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Rethinking the Preoperative Psychological Evaluation – A New Paradigm for Improved Outcomes and Predictive Power

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1. Introduction

Weight loss surgery (WLS) has become increasingly commonplace, as rates of morbid obesity and its serious medical consequences continue to rise in developed countries worldwide (Nguyen et al., 2005; Steinbrook, 2004). From 1998 to 2002, an increase in WLS of approximately 450% was observed in the United States alone, and from 2002 to 2004, it was estimated that more than 357,300 adults in the United States had undergone WLS (Wysoker, 2005). Most patients benefit from the procedure; however there remain at least 20% of patients who fail to lose the expected amount of weight or who regain a significant amount of lost weight (Christou, Look, & Maclean, 2006; Kalarchian et al., 2007; Kinzl et al., 2006). Some researchers have identified 7-10 year failure rates of up to 35% for gastric bypass patients and up to 57% for laparoscopic banding patients (Ayyad & Andersen, 2000; Fischer et al., 2007). A recent long-term follow-up of 200 gastric banded patients found that excess weight loss (EWL) was gradually regained, resulting in only 15.6% EWL after 14 years and a reoperation rate of 30.5% (Stroh, Hohmann, Schramm, Meyer, & Manger, 2011). While a minority of these failures or suboptimal outcomes may be due to technical surgical errors or complications, the majority of them are attributable to psychological and behavioral factors that interfere with patients' abilities to make or maintain lasting changes in lifestyle (Boeka, Prentice-Dunn, & Lokken, 2010; Buchwald et al., 2004; Pessina, Andreoli, & Vassallo, 2001). Long-term failure rates highlight the need to selectively identify patients at-risk for minimal weight loss or weight regain (O'Brien, McPhail, Chaston, & Dixon, 2006; Stroh et al., 2011).

It is widely accepted that obesity is multifactorial in nature, and that psychological and behavioral influences play an integral role in the development and maintenance of an obese state (Buchwald et al., 2004; Kinzl et al., 2006). The preoperative psychological evaluation for WLS candidates was uniformly put into practice following the 1991 National Institutes of Health Consensus Panel recommendations that officially recognized the key role of psychological and behavioral factors toward the ability of a patient to ultimately be successful with WLS (Buchwald, 2005; Buddeberg-Fischer, Klaghofer, Sigrist, & Buddeberg, 2004; Kinzl et al., 2006; NIH Consensus Panel, 1991). A majority of WLS programs and

insurance carriers subsequently began requiring a presurgical psychological evaluation in order to clear the candidate for surgery (Bauchowitz et al., 2005; Kalarchian et al., 2007). At its outset, it was widely assumed that a preoperative psychological evaluation would be useful in identifying patients who would be at-risk for suboptimal or failed outcomes (Ashton, Favretti, & Segato, 2008; Bauchowitz et al., 2005; Kalarchian et al., 2007). This assumption was largely based on research that had been able to identify various psychological and behavioral patterns among obese patients that were associated with failure or suboptimal outcomes for conventional weight loss programs (Bauchowitz et al., 2005).

Research to date has found few consistently significant associations between independently studied traditional psychological risk factors that were assumed to be equally problematic for WLS patients (Franks & Kaiser, 2008; Greenberg, 2003; Greenberg, Sogg, & Perna, 2009; Grothe, Dubbert, & O'jile, 2006; Herpertz, Kielmann, Wolf, Hebebrand, & Senf, 2004; van Hout, Verschure, & van Heck, 2005). For example, our review of the literature found that Axis I pathology such as Mood Disorders, Anxiety Disorders, and Eating Disorders; while higher in the WLS candidates as compared to the normal population, have not uniformly predicted poorer weight loss or other health outcomes (Franks & Kaiser, 2008). In contrast, weight loss subsequent to WLS predicted improvement in depression and anxiety following the surgery and subsequent weight loss (Swan-Kremier, 2005). Other studies have suggested that it is the degree of psychopathology and the past history of psychiatric treatment that is relevant to WLS outcomes rather than the presence or absence of a diagnosable condition at the time of the presurgical evaluation (Ashton et al., 2008; van Hout et al., 2005).

The paucity of research findings for the utility of the preoperative evaluation in predicting outcomes has led to criticism of the field (Ashton et al., 2008; Greenberg et al., 2009). Some have demanded that the validity of the preoperative psychological evaluation be demonstrated for justification of its requirement for WLS (Ashton et al., 2008). It has become clear that the field of psychology must take a critical look at the current state of the science in this area, identify the problems, and revise its approach to meet the scientific rigor of evidence-based medicine. The lack of predictive power for any particular element of the psychological evaluation has been noted, and various reviews of the literature have been consistent in their observations about the problems with much of the research. Sogg and Mori (2004) point out that the research in this area generally has been hampered by the fact that the approach to the psychological evaluation for bariatric patients is non-standardized, resulting in heterogeneity of data, definitions, and measurements of constructs of interest. They further point out that many of the published studies suffer from methodological flaws. Others contend that because the psychological evaluation is not independent of clinical decision-making, patients get triaged out of WLS or get deferred into other treatments (both psychological and weight control-related) prior to the surgery (Greenberg et al., 2009; Kalarchian et al., 2007). Still others have pointed out that there is still no consensus of what constitutes WLS success (Franks & Kaiser, 2008). In addition to the aforementioned problems, we propose that there exists a more fundamental issue; the lack of a theory-based approach from which to systematically investigate and understand research findings.

In this chapter we will: 1) review and critique the current approach to the psychological evaluation for WLS candidates, 2) discuss attempts that have been made to improve the predictive utility of the evaluation, 3) highlight the specific areas of inquiry that have shown

merit for predicting postoperative outcomes, 4) explore the reasons for the poor predictive power of the current medical model, and 5) propose a new paradigm from which to approach the evaluation with supportive evidence from the extant literature. A suggested theory-driven clinical intake and psychological assessment procedure will be outlined, with guidelines for clinical decision making. Finally, future considerations for research and clinical practice will be discussed.

2. State of the psychological science in bariatric evaluations

The initial medical model approach to the preoperative psychological evaluation of WLS candidates was based on the clinical convention of information gathering that is used to rule out or to formulate a mental health diagnosis. This involves gathering information relevant to a chief complaint and its associated symptoms and history, the past medical history, the psychosocial history, and the family history. The approach is contemporary in that it also incorporates a whole-person view that is supposed to integrate biological, psychosocial and environmental dimensions into formulating a diagnosis, as opposed to relying solely on the physical and biological aspects. Some psychologists also utilize psychological testing and may administer the mini-mental status exam or some other form of cognitive screen as well.

The intended purpose for gathering this information is to select a rational treatment approach by applying the information to diagnostic schema and their associated interventions. Optimally, these interventions should be based on a scientific evidence-base that links treatments with demonstrated outcomes. However, there are few interventions that are specifically tailored to the multiple determinants of a given psychological diagnosis. A similar issue exists for obesity, where the available treatments are not yet tailored to the complex and multiple determinants of the condition. Given that the goal for the preoperative psychological evaluation for WLS is to predict who will be successful and who is at risk for failure or suboptimal outcomes, the initial approach to the evaluation was not sufficiently designed with prediction in mind. In 2004, a behavioral health committee for the American Society of Metabolic and Bariatric Surgery (ASMBS) attempted to improve the utility of the presurgical evaluation by publishing which elements were thought to be important in conducting the assessment (LeMont, Moorehead, Parish, Reto, & Ritz, 2004). Due to the lack of empirical data in this area, however, no consensus or practice guidelines were able to be firmly established. Thus, little progress has been made in standardization of assessment and data collection from which to draw conclusions about relationships to postsurgical outcomes (Sogg & Mori, 2004).

2.1 What is known – paradoxical results

While there has been no agreed-upon defined outcome for WLS, a general professional consensus may be gleaned based on what is most consistently used in the research literature. Over the years, the field appears to have adopted a “>50% excess weight loss” (EWL) as a cut-point indicating “success.” The use of EWL as the sole basis for defining success or failure is scientifically problematic, particularly when we are to set practice standards according to an evidence-base. The 50% EWL criterion is essentially an arbitrary standard, as it is calculated based on a statistical comparison to ideal weight standards, which are themselves arbitrarily defined (Franks & Kaiser, 2008). Additionally,

the 50% EWL criterion is independent of associated health improvements and has not yet been shown to have any clinical superiority over lower amounts. Even less clear are what criteria should be used to discriminate “suboptimal” weight loss and “failure.” Many patients will reduce their medication needs, resolve co-morbid medical conditions, and experience improved psychosocial function and quality of life (QOL) well before achieving the >50% EWL mark. Yet, few psychological studies rely on criteria other than EWL as their prediction standard. Thus, the research in psychological prediction of outcomes has been severely limited by a significant methodological flaw in the selection of prediction criteria.

Nonetheless, several reviews of the literature, including our own, have yielded consistent results about what appears to influence EWL, psychosocial function, and/or QOL (Ashton et al., 2008; Franks & Kaiser, 2008; Greenberg, 2003; Greenberg et al., 2009; Grothe et al., 2006; Herpertz et al., 2004; van Hout et al., 2005). These include a history of psychiatric inpatient admissions, outpatient psychiatric treatment or counseling, social support, body image, and depression. With regard to prior psychiatric admissions, it appears that inpatient admissions, irrespective of the quantity, are related to increased postsurgical medical and psychological complications and reduced patient satisfaction (Ashton et al., 2008; van Hout et al., 2005). However, a history of outpatient psychological treatment appears to be a positive predictor for postsurgical weight loss. It has been assumed that these findings related to a patient’s ability to develop positive coping skills that carries over to the behavioral and psychological challenges faced during the postsurgical phase (Grothe et al., 2006). Presurgical body dissatisfaction, present in about 70% of patients, appears to be inversely related to postsurgical weight loss; however, a causal connection has not been established (Swan-Kremier, 2005). The presence of presurgical depression may result in less postsurgical weight loss than for non-depressed patients (van Hout et al., 2005). However, depression has not been a prognostic indicator of overall failure based on % EWL, psychosocial function, or quality of life (Kalarchian et al., 2005; Ma et al., 2006; Swan-Kremier, 2005). Some have reported that it may actually promote greater short-term weight loss (Averbukh et al., 2003; Ma et al., 2006).

Reviews of the literature have also been consistent in reporting findings that are not yet well-elucidated, but are nonetheless provocative. For example, marital relationship appears to be an important mediator of postsurgical results, although the nature of the association is unclear. Limited research suggests a possible U-shaped relationship, with marital satisfaction as well as dissatisfaction showing a positive association with postsurgical weight loss (Herpertz et al., 2004; van Hout et al., 2005). Also unclear is the effect of social support on complications and weight loss in the postsurgical phase (Grothe et al., 2006; Herpertz et al., 2004). Our own study of postsurgical support group attendance for laparoscopic banded patients demonstrated that increased attendance was associated with higher rates of weight loss one year after surgery (Kaiser, Franks, & Smith, 2011). This is consistent with a previous review of the literature that concluded that social support appeared to impact weight loss through the influence on adherence to postsurgical lifestyle modifications (Herpertz et al., 2004). Limited research has shown that the presence of anxiety in conjunction with presurgical obesity-related psychosocial stress may be positively associated with postsurgical weight loss (Herpertz et al., 2004; Ryden, Karlsson, Sullivan, Torgerson, & Taft, 2003; van Hout et al., 2005); however, the specific nature of the role of

anxiety and a causal relationship to postsurgical outcomes have not been well-studied (Kalarchian et al., 2007; Rosik, 2005). Areas of research that continue to show conflicting results with regard to postsurgical outcomes include self-esteem (van Hout et al., 2005) and a presurgical diagnosis of binge eating disorder (Franks & Kaiser, 2008).

Finally, a consistent body of literature shows no strong relationship to postsurgical outcomes for specific personality traits, presurgical life stress, or a history of childhood abuse. Childhood sexual abuse and maltreatment, while more prevalent in the severely obese population (Grilo et al., 2005; Wildes, Kalarchian, Marcus, Levine, & Courcoulas, 2008), do not appear to have any relationship with postsurgical weight loss (Fujioka, Yan, Wang, & Li, 2008; Grilo, White, Masheb, Rothschild, & Burke-Martindale, 2006). Presurgical life stress, in and of itself, does not appear to have a negative impact on weight loss (Herpertz et al., 2004; van Hout et al., 2005). While poor postsurgical weight loss may be observed in personality disordered patients (Grothe et al., 2006; Herpertz et al., 2004), studies of personality traits have shown no consistent prognostic value with regard to weight loss or psychosocial outcomes (Herpertz et al., 2004). One study of gastric bypass patients, utilizing the Minnesota Multiphasic Personality Inventory – 2 (MMPI-2), found that patients with <50% EWL one year postsurgery had higher presurgical elevations of the Hypochondriasis and Hysteria scales. However, since the elevations were not above the clinical cut-off for these scales, the clinical significance of this finding is unclear. A recent study using both the MMPI-2 and the Millon Multiphasic Clinical Inventory (MCMI- III) found that the K-scale from the MMPI-2 and the Schizoid, Schizotypal, and Compulsive scales from the MCMI-III predicted weight loss, but differentially at various post-operative time points (Belanger, Wechsler, Nademin, & Virden, III, 2010). Additionally, the sample used in this study was inclusive of patients who had been approved without reservation and patients who had received psychological/psychiatric treatment presurgically or concurrent with the procedure, making it difficult to draw conclusions. In a cluster analytic approach to determine psychological profiles in 153 candidates for vertical banded gastroplasty, 3 distinct patterns were found that were comprised of combinations of high to low functioning, but these occurred across 7 domains (personality, coping, eating behavior, locus of control, body attitude, social functioning, and health-related quality of life) (van Hout, van Oudheusden, Krasuska, & van Heck, 2006). Generally, the research in the area of personality profiles has pointed to the heterogeneity of presurgical candidates and an inability to uniformly predict outcomes (Belanger 2010).

2.2 Second generation approaches to assessment

Given the disappointment of standard personality tests such as the Minnesota Multiphasic Personality Inventory (MMPI-2) in predicting WLS outcomes, more health- and behavior-specific assessment tools were investigated or newly developed. Based on its predictive utility with other health conditions, the Millon Behavioral Medicine Diagnostic (MBMD™) came into favor for use with bariatric patients (Fabricatore, Crerand, Wadden, Sarwer, & Krasuski, 2006; Walfish, Vance, & Fabricatore, 2007). Within two years of its introduction to the bariatric field, the authors of the test provided adjusted norms for the bariatric population (Millon, Antoni, Millon, Minor, & Grossman, 2007). Two problems very quickly came to light. First, there were no studies establishing that the instrument was valid or reliable for the bariatric population. Second, the method that was used to develop the

adjusted norms was not reported. To date, the procedure for establishing the adjusted norms has not been published, making it difficult for consumers of the Bariatric version of the test to verify that it is a psychometrically sound instrument for the bariatric population. A recent study by Walfish, et al. urged caution for the use of the MBMD™ - Bariatric Norms with WLS patients due to the lack of adequate reliability for many of the scales (Walfish, Wise, & Streiner, 2008).

Behavior-specific tools (as opposed to personality measures) have been used to assess constructs related to various aspects of eating behavior. Using the Questionnaire on Eating and Weight Patterns (QWEP and QWEP-R), no differences were found in rates of postsurgical weight loss at one year follow-up between subjects who were preoperatively classified as binge-eaters or non-binge eaters (Fischer et al., 2007). However, pre-surgical grazing behavior was found to predict 19.5% of the variance in postsurgical % EWL (Colles, Dixon, & O'Brien, 2008). The Eating Disorder Inventory has also been utilized as a standardized assessment tool to characterize presurgical eating behavior. Regardless of which assessment tool is utilized, some studies find smaller % EWL for patients with presurgical binge eating, but still report significant weight loss. Patients with presurgical binge eating who have undergone laparoscopic banding surgery have been reported to undergo more frequent band adjustments and have more postsurgical complications than patients without disordered eating (Busetto et al., 2005).

The Three Factor Eating Questionnaire (TFEQ - Stunkard & Messick, 1985) and other similar surveys used to assess cognitive restraint, disinhibition, and hunger have been consistently useful in demonstrating postsurgical changes in eating behavior (Kaiser et al., 2004; Smith, Franks, Kaiser, & Carrol, 2008). In and of themselves, various presurgical eating behavior constructs do not appear to independently predict postsurgical outcomes such as weight loss. Less understood, however, has been how presurgical eating behaviors may interact with other psychological characteristics. For example, higher presurgical non-hungry eating, measured by TFEQ, when combined with symptoms of depression as measured by the Beck Depression Inventory (BDI), was associated with poorer % EWL in laparoscopic banding patients (Colles et al., 2008).

Another attempt to standardize the preoperative evaluation has been through the use of a semi-structured interview. For example, the Weight and Lifestyle Inventory (WALI - (Wadden & Foster, 2006) covers information relevant to weight history, weight loss history and goals, eating habits, food intake, eating patterns, physical activity, family and social support, self-perceptions, psychiatric history, stress, and medical history. Thus far, it appears that data from the WALI has been used to describe various preoperative characteristics of patients rather than for postoperative predication (Allison et al., 2006; Fabricatore et al., 2006; Gibbons et al., 2006). In addition to including the QWEP, the WALI incorporates a survey on Eating Habits. Factor analysis of the Eating Habits Survey demonstrated the presence of 5 factors: eating in response to negative affect, eating in response to positive affect and social cues, general overeating and impaired appetite regulation, overeating at early meals, and snacking (Fabricatore et al., 2006). Preliminary data using the survey show that it may hold promise in identifying patients at risk for non-hunger related eating (Fabricatore et al., 2006; Kaiser, Franks, Carrol, & Smith, 2009).

Just prior to the introduction of the WALI for use with bariatric patients, the Boston Interview for Gastric Bypass was introduced (Sogg & Mori, 2004). Its stated purpose was to address the variability in type of assessments that were being conducted between sites, and to provide a mechanism by which to gather consistent and comparable information for research in outcome prediction. Components of the semi-structured interview include: weight/diet/nutrition history, current eating behaviors, medical history, knowledge of surgical procedures/risks/postsurgical regimen, motivation and expectations of surgical outcome, relationships and support system, and past/current psychiatric functioning. It was revised to the Boston Interview for Bariatric Surgery in consideration of subsequent advances in knowledge (Sogg & Mori, 2004). The authors point out that the role of the psychological evaluation is evolving beyond that of a screening process and argue for its use as part of a presurgical program of education, intervention, and treatment planning (Sogg & Mori, 2004).

Recently, others have proposed the utilization and exploration of more newly developed instruments such as the Personality Assessment Inventory (PAI - Corsica, Azarbad, McGill, Wool, & Hood, 2010), the PsyBari (Mahony, 2010), and the Revised Master Questionnaire (Corsica, Hood, Azarbad, & Ivan, 2011). Corsica et al. demonstrated that the PAI has sound psychometric properties for use with the bariatric population (Corsica et al., 2010). Given the established psychometric strengths of the PAI and its proven applicability in medical settings, it appears to hold an advantage over other personality assessments. Furthermore, the PAI's ability to provide information descriptive of self-concept, interpersonal style and functioning, and perception of stress and social support may prove it to be useful in providing information under a model from which to predict postsurgical outcomes.

The PsyBari is a self-report survey comprised of questions designed to assess constructs that were thought by the author and "other bariatric surgery professionals" to be important to measure preoperatively (Mahony, 2010). These include surgical motivation, emotional eating, anger, binge eating, obesity-related depression, weight-related social impairment, knowledge of postsurgical dietary restrictions, substance/alcohol abuse, and surgical anxiety. As useful as the PsyBari may be in streamlining the evaluation process and providing a way to standardize data collection, it is lacking in a clearly delineated rationale for construct selection or a theoretical framework from which to operationalize the various constructs. The PsyBari is still under development and needs further refinement and demonstration of validity and reliability.

The Revised Master Questionnaire (MQR) was recently evaluated for its potential use for WLS candidates (Corsica et al., 2011). It was originally developed in 1984 as a self-report survey to assess constructs thought to be important to success in conventional weight loss programs (Straw et al., 1984). Factors assessed by the MQR include stimulus control, motivation for weight loss and weight loss behaviors, hopefulness about weight loss and the future, unchangeable versus changeable attributions for weight, and understanding the caloric value of specific foods and activities. These 5 factors were reported to have been empirically supported as valid constructs for obese individuals seeking conventional treatment and to have demonstrated usefulness in prediction of weight loss. Based on these findings and the need for tools to assess weight control-related constructs, Corsica et al.

sought to determine its applicability for WLS candidates (Corsica et al., 2011). They administered the MQR to 790 candidates for gastric banding surgery and gastric bypass surgery. Results indicated acceptable reliability, confirmation of the factor structure, and convergent validity between factors and relevant psychological tests. Corsica, et al. (2011) also presented preliminary norms for use with WLS candidates. The usefulness of the MQR in determining postsurgical outcomes remains to be empirically tested.

These various second generation approaches to the preoperative evaluation of the bariatric patient hold promise for identifying different factors that may be relevant to postsurgical outcomes. However, they are likely to be of limited value in and of themselves. If a principal goal is indeed to establish predictive utility, adjustments will need to be made to the preoperative psychological evaluation to gather construct-specific data that have a basis for their use in the prediction of outcomes. In order to make such adjustments, we will need to decide what outcomes are important to predict. These defined outcomes should be linked to measurable prediction (mediating) variables, i.e. those that have the potential to directly influence the outcome. In order to accomplish this, we first need to establish a systematized way of selecting information related to these prediction variables. While several practitioners have published standardized clinical assessments (Mahony, 2010; Sogg & Mori, 2004; Wadden & Foster, 2006), the information determined important continues to be based largely on clinical convention and not systematically tied to an empirical basis. Empirical evidence without an overarching framework prohibits a broader understanding of relationships among complex determinants and the outcome(s) of interest, and thus does little to guide clinical practice (Green, 2000). In order to effectively discriminate which assessments will be useful, we need to operate under a theoretical framework that can serve as to guide our selection of constructs. We suggest using a theory-driven approach to formulating the presurgical evaluation as a way to understand the nature of what we are trying to predict, and as a framework to (a) select variables for which interventions may be approached, (b) to organize the information, and (c) to systematically test the relationships between variables and outcomes through the course of treatment and follow-up.

3. Empirical support for theoretical models in weight loss studies

According to a recent review (Painter, Borba, Hynes, Mays, & Glanz, 2008), the most common health behavior theories referenced in a random sample of studies published in high profile journals in 2004 - 2007 were: 1) the *Health Belief Model*, which has undergone several revisions and versions since the original work (Hochbaum, 1958); 2) the *Transtheoretical Model* (Prochaska, Diclemente, & Norcross, 1992) and 3) *Social Cognitive Theory* (Bandura, 1986). Another recent review was undertaken to evaluate several health behavior change models in relation to their utility in obesity prevention (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003). Of the various motivational models reviewed, the *Theory of Planned Behavior* was judged to be the most promising for applicability to weight management based on empirical evidence. Less frequently applied theories/explanatory models include the *Theory of Self-determination* (Deci & Ryan, 1985b) and the *Health Behavior Internalization Model* (Bellg, 2003), which both seek to understand motivation and change processes pertinent to long-term behavior maintenance. An *Integrated Model* recently proposed (Hagger, Chatzisarantis, & Biddle, 2002) has been tested for predictive ability in

weight loss behaviors and maintenance (Hagger, Chatzisarantis, & Harris, 2006; Jacobs, Hagger, Streukens, De, I, & Claes, 2011). This model combines aspects of the Theory of Planned Behavior and Self-determination Theory. We discuss each theory or model in terms of the advantages and disadvantages one may hold over another relative to the bariatric population and the goal of long-term maintenance of lifestyle behavior changes.

3.1 Health belief model

The core concept of the *Health Belief Model*, as put forth by Hochbaum in 1958, is that health behavior depends on personal beliefs about a disease and the resources or strategies available to the individual that will decrease the likelihood of contracting the disease. The version of the *Health Belief Model* (Becker & Rosenstock, 1984) includes four beliefs or components that work individually and in concert to predict health behaviors. These components include 1) perceived threats, 2) perceived seriousness, 3) perceived benefits, and 4) perceived barriers. In reviewing contemporary models of health behavior change, Baranowski et al. found little support for the Health Belief Model as applied to weight management (Baranowski et al., 2003). Few studies were able to demonstrate that there exists an interaction between perceived susceptibility and perceived seriousness, and that these in turn determine motivation to change or relate to actual behavior change. Cues to action have not been well studied, possibly because they are not stable or predictable. Studies of cues to action suggested that people are not able to accurately rate personal salience. There was only modest support for the effectiveness of using fear-based communication to affect perceived susceptibility and seriousness in effecting behavior change (Baranowski et al., 2003).

3.2 Transtheoretical model

The Transtheoretical Model (TTM - Prochaska et al., 1992) draws on several different theories to incorporate a number of change processes and concepts such as decisional balance and self-efficacy, that are purported to determine movement between stages of behavior change (Prochaska & Velicer, 1997). It assumes that individuals go through five progressive stages of behavior change: *precontemplation*, *contemplation*, *preparation*, *action*, and *maintenance*. The theory assumes that individuals do not move from one stage to another in a linear fashion. Rather, individuals may sustain multiple relapses in their effort to change their behavior, moving back and forth between the stages in a recursive fashion until the behavior change is permanent. The model proposes that there are four *dimensions* to change: the aforementioned stages of change, processes of change, decisional balance, and self-efficacy. Appropriate interventions for behavior change vary according to each stage of change and/or dimension of change in the TTM.

Our review of 14 studies focusing on weight loss and the Transtheoretical Model found that only four were specifically obesity intervention trials and none were performed on bariatric samples. Only two of the four had follow-up periods of longer than six months, the duration which the TTM model specifies is necessary to progress to the stage of maintenance of the new behavior. Furthermore, there has been little to no empirical work done to support the segregation of the stages and the dimensions of the TTM. Various reviews have not found strong support for the TTM as an explanatory or predictive basis for health behavior change,

including dietary interventions (Salmela, Poskiparta, Kasila, Vahasarja, & Vanhala, 2009) and exercise (Hutchison, Breckon, & Johnston, 2009). It has been pointed out, however, that many of the interventions studied were built around limited constructs (stages of change) rather than incorporating concepts from the broader TTM model itself (Armitage, 2009; Prochaska, 2006). Particularly understudied have been the specific processes of change. While there appears to be some general support for several of the independent TTM constructs, much work remains to be done in the application of this theory *in toto* to weight loss, especially for the bariatric population.

3.3 Social cognitive theory

Put forth by Bandura in 1986, *Social Cognitive Theory* (SCT) posits a “triadic interaction model” between personal factors, behavior, and the environment that is central to adaptation and change. Reciprocal interactions between each element determine thoughts, actions, beliefs, cognitive competencies, and behavior. For Bandura, cognition plays a central role in a person’s construction of reality and thus the ability to self-regulate. Individuals are seen as proactive and as holding beliefs about themselves that affect their sense of personal agency and in turn, influence their behaviors. A core cognition affecting the belief system is self-efficacy, which is seen as providing the foundation for motivation. Efficacy belief is believed to be the major impetus of action, and can be modified through mastery experiences, vicarious experiences, modeling, and social persuasion. A person’s outcome expectancies form the primary motivation for action, while self-efficacy and capabilities provide resources for action. Several primary capabilities are thought to be fundamental, including the capacity to symbolize and extract meaning; the ability for forethought and planning; the ability to learn vicariously; and the ability to self-regulate through self-observation, self-monitoring, and self-reflection.

These latter constructs have not been as well-studied as have the concepts of self-efficacy and outcome expectancies (Baranowski et al., 2003). Baranowski et al.’s review of SCT found support for many of its constructs with regard to behavior change, particularly self-efficacy and outcome expectancies. However, they also describe a great deal of variability that is not yet well-understood between genders and across different age groups in relation to the role of outcome expectancies and self-efficacy for diet or physical activity (Baranowski et al., 2003).

3.4 Theory of reasoned action, theory of planned behavior

As an elaboration of social learning theory (Miller & Dollard, 1941) and Bandura’s *Social Cognitive Theory*, the *Theory of Reasoned Action* was an extension to socially learned attitudes and norms (Fishbein & Ajzen, 1975). Later, this was expanded to the *Theory of Planned Behavior* (TPB) (Ajzen, 1985), which asserts that individuals form intentions to behaviors based on beliefs, norms and attitudes (Figure 1). Behavior is largely determined by *the intention* to act or not act, although significant perceived barriers may moderate this relationship. Intention is thought to be the closest measurable construct proximal to the behavioral act, therefore the model attempted to identify variables that determine intention.

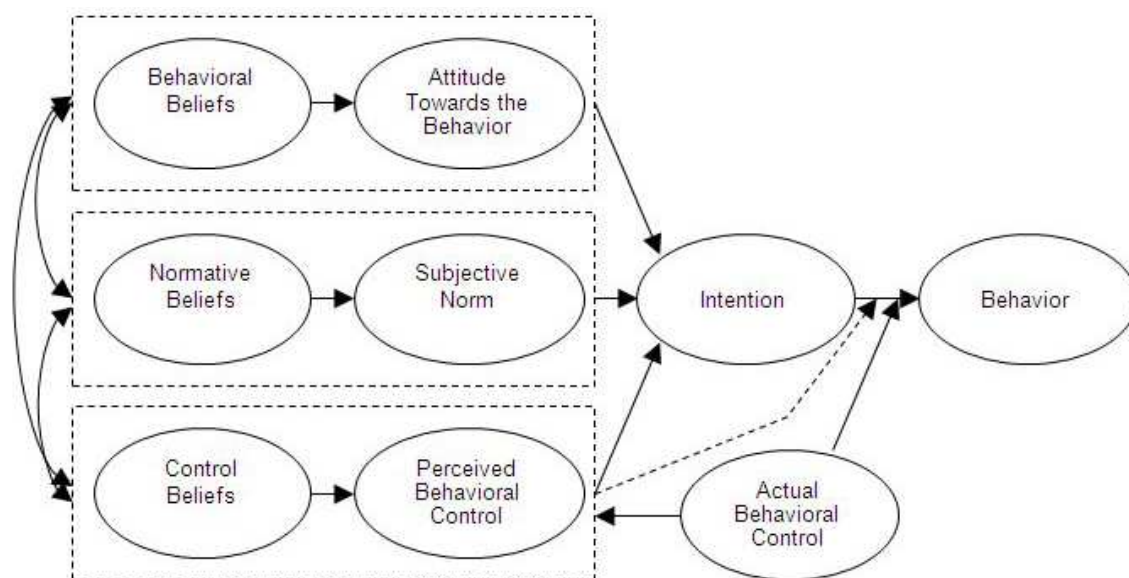


Fig. 1. Model diagram of the Theory of Planned Behavior (Ajzen, 1991)

In the original theory (Theory of Reasoned Action), intentions are moderated by two factors: 1) *attitude toward the behavior* (i.e., personal evaluation of the behavior), and 2) *subjective norm* (i.e., perception of social pressure to engage or not engage in the behavior). *Attitude toward the behavior* is based on the individual's belief that the behavior will lead to a desired outcome or away from an undesired outcome. One's *subjective norm* is created by the perception of the evaluation (either positive or negative) of a particular individual (or group of individuals) placed on the behavior and one's motivation to comply with norms set by others with whom one identifies or is influential. Thus, personal attitudes toward the behavior are weighed against subjective norms or opinions of presumably important others. The *Theory of Planned Behavior* (Ajzen, 1991) added the concept of "perceived behavioral control". That is, one's perception of how much control one has over a particular behavior or action greatly predicts whether or not an action or behavior will be undertaken. The more resources and opportunities an individual believes are personally available, the stronger the belief in the ability to control the target behavior. In essence, the easier the behavior appears to be, the more likely the behavior will be performed. For example, behaviors that are almost automatic will be the most predictable behaviors as these are the behaviors that individuals are more likely to *intend* to perform. Thus, predictions of behavior can be made from knowledge of an individual's attitude toward the behavior, one's subjective norm, and the perceived behavioral control. These three factors are thought to work in concert to shape an individual's intention to behave. Later research suggested that the relationship between actual and perceived behavioral control is a determinant of whether or not intention resulted in actual performance of the behavior (Ajzen, 2001).

In a review of behavior change models relative to weight control, the component of attitude from the TPB appears to be the strongest determinant of dietary behavior, with perceived behavioral control and subjective norms demonstrating less predictive power (Baranowski et al., 2003). A review of studies comparing perceived controllability and self-efficacy found that only perceived difficulty in performance of the behavior (self-efficacy) was significant in the prediction of change in dietary behavior (Ajzen, 2001). With regard to multiple behaviors but primarily physical activity, a meta-analysis (Hagger & Chatzisarantis, 2009)

determined that prior behavior accounted for much of the variance predicted by the constructs of the TBP. A recent study specifically applied the TBP to the prediction of exercise in 212 bariatric patients during the preoperative stage through the postsurgical stage for more than one year (Hunt & Gross, 2009). Results were reportedly consistent with other reports in the literature that found moderate to large correlations among the various constructs of the model as well as strong associations between perceived behavioral control, exercise intention and behavior. Only a weak association between subjective norms and intention to exercise was found, which appears to be consistent across many studies. One limitation was the use of subjective self-report surveys of physical activity rather than objective measures. The review by Baranowski et al. concluded that the constructs of TPB, while moderately predictive of *subjective* estimates of health behaviors, are poorly predictive when objective measurements of health behaviors are utilized (Baranowski et al., 2003). Another common criticism of TPB has been that, while it may provide information that is useful for prediction of behavior, it has not provided a useful foundation for developing interventions because there are no constructs included to help understand behavior change processes (Baranowski et al., 2003; Hobbis & Sutton, 2005). However, the TPB has undergone modifications to incorporate such concepts as belief salience and accessibility, past behavior and experience, moral norms, values, self-identity, goal desirability, mood, cognition, and affect on the formation and modification of attitudes, as well as the role of temporal stability and cognition on the relationship between intention and actual behavior (Ajzen, 2001). Baranowski and colleagues' review of health behavioral change models concluded that the TBP, with its more recent modifications, held the most promise for application to diet and physical activity changes in the treatment of obesity (Baranowski et al., 2003).

3.5 Self-determination theory (Deci and Ryan, 1985)

Much research reflects the challenge of maintaining weight loss, no matter the means by which it was initially lost (Sarwer, von Sydow, Vetter, & Wadden, 2009). According to self-determination theory, the level of motivation must be internally regulated and have an orientation of autonomy for long-term behavior maintenance to occur (Deci & Ryan, 1985b). Phases across the internalization continuum reflect the developmental process and styles of regulation going from non-regulation to fully integrated regulation (Figure 2).

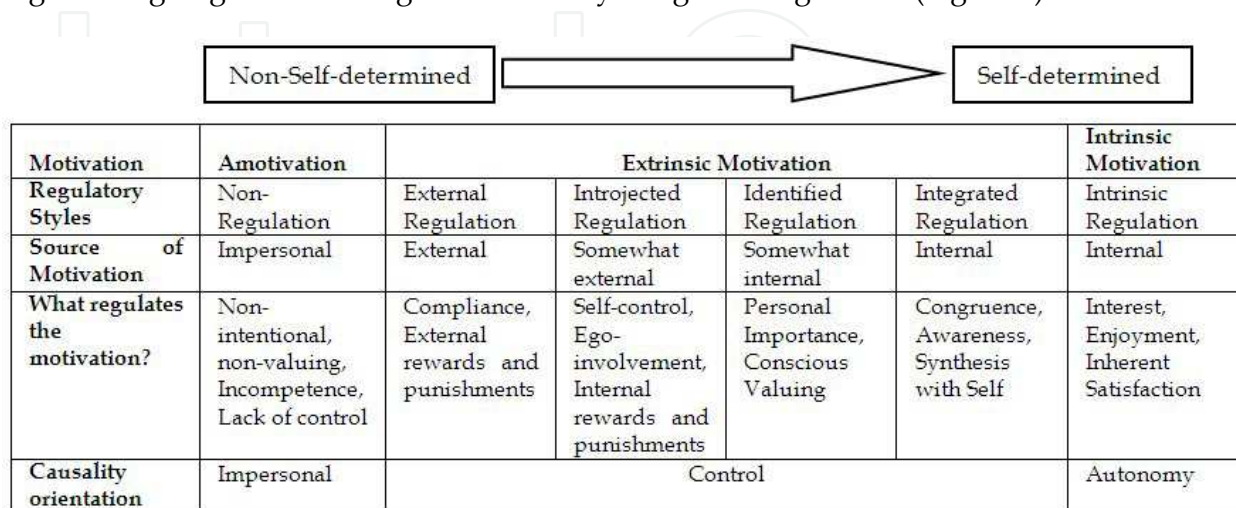


Fig. 2. The self-determination continuum (Based on Deci & Ryan, 1985b; Ryan & Deci, 2000)

For long term behavioral regulation to become fully integrated and therefore maintained, the person must develop: 1) an integrated identity and 2) a locus of causality that is *internal* (deCharms, 1968; Deci & Ryan, 1985b). This locus of causality is distinguished from locus of control (Rotter, 1966) in that the perceived source and initiation of the motivated behaviors are inside the self (autonomous) or outside the self (therefore, controlled, e.g. by directives of others or external rewards and contingencies) (Deci & Ryan, 1985b; Williams, Grow, Freedman, Ryan, & Deci, 1996). The goal state of integrated regulation results from the adoption of the behavior into one's core set of values.

An important aspect of self-determination is that of seeking ideal challenge and competency. Individuals tend to approach activities that are at an optimal level of psychological incongruity, i.e. interesting and enjoyable challenges that are optimal for one's abilities (Bandura, 1986; Deci & Ryan, 1985b). Three important factors relating to perceived competence are: 1) the task must be optimally challenging, 2) the task must be associated with immediate, spontaneous feedback or interpersonal feedback from a significant other, and 3) the action and feedback must be experienced as informational rather than controlling. The third characteristic is essential for integrated internalization. The factors increasing perceived competence highlight the importance of setting and generating focus on intermediate, realistic goals. Successive approximations use tasks and goals that are hierarchically structured to provide a person with increased perceptions of competence and lowered levels of anxiety (Bellg, 2003). Research has demonstrated that efficacy expectations are key to successful behavior change (Ajzen, 2001). Increasing perceived competence through treatment gains is a result of enhanced perception of internal causality.

Self Determination Theory (Deci & Ryan, 1985, pp. 153-159) also described three causality orientations: 1) autonomy, 2) control, and 3) impersonal. *Autonomy orientation* is the tendency for behavior to be initiated and regulated by events internal to one's sense of self as well as events in the environment that are interpreted as *informational*. In both, the locus of causality is internal. *Control orientation* is the tendency for behavior to be initiated by events that are external to one's integrated sense of self (i.e., introjected values or internally conflicting events) and by events in the environment that are interpreted as controlling. In both, perceived locus of causality is external. *Impersonal orientation* is based on a sense of one's being incompetent to deal with challenges. It is erratic and non-intentional, for the person lacks the necessary psychological structures for coping with internal and external forces. Impersonal orientation involves the beliefs that behavior and outcomes are independent and that the associated forces are uncontrollable, resulting in the perception of incompetence leading to amotivation.

The role of autonomy has been shown to be an important determinant for behavioral change in obesity intervention programs. For example, patients with a greater sense of autonomy in selecting a weight loss program were shown to have greater attendance in the program, to lose more weight, to adopt a better exercise regimen, and to maintain greater weight loss (Williams et al., 1996). Other studies have consistently demonstrated a strong relationship between positive health behaviors in patients who report a high sense of autonomy, and a greater sense of autonomy and perceived competence when health care environments were perceived as autonomy supportive (Shigaki et al., 2010; Williams et al., 2002).

3.6 A Needs-focused model of self-determination theory – the health behavior internalization model (HBIM - Bellg, 2003)

The HBIM focuses on four self-needs (identity, self-determination, security and support) as well as four behavior-related needs (preference, context, competence and coping) as components of the development of internalized regulation of health behaviors (Figure 3). Internalization of self-regulation is characterized by low conflict/high acceptance, high autonomy, high security, high perceived support, high satisfaction with behavior choices/context, high perceived competence, and adequate coping without undesired behavior co-occurring. This HBIM builds on Self-determination theory by adding it into a context of needs that interact in order to resolve into internalization and self-regulation. The security component refers to perceived threats associated with an adverse medical situation. Fear of declining health may be perceived as a threat that initially promotes treatment-seeking and/or behavioral adherence, but it is not likely to lead to long-term behavioral change as people tend not to maintain levels of fear, anxiety and guilt (conflict states) (Bellg, 2003). This model shows promise, but has not yet been tested.

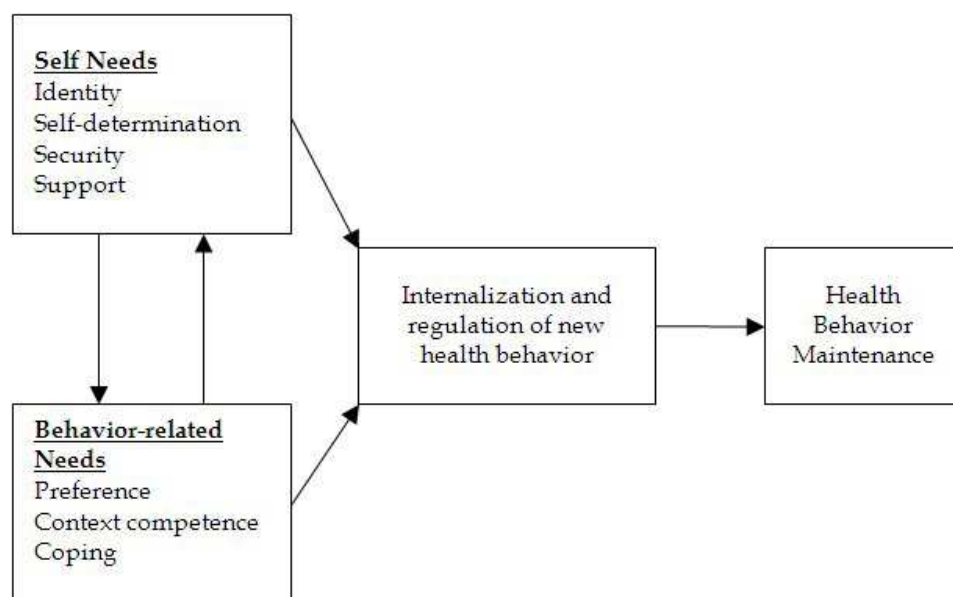


Fig. 3. Health behavior internalization model (Bellg, 2003).

Bellg (2003) describes the transition to internalization as being a product of the need to reduce conflict. In externally controlled behaviors, conflict occurs between the values of self-related needs and behavior-related needs of the individual. Bellg states that the process of transforming the external ideas and regulations of the social environment (when these are perceived as a desirable goal to obtain) to becoming personally held values is a fundamental human need. The new, integrated state is stable and free of conflict or a feeling of external control.

3.7 The integrated model (Hagger, 2006)

Hagger and colleagues performed a structural modeling study on an integrated model that linked Self-determination Theory and the Theory of Planned Behavior (SDT/TPB), testing effects of change in antecedents on exercise and dieting (Hagger et al., 2006). Later, Jacobs

and colleagues reported further testing and refinement of this integrated model on dieting and physical activity behaviors in undergraduates at baseline and at a one-year follow-up (Jacobs et al., 2011). In this integrated model, changes in autonomous and controlled motivation were assessed for effects on changes in attitudes and self-efficacy. All four of these constructs were tested for relationships to change in behavioral intentions and the subsequent change in diet/exercise behavior. While for both diet and exercise behaviors, increased autonomous motivation was associated with increased self-efficacy and behavioral intentions, the intensity of the exercise intervention moderated the relationship between self-efficacy and intentions (Jacobs et al., 2011). Both studies used assessments designed to measure constructs specific to Self-determination Theory.

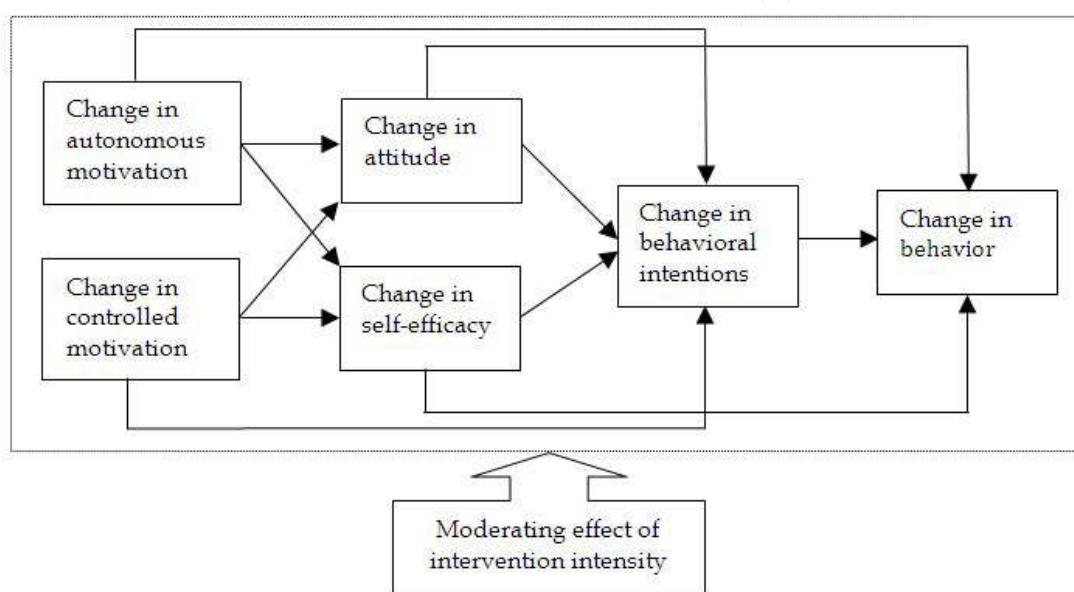


Fig. 4. Integrated model of the Theory of Planned Behavior and Self-determination theory (Jacobs et al., 2011).

3.8 Summary of theories and relevance in bariatric psychological evaluation

In examination of the application of these most popular or relevant theories to weight loss treatment-seeking or bariatric populations, we found few thorough and long-term studies of the mechanisms and processes of lifestyle behavior change maintenance. Also, we found that many of these theories or models are modestly descriptive but not explanatory. Further, we found little support in the predictive power of measuring some of these constructs for maintenance of postsurgical weight loss. Since the evolution of the presurgical psychological evaluation has origins in the medical diagnostic model rather than a prognostic model, we believe that a more systematic approach to the evaluation is needed to advance our understanding of the constructs and processes of long-term postsurgical behavioral change. Based on our limited review, it appears that aspects of both Self-determination Theory and the Theory of Planned Behavior have the most demonstrated empirical support thus far, such that the integrated SDT/TPB model has the greatest potential application for this purpose. Additionally, the Health Belief Internalization Model appears to hold promise in providing constructs relevant to the specific needs-satisfaction processes required for internalization to occur. More empirical

work is needed, including the development and validation of assessments of its constructs before it can be applied in the clinical setting.

4. Proposal for applying a new, theoretically-based model to presurgical assessment

We propose that a paradigm shift is needed in order to address the apparent deficiencies of the current approach to the presurgical psychological evaluation of WLS candidates. Specifically, we propose that the presurgical psychological evaluation undergo a reformulation with a theory-based, integrated stage and motivational basis to inform the selection of pertinent areas of inquiry and assessment tools. Ideally, the theory would be one that is applicable to understanding health behavior changes that are relevant to positive postoperative outcomes. Based on the current body of literature, it appears that following a bariatric diet, following an exercise program, and attending a bariatric support group comprise targeted activities that support the goals of long-term maintenance in improved health and optimum weight loss. We propose basing the presurgical psychological evaluation on an integrated theoretical model (SDT/TPB), so that clinicians can begin to assess constructs pertinent to long-term maintenance of these relevant health behaviors (Figure 4). In order to effectively assess the constructs relevant to the integrated theoretical model, the presurgical psychological evaluation must be coordinated to occur subsequent to patient interactions with the surgeon and the dietician so that the patient has a reference point and exposure to postsurgical expectations from which to answer questions.

Based on this new paradigm and empirical evidence to date, the recommended presurgical psychological evaluation would ideally evaluate the constructs and areas listed below. Assessments should be utilized that have demonstrated validity and reliability for use with the bariatric population. This list is not intended to be exhaustive, but is based on our review of the current literature related to WLS outcomes and to a plausible theoretical framework.

1. **Psychological functioning, including personality disorders, psychopathology, self-esteem, and coping.** The Personality Assessment Inventory (PAI) (Morey, 2007) has recently been shown to be a valid and reliable instrument that offers data relevant to clinical decision making for these constructs. Other personality tests, such as the Millon Behavioral Medicine Diagnostic™ - Bariatric (Millon et al., 2007) and the Millon Clinical Multiaxial Inventory - III™ (Millon, Millon, Davis, & Grossman, 2009) need further research to demonstrate their use with the bariatric population.
2. **Eating disorders and body dissatisfaction.** The Eating Disorder Inventory - 2 offers a valid assessment of these constructs. The Body Shape Questionnaire (BSQ- Cooper, Taylor, Cooper, & Fairburn, 1987) has also been utilized as an effective measurement of body dissatisfaction with bariatric patients. Additionally, semi-structured interviews such as the Weight and Lifestyle Inventory (WALI - Wadden & Foster, 2006) or the Boston Interview for Bariatric Surgery (Sogg & Mori, 2004) utilize questions designed to evaluate these constructs.
3. **Autonomous motivation for bariatric lifestyle changes.** The Treatment Self-Regulation Questionnaire (TSRQ - Levesque et al., 2007; Ryan & Connell, 1989;

Williams et al., 1996) assesses four factors (autonomous regulation, introjection, external regulation and amotivation) that could be used to evaluate the degree to which the patient has adopted autonomous motivation for the bariatric diet, an exercise program, and support group attendance. The TSRQ is a 15-item self-report survey that takes less than 5 minutes to complete for each behavioral topic. Items could be responses to the following suggested stems: “The reason I would follow a bariatric diet/an exercise program/attend support group is because...”. Item responses represent various autonomous, controlled, and amotivational statements. Responses are according to a seven-point, Likert-type scale ranging from 1 (not at all true) to 7 (very true). Internal consistencies across several health behaviors ranged for the four factors from .73 - .93 with the exception of one dataset where amotivation was .41, but three other datasets ranged from .73 - .79 for this factor (Levesque et al., 2007).

4. **Self-efficacy.** Perceived Competence Scale (PCS - Williams & Deci, 1998; Williams, Freedman, & Deci, 1998). The PCS is a 4-item self-report survey that can be adapted and used to determine a patient’s perceived competence, or self-efficacy, for maintaining a bariatric diet, an exercise program, and attendance in support group. Responses are according to a seven-point, Likert-type scale ranging from 1 (not at all true) to 7 (very true). It takes approximately one minute to complete for each behavior domain. In two studies, internal consistencies were above .80 (Williams & Deci, 1998; Williams et al., 1998).
5. **Clinical support resources.** Health Care Climate Questionnaire (HCCQ - Williams et al., 1996). The HCCQ is a 15-item self-report survey (or a 5 item short version) used to assess the level of autonomy support that a patient perceives is provided by the bariatric surgeon and staff. It takes approximately 5 minutes to complete. Ratings are on a 7-point scale which indicates the degree to which health care providers are perceived to be autonomy supportive. Higher scores indicate greater perceived autonomy support. Across domains, the alpha coefficient of internal consistency is above .90.
6. **Control orientation.** General Causality Orientations Scale (GCOS - Deci & Ryan, 1985a). The GCOS is a 36-item self-report survey of various vignettes used to determine the degree to which a patient is oriented toward autonomy as a general tendency. It takes approximately 20 minutes to complete. The GCOS is available in two forms. The original scale consists of 12 vignettes and 36 items. Each vignette describes a typical social or achievement oriented situation with three types of possible responses: an autonomous, a controlled, or an impersonal type. Respondents indicate (on 7-point, Likert-type scales) the extent to which each response is typical for them. Higher scores indicate higher amounts of the particular orientation. Subscale scores are generated by summing the 12 responses on items corresponding to each subscale. This scale has been shown to be reliable, with Cronbach alpha values of about .75 and a test-retest coefficient of .74 over two months (Deci & Ryan, 1985a).
7. **Attitudes Toward Behaviors** (Ajzen, 2001; Ajzen & Fishbein, 1980). Cognitive and affective attitude toward the bariatric diet, exercise, and support group attendance can be assessed using two sets of three bipolar items on a 7 point scale. Cognitive attitude is

comprised of the following scales: useful to useless, wise to foolish, beneficial to harmful. Affective attitude is comprised of the following poles: pleasant to unpleasant, interesting to boring, and enjoyable to unenjoyable.

8. **Perceived Behavior Control** (Ajzen, 2001). The measurement of PBC occurs on a 7-point, Likert-type scale (-3 not at all, +3 extremely) that measures confidence, ease-difficulty, and control ability for following a bariatric diet, maintaining an exercise program, and regularly attending support group. The extent to which this scale may overlap with the Perceived Competence scale (#4 above) is not known.

The use of an assessment battery that is based on current empirical evidence and a theoretical model for prediction of long-term behavior change, as we are proposing, should generate information that will inform prognostic statements and guide recommendations needed to improve prognosis that are based on specific processes under the model. Using this battery, it would be anticipated that patients who were autonomy oriented; high in autonomous motivation, confidence, and perceived control for the expected postsurgical lifestyle behavior changes; and who perceive the health care climate as supportive would receive a favorable prognosis for maintenance of behavioral changes. Ideally, these would support postsurgical success, as defined by maintenance of EWL corresponding to improved health and quality of life. Patients found to have an impersonal orientation; who were amotivated, who lack confidence or perceive themselves to have little control for lifestyle modifications; and who perceive the health care climate as non-supportive would receive the poorest prognosis. Furthermore, patients with a personality disorder diagnosis or who have a high degree of psychopathology (including disturbed eating) or body dissatisfaction would also be considered at risk for poor postsurgical behavioral adherence. Low self-esteem or poor coping skills would warrant caution. It is unclear to what extent these non-theoretically based psychological constructs are related to and may be picked up by constructs under the integrated model, such as causality orientation, autonomous motivation, self-efficacy/competence, and perceived behavioral control.

By evaluating the current status as well as the attitudes and perceptions of the bariatric patient using the integrated principles of SD/TPB, clinicians can identify key issues that may need to be addressed to assist a patient in achieving intrinsically motivated health behavior maintenance to achieve sustained behavior changes that support the long-term goals of the surgery. We are in agreement with Sogg and Mori's (2004) assertion that the role of the presurgical psychological evaluation should be used for treatment planning, but propose that treatment recommendations and components are based on a theoretically sound, motivational model for systematic testing.

Based on our view of the SDT/TPB integrated model, key targets for increasing intentions (and therefore behaviors) are: 1) facilitating development of an autonomous orientation within the patient, 2) maximizing a perception of internal regulation of behavioral goals, 3) increasing positive attitudes associated with desired behaviors, and 4) optimizing self-efficacy surrounding skills needed to easily maintain lifestyle patterns. Theoretically-based guidelines for promoting these areas in relation to behavioral targets such as dietary change, physical activity, and regular attendance in a supportive group intervention have been

described throughout the literature and can help guide the development of interventions specific to the bariatric population.

5. Conclusions

In conclusion, it is our contention that bariatric clinical practice and outcomes research would benefit from the application of theories and models that describe and model behavior change processes, and that psychological evaluation and assessments should be framed in theory and based on empirical evidence. Our proposal to use the SDT/TPB integrated model to guide the presurgical psychological evaluation for bariatric surgery represents the first attempt to establish an empirically-justified approach. As a framework for understanding the processes that determine the long-term behavior changes needed for postsurgical success, clinicians are in a better position to provide prognostic statements and treatment recommendations that have a scientifically-based rationale.

Future studies should seek to validate and establish the psychometric properties of psychological tests or questionnaires for the bariatric population. Studies should also determine their validity across age, gender, and cultural groups. Assessments that are designed to measure the various constructs of a theoretical model should be validated. This will allow for sound systematic investigations of the relationships of the validated measures with defined behavioral targets. In this way, we will begin to amass empirical evidence of the predictive utility of our instruments. However, selected behavioral targets should also be evaluated for their relationship to various parameters thought to represent postsurgical success. Furthermore, if a specific % EWL cut-off is to be used as a criterion of success, its clinical utility needs to be firmly established.

The role of the presurgical psychological evaluation should be expanded to incorporate treatment planning. Often, abrupt lifestyle prescriptions are directed at patients who are very far from a level of mastery at attempting, much less maintaining a new pattern of behavior. In the case of the postsurgical phase, patients are often unlikely to have ever encountered an eating plan similar to a bariatric diet. They are also not likely to be able to perform 30 minutes of moderate physical activity several times per week. Thus, it is likely that the process involved in change is recursive and prone to derailing without a supportive, patient-centered plan. Future studies should seek to characterize postsurgical phases and develop treatment plans to address their corresponding challenges. According to SDT/TPB, plans that are too rigid (not strongly identifiable to the patient) or directive (not autonomy supporting) will not likely aid the patient in making the needed internalization transition required for long-term maintenance of change.

With the advent of evidence-based medicine and the increasing need to justify evaluative and other clinical psychological services for bariatric patients, the presurgical psychological evaluation has been in need of a critical review. Our review suggests that a paradigm shift is in order to broaden our knowledge and advance the field. By suggesting a theory-based approach and presenting an example of a theory-based assessment battery, we hope to generate dialogue and stimulate further discussion and research on this topic in order to improve bariatric care.

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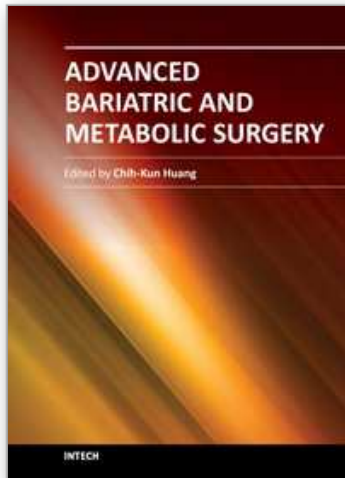
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Bariatric surgery has gained importance in the last 20 years because of the high prevalence of global obesity, and the vast understating of the physiological and pathological aspects of obesity and associated metabolic syndromes. This book has been written by a number of highly outstanding authors and pioneering bariatric surgeons from all over the world. The intended audience for this book includes all medical professionals involved in caring for bariatric patients. The chapters cover the choice of operation, preoperative preparation including psychological aspect, postoperative care and management of complication. It also extends to concept and result of metabolic surgery and scarless bariatric surgery.

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