



Problematic eating behaviors among bariatric surgical candidates: A psychometric investigation and factor analytic approach



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ABSTRACT

Psychological factors (e.g., anxiety, depression) are routinely assessed in bariatric pre-surgical programs, as high levels of psychopathology are consistently related to poor program outcomes (e.g., failure to lose significant weight pre-surgery, weight regain post-surgery). Behavioral factors related to poor program outcomes and ways in which behavioral and psychological factors interact, have received little attention in bariatric research and practice. Potentially problematic behavioral factors are queried by Section H of the Weight and Lifestyle Inventory (WALI-H), in which respondents indicate the relevance of certain eating behaviors to obesity. A factor analytic investigation of the WALI-H serves to improve the way in which this assessment tool is interpreted and used among bariatric surgical candidates, and subsequent moderation analyses serve to demonstrate potential compounding influences of psychopathology on eating behavior factors. Bariatric surgical candidates ($n = 362$) completed several measures of psychopathology and the WALI-H. Item responses from the WALI-H were subjected to principal axis factoring with oblique rotation. Results revealed a three-factor model including: (1) eating in response to negative affect, (2) overeating/desirability of food, and (3) eating in response to positive affect/social cues. All three behavioral factors of the WALI-H were significantly associated with measures of depression and anxiety. Moderation analyses revealed that depression did not moderate the relationship between anxiety and any eating behavior factor. Although single forms of psychopathology are related to eating behaviors, the combination of psychopathology does not appear to influence these problematic behaviors. Recommendations for pre-surgical assessment and treatment of bariatric surgical candidates are discussed.

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1. Introduction

The prevalence of psychopathology is often higher in bariatric surgical candidate populations than the general population (Kalarchian et al., 2007). Specifically, bariatric surgical candidates experience high rates of depression and anxiety (e.g., Muhlhans, Horbach, & de Zwaan, 2009; Sarwer et al., 2004). A wealth of extant literature has contributed to the evidence that psychological factors can influence bariatric surgical candidates' pre-surgical and post-surgical success (Abilés et al., 2010; Kalarchian et al., 2007). In particular, high levels of psychopathology are related to poor program outcomes, such as failure to lose significant weight pre-surgery or weight regain following surgery (de Zwaan et al., 2011; Kalarchian et al., 2007, 2008). Given the research indicating that psychopathology is a negative prognostic indicator for bariatric programs, the practice of assessing such psychological factors has become common-place in bariatric surgery settings (Walsh, Vance, & Fabricatore, 2007). In fact, the detection of untreated or undertreated depression and anxiety through psychological assessment are among

the top reasons that bariatric surgical candidates are denied or delayed surgery (Walsh et al., 2007). The pre-surgical psychological assessment has proven useful in identifying psychological indicators of poor bariatric program success (Franks & Kaiser, 2008; Pawlow, O'Neil, White, & Byrne, 2005), and in doing so, identifying key targets for psychological intervention.

Comparatively, a much smaller body of literature has examined behavioral factors which may influence bariatric surgical candidates' pre- and post-surgical outcomes. Given the population, eating behaviors in particular warrant attention. Although examining eating behaviors in a bariatric population seems intuitive, a recent systematic literature search (Carter & Jansen, 2012) failed to produce any studies that sought to identify the target eating behaviors involved in obesity. The lack of consensus regarding the key behavioral factors involved in bariatric program success is in stark contrast to the well-established literature regarding the emotional factors involved. Furthermore, there is little information regarding potential interactions between the emotional and behavioral components of bariatric surgical candidates' cases.

Despite the dearth of research conducted on potentially problematic eating behaviors, a clinical tool exists which queries this information. The Weight and Lifestyle Inventory (WALI; Wadden & Foster, 2006) is a self-report questionnaire routinely used in pre-surgical bariatric

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evaluations and includes a set of 24 items (Section H; from herein referred to as WALI-H) that queries the relevance of certain eating behaviors to obesity. Using a five-point Likert-style scale, respondents rate the degree to which they believe 24 different eating behaviors contribute to their obesity. The WALI-H has been used in the past to make intervention recommendations based on bariatric surgical candidates' endorsement of various eating behaviors (Walfish, 2004; Walfish & Brown, 2009).

Fabricatore, Crerand, et al. (2006), Fabricatore, Wadden, et al. (2006) conducted a principal components analysis (with promax rotation) on the WALI-H, which yielded five factors. The first factor was labelled *negative affect* as the seven pertinent items assess eating in response to various negative emotions (i.e., stress, depression, anxiety, anger, boredom, loneliness, fatigue). The second factor, *positive affect and social cues*, consisted of five items that assessed eating in response to positive emotions or social events (e.g., eating when happy, eating when celebrating). The third factor, *overeating/impaired appetite*, consisted of seven items related to overeating, hunger, cravings, and not feeling full. The fourth factor, *overeating at early meals*, only consisted of two items, and pertained to overeating at breakfast and lunch in particular. The fifth factor was titled *snacking*, and its two items related to snacking after dinner and between meals. Fabricatore, Crerand, et al. (2006), Fabricatore, Wadden, et al. (2006) demonstrated adequate internal consistency (Cronbach's alpha coefficients ranged from 0.65 to 0.88) and test-retest reliability (reliability coefficients ranged from 0.61 to 0.81) for the five factors. Furthermore, all five factors demonstrated an association with depression and binge eating (with the exception of *positive affect and social cues* being unrelated to depression).

Although Fabricatore, Crerand, et al. (2006), Fabricatore, Wadden, et al. (2006) were able to demonstrate acceptable psychometric properties for the five-factor model of the WALI-H; a few notable limitations would suggest that further factor analytic studies are warranted. First, this factor structure has yet to be replicated in an independent sample. Second, in recent years the recommendations for factor analytic practices have been updated. As such, principal axis factoring is now favored above principal components analysis (Costello & Osborne, 2005). Similarly, using eigenvalues ≥ 1 as the primary criteria for determining factors has been amended. Currently, more stringent criteria, such as comparing eigenvalues to parallel analyses is considered best practice for determining factors (Costello & Osborne, 2005; Thompson, 2004). Moreover, it is generally accepted that factors should not have fewer than three items, as these factors are unstable and should not be considered robust (Costello & Osborne, 2005).

Given these recent advances in statistical practices specifically, and the general need to replicate in independent samples, additional examination of the factor structure of the WALI-H may prove beneficial. As such, the current investigation was designed to: 1) re-examine the factor structure of the WALI-H; 2) investigate how measures of psychopathology typically encountered in a bariatric population are related to the factors; and 3) investigate potential moderating or compounding influences of psychopathology on eating behavior factors. The current investigation will serve to improve the way in which a common pre-surgical assessment tool is interpreted and used among bariatric surgical candidates, as well as improve the overall understanding of key eating behaviors and psychopathology in a bariatric population.

2. Material and Methods

2.1. Participants

Data was collected from 362 (274 women and 88 men) bariatric surgery candidates from the XXXX Region (XXXX) bariatric surgical assessment clinic in XXXX, Canada. Candidates (M age = 44.3; SD = 10.4) were enrolled in a six-month pre-surgery program during which they had regular consultations with a multidisciplinary team consisting of a surgeon, clinical psychologist, dietician, nurse, and exercise therapist.

The majority of candidates were married (59%), Caucasian (84%) and most had at least a high school education (84%). There were no significant demographic differences between male and female bariatric surgical candidates. Bariatric surgical candidates had an average weight of 147.78 kg (SD = 29.14), which corresponds to an average body mass index (BMI) of 52.16 (SD = 8.46). This degree of obesity is typical of other bariatric populations (e.g., Fabricatore, Crerand, et al., 2006; Fabricatore, Wadden, et al., 2006). Candidates approved for surgery received Roux en Y gastric bypass or gastric banding procedures.

2.2. Procedure

All bariatric surgical candidates completed a battery of questionnaires as part of their involvement in the six-month pre-surgery program. The data for the current study was collected from the patients' initial pre-surgical psychological assessment. Furthermore, objective measures of height and weight were obtained and converted to BMI.

2.3. Measures

2.3.1. Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977)

The CES-D is a 20-item self-report measure that assesses for the presence of depressive feelings and behaviors over a one week period. The CES-D queries symptoms associated with depression (e.g., depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, loss of appetite, sleep disturbance, psychomotor retardation) that have been used in previously validated scales of depression (Radloff, 1977). Items are rated on a 4-point Likert scale based on the frequency of occurrence during the past week (i.e., responses range from *rarely/none of the time* – less than one day, to *most/all of the time* – 5 to 7 days). Total scores range from 0 to 60 with higher scores indicating more depressive symptomatology. Cut off scores are as follows: scores ranging from 15 to 21 indicate mild to moderate depression, and scores greater than 21 suggest the possibility of major depression. The CES-D has demonstrated high internal consistency across studies (α = .63 to .91; Devins, Orme, & Costello, 1988; Radloff, 1977) and moderate test-retest reliability (r = .61) in various adult populations (Devins et al., 1988). Furthermore, the CES-D has successfully been utilized to assess depression among bariatric patients (Bond, Phelan, Leahey, Hill, & Wing, 2009). In the current study, the CES-D demonstrated excellent internal consistency (α = .92).

2.3.2. Self-reported Zung Anxiety Scale (ZAS; Zung, 1971)

The ZAS is a 20-item measure developed to assess the frequency of anxiety symptoms over a one-week period. The ZAS contains four factors including: anxiety and panic, somatic control, vestibular sensations, and gastrointestinal/muscular sensations (Olatunji, Deacon, Abramowitz, & Tolin, 2006). Items are rated on a 4-point Likert scale based on the frequency of occurrence during the past week (i.e., responses range from *none or a little of the time*, to *most/all of the time*). Total scores range from 20 to 80, with higher scores indicating more anxiety. A score of 36 or higher indicates clinical anxiety (Zung, 1971). In past research, the ZAS has demonstrated good internal consistency (α = .81; Olatunji et al., 2006). In the current study, the ZAS demonstrated comparably good internal consistency (α = .83).

2.3.3. Weight and Lifestyle Inventory (WALI; Wadden & Foster, 2006)

The WALI is a self-report questionnaire that examines biological, environmental, and psychosocial factors related to weight difficulties. The WALI is commonly used in bariatric pre-surgical settings. For the current study, Section A and Section H were utilized. Questions from Section A of the WALI query demographic and weight information of bariatric surgical candidates. Section H of the WALI lists 24 different eating behaviors, and has respondents rate the degree to which they believe each eating behavior contributes to their obesity. Items are rated

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