orlistat), became available in 2007 for use by adults over the age of 18 for weight loss assistance (Schwartz et al.).

Although there are two prescription medications for weight loss, the pathways in which they promote weight loss are different. Sibutramine, approved in 1997, promotes weight loss by reducing one's appetite via the inhibition of the reuptake of the neurotransmitters norepinephrine and serotonin. Clinical trials found that 60% of the overweight and obese adults who received sibutramine lost at least 5% of their baseline weight, as compared to 30% of those in the placebo group. Another finding from the clinical trial found an increase in blood pressure which warranted a warning on the label. Additional labeling warned against the use of sibutramine in those with a history of cardiac or stroke events. In 2009, the Federal Drug Administration (FDA) began reviewing sibutramine, for a possible recall, due to risk of heart attacks associated with its use. The FDA (2010a) appeal came on the heels of a 3-year long study (SCOUT trial) of 10,000 overweight and obese adults who were randomly assigned to receive sibutramine or placebo. The findings of the double-blind placebo study indicated 11.4% of those who received the treatment versus 10.0% of placebo group had a major cardiac event (FDA). The concern of the side and

adverse effects of sibutramine harkens back to earlier FDA approved weight loss medication in which adverse events lead to a recall of the medication.

The other prescription weight loss medication, along with the over-the-counter medication, both with the generic name of orlistat, are differentiated by their dosage. Xenical has a dosage of 120mg, while Alli's dose is 60mg. According to Genetech USA (2010), orlistat is the first non-appetite suppressant medication for weight loss. Orlistat works by blocking the break down of one-third of the fat in the digestive system, via the inhibition of lipase. Roche (2000) reported that seven long-term studies of one to two years, conducted by the manufacturer found, one year of the results yielded a weight loss of 12.4-13.4 pounds in the treatment group versus 5.8-6.2 pounds in the placebo groups. Additionally, Roche found that there was also an improvement in metabolic and cardiovascular risk factors in the medication versus the placebo group. Regarding weight loss maintenance, pooled data from 4 studies indicated that 40% of treatment subjects who engaged in two years of the same treatments had more than 5% loss of body weight versus 24% of the placebo group (Roche 2000). In the tradition of warnings issued on side effects of prescription weight loss medications, the FDA has reported rare but severe cases of liver damage. Of the 13 reports of liver damage, 12 were with Xenical and did not originate the United States and the other report was with Alli and originated in the U.S. (FDA, 2010b). There is no current review of the medication or other indications that either dose of orlistat will be recalled.

Given the mixed history of success with medication intervention to induce and maintain weight loss, Bray (2008) compared the efficacy of weight loss in short term medication trials. The conclusions reached by Bray (2008) across eight weight loss medications were that the amount of weight lost was significantly higher for those who received the medication versus

those who received the placebo. Although the findings indicated a greater amount of weight loss, no long term outcome studies were conducted to see if there was maintenance of the weight that was lost. However, Bray concluded that studies examining the efficacy of weight loss medications should also include a diet change. The indications for medication and diet change simultaneously in research studies were to replicate real-world physician advice, and to gain a clear picture of overall weight loss (Bray).

Combined Treatments.

The use of pharmacotherapy and lifestyle changes separately has yielded low success in weight loss maintenance. Research indicates the 5-year success rate of lifestyle modifications and pharmacotherapy on weight loss maintenance to be 1-25% (Anderson, Konz, Frederich & Wood, 2001; Rothblum, 1999). In the pursuit of increasing the probability of sustained weight loss, there has been a trend to combine multiple treatment modalities.

One naturalistic study explored how participants would use an over-the-counter weight loss drug that also included lifestyle information. Schwartz et al. (2008) conducted a study of 237 adults who had purchased and used Alli (60mg orlistat) over the course of 3 months. The Alli packaging included a personal food diary, a fat gram wheel and counter, information on portion size, and for first time buyers a diet success planner was included. More specifically, the diet success planner provided information on goal-setting and maintaining motivation, nutrition, and physical activity. Initial demographic information was collected at their first pharmacy visit and 5 phone interviews were completed to assess the participant's use of the product. Later, educational materials, weight loss, and contact with medical professionals were provided to the participants. Schwartz and colleagues found that more than 90% of the participants reported success in maintaining their diets, 75% participated in an exercise program with 51% increasing

the frequency or duration of their exercise over the study, and 50% reported a five percent weight loss over the course of the study. The naturalistic study by Schwartz and colleagues may hold promise with a sample of obese individuals who are able to manage weight loss pursuits with limited outside support. However, it is not known how long or by what means the weight loss was maintained. A longer term study using medications may yield weight loss maintenance in those who use weight loss medication, which may be a function of a new behavior being formed by taking medication for weight loss.

Wadden and colleagues (2005) completed a randomized trial of the efficacy of four weight loss treatment groups over the course of 52 weeks. The first treatment group completed weekly 90-minute group sessions of lifestyle modifications led by a trained psychologist, for the first 18 weeks. The group sessions were held every other week for weeks 20-40, and a follow-up visit at week 52. The second treatment group received sibutramine (brand name Meridia), a weight loss medication, and were provided a pamphlet on tips for healthy eating and activity. This group had 8 brief visits with a primary care provider at weeks 1, 3, 6, 10, 18, 26, 40, and 52. The third group received both the 90-minute group session and medication. The last group received instructions to complete a daily food and activity diary, and met with a primary care provider for brief support and review of homework. Results of the year long study yielded a significant weight loss of 12.1 $\pm$ 9.8 kg for those who received medication and group sessions, a weight loss of 7.5 $\pm$ 8.0 kg for those who received medication and brief therapy, 6.7 $\pm$7.9kg for those in the lifestyle modification, and 5.0 $\pm$ 7.4 kg for those in the medication-only group. The findings from the research of Wadden et al (2005) yielded a greater amount of weight loss for those who had combined treatments versus those who had single treatment interventions.

Wadden and colleagues results support the contention that an increased amount of weight loss can be achieved when multiple treatment modalities are used.

The low rate of sustained weight loss utilizing lifestyle modifications and pharmacotherapy has opened the door for more invasive and consequently more successful treatment modalities for obesity, bariatric surgery. Additionally, the cost of weight-loss treatments varies widely, but the growing trend has been for insurance to cover the cost of surgical interventions at a much higher rate than lifestyle interventions including counseling. According to Tsai, Asch, and Wadden (2006), surveys completed by health insurance providers in Pennsylvania, displayed a disparity in levels of coverage for weight loss interventions. Some of their findings include: all of the companies provided a level of coverage for bariatric surgery, 56% covered nutritional counseling, 31% covered "intensive" counseling, and less than half covered other lifestyle interventions. Similar findings were reported by Horwich (2003), who surveyed health insurance providers in Minnesota. The only category in which all five major health insurance carriers were providing coverage was medical in nature: bariatric surgeries, prescription obesity medications, and physician appointments regarding obesity. The rate of coverage dropped when it came to meeting with a nutritionist (4 out of 5 companies), and none of the companies covered independent weight loss options (e.g. gym memberships, Weight Watchers) or behavior modification programs. As the pendulum has swung back to a medical model for the treatment of obesity, a medical procedure has revolutionized obesity treatment.

Bariatric Surgery

Bariatric surgery is a term that encompasses the surgical methods used to promote weight loss, either by restricting food intake, reducing the absorption of food, or the combination of both procedures (NIH/NHLBI, 1998). The indication for surgery according to the clinical guidelines

of NIH/NHLBI (1998), are for patients who have failed less invasive weight loss methods who have a BMI ≥ 40 or in patients who have co-morbid medical problems whose BMI is ≥ 35. Weight loss surgery was first suggested after irreversible operations for cancer and other abdominal diseases resulted in the loss of large portions of the stomach and/or small bowel (Mason et al, 1994). The resulting loss of abdominal tissue caused a loss in weight and was thought to be a useful treatment to obesity, but in the long-term this type of surgery caused many patients to lose an excessive amount of weight causing them to remain under normal weight.

The original intestinal bypass, the jejunoileal bypass (JI), was utilized between 1954 and 1974 and was thought to provide weight loss as excess food would be poorly digested or rapidly processed as to not allow absorption of the nutrients from the food (Buchwald & Buchwald, 2002; Mason et al., 1994). Unfortunately, not only were essential nutrients passed too quickly, but appetite was suppressed and the side effects were hard to manage (Mason, 1993). In the 1970's and 1980's, the utilization of restrictive techniques were introduced, which yielded fewer complications (Buchwald & Buchwald).

Restrictive techniques

The goal of the restrictive procedures is to reduce the volume of the stomach, which reduces the food intake and creates satiety more quickly. The procedures that restrict the stomach volume are the vertical-banded gastroplasty (VBG) and the laparoscopic adjustable gastric banding (LAGB). The VGB was first used in surgery in 1980 and involves vertically dividing the upper stomach, leaving a gastric window to which a mesh collar was placed to support the opening. This procedure allows for quick satiety with a small consumption of food and slow emptying of the pouch, which produces prolonged satiety. Side effects during and after surgery from VGB include leakage of stomach juices (.6%), stretching the pouch out, and pain or

vomiting from pouch obstruction (Mason et al., 1994). Since the advent of the LAGB in the early 1990's, the VGB procedure has not been widely used (Buchwald & Buchwald).

The LAGB is a minimally invasive procedure in which an adjustable band is placed near the upper end of the stomach. This creates a small upper stomach and a narrow passage to the rest of the stomach. This upper stomach reduces the capacity of food intake without altering the digestive process. Side effects during and after surgery from this procedure include: band erosion into the stomach wall, pouch dilation, stomach slippage, gastric perforation, and death (Belachew, Belva, & Desaive, 2002). This procedure was approved by the FDA in 2001 and is both adjustable and reversible.

Another restrictive procedure that is growing in popularity as a stand alone procedure is the vertical sleeve gastrectomy (VSG), also known as gastric sleeve surgery. It was originally performed as a two-step process, prior to a malabsorptive surgery for morbidly obese patients who were at high risk for complications from a malabsorptive surgery (Weight Loss Surgery, 2010). In this procedure 60-80% of the stomach along the curvature is removed, leaving a "sleeve" as the stomach. Not only is this procedure restrictive, it also helps to control hunger, as the piece of the stomach that is removed contains the hunger hormone, ghrelin. Risks of this procedure include stomach leaks or bleeding (Weight Loss Surgery).

Malabsorptive techniques

Malabsorptive procedures shorten the small intestine to decrease the absorption of nutrients. The current malabsorptive procedure, which evolved from the JI surgeries from the 1970's, has produced better outcomes without the side effects. This is the biliopancreatic diversion (BPD). As mentioned earlier, the historical context of bariatric surgery lies in a malabsorptive technique. The bulk of the BPD procedures were performed in Italy and in the

U.S. a modified version of the BPD, the duodenal switch is not widely utilized, but is gaining acceptance.

Combined procedures

Combined procedures restrict the capacity of the stomach and limit the absorption of nutrients. This technique is seen as the "gold standard treatment" (Vetter, Cardillo, Rickels, & Iqbal, 2009, p. 95) for obesity procedures. The procedure thought of as the gold standard is the Roux-en-Y gastric bypass (RYGB). RYGP has fewer complications than other intestinal bypass surgeries, can produce greater amounts of weight loss than restrictive procedures, and can be done laparscopically (Buchwald & Buchwald). This surgical procedure involves creating a new small pouch (holding 100-150 ml) that restricts the amount of food ingested (Buchwald & Buchwald, 2002). The small pouch is attached lower in the intestine, bypassing the rest of the stomach, duodenum, and the upper parts of the intestine (Mason et al., 1994). The side effects of the RYGB procedure include dumping syndrome (nausea, vomiting, weakness, sweating, and diarrhea) which can be precipitated by the consumption of high fat/sugar foods. Additional side effects of the RYGB procedure are vitamin insufficiency, hair loss, bowel obstruction, and death (Mason et al.).

Given the history of the exogenous view of obesity held by the medical profession, the proliferation of surgical intervention to treat obesity, displays a change in the conceptualization of obesity. An example in the change can be seen by the announcement in 2004 from the Health and Human Service (HHS) in which the language stating that obesity was not an illness would be removed from the Medicare manual. The change in the language also allowed for medical coverage if new interventions and treatments demonstrated effectiveness (HHS, 2004). As the

pendulum continues to swing in the manner of treatment of obesity, psychology still has a presence in the medical intervention of obesity.

Psychology In The Surgical Evaluation Of Obese Adults

Psychologists continue their role in the provision of psychological services to obese adults. In the provision of these services, specifically, in the context of evaluating appropriateness for bariatric surgery, there are no established psychological contraindications (Bauchowitz et al., 2005; Greenberg, Sogg, & Perna 2009). Bauchowitz et al. contends that illicit drug use, uncontrolled schizophrenia, severe mental retardation, and limited understanding of the surgery are contraindications for bariatric surgery. According to Greenberg, Sogg, and Perna the literature lacks documentation of a strong association between pre-surgical evaluation and post-surgical outcomes. Greenberg and colleagues note that patients with severe psychological dysfunction are deferred for surgery thus resulting in a restriction of variance which makes it more difficult to find statistical significance.

The goal of the psychological evaluation is to provide a service to both the surgeon and the patient, but the lack of psychological guidelines limit the role of psychology. Bean, Stewart, and Olbrisch (2008) contend the role of a psychologist is that of a consultant, in which the psychologist identifies factors which may have a negative impact on the post-surgical outcomes or adherence and makes recommendations to the surgical staff.

A landmark study by Bauchowitz and colleagues (2005) explores the current psychological evaluation practices at bariatric surgery centers across the country in order to help develop a consensus on contraindications to surgery. They received responses from 81 bariatric surgery centers, including responses from private hospitals, academic medical centers, public hospitals, and private surgery clinics. Of importance, Bauchowitz et al. found 88% of the

respondents require patients to complete a psychological evaluation, regardless of the insurance requirement. Over half of the clinicians completing the psychological evaluation were psychologists (82.7%), followed by psychiatrists (37%), master-level professionals (13.5%) and surgeons (2.4%). Bauchowitz and colleagues (2005) found that the overwhelming majority (70.4%) of respondents used informal guidelines in their evaluative process, while 22% of the programs use a formal guideline. As for as the use of assessment instruments, Bauchowitz et al. (2005) found that over half use symptom inventories, 30% use personality inventories, 19% use quality of life inventories, and 11% use eating disorder inventories. Just as the method of evaluation has varied between programs, the variance continues when it comes to the exclusionary criteria for bariatric surgery. The following are the top five definite contraindications for surgery: current illicit drug use (88.9%), active symptoms of schizophrenia (86.4%), severe mental retardation (81.5%), current heavy drinking (77.8%), lack of knowledge about surgery (77.8%), and significant medical non-compliance (69.1%). Of interest, active binge eating disorder was a definite contraindication for 48% and possible contraindication for 40% of the responding bariatric surgery center. This study confirms the dominant use of psychological evaluations in decision making for appropriateness of individuals for bariatric surgery, and illustrates the variance in protocols and guidelines used in determining contraindications.

It is important to state that although surgery provides the physiological opportunity to lose weight, there are behavioral aspects that must change in accordance for the weight loss to be sustained. The restrictive and malabsorptive surgeries both promote behavioral changes in regards to chewing foods thoroughly, eating small meals, avoiding high fat/sugar food items, avoiding carbonated beverages, eating high protein foods, and not overeating (Mason et al.,

1994; Weight Loss Surgery, 2010). If the aforementioned behaviors are not changed, patients can stretch the pouch and regain the weight they had lost.

Zijlstra, Boeiji, Larsen, Ramshorst, and Geenen (2008) interviewed 11 patients who were not successful in weight loss after having the LAGB procedure. Patients were deemed unsuccessful if at a 2 year post-operation check-up they had a BMI at or over 40 or had loss less than 10 BMI points. Common themes stated by patients included a history of emotional and binge eating, that they adapted post-operatively (which tested the limit of the band), lack of awareness of personal control, and no expectations that the patient had to change their behaviors. Eventually the patients were allowed to eat as they did before the surgery and the band was blamed for not working. The researchers linked the stages of change with the patient's response pattern and found that 8 of the 11 were in the precontemplation or contemplation stage. Interestingly, three of the interviewed patients were planning to pursue gastric bypass for weight loss support, although it was unclear what stage of change they were in.

A study by Dixon and colleagues (2009) found no relationship between readiness to change score and excess BMI loss at 2 years in 227 patients who had undergone adjustable gastric banding. They did find a significant relationship between poor weight loss and physician follow-up. Dixon et al.'s study provided yet another opportunity for the intervention of psychologists. Although weight loss surgeries have the potential to help obese adults lose a tremendous amount of weight, the surgery in and of itself is not the cure-all to eradicate obesity. The complex psychological and environmental factors contributing to obesity must still be dealt with even when surgery is pursued.

Psychology has played a pivotal role in the development, research, treatment, and understanding of the intractable disorder of obesity. The early psychoanalytic theory allowed for

the evolution of understanding to the current workings of the multi-factorial processes currently believed to contribute to obesity. This current understanding allows for the integration of genetic, behavioral, and environmental factors which contribute to obesity. Just as the understanding of obesity has evolved, so have the treatments. Obesity has been a disease which has been difficult to treat and even more difficult to maintain weight loss. The current treatment method that has proven to be most efficacious in sustaining weight loss is bariatric surgery in which fewer calories are consumed and/or absorbed. Given the difficulty in treating obesity, even when using surgical intervention, psychological evaluations are utilized to better understand an individual's ability to adhere to lifestyle changes and the incidence of psychiatric disorders.

Chapter III

Methods

The purpose of this study is to understand the relationship between binge eating and the incidence of psychopathology in obese adults seeking bariatric surgery. The dual pathway model by Stice (2000) postulated binge eating is a compensatory behavior used to distract and gain comfort from the cycle of dieting and negative affect. The cumulative effect of not being able to meet societal and personal standards promotes the negative emotions that an individual attempts to control, but when unable to control those emotions, binge eating results. Given the paucity of research examining the relationship between binge eating and psychopathology in a sample of adults seeking bariatric surgery, this study will examine the relationship utilizing archival data at an established surgery center. This chapter will provide information on the participants, measures, and a description of the procedures.

Participants

Participants were adults seeking either laparoscopic adjustable gastric banding or Roux-en-Y gastric bypass procedures at a medical center in the Kansas City metropolitan area. Table 1 presents the descriptive data of the participants by level of binge eating. A total of 217 adults, of whom 176 (81.1%) were women and 41 (18.9%) were men, were evaluated for psychological candidacy for bariatric surgery. The mean age of the sample was 43.68 (SD = 11.00), with a range of 22 to 68. The sample was comprised of 72 (33.2%) African-Americans, 135 (62.2%) Caucasians, 6 (2.8%) Hispanics, and 2 (.9%) Native Americans. Regarding employment status 177 (81.6%) of the participants were employed, while 37 (18.4%) were not employed. The range of the education of the participants was; 3 (1.4%) did not graduate high school, 78 (35.9 %) have a high school diploma or equivalent, 121 (55.7%) have 1-4 years of college education, and 15

(6.9%) have graduate education. The Body Mass Index (BMI) for the participants ranged from 33.5-76.0 (M = 46.09, SD = 7.56), 89 adults (41%) endorsed a psychiatric history whereas 127 (58.5%) denied any previous psychiatric diagnosis or psychotropic medication use.

Measures

Demographic Questionnaire. The demographic questionnaire was developed by Corsica (2000), and was used to gain information about the persons seeking surgery. The demographic information has been used for research purposes to better understand the psychological aspects of obese adults seeking surgery. This questionnaire is completed by the patient and submitted by the patient along with other assessment forms. The demographic questions gather information on race/ethnicity, education, occupation, employment status, relationship/marital status, number of children, and household composition. The second section asks questions regarding health, including physical and mental health problems, current medications, and current or past tobacco, alcohol, and drug use. The third section collects weight and surgery preparedness information assessing their attributions of their obesity, previous weight loss attempts, typical daily diet, presence of emotional or binge eating, rationale for surgery, and their understanding about the surgical process. See Appendix B.

Pre-Bariatric Surgery Psychological Interview. The clinical interview template was developed by Twillman (2009). This is a paper and pencil form utilized by the clinician to gain additional information about the patient's social history, weight history, diet history, lifestyle, physical, and mental health history during a face-to-face interview with the patient. The section on mental health includes history of trauma, hospitalization, psychotherapy and psychotropic medication use as well as coping strategies they employ when stressed. A recent revision of this form by Twillman in 2010 added questions regarding symptoms of binge eating disorder to the

mental health section. Additionally there is an, "attitudes towards surgery" section in which the patient's rationale for surgery and weight-loss goals, their knowledge of the pre and post surgery requirements, family reaction to their surgery goals, and caregiver arrangements are evaluated. See Appendix C.

Beck Depression Inventory–II. (BDI-II), is a 21 item self-report tool used to assess the presence and level of depression in individuals age 13 and older (Beck, Steer, & Brown, 1996). The BDI-II is a screening, not a diagnostic, tool for depression. The BDI-II was revised in 1991 to reflect the diagnostic criteria in the DSM-IV. As such the BDI-II assessed the physical, emotional, and cognitive symptoms of depression. The BDI-II uses a 4-point Likert scale for 19 items, with a range of 0 (no symptoms) to 3 (elevated symptoms). The Likert scale is expanded to seven points for the two questions which address increases and decreases in sleep and appetite, respectively. The score categories for sleep and appetite are 0, 1a, 1b, 2a, 2b, 3a, 3b with 3 indicating a higher level of disturbance than 0. The letter "a" indicates a decrease in a behavior, whereas the letter "b" indicates an increase in the behavior.

Individuals are to respond to each question based on the way they have been feeling for the past two weeks. The BDI-II provides an interpretation of scores with the following range: minimal depression (scores of 0-13), mild depression (scores of 14-19), moderate depression (scores of 20-28), and severe depression (scores of 29-63).

The internal consistency of the BDI-II was developed from a sample of 500 psychiatric outpatients and 120 college students. The coefficient alpha for outpatient sample was .92, and .93 for college students. The coefficient alpha for the BDI-II is higher than for the BDI-A, which had an alpha of .86 (Beck, Steer, & Brown, 1996). The test-retest correlation, administered 1 week apart, was .93 in a sample of 26 outpatients who were referred for depression. The BDI-II

displays convergent and discriminant validity when evaluated with anxiety and depression scales in a sample of college students. The correlation between the Revised Hamilton Psychiatric Rating Scale for Depression was .71. The correlation with the Beck Anxiety Inventory was .60 and .47 for the Revised Hamilton Anxiety Rating Scale.

Binge Eating Scale (BES; Gormally, Black, Daston, & Rardin, 1982) is a 16 item self-report questionnaire which measures the presence and level of binge eating. The BES assessed the behavioral expression of a binge (eating in isolation) and the feelings and emotions that precipitate or follow a binge (lack of control to cue a binge, or feelings of guilt after a binge episode). The items of the BES used a 4-point Likert scale with a range of 1 (no binge eating) to 4 (severe binge eating). BES scores range from 0-46. The BES was validated by comparing the scores from two samples (n = 65 and n = 47) of overweight individuals who sought obesity treatment with external criterion-based clinical interviews. The structured interviews determined severity of binge eating by examining behaviors of a recent binge eating episode, emotions after the episode, and general feelings to control urges to eat. Gormally et al. found high inter-rater reliability of the structured interview when a second interviewer independently rated a participant, with no awareness of their BES score. One hundred percent of the ratings were within 1 point and 67% were in complete agreement of the scores.

Timmerman (1999) provided additional assessment of the reliability and validity of the BES. The test re-test reliability was strong (r = .87, p < .001) and moderate association between combined objective and subjective binge severity and BES (r = .42-.46, p < 001). The score cut-off utilized by Gormally et al. (1982) to indicate presence and severity of binge eating was developed based on the structured interview results. According to the interview scores of the sample of 65 individuals, those found to not binge eat had a mean BES score of 14.9.

Participants who were found to engage in moderate binge eating had a mean BES score of 19.6. Participants who were found to engage in severe binge eating had a mean BES score of 28.9. The second sample of 47 individuals were found to have BES scores of 13.4 for no binge eating, 21.1 for moderate binge eating, and 31.3 for severe binge eating. Appolinario, Fontenelle, Papelbaum, Bueno, and Coutinho (2002) utilized a BES score of 17 and above to indicate "moderately severe" (p. 272) binge eating behavior, when examining the efficacy of topiramate in reducing binge eating. Research by Celio, Wilfley, Crow, Mitchell, & Walsh (2004) and Greeno, Marcus, and Wing (1995) also utilized the cut-off 17 and below to indicate non-binge eaters and scores above 27 to indicate severe binge eating. For this study, BES cut-off scores were as follows: 0-16 was indicative of no problem with binge eating, 17-26 indicated a mild to moderate problem and scores over 27 indicated a severe problem with binge eating.

Personality Assessment Inventory *(PAI)* is a 344 item self-report measure designed to assess multiple dimensions of personality and psychopathology in individuals whose age is 18 and older (Morey, 1991). PAI items are rated on a four point scale: very true, mainly true, slightly true, and not at all true. The PAI is written at a fourth grade reading level. The items of the PAI comprise 22 separate scales: 4 validity scales, 11 clinical scales, 5 treatment scales, and 2 interpersonal scales. The validity scales are inconsistency [ICN] (determines if respondent consistently answers), infrequency [INF] (determines if respondent is randomly responding), negative impression management [NIM] (suggests exaggerated negative responses), and positive impression management [PIM] (suggests exaggerated positive responses). The clinical scales are somatic complaints [SOM], anxiety [ANX], anxiety-related disorders [ARD], depression [DEP], mania [MAN], paranoia [PAR], schizophrenia [SCZ], borderline features [BOR], antisocial features [ANT], alcohol problems [ALC], and drug problems [DRG]. The treatment scales are

aggression [AGG], suicidal ideation [SUI], stress [STR], nonsupport [NON], and treatment rejection [RXR]. The interpersonal scales are dominance [DOM] (determines the extent to which a person is controlling and independent in relationships) and warmth [WRM] (determines the extent to which a person is supportive and empathetic in relationships). In addition to the aforementioned scales the PAI has twenty-seven items identified as critical as the items may indicate a potential crisis situation because those items have low endorsement rates in non-pathological adults.

The raw scores of the PAI are transformed to *t*-scores for interpretation relative to a standardization sample of 1000 community-dwelling adults. *T*-scores have a mean of 50 with a standard deviation of 10. A *t*-score of 70 or above represents a pronounced deviation from the typical response of community-dwelling adults. The PAI was normed on three subject samples: 1462 person census-matched standardized sample, 1265 person representative clinical sample, and 1051 college students. Reliability of the PAI has been well established. Internal consistency reliability for the full scale has a median alpha of .81 for the normative sample, .86 for the clinical sample, and .82 for the college sample. Morey (1991) indicates minimal variability in internal consistency due to race, gender, or age. The ranges for test-retest reliability were .74-.90 for the normative samples, for the clinical sample .82-.94, and for the college sample .66-.89. The range of values evaluating test-retest reliability for the interpersonal scales in the normative sample was .72-.85, the clinical sample was .79-.93, and the college sample was .69-.89.

The PAI was developed with four validity scales to assess the influence of certain response styles which may impact test results (Morey, 1991). Two of the scales (INF and ICN) were developed to assess deviations from careful responding. The internal consistency of INF and ICN are lower (< .60) when compared to the clinical scales. The INF and ICN scales were

developed by analyzing 1000 simulated random response protocols. The results yielded a t-score of 71 on the INF scale and t-score of 64 on the ICN scale to indicate a random response pattern. 99.4% of the random protocols were correctly identified via elevations of either INF or ICN. Additional analysis by Morey indicated greater specificity in identifying random responses when using reference clinical data, resulting in the invalid protocols when scores are two standard deviations from the clinical mean. Scores two standard deviations above the clinical mean are invalid when INF $t \geq 75$ or ICN $t \geq 73$.

The other two validity scales (NIM and PIM) were developed to assess the level of impression management via participants presenting themselves in an overly positive light (PIM) or overly negative light (NIM). They both have acceptable internal consistency at .72 (NIM) and .71 (PIM). When utilizing response sets from the community dwelling sample, impression management could be determined using cut-off scores of PIM $t \geq 57$ and NIM $t \geq 73$. Research by Baity, Siefert, Chambers, & Blais (2007) supported the use of Morey's original cut-offs for use in a psychiatric sample. Recent research by Tasca, Wood, Demidenko and Bissada (2002) evaluated the psychometric properties of the PAI to establish its generalizability in an eating disordered population. Evaluating 238 women presenting for treatment for eating disorders (anorexia, bulimia, binge eating disorder), Tasca et al. found the reliability of the full scales of the PAI for eating disordered sample to be .82 and was significantly less than Morey's (1991) clinical sample $t\,(19) = -2.89, p < .01$, but still within acceptable range of internal consistency.

Of interest to the hypotheses of this study, the scales measuring negative impression management (NIM), positive impression management (PIM), depression (DEP), anxiety (ANX), anxiety-related disorders (ARD), stress (STR), nonsupport (NON), dominance (DOM), and warmth (WRM) were used.

Perceived Disability Scale (PDS; Frey, Lofland, O'Connor, & Semenchuk, 2000) is a 10 item self-report measure which allows participants to rate their level of subjective disability across ten domains of their life. The 10 items are Home activity, Passive Recreational activity, Active Physical activity, Occupation or Education, Self-Care, Basic Life activity, Sleep, Sexual Behavior, Thinking, and Social. The PDS uses an 11-point Likert scale for all 10 items, with a range of 0 (No Disability) to 10 (Total Disability). An example of the question assessing disability in home activities is "active things you do around the house, including making the bed, cooking, cleaning (dusting, vacuuming, dishes, laundry, floors) shopping, yardwork, etc", whereas basic life activities asks about "eating, drinking, and breathing." The PDS was designed to provide a quick and understandable measure to assess an individual's level of perceived disability.

Preliminary psychometric properties of the PDS conducted by Frey et al. (2002; as cited in Weber, 2002) on 100 patients seeking treatment from interdisciplinary pain clinics yielding a coefficient alpha of .88. Weber followed up to further establish psychometric properties of the PDS, utilizing patients in a rehabilitative setting, who had suffered from chronic pain, low back pain, headache, spinal cord injury, or other pain. The mean score for all patients (n = 349) was 46.0, SD = 22.6, score range 0-93. The test-retest reliability was strong at r = .89 at the .01 alpha level, n = 116 (Weber). Construct validity with the Oswestry Disability Questionnaire was significant at the .05 alpha level r = .73 (n = 178) (Weber). See Appendix D.

Revised Master Questionnaire (RMQ) is a 56 item true-false self-report questionnaire which measures behaviors, attitudes, and knowledge related to weight gain and loss behavioral treatments modify, rather than stable personality traits (Straw, Straw, & Craighead, 1979; Straw & Straw, 1984; Straw et al., 1984). It was designed to serve as an outcome measure to cognitive

behavioral interventions for obesity treatment, and a predictor of change in weight when receiving treatment. The RMQ is a revision completed by Straw, Straw, and Craighead (1979) from the Master Questionnaire (MQ), in which the MQ had 302 items measuring the domains of Spouse Support for weight loss, Energy Balance Habits, Cognitions relevant to weight loss, and Energy Balance Knowledge (Straw and Straw). The scales were developed using a hierarchical cluster analysis to identify unidimensional subsets of items based on their intercorrelations, which was followed by a factor analysis to replicate and confirm the relationships among the subscales (Straw et al.). Early in the development of the MQ, revisions were made to shorten and homogenize the scales. This revision resulted in a 56 item true-false revised questionnaire which contains five domains; Stimulus Control, Hopelessness, Motivation, Feeling Born Fat (which is now referred to as Physical Attribution), and Energy Balance Knowledge (Straw & Straw).

The five scales of the RMQ were validated across two samples of applicants at weight loss programs in Chicago, Illinois (n = 99) and Winston-Salem, North Carolina (n = 95). Straw and Straw (1984) found that the test-retest correlations were not as strong for the RMQ as the original scale, notably the Energy Balance Knowledge scale had an "unacceptably low" (p. 1) correlation of .50. The test-retest correlations after a two-week period for the Chicago, Illinois sample for the five scales were: Stimulus Control .71, Cognitive Factors combined .69 (Cognitive Factors divided into subscales of: Hopelessness/Helplessness .71, Motivation .48, and Physical Attribution .61), Energy Balance Knowledge .50 (Straw & Straw). Coefficient alpha for the five subscales were derived from a re-analysis of the original data set of 216 individuals. Stimulus Control scale alpha = .84, Hopelessness scale alpha = .79, Motivation scale alpha = .77, Physical Attribution scale alpha = .79, Energy Balance Knowledge scale alpha = .68.

For the current study, means and standard deviations were provided by a bariatric surgery center in Chicago that utilizes the RMQ in their psychological assessment of prospective bariatric patients (J. Corsica, personal communication, May 5, 2010). The measure is scored by adding the number of false endorsements, because more false responses indicate increasing levels of adaptive functioning. The means and standard deviations for a bariatric population for the scales utilized in the current study are: Stimulus Control $M = 5.4$ and $SD = 2.1$, Hopelessness $M = 6.7$ and $SD = 2.3$, Motivation $M = 7.3$ and $SD = 3.0$, Physical Attribution $M = 7.2$ and $SD = 3.2$, and Energy Balance $M = 6.9$ and $SD = 2.0$. See Appendix E.

Procedures

Approval from the Human Subjects Committee was obtained from the University of Kansas, as well as the medical center from which the data was utilized. The bariatric surgery center from which the data was provided, is staffed by two surgeons, a licensed psychologist, a registered dietician, and a program coordinator. In addition to the licensed staff psychologist, clinical interviews were also completed by other psychological staff under the supervision of the staff psychologist. Additional members of the psychological staff included a post-doctoral fellow, pre-doctoral clinical psychology interns, and doctorate level practicum students. The process utilized in this bariatric surgery center involves the patient receiving a packet which contains an informational letter (see Appendix A) and a battery of assessment, which they are to complete prior to their appointment with the psychological staff for a clinical interview. Once the psychological questionnaires and the clinical interview are completed, a report is written by the individual who completed the clinical interview. If the staff psychologist did not complete the interview, they supervised the content and completion of the report which indicated the patient's candidacy for bariatric surgery from a psychological perspective.

In addition to the psychological component, prospective patients had additional mandatory consultations with other providers. Patients must meet with a registered dietician, attend a gastric bypass informational and at least two support groups (intended for pre and post surgery patients). From a surgical standpoint, patients are required to lose 10 pounds or one percent of their body weight prior to surgery. This program does not employ a stringent cut-off for accepting or rejecting patients for surgery. Instead, the criteria for exclusion from a psychological perspective for surgery in this program were related to a limited ability to adhere to post-surgical behaviors. Of note, very few patients were deemed unacceptable for surgery from a psychological perspective, but for those who were, the recommendation was made for behavioral changes and education (including psychotherapy), with follow-up by the staff psychologist to reassess psychological fitness for surgery. Otherwise, those patients who displayed an understanding of the role of the surgery, have healthy coping skills and support, and have knowledge of the recommended pre and post surgical changes, were found acceptable from a psychological perspective for surgery.

Participants completed a battery of assessments prior to coming in for a clinical interview with psychological staff. The assessments completed prior to interview were the Beck Depression Inventory-II (BDI-II) (Beck, Steer, and Brown, 1996), the Binge Eating Scale (BES) (Gormally, Black, Daston, and Rardin, 1982), the Personality Assessment Inventory (PAI; Morey, 1991), the Perceived Disability Scale (PDS; Frey, Lofland, O'Connor, & Semenchuk, 2000), the Revised Master Questionnaire (RMQ; Straw, Straw, & Craighead, 1979), and the Confidential Demographic Information Sheet (Corsica, 2000).

Data Analysis

Statistical Package for the Social Sciences (SPSS 18.0 for Windows, 2010) was the statistical program utilized to analyze the data. A retrospective design was utilized to understand the relationship between binge eating and psychopathology in adults seeking bariatric surgery. Preliminary analyses were conducted to obtain descriptive data. Hypotheses One a – One d suggests that greater rates of psychopathology will be seen in obese adults who engage in binge eating versus obese adults who do not binge eat. This was analyzed using Multivariate Analysis of Variance (MANOVA) to detect differences of rates of psychopathology between binge eating and non-binge eating obese adults. Hypothesis Two postulates higher rates of impression management will be seen in obese adults who binge eat and was analyzed using a MANOVA. Hypothesis Three posits that binge eating will have no significant impact on rates of self-reported levels of disability. This was analyzed using an Analysis of Variance (ANOVA). Hypothesis Four will provide psychometric data on the RMQ in a sample of adults seeking bariatric surgery. Means, standard deviations, descriptive statistics, internal consistency, and exploratory factor analysis were computed for psychometric information.

Chapter IV

Results

The present study was designed to measure the relationship between binge eating and the presence of psychopathology in obese adults seeking bariatric surgery. This chapter will present socio-demographic characteristics of the sample, followed by the statistical findings from the hypotheses of this study.

Socio-Demographic Characteristics

As stated earlier, the sample was divided into categories based on their binge eating scores. The subjects whose binge eating score was between 0-16 were grouped into the "no binge eating" category (n = 116), those who scored between 17-27 were grouped into the "moderate binge eating" category (n = 81), and those who scored over 28 were grouped into the "severe binge eating" category (n = 19). Table 1 provides a description of demographic characteristic of the three levels of the binge eating groups.

The no binge eating group had 93 (80.2%) women and 23 (19.85%) men, with an average age of 43.28 (SD = 10.30), average BMI of 45.73 (SD = 7.54), and average years of education 13.97 (SD = 2.07). The ethnic make-up of the no binge eating group consisted of 44 (38.3%) African-Americans, 68 (59.1%) Caucasians, 2 (1.7%) Hispanics, and 1 (0.9%) Native-American. Ninety-three (80.2%) of this group were employed, and 23 (19.8%) were not employed. Thirty-six (31%) of the no binge eating group reported a history of psychiatric illness, while 80 (69%) denied any history. The type of bariatric surgery planned by participants of the no binge eating group included 62 (62%) who planned laparoscopic banding, 35 (35%) who planned gastric bypass, and 3 (3%) who planned the gastric sleeve.

The moderate binge eating group had 65 (80.2%) women and 16 (19.8%) men, with an average age of 44.26 (*SD* = 12.01), BMI of 46.37 (*SD* = 7.28), and 13.93 (*SD* = 2.05) years of education. The ethnicity of this group consisted of 21 (26.3%) African-Americans, 54 (67.5%) Caucasians, 4 (5%) Hispanics, and 1 (1.3%) Native-American. Sixty-nine (85.2%) participants of this group were employed, while 12 (14.8%) were not. Forty-one (51.3%) of this group acknowledged a psychiatric history and 39 (48.8%) denied such history. Forty-seven (70.1%) of the participants in this group planned to have laparoscopic banding, while 20 (29.9%) planned gastric bypass.

The severe binge eating group had 17 (89.5%) women and 2 (10.5%) men, with an average age of 42.84 (*SD* = 10.84), BMI of 47.07 (*SD* = 8.96), and years of education 14.11 (*SD* = 2.00). Seven (36.8%) of this group were African-American and 12 (63.2%) were Caucasian. Fourteen (73.7%) of this group are employed, while 5 (26.3%) were not employed. Eleven (57.9%) of the participants reported a psychiatric history, while 8 (42.1%) denied a history. Ten (55.6%) participants planned laparoscopic banding, 6 (33.3%) planned gastric bypass, and 2 (11.1%) planned the gastric sleeve. Means and standard deviations for all measures by level of binge eating is provided in Table 2.

Hypothesis 1

It was hypothesized that obese adults seeking weight loss surgery who have moderate to severe problems with binge eating will have higher scores on measures of psychopathology, as measured by rates of depression, anxiety, interpersonal difficulties, and stress, than obese adults who do not binge eat. Binge eating was measured using the Binge Eating Scale (BES). Psychopathology was measured using the Beck Depression Inventory (BDI) and selected scales from the Personality Assessment Inventory (PAI). In addition to measures of psychopathology,

scales of the PAI were used to measure interpersonal functioning. The scales used to measure psychopathology from the PAI were Anxiety (ANX), Anxiety Related Disorders (ARD), and Depression (DEP). The scales used to measure interpersonal functioning were Nonsupport (NON), Stress (STR), Warmth (WRM), and Dominance (DOM).

Prior to the analysis of data, the data was inspected for invalid PAI protocols based on inconsistent or infrequent response patterns, which would reflect an inaccurate portrayal of the subject. The two validity scales of the PAI utilized by this study to measure a valid PAI were Inconsistency (ICN) and Infrequency (INF). According to Morey (1991), scores two standard deviations above the clinical mean invalidate the entire questionnaire when INF $t \geq 75$ or ICN $t \geq 73$. This procedure resulted in the exclusion of 7 participants. One additional subject was excluded from the analysis due to a missing score on the Binge Eating Scale. The excluded subjects resulted in a total of 209 subjects in this analysis.

To test the first hypothesis, a one-way Multiple Analysis of Variance (MANOVA) was utilized to determine the relationship between the measures of psychopathology and the categorical demographic variables of gender, race, psychiatric history, type of surgery, and employment. Due to the nature of the sample, the categorical demographic variables of race and type of surgery were dichotomized. The race variable was dichotomized into minority (African American, Hispanic, or Native American) or non-minority (Caucasian) due to the small numbers of Hispanic and Native American subjects. To increase power of the type of surgery, the category was dichotomized into restrictive and mal-absorptive surgery. Only 5 of the subjects were seeking the gastric sleeve, a restrictive procedure, and were therefore grouped with the 115 subjects seeking the other restrictive procedure, laparoscopic gastric banding.

The multivariate tests using Pillai's Trace resulted in a significant relationship between the demographic variables and the dependent variables. To control for Type 1 error, the Bonferroni method was employed, resulting in a p value of .006 to reach significance. The results of the non-significant multivariate test are as follows: Gender $F(8, 175) = 1.87, p = .07$, Race $F(8, 175) = 1.77, p = .09$, Employment $F(8, 175) = 1.65, p = .11$, and Type of surgery $F(8, 175) = .36, p = .94$. Significance was found in Psychiatric history $F(8, 175) = 3.09, p = .003$.The interaction of the demographic variables yielded a non-significant relationship with the dependent variables.

Follow-up univariate tests were performed resulting in significance between psychiatric history and the following dependent variables, with $p \leq .006$: BDI $F(1, 638) = 9.24, p = .003$, $\eta^2 = .05$, PAI-anxiety $F(1, 884) = 11.17, p = .001$, $\eta^2 = .06$, PAI-anxiety-related disorders $F(1, 806) = 9.70$, p = .002, $\eta^2 = .05$, PAI-depression $F(1, 1668) = 16.26, p = .000$, $\eta^2 = .08$, PAI-stress $F(1, 625) = 7.58, p = .006$, $\eta^2 = .04$, and PAI-non support $F(1, 1536) = 16.44, p = .000$, $\eta^2 = .08$. No significant relationship was noted for the following demographic variables: PAI-dominance $F(1, 425) = 3.79, p = .05$, $\eta^2 = .02$, and PAI-warmth $F(1, 7 = .10, p = .76$, $\eta^2 = .001$.

A correlational analysis was performed among the continuous demographic variables of age, BMI, and education with the dependent variables. Using the Bonferroni approach to control for Type 1 error, a p value of .006 was necessary for significance. No significant correlations were noted amongst the demographic and dependent variables.

As one of the demographic variables had a significant relationship with the dependent variables, a univariate ANOVA was first performed with psychiatric history as the independent variable and binge eating group as the dependent variable. The analysis resulted in a significant relationship between psychiatric history and the binge eating groups at p=.000. The significant

relationship resulted in the addition of psychiatric history as an independent variable in the statistical analysis of binge eating and psychopathology.

A MANOVA was performed to understand the relationship between the binge eating groups and the eight dependent variables. The multivariate test for equality of covariance, Box's Matrices was significant, $F(144,7877) = 1.49$, $p = .000$. The significant Box's M indicates a violation of the homogeneity of variance assumption, in this study likely due to the unequal group sizes. As a result Pillai's Trace was utilized as the multivariate statistic as it accounts for unequal group sizes. A significant relationship was found between levels of binge eating and the dependent variables, $F(16, 392) = 4.23$, $p < .001$, $\eta^2 = .15$, as well as psychiatric history and the dependent variables, $F(8, 195) = 2.52$, $p = .013$, $\eta^2 = .09$. The interaction between psychiatric history and levels of binge eating did not result in a significant relationship, $F(16, 392) = .47$, $p = .96$, $\eta^2 = .02$. The lack of a significant interaction indicates that psychiatric history and binge eating have separate and independent effects on levels of psychopathology.

Univariate ANOVAs were performed to discern which dependent variables were significantly related to levels of binge eating and psychiatric history. Bonferroni control of Type I error for the eight analyses resulted in a critical p value of .006. There was a significant difference amongst the binge eating groups for BDI $F(2, 1662) = 29.41$, $p = .000$, $\eta^2 = .23$, PAI-anxiety $F(2, 995) = 14.33$, $p = .000$, $\eta^2 = .12$, PAI-anxiety-related disorders $F(2, 1004) = 13.56$, $p = .000$, $\eta^2 = .12$, and PAI-depression $F(2, 1041) = 10.65$, $p = .000$, $\eta^2 = .10$. There was no significant difference within the binge eating groups for the dependent variables of PAI-stress $F(2, 237) = 2.97$, $p = .05$, $\eta^2 = .03$, PAI-nonsupport $F(2, 120) = 1.33$, $p = .27$, $\eta^2 = .01$, PAI-dominance $F(2, 448) = 4.08$, $p = .02$, $\eta^2 = .04$, and PAI-warmth $F(2, 4) = .06$, $p = .94$, $\eta^2 = .001$.

Univariate ANOVAs of psychiatric history and the dependent variables resulted in the following significant relationships: PAI-depression $F(2, 1560) = 15.97, p = .000, \eta^2 = .07$ and PAI-nonsupport $F(2, 1182) = 13.08, p = .000, \eta^2 = .06$. No significant effect was found between psychiatric history and the following dependent variables: BDI $F(2, 251) = 4.41, p = .04, \eta^2 = .02$, PAI-anxiety $F(2, 510) = 7.36, p = .007, \eta^2 = .04$, PAI-anxiety-related disorders $F(2, 366) = 4.95$, p = .03, $\eta^2 = .02$, PAI-stress $F(2, 392) = 4.91, p = .03, \eta^2 = .02$, PAI-dominance $F(2, 143) = 1.31, p = .25, \eta^2 = .01$, and PAI-warmth $F(2, 255) = 3.26, p = .07, \eta^2 = .02$. Table 3 displays significance levels for the independent and dependent variables.

Post-hoc contrasts were performed to identify which level(s) of binge eating were significantly different for the dependent variables that had significant effects, as shown in Table 4. Scheffe and Dunnett's T3 were the test statistics utilized in the post-hoc analysis to account for the lack of homogeneity of variance across different binge eating groups and for multiple comparisons, resulting in significance when $p \leq .05$. The dependent variables of depression (as measured by the BDI and PAI), anxiety, and anxiety-related disorders have significant differences in mean scores between all levels of binge eating groups (no binge eating vs. moderate binge eating; no binge eating vs. severe binge eating; and moderate binge eating vs. severe binge eating) at the $p < .001$ level. The exception to the p value < .001 was found in the difference between the moderate and severe binge eating groups for anxiety, with a $p = .04$ found with the Scheffe test and a non-significant value of .192 with Dunnett's T3.

Hypothesis 2

It was hypothesized that obese adults seeking weight loss surgery who have moderate to severe problems with binge eating will have higher scores of impression management than obese adults who do not binge eat. Positive and negative impression management was measured

utilizing the positive impression management (PIM) and negative impression management (NIM) scales of the PAI and binge eating was measured using the BES.

To evaluate a potential relationship between the measures of impression management and the categorical demographic variables of gender, race, psychiatric history, type of surgery, and employment, a MANOVA was conducted. To control for Type 1 error, the Bonferroni method was employed, resulting in a p value of .025 to reach significance. The results of the non-significant multivariate test, as measured by Pillai's Trace, are as follows: Gender $F(2,181) = .33$, $p = .72$, Race $F(2, 181) = 1.36$, $p = .26$, Employment $F(2, 181) = .05$, $p = .96$, and Type of surgery $F(2, 181) = .60$, $p = .55$. Significance was found in psychiatric history $F(2, 181) = 7.75$, $p = .001$. Follow-up univariate tests displayed the significant relationships between psychiatric history and PIM, $F(1, 1218) = 11.82$, $p = .001$, $\eta^2 = .06$, and NIM $F(1, 338) = 9.56$, $p = .002$, $\eta^2 = .05$.

A MANOVA was utilized to evaluate this hypothesis. The multivariate test for equality of covariance, Box's Matrices was significant, $F(15,4473) = 2.13$, $p = .007$, indicating inequality in the covariance matrices. The Bonferroni approach was employed to control for Type 1 error, resulting in a p value of .025 to reach significance. A significant difference in impression management scores amongst the levels of binge eating was found, as measured by Pillai's Trace, $F(4, 404) = 7.64$, $p < .01$, $\eta^2 = .07$. A significant difference was also found between psychiatric history and both measures of impression management, as measured by Pillai's Trace, $F(2, 201) = 3.89$, $p = .02$, $\eta^2 = .04$. The interaction of the two independent variables were not significant, as measured by Pillai's Trace, $F(4, 404) = .49$, $p = .74$, $\eta^2 = .005$. Table 5 displays the findings.

Follow up tests from the MANOVA were conducted. To control for Type 1 error the Bonferroni method was utilized resulting in a p value of .025 necessary for significance. A

significant relationship was found between positive impression management and psychiatric history, $F(1, 461) = 5.21, p = .02, \eta^2 = .03$ and levels of binge eating, $F(2, 1450) = 16.37, p < .001, \eta^2 = .14$. A significant relationship was found between negative impression management and psychiatric history $F(1, 195) = 5.42, p = .02, \eta^2 = .03$. The relationship between negative impression management and levels of binge eating was not significant, $F(2, 119) = 3.32, p = .04, \eta^2 = .03$.

To better understand the differences within the levels of binge eating, a post-hoc analysis utilizing Scheffe and Dunnett's T3, $p \leq .05$, was conducted with the following findings. A significant difference was found in negative impression management scores between those who did not binge eat and those who moderately binge ate at $p = .02$, and those who did not binge eat and those who severely binge ate at $p = .01$. No significant difference was found in negative impression management between the moderate and severe binge eating groups at $p = .34$ (.37 for Dunnett's T3 test). As for the scores on positive impression management, there was a significant difference in positive impression management scores between all groups, the no and moderate binge eating subjects and the no and severe binge eating subjects at $p < .01$, and the moderate and severe binge eating subjects at $p = .01$ (.03 for Dunnett's T3).

Hypothesis 3

It was hypothesized that binge eating, at any level, would not have a significant impact on the rates of self-reported levels of disability in obese adults seeking weight loss surgery. Disability was measured utilizing the Perceived Disability Scale (PDS) and binge eating was measured utilizing the BES. Similar to the findings by Frey (2002; as cited in Weber, 2002) the internal consistency of the PDS was found to have a Cronbach's alpha of .87, indicating a high level of reliability for this measure. The ten items of the PDS contribute to the overall reliability

of the scale. Additionally, the items of the scale are significantly correlated with each other at the .01 level, two-tailed Pearson correlations ranged from .20 - .65. Table 6 displays the correlations between the ten items of the PDS.

To evaluate a potential relationship between the measure of total perceived disability and the categorical demographic variables of gender, race, psychiatric history, type of surgery, and employment, a one-way ANOVA was conducted. The results of the univariate tests are as follows: Gender $F(1,871) = 3.21$, $p = .08$, Race $F(1,929) = 3.42$, $p = .07$, Employment $F(1,121) = .49$, $p = .50$, Psychiatric history $F(1,902) = 3.32$, $p = .07$, and Type of surgery $F(1,959) = 3.53$, $p = .06$. The interaction of the demographic variables yielded a non-significant relationship with the dependent variables. None of the demographic variables, or their interactions, were significant, therefore they were not used in the evaluation of the hypothesis.

An ANOVA was utilized to evaluate the relationship between disability as measured by the total score on the PDS and levels of binge eating. Continuing the use of the three levels of binge eating, the 114 subjects in the no binge eating group had a mean PDS score of 19.53 ($SD = 14.66$), the 78 subjects in the moderate binge eating group had a mean PDS score of 29.30 ($SD = 17.10$), and the 18 subjects in the severe binge eating group had a mean PDS score of 43.23 ($SD = 15.47$). The ANOVA was significant $F(2, 5424) = 22.07$, $p < .01$. Follow-up tests were conducted to evaluate pairwise differences among the means. Bonferroni's and Dunnett's T3 tests were utilized in the post-hoc comparison and a significant difference was found in the means between the three levels of binge eating and disability. The subjects with no binge eating had disability scores 9.276 points lower than those who moderately binge ate, $p < .01$, and 23.74 points lower than those who binge ate at a severe level, $p < .01$. Subjects who engaged in

moderate levels of binge eating had disability scores 13.98 points lower than those who engaged in severe levels of binge eating, $p < .01$.

Analysis Data on the Revised Master Questionnaire (RMQ)

An analysis of the psychometric properties of the RMQ was performed to better understand the utility of its use in this sample. The RMQ was originally developed to assess the attitudes related to obesity and weight loss, as well as predict outcomes of cognitive-behavioral obesity treatment. In this study, the RMQ was used to assess attitudes, behaviors, and knowledge related to obesity and weight loss (not used to predict outcomes of treatment). The means, standard deviations, internal consistency, and factor analysis of the RMQ was performed. The means and standard deviations according to level of binge eating are displayed in Table 2.

Internal Consistency.

The RMQ is divided into 5 content areas and the internal consistency of each content area was evaluated. Listwise deletion was employed for each content area to exclude cases in which subjects had missing values, resulting in four cases being excluded. The Cronbach's alpha for each content area from the current study along with the original alpha are provided in Table 7. There were 213 cases examined for the Stimulus Control area, yielding a Cronbach's alpha = .63. The nine items of this area have a Corrected-Item Total Correlation ranging from .10 to .46. If Stimulus Control question 6, " I often nibble on food when I am clearing off the table", (.10) was deleted it would result in an increase in Cronbach's alpha to .66, suggesting that it is not contributing to the overall Stimulus Control content area.

There were 202 cases examined (15 cases were excluded) for the Hopelessness area, yielding a Cronbach's alpha = .72. The ten items of this area have a Corrected-Item Total Correlation ranging from .23 to .50. If Hopelessness question 2, "I can't imagine what I would

look like if I were thin", (.28) was deleted it would result in an increase in Cronbach's alpha to .73, indicating its lack of contribution to the overall Hopelessness content area.

In the Motivation area, there were 199 cases examined after 18 cases were excluded, yielding a Cronbach's alpha = .75. The twelve items of this area have a Corrected-Item Total Correlation ranging from .21 to .54. There were no questions in this content area that would result in an increase in Cronbach's alpha if the items were deleted.

There were 193 cases examined after 24 cases were excluded, for the Physical Attribution area, yielding a Cronbach's alpha = .76. The fifteen items of this area have a Corrected-Item Total Correlation ranging from .21 to .57. As in the last content area, the deletion of any question of this content area would not result in an increase in Cronbach's alpha.

The Energy Balance area had 196 cases examined after 21 cases were excluded, yielding a Cronbach's alpha = .58. The ten items of this area have a Corrected-Item Total Correlation ranging from .21 to .35. The deletion of any question from this content area would not result in an increase in Cronbach's alpha.

Exploratory Factor Analysis.

Exploratory factor analysis was performed to examine the relationships between the variables that comprise the RMQ. An examination of the correlation matrix revealed significant correlations between the content areas, supporting the use of an oblimin rotation in the exploratory factor analysis. The analysis of variance resulted in nineteen factors that have an eigenvalue at or above 1, which accounts for 64% of the variability in the original variables. The original derivation of the RMQ has 5 factors, and the analysis of the first five factors accounted for 30.54% of the variance in the original variables. Factor 1 (Stimulus Control) accounted for 13.9% of the variance, Factor 2 (Hopelessness) accounted for 5.44% of the variance, Factor 3

(Motivation) accounted for 4.1% of the variance, Factor 4 (Physical Attribution) accounted for 3.74% of the variance, and Factor 5 (Energy) accounted for 3.36% of the variance. Almost 60% of the variance in the scale is not accounted for by the five factors.

In examining the structure matrix of the factor analysis it was evident that the five factors had loadings from a mixture of the content areas. The first factor originally designed to define Stimulus Control included items predominately from Motivation (.36 to.63) and Hope (.32 to .51), with two items from Stimulus Control (.34 to .37). The second original factor of Hopelessness had 5 items of which two came from Energy Balance (.48 to .51), two from Physical Attribution (.34 to .37), and one item from Hope (.34). The third factor had 15 items from all five content areas, ranging from .32 (Hope) to .53 (Stimulus Control). The fourth factor, originally described to load on Physical Attribution, was comprised of 19 items all of which were negatively loaded. Fourteen of the items on the fourth factor were from Physical Attribution (-.30 to -.65), the remaining six items were from Motivation (-.30 to -.36)), and Hope (-.47). The fifth factor was comprised of 8 items from Hope (.30 to .46), Physical Attribution (.37 to .46), Stimulus Control (.32 to .37), and Energy Balance (.42 to .59). The exploratory analysis from this study did not support the factor consistency of the structure as it was designed by the original authors (Straw, Straw, & Craighead, 1979; Straw & Straw, 1984; Straw et al., 1984).

Chapter V

Discussion

This chapter summarizes and interprets the findings of the hypotheses of this study. The interpretation of the findings will include a discussion in relation to the body of literature on binge eating disorder and the role of psychological evaluation in bariatric surgery. Limitations and future directions will also be examined.

Summary of Findings

In the present study, 46% of the subjects reported moderate to severe levels of binge eating, which is greater than the rates reported by Castellini and colleagues (2008) and Spitzer et al. (1993). The overall sample revealed 81% of the subjects were women, which held consistent with the gender breakdown within each binge eating group. The gender ratio in the binge eating groups in the current study is beyond the estimation cited in the DSM-IV-TR (APA, 2000), which reports that women are 1.5 more times likely to have BED than men. There were no significant differences between the subjects who were grouped in the levels of binge eating with respect to their age, education, ethnicity, or employment status. Interestingly, there was no significant difference between the levels of binge eating and BMI, which corresponds with the findings of Stunkard and Allison (2003). The lack of a difference between BMI's in the different binge eating groups may illustrate the greater need for psychological intervention for those who binge eat, in order to help them learn binge triggers and build more adaptive resources after surgery. The lack of difference in BMI also points to the restrictive nature of binge eating; binges are episodes of overeating, not the consistent over consumption of food.

There was a difference in the reporting of psychiatric history between the no binge eating and moderate and severe binge eating groups. The difference between groups and the presence of

a psychiatric history is in line with findings of Kalarchian and colleagues (1996) who estimated that 66% of surgical candidates have had at least one Axis I diagnosis.

Hypothesis 1 stated that obese adults who sought weight loss surgery who have moderate to severe problems with binge eating will have higher scores on measures of psychopathology than those who do not binge eat. With one exception, none of the demographic variables had a significant relationship with the measures of psychopathology. The demographic variable, psychiatric history, was included in this analysis as an independent variable as it had a significant relationship with the measures of psychopathology. No significant relationship was found between the interaction of psychiatric history and the levels of binge eating. A significant relationship was found between the levels of binge eating and the measures of psychopathology, as well as psychiatric history and the measures of psychopathology. There was a significant difference between all three levels of binge eating on measures of depression (both the BDI and PAI), anxiety, and anxiety-related disorders, indicating a positive relationship with binge eating and depression and anxiety. This confirms earlier findings of elevated rates of psychopathology in the binge eating population. Specifically, findings show that depression and anxiety related disorders are more common in binge eating obese adults than obese adults who do not binge eat (Black et al., 1992). Higgs and colleagues (1997) suggested those who seek medical treatment for obesity are more likely to have a history of depression and anxiety, so in the context of obese adults, the results of the current study may display a disproportionate number of those with a psychiatric history due to the medical setting this data was collected from.

No significant relationship existed between levels of binge eating and the interpersonal measures. This finding is surprising given the theoretical models that stipulate social shortcomings are one of the pathways to negative affect and binge episodes (Heatherton &

Baumeister, 1991). Most notably, the measure of stress was not significant for those elevated in binge eating as elevations of stress tap into a sense of not having control or being powerless. A sense of not having control is seen in binge eating episodes, but the type of control as measured by the PAI does not tap into the control aspect of stress seen in binge eating events. The PAI measurement of stress examines life stressors that an individual is currently or has recently experienced, such as financial, employment, or family difficulties.

There was a significant difference between those with a psychiatric history and those without on the PAI measures of depression and nonsupport. The positive relationship between psychiatric history and depression corresponds to the findings of Bulik et al. (2002), but surprisingly both measures of depression were not positive. While highly correlated with each other, the PAI scale of depression measures clinical aspects of depression, whereas the BDI measures the presence and level of depression. The differentiating factor between the two questionnaires may have been elicited in this study and discerned between those who have had depression at a diagnosable level versus those that are sub-threshold for diagnosis. An elevation in the measure for nonsupport indicates a perception that the social environment (family, friends, co-workers) are not supportive. So, those with a psychiatric history had the tendency to report feeling less support from their environment than those without a history of psychiatric illness.

The second hypothesis of this study was that obese adults who sought weight loss surgery who have moderate to severe problems with binge eating will have higher scores of impression management than obese adults who do not binge eat. This hypothesis was rejected. Although a significant difference between scores on levels of binge eating and positive impression management were found, the mean score was the lowest for the severe binge eating group and the highest for no binge eating, with the moderate binge eating group in the middle. Although

there is a dearth of literature regarding impression management and binge eating, the theoretical supposition that negative affect is tied to binge eating would translate into a higher rate of participants presenting themselves in a positive manner. The findings from this study did not translate into the theoretical supposition, but the lack of literature concerning impression management in obese adults who binge eat is an area for future research. Work within the field of eating disorders suggests a mix of acknowledgment of problematic behaviors (Raymond et al., 1995; Vitousek et al., 1990), but again the literature is lacking in this area of binge eating research. No overall significant differences were found between the binge eating groups and scores on negative impression management. Although no overall difference was found between negative impression management and binge eating groups as whole, there was a significant difference between the no binge eating and moderate and severe binge eating groups. The scores on negative impression management were below clinical significance, but indicate those that binge eat have higher scores on negative impression management. Given the theory of binge eating as a coping mechanism to negative affect, it would seem this finding is aligned with the theoretical implications. The increased scores on measures of psychopathology as well as higher endorsements of a psychiatric history in those who engage in higher levels of binge eating may account for the increased scores of negative impression management. Those who have a psychiatric history or were struggling with depression or anxiety during the psychological evaluation and engage in moderate to severe rates of binge eating, may have a darker lens through which they evaluate their environment thus, impacting the impression they have of themselves. This darker filter may account for the increased scores of negative impression management and the decreased scores of the positive impression in the moderate to severe binge eating groups.

The hypothesis regarding impression management and binge eating also included psychiatric history as an independent variable and was found to be significant with scores on both positive and negative impression management. The scores for negative impression management are higher for those who have a psychiatric history than those who don't, whereas scores on positive impression management are lower for those who have a psychiatric history. The higher negative impression management scores, though not elevated to a clinical level, may be related to the often depressed filter through which those who have psychiatric diagnoses view certain aspects of their environment or life. The inverse of the more pessimistic outlook would support the finding of lower positive impression management scores for those who have a psychiatric history.

The third hypothesis, postulated that there would be no significant relationship between levels of binge eating and rates of self-reported disability in obese adults seeking weight loss surgery. There was a significant difference between the levels of binge eating and scores on self-reported disability, indicating a positive relationship between disability scores and levels of binge eating. None of the demographic variables had a significant relationship with the disability scores, BMI and employment. Although there was no significant difference between BMI in the binge eating groups, BMI increased as level of binge eating increased. The additional weight in the moderate and severe binge eating groups may account for an increased perceived level of disability, as there is a positive relationship between weight and health problems. Another explanation may be seen in the. lens through which those in the moderate and severe binge eating groups view their environment. Those who binge eat may have a distorted perception of their environment, which is negative, creating a "false" inflation of their perceived level of disability. Research by Reuser et al. (2009) indicated a higher level of disability within the obese

population, which has corollaries to employment status. Although employment status was not significant with disability, the current evaluative process does not examine the impact of disability on workplace productivity. Wolf and Colditz (1998) found an increase in lost productivity in the workplace attributed to obesity. Reuser and colleagues' research yielded a positive relationship between obesity and disability, which was found in this study, but not at a significant level. Given that as BMI increases, disability increases the impact on workplace activities of daily living are likely to be impacted with increased BMI.

Type of surgery was not related to disability, which was divided into the categories of restrictive and malabsorptive. The malabsorptive surgery, of gastric bypass, is actually a combination of restrictive and malabsorptive and utilized in patients who have more excess weight, versus the laparoscopic banding which is used in those with less weight to lose. Given people who have more weight to lose are more likely to opt for gastric bypass surgery, the extension that those who are opting for gastric bypass would weigh more and have higher perceived disability was not seen in this study.

The final analysis of this study was the examination of the psychometric properties of the RMQ. The internal consistency of four of the five content areas were all within an acceptable range for internal consistency. The content area for the Stimulus Control had one question which if deleted would have added strength to the overall area. The content area of Energy Balance had an alpha=.58, which borders the range for acceptable consistency. As the Energy Balance content area displays borderline acceptable internal consistency, this suggests that the items of that area are not measuring the same overall construct. Overall, the items in each of the content areas are measuring the same construct. The same cannot be said for the results of the factor analysis.

The five factors of the RMQ only accounted for 30% of the variance, which left close to 70% of the variance unaccounted for. The structure matrix of the factor analysis provided a strong display that the items of the factors loaded in all content areas. The factor area of Stimulus Control was predominately loaded with items from the Motivation and Hope content area. The factor area Hopelessness only had one item from that content area. The fact that the items loaded on different content areas than originally constructed indicated that theoretically the factors were unclear. This may demonstrate a change in the conceptualization of the content areas since the instruments development in the late 1970's-early 1980's (Straw, Straw, & Craighead, 1979; Straw & Straw, 1984; Straw et al., 1984). The use of this instrument as a component of psychological assessment for bariatric surgery candidates is not supported by the findings of this study without further study and revision.

Limitations

There are a number of limitations in this study that if replicated would give greater clarity to the findings of this study. One limitation is the use of questionnaires that were developed to screen for the presence of dysfunction, not diagnose it. The questionnaire that measured binge eating (BES) is a tool that measured the presence and level of binge eating, but is not a diagnostic tool. As there is somewhat of a transient nature to binge eating (Stunkard & Allison, 2002), the ability to interview or use a tool that has a diagnostic property would have allowed for a more precise measurement of BED. As such, this study measured the presence and level of binge episodes, not of the actual disorder. The same can be said for one of the measures of depression. The BDI is a screening measure for depression, but not a stand alone diagnostic tool. Because some of the questionnaires serve as screens for measures of psychopathology, caution

must be utilized in stating that the rates of true or diagnosable psychopathology is more in the moderate and severe binge eating groups versus the no binge eating groups.

The RMQ was developed to measure knowledge, attitudes, and beliefs related to obesity and weight loss, utilizing the five content areas of Stimulus Control, Hopelessness, Motivation, Energy Balance, and Physical Attribution. The results of the current study found that the factors of the RMQ are theoretically unclear or mixed. The lack of a meaningful factor structure limits the clinical application of this instrument. There is limited published information about this instrument aside from the initial publications from the developers of the instrument, so it is unknown how widely used the instrument is. As the RMQ may not accurately measure what it purports to measure, a revision to measure the factors is recommended if this questionnaire is to continue to be used for evaluative purposes.

The proportion of women to men was another limitation in this study. There were almost 4 times as many females as males in this study; however, much of the literature concerning weight loss has a disproportionate number of women in the studies. Due to the small number of men in this study, the generalizability of the findings of the study is limited for men.

Future Directions

As the RMQ was not found to measure the intended constructs related to knowledge and beliefs about obesity and weight loss, the revision of this questionnaire will be a useful tool. The ability for a practitioner to have a tool that can provide clarity on the attitudes and beliefs of a prospective bariatric surgery candidate is important, as it will provide areas which may need to be remediated to increase successful outcomes of surgery. The ability to have a questionnaire that is accurately able to gauge a patient's perception of weight loss and gain will help in the

development of a battery of assessments to be utilized consistently by psychologists who are a part of the bariatric treatment teams.

Continued research into the relationship between affect and binge eating is needed to help clarify the role of affect in the surgery-seeking population. If research supports the theory tying affect to binge eating, that finding could provide greater specificity in the type of assessments that are utilized when evaluating the psychological appropriateness of weight loss surgery. Determining if a prospective patient has negative affect may have implications for post-operative success. The examination of affect will provide insight into the skills that may need to be supported, as well as display barriers to success after surgery. Not directly addressed in this study but alluded to in the discussion of the dual-pathway model of binge eating, is the idea that binge eating is a coping mechanism for negative affect and dieting. If binge eating is a coping mechanism, it is imperative that special care be taken pre-operatively to replace ineffective coping skills with effective coping skills to provide an opportunity for success after surgery. The importance of replacing maladaptive coping (binge eating) with adaptive coping will not only provide greater weight loss, it will reduce the chance of complications related to overeating with a significantly reduced stomach.

As this study examined individuals prior to their weight loss surgery, a follow-up study to examine outcomes would shed light on any differences between the binge eating groups and weight loss and levels of psychopathology. If post-operative differences are found between the binge eating groups, that may inform the type of assessments that are used in the initial psychological evaluation.

As researchers and clinicians seek to reduce the rates of obesity, the most promising treatment to date is surgical intervention. Surgery is not without risks and complications, but the

ability to target at-risk individuals who may not succeed with their weight loss goals is an area in which psychologists have made gains. Although gains have been made, greater clarity is needed to accurately identify the at-risk population and proper treatment. This study confirmed the greater incidence of psychopathology in obese adults who binge eat. It is believed that with continued research and fine-tuning of assessments, the field of psychology will continue to positively impact efforts to reduce the number of obese adults in the U.S.

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Appendix A:

Psychological Evaluation for Bariatric Surgery

Psychological factors play a large role in issues related to weight management. Having bariatric surgery means making a lifestyle change, something that has emotional and behavioral effects in additions to the physical effects you hope to see. Your psychological make-up will be very important as you undertake this major life change effort.

For these reasons, psychological evaluation is part of what is required before surgery can be scheduled. As part of our psychological evaluation effort, there are a number of questionnaires we need to have you complete. Doing this will give us a better picture of you, in a way that will save both you and us a lot of time, while giving us a better picture of you than we can get just by talking to you. Of course, in addition to these tests, we will be spending time in a face-to-face interview.

Please complete the questionnaires in this packet before you come for your psychological evaluation appointment. I will not be able to complete a psychological evaluation report until I have the results of these tests, in addition to the information I gather from talking to you. If you do not have these completed before the appointment, your evaluation will be "on hold" until the completed tests are received.

As you complete these tests, it is very important that you be as honest as possible. There is no "right" answer to these test questions, and trying to figure out a "right" answer will give us false information, something that will not be helpful to you in the long run.

If you have any questions about these tests, please call me, and I will return your call to try to answer your questions. I look forward to meeting you and to working with you as you of this experience.

Sincerely,

Clinical Psychologist
Department of Psychiatry and Behavioral Sciences

Appendix B:

Confidential Demographic Information

Name:_____ Birthdate:_____

Address:_____

Street City Zip Code

Phone Numbers: Home:_____Work:_____Cell/Pager:_____

Race/ethnicity: African-American Caucasian Hispanic Indian Other (specify)

How far did you go in school?_____

Occupation:_____

Where Employed:_____For how long?_____

Relationship Information: Single Cohabitating Married Separated Divorced Widowed

Length of relationship/marriage:_____

Date(s) of former marriage(s) (if applicable):_____

Name & age of children (yours and/or partner's)_____

With whom do you currently live?_____

Current Health Problems:_____

_____

Current Medications:_____

Do you smoke cigarettes?_____ If applicable: Cigarettes per day_____ or I quit in____(yr)

Do you drink alcoholic beverages?_____ How often:_____ Amount:_____

Do you use drugs?_____ How often:_____ Amount:_____

Have you ever had a drug or alcohol abuse problem?_____

Weight and Surgery Information

People attribute their obesity to a variety of causes. What do you think has caused your weight problem?

_____

_____

Please tell us any programs or diets you've followed to lose weight (ex" Weight Watchers, Fen-phen). Include the year and the amount of weight lost, if any. For example: "Weight Watchers, 1996, 20 lbs"

Please describe a typical day of eating, including meals, snacks and beverages. Include time, type of food, amount of food.

Do you think your eating habits or choices are abnormal compared to others? Why?

Do you consider yourself an emotional eater or a binge eater? Please explain

Why do you want have surgery for obesity?

What do you hope will be different for you after surgery, other than weight loss?

What reading and research have you done about the surgery?

What have you done so far to get yourself ready for surgery?

Below are a number of common difficulties many people have. Please circle any that may apply to you, or feel free to write in any other concerns:

Depression	Relationship problems
Anxiety	Body image problems
Emotional Eating	Self-esteem problems
Binge Eating	Trouble sleeping
Eating Disorder	Other concerns:

Appendix C

Pre-Bariatric Surgery Psychological Interview

Name_____ DOB _____

Surgeon_____ DOE _____

Type of surgery: Band Bypass Sleeve Undecided Seen nutritionist? _____

Social Background

Where from:_____ Work: _____

Relatives here and relationship:_____ Education: _____

Lives with:_____ Typical Day:_____

Marriage/relationship:_____ _____

Children:_____ _____

Behavioral Observations

Appearance/Affect/Behavior_____

Interpersonal style in interview_____

Intelligence_____

Weight and Diet History

When did you first become overweight?_____

Weight changes since childhood:

Age 16:_____ Age 20:_____ Age 30:_____ Age 40:_____ Age 50:_____ Now:_____; Ht_____

Any periods of rapid weight gain or steady progression?_____

Personal philosophy of why you are overweight:_____

Weight loss attempts:

Largest:_____ How/when:_____ Most recent:_____

JC NS WW Atkins South Beach

Slim 4 Life SlimFast

Rx meds: Phen-fen Phentermine Meridia Xenical

OTC meds: Metabolife Dexatrim Hydroxycut Other:_____

Health problems & previous hospitalizations/surgery:

HBP Diabetes High cholesterol Pain Other:_____

Surgeries:_____ Meds:_____

Lifestyle

Regular exercise:_____ Vitamins:_____
Caffeine:_____ Cigarettes: Never Former (when/how quit:_____) Current (cpd _____)
Alcohol:_____ Drugs:_____ Ever in trouble for them?_____

Typical eating pattern

B:_____
L:_____
D:_____
S:_____
B:_____
Do you use food to cope with stress, boredom, anxiety, anger, depression?_____

Binge Eating Disorder Criteria (DSM-V)

Do you have a history of eating a lot more food in a period of time than most people would eat under similar circumstances? Y N

Do you feel a lack of control over eating during these episodes? Y N

If this happens, has it happened at least twice a week for the past three months? Y N

If yes, do you have any of the following during these episodes?:

Eating much more rapidly than normal? Y N

Eating until feeling uncomfortably full? Y N

Eating large amounts of food when not feeling physically hungry? Y N

Eating alone because of being embarrassed by how much you are eating? Y N

Feeling disgusted with yourself, depressed, or very guilty after overeating? Y N

Does this eating pattern distress you? Y N

Mental Health

How would you describe your personality in general?_____
What is your mood generally like?_____
Symptoms of depression/anxiety: Down/depressed most of the day nearly every day?
Anhedonia? Sleep or appetite disturbance? Hopelessness?

Ever been diagnosed with a psychiatric condition? (depression, anxiety, BED)_____
Have you ever seen a counselor or therapist (or wanted to)?_____
Ever been an inpatient in a psych hospital?_____
Trauma history:_____
Current stressors?_____
How do you cope with stress/disappointments etc._____
Social support:_____
Attitude toward surgery

Why do you want to have the surgery?_____
How much weight are you hoping to lose?_____ What about ½ of that?_____
What research have you done on the procedure?

Internet Reading TV Discussed with patients Support group Seminar

How has your family/significant other reacted?_____
What are your caregiver arrangements?_____
Will your work situation allow you to take the time off of work?_____
Tell me what you know about the surgery – the procedure, the follow-up, the eating requirements…

(2-4 days in hospital; 2 wks-1 month at home with caregiver. No lifting at all; eating: stage 1: first week only liquids; stage 2: 3-4 weeks soft, pureed food. When OK'd to eat solids, trial and error. Solids too early can cause tear or ulcer. You can undo the operation by stretching or pulling out the staples. 1/3 - 1/2. Success depends on how well you adapt to making these changes.)

Understanding of the procedure and dietary restrictions

(Eat slowly, chew food thoroughly, no drinking with eating, protein first, no refined sugars; take chewable vitamin, calcium).

Confidence in ability to make these changes?_____
How do you know?_____

Appendix D:

PDS

Instructions: Circle the number that describes your current level of disability in each activity.
0=I have no trouble doing this/No disability and 10=I can't do this at all/Total disability.

1. Home activities: includes active things you do around the house, including making the bed, cooking, cleaning (dusting, vacuuming, dishes, laundry, floors) shopping, yardwork etc.

0 1 2 3 4 5 6 7 8 9 10
(No disability) (Total disability)

2. Passive recreational activity: activities done alone or with others such as hobbies, puzzles, knitting, dining out, going to movies, social functions (do not include watching TV).

0 1 2 3 4 5 6 7 8 9 10
(No disability) (Total disability)

3. Active physical activity: activities done alone or with others that are sport or exercise in nature, such as long walks, jogging, swimming, bicycling, golfing, bowling, tennis, etc.

0 1 2 3 4 5 6 7 8 9 10
(No disability) (Total disability)

4. Occupation and/or education: includes physical and cognitive activities related to working at your job, school, volunteer work etc.

0 1 2 3 4 5 6 7 8 9 10
(No disability) (Total disability)

5. Self-care: includes activities of daily living such as bathing, brushing your teeth, getting dressed, going to the bathroom, combing your hair, shaving, moving about your home etc.

0 1 2 3 4 5 6 7 8 9 10
(No disability) (Total disability)

6. Basic life activities: includes eating, drinking, and breathing.

0 1 2 3 4 5 6 7 8 9 10
(No disability) (Total disability)

7. Sleep: includes you ability to fall asleep, stay asleep, and feel rested in the morning.

0 1 2 3 4 5 6 7 8 9 10
(No disability) (Total disability)

8. Sexual behavior: includes the quality (frequency, ability, pleasure etc) of your sex life.

0 1 2 3 4 5 6 7 8 9 10
(No disability) (Total disability)

9. Thinking: refers to memory, attention, concentration, problem-solving, understanding etc.

0	1	2	3	4	5	6	7	8	9	10
(No disability)										(Total disability)

10. Social: refers to maintaining or developing relationships with family, friends, or others.

0	1	2	3	4	5	6	7	8	9	10
(No disability)										(Total disability)

Appendix E:

Master Questionnaire-Revised

Please read each item carefully and then circle either true or false. Please answer every item.

1. Talking about food makes me hungry.	T	F
2. If other people are eating in front of me, I will usually join in even if I'm not hungry.	T	F
3. Watching other people eat makes me hungry.	T	F
4. If a package or carton is part full, I will often continue eating until it is completely empty.	T	F
5. When I see or hear a commercial about food, I often feel the desire to snack.	T	F
6. I often nibble on food when I am clearing off the table.	T	F
7. I snack a lot in the evening.	T	F
8. I like to eat while I am watching television.	T	F
9. I often use high calorie foods as a pick-me-up or reward.	T	F
10. I have a lot of bad luck.	T	F
11. I can't imagine what I would look like if I were thin.	T	F
12. When it comes to willpower, I am a failure.	T	F
13. Sometime I feel like my eating is out of control and that I can't do anything to change it.	T	F
14. I often feel I have little control over my life.	T	F
15. I have a very negative image of myself,	T	F
16. It doesn't seem fair that some people never have to worry about their weight.	T	F
17. I am not very successful at talking myself into being patient and trying harder.	T	F

18. Sometimes I feel like I have been unjustly treated by God or nature.	T	F
19. I feel helpless in many aspects of my life.	T	F
20. I often wonder if I am not just kidding myself when I go on a new reducing program.	T	F
21. There was a time when I think I could have stayed thin, but now it may be too late.	T	F
22. When I am dieting, I don't feel like I am making progress unless I feel hungry.	T	F
23. My enthusiasm for reducing has decreased a lot.	T	F
24. I would probably be disappointed if I didn't lose at least 10 pounds per month.	T	F
25. I often doubt whether I have what it takes to succeed at weight control.	T	F
26. I doubt that I would ever stick to an exercise program long enough for it to do me much good.	T	F
27. I have trouble focusing on long-range benefits of reducing.	T	F
28. My motivation is seldom very lasting.	T	F
29. I would classify myself as a weak-willed person.	T	F
30. If I couldn't lose more than a pound a week, I'd probably give up.	T	F
31. If exercise were the only way to reduce I'd be in trouble.	T	F
32. For me to reduce I will probably have to eat less than a thousand calories per day.	T	F
33. My metabolism is probably below average.	T	F
34. I think there is something wrong with me because I have so much trouble losing weight.	T	F
35. Some people are just naturally fat and I am one of them.	T	F
36. I think I have a low tolerance for calories-it doesn't take many for me to gain weight.	T	F

37. I think I have inherited at least some of my weight problems. T F

38. There are unchangeable differences between really fat and really thin persons. T F

39. My fat doesn't seem to move or melt as fast as other peoples'. T F

40. For me it doesn't take much to gain weight. T F

41. Even when I follow my diet strictly I don't seem to be very successful at reducing. T F

42. A person who is naturally fat can lose weigh temporarily, but then almost always gains it back. T F

43. It really aggravates me when I see a thin person overeating. T F

44. Some people don't have to worry about their weight because they have been born "immune" to fat. T F

45. There is a lot of truth in the saying you can't teach an old dog new tricks. T F

46. I resent it when a thin person brags about how they don't have to watch their weight. T F ___

47. Unless you sweat when you exercise, you are probably not burning up many calories. T F

48. A balanced diet doesn't have to include fat. T F

49. The amount of fatigue caused by an activity is a good index of how many calories it consumes. T F

50. Whenever possible a reducing diet should totally eliminate fats. T F

51. Processed foods are usually lower in cholesterol and calories than unprocessed foods. T F

52. Ounce for ounce, dried fruits are slightly lower in calories than unprocessed foods. T F

53. In terms of calorie content, honey and natural sweeteners are lower than white sugar. T F

54. In terms of protein and calorie content, hot breakfast cereals are better for you than cold ones. T F

55. An individual often eats more when he is hot than when he is cold. T F

56. Low-fat and non-fat milk products contains less protein and calcium than those made from whole milk. T F ___

Appendix F

Table 1

Demographic Information

	No BES (n=116)		Moderate BES (n=81)		Severe BES (n=19)		Total (n=74)	
Categorical Variables	n	%	n	%	n	%	n	%
Gender								
Female	93	80.20	65	80.20	17	89.50	9	9.00
Male	23	19.85	16	19.80	2	10.50	10	10.00
Race								
African American	44	38.30	21	26.30	7	36.80	9	9.00
Caucasian	68	59.10	54	67.50	12	63.20	9	9.00
Hispanic	2	1.70	4	5.00	0	0.00	9	9.00
Native American	1	0.90	1	1.30	0	0.00	9	9.00
Employment Status								
Employed	93	80.20	69	85.20	14	73.70	9	9.00
Unemployed	23	19.80	12	14.80	5	26.30	9	9.00
Psychiatric History								
Yes	36	31.00	41	41.30	11	57.90	9	9.00
No	80	69.00	39	48.80	8	42.10	9	9.00
Type of Surgery								
Gastric Banding	62	62.00	47	70.10	10	55.60	9	9.00
Gastric Bypass	35	35.00	20	29.90	6	33.30	9	9.00
Gastric Sleeve	3	3.00	0	0.00	2	11.10	9	9.00

Table 1

Demographic Information cont'd.

	No BES (n = 136)		Moderate BES (n = 95)		Severe BES (n = 19)	
Continuous Variables	M	(SD)	M	(SD)	M	(SD)
Age	43.28	(10.30)	44.26	(12.01)	42.84	(10.84)
BMI	45.73	(7.54)	46.37	(7.28)	47.07	(8.96)
Years of Education	13.97	(2.07)	13.93	(2.05)	14.11	(2.00)

Table 2

Means and Standard Deviations of Measures

	No BES		Moderate BES		Severe BES	
Variable	M	(SD)	M	(SD)	M	(SD)
BDI	10.00	(7.00)	15.70	(8.36)	25.21	(8.33)
PDS	19.54	(14.66)	29.29	(17.10)	43.28	(15.47)
PAI						
Negative Impression management	47.82	(5.68)	50.28	(6.69)	52.65	(5.78)
Positive Impression management	55.21	(8.25)	48.54	(11.15)	41.00	(9.76)
Anxiety	47.44	(7.03)	53.25	(9.50)	59.00	(11.64)
Anxiety-related disorders	45.97	(7.75)	50.62	(9.77)	58.88	(9.73)
Depression	52.35	(9.56)	57.68	(11.15)	66.76	(11.96)
Stress	48.90	(7.75)	52.04	(9.88)	54.82	(12.13)
Nonsupport	45.12	(8.78)	47.91	(11.15)	51.82	(10.61)
Dominance	53.81	(10.42)	50.67	(9.90)	45.82	(12.88)
Warmth	52.18	(9.10)	51.87	(8.23)	50.24	(9.18)
RMQ						
Stimulus Control	14.41	(1.82)	12.34	(1.97)	11.21	(1.65)
Hopelessness	17.34	(2.11)	15.59	(2.41)	15.00	(2.28)
Motivation	20.75	(2.66)	19.17	(2.92)	18.05	(2.32)
Physical Attribution	24.22	(2.97)	22.21	(3.15)	20.00	(2.50)
Energy Balance	16.91	(1.94)	16.82	(1.81)	16.42	(1.92)

Note. BDI = Beck Depression Inventory; PDS = Perceived Disability Scale;
PAI = Personality Assessment Inventory; RMQ = Revised Master Questionnaire

Table 3

Multiple Analyses of Levels of Binge Eating and Psychiatric History on Psychopathology (n = 208)

	Binge Eating Groups			Psychiatric History		
Variable	F	p	$\hat{\eta}^2$	F	p	$\hat{\eta}^2$
BDI	29.41	0.00*	0.23	4.41	0.04	0.02
PAI						
Anxiety	14.33	0.00*	0.12	7.36	0.007	0.04
Anxiety-related disorders	13.56	0.00*	12.00	4.95	0.03	0.02
Depression	10.65	0.00*	0.10	15.97	0.00*	0.07
Stress	2.97	0.05	0.03	4.91	0.03	0.02
Nonsupport	1.33	0.27	0.01	13.08	0.00*	0.06
Dominance	4.08	0.02	0.04	1.31	0.25	0.01
Warmth	0.06	0.94	0.001	3.26	0.07	0.02

Note. BDI = Beck Depression Inventory; PAI = Personality Assessment Inventory. *p < .006

Table 4

Multiple Comparisons of Levels of Binge Eating and Psychopathology (n = 209)

	No BES vs. Moderate BES		No BES vs. Severe BES		Moderate BES vs. Severe BES	
Variable	Mean Difference	*p*	Mean Difference	*p*	Mean Difference	*p*
BDI	-5.81	0.00*	-16.03	0.00*	-10.22	0.00*
PAI						
Anxiety	-5.89	0.00*	-11.56	0.00*	-5.67	0.04*
Anxiety-related disorders	-4.74	0.00*	-12.91	0.00*	-8.16	0.00*
Depression	-5.45	0.00*	-14.41	0.00*	-8.96	0.00*
Stress	-3.07	0.07	-5.92	0.04*	-2.85	0.49
Nonsupport	-2.90	0.12	-6.70	0.03*	-3.80	0.33
Dominance	3.06	0.14	7.99	0.02*	4.93	0.24
Warmth	0.33	0.97	1.940	0.70	1.61	0.79

Note. BDI = Beck Depression Inventory; PAI = Personality Assessment Inventory. *p < .05

Table 5

Multiple Analyses of Binge Eating and Psychiatric History on Impression Management (n = 208)

	Binge Eating Groups			Psychiatric History		
Variable	*F*	*p*	η^2	*F*	*p*	η^2
PAI						
Positive Impression Management	16.37	0.00*	0.14	5.21	0.02*	0.03
Negative Impression Management	3.32	0.04	0.03	5.42	0.02*	0.03

Note. PAI = Personality Assessment Inventory. *p < .025

Table 6

Intercorrelations among items of the Perceived Disability Scale (PDS)

	n	1	2	3	4	5	6	7	8	9	10
1. PDS 1	211	_									
2. PDS 2	211	0.65**	_								
3. PDS 3	209	0.61**	0.54**	_							
4. PDS 4	208	0.55**	0.56**	0.48**	_						
5. PDS 5	210	0.54**	0.52**	0.32**	0.44**	_					
6. PDS 6	211	0.31**	0.27**	0.28**	0.33**	0.51**	_				
7. PDS 7	211	0.31**	0.30**	0.31**	0.20**	0.30**	0.36**	_			
8. PDS 8	209	0.49**	0.49**	0.42**	0.34**	0.38**	0.23**	0.40**	_		
9. PDS 9	211	0.41**	0.46**	0.32**	0.35**	0.48**	0.35**	0.56**	0.40**	_	
10. PDS 1(	211	0.44**	0.47**	0.34**	0.30**	0.36**	0.33**	0.45**	0.44**	0.60**	_

Note. p** < .01. PDS = Perceived Disability Scale

Table 7

Internal Consistency of the Revised Master Questionnaire (RMQ)

	Current Study		Original Sample	
Variable	*n*	α	*n*	α
RMQ				
Stimulus Control	213	0.63	216	0.84
Hopelessness	202	0.72	216	0.79
Motivation	199	0.75	216	0.77
Physical Attribution	193	0.76	216	0.79
Energy Balance	196	0.58	216	0.82

Note. BDI = Beck Depression Inventory; PDS = Perceived Disability Scale;
PAI = Personality Assessment Inventory; RMQ = Revised Master Questionnaire

Table 8

Structure Matrix of the Revised Master Questionnaire (RMQ)
(n = 209)

	Factor				
Variable	1	2	3	4	5
RMQ					
Motivation 7	0.628			-0.354	
Motivation 6	0.627				
Motivation 10	0.542		0.419		
Hope 3	0.506		0.419		
Motivation 9	0.484				
Motivation 1	0.478			-0.364	
Motivation 12	0.443				
Motivation 4	0.437				
Hope 8	0.432				
Motivation 8	0.431				
Motivation 2	0.388			-0.301	
Motivation 11	0.364				
Energy Balance 4		0.506			
Energy Balance 2		0.481			
Physical Attribution 1		0.366		-0.303	
Hope 2		0.337			
Energy Balance 7					
Stimulus Control 5			0.528		
Stimulus Control 2	0.344		0.458		

Note. RMQ = Revised Master Questionnaire

Table 8

Structure Matrix of the Revised Master Questionnaire (RMQ) cont'd.
(n = 209)

	Factor				
Variable	1	2	3	4	5
RMQ					
Hope 6	0.398		0.434		
Hope 10	0.345		0.424		0.337
Stimulus Control 3	0.372		0.405		
Stimulus Control 9			0.397		
Physical Attribution 15			0.392	-0.344	
Physical Attribution 12			0.391	-0.308	0.365
Stimulus Control 1			0.374		
Hope 4	0.362		0.371		
Stimulus Control 7			0.357		
Stimulus Control 8					
Stimulus Control 4					
Physical Attribution 5		0.343		-0.649	
Physical Attribution 8				-0.493	
Hope 7				-0.474	
Physical Attribution 3				-0.442	
Physical Attribution 2				-0.437	
Physical Attribution 11				-0.416	
Physical Attribution 9				-0.415	
Physical Attribution 10				-0.399	

Note. RMQ = Revised Master Questionnaire

Table 8

Structure Matrix of the Revised Master Questionnaire (RMQ) cont'd.
(n = 209)

	Factor				
Variable	1	2	3	4	5
RMQ					
Physical Attribution 6				-0.386	
Physical Attribution 13				-0.384	
Motivation 5				-0.336	
Physical Attribution 7				-0.312	
Physical Attribution 4				-0.303	
Energy Balance 1					
Motivation 3					
Energy Balance 8					
Energy Balance 5					0.593
Physical Attribution 14					0.459
Hope 5	0.324		0.409		0.458
Energy Balance 6					0.423
Stimulus Control 6					0.321
Hope 1					0.301
Energy Balance 3					
Hope 9					
Energy Balance 10					
Energy Balance 9					

Note. RMQ = Revised Master Questionnaire