



Attachment style and emotional eating in bariatric surgery candidates: The mediating role of difficulties in emotion regulation



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ABSTRACT

Objective: Difficulties with emotion regulation is a hypothesized mechanism through which attachment insecurity may affect emotional eating. No studies have yet investigated this effect in the bariatric population. Because many obese individuals engage in emotional eating, difficulty regulating emotion may be an important underlying mechanism through which attachment insecurity is linked to emotional eating in bariatric surgery candidates.

Methods: In this cross-sectional study, 1393 adult bariatric surgery candidates from the Toronto Western Hospital were recruited to complete the Emotional Eating Scale (EES), Patient Health Questionnaire-9 (PHQ9), Generalized Anxiety Disorder-7 (GAD7), Difficulties in Emotion Regulation Scale (DERS), Eating Disorder Examination Questionnaire (EDE-Q), and the Experiences for Close Relationships 16-item Scale (ECR-16) in order to explore the mediating role of emotion regulation on the relationship between attachment insecurity and emotional eating. Path analysis within a structural equation modeling framework examined direct and indirect effects of attachment insecurity on emotional eating.

Results: The indices of this overall model indicated that the specified set of direct and indirect pathways and corresponding correlations were a good fit with the data (RMSEA < .06, CFI = 1.00; SRMR < .08). Moreover, tests of all of the possible indirect pathways between attachment style and emotional eating were significant.

Discussion: Findings suggest that difficulties in emotion regulation may be an important mechanism to consider when examining the association between attachment insecurity and emotional eating in adult bariatric surgery candidates. Although causality cannot be concluded, these results shed light on the important role that emotion regulation may have in predicting problematic eating in bariatric patients.

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Obesity is the fifth leading cause for global deaths (World Heart Federation, 2015), and overall, approximately 13% of the world's adult population (11% of men and 15% of women) were obese in 2014 (World Health Organization, 2015). Bariatric surgery is the most effective treatment for morbid obesity, resulting in significant weight loss (Ballantyne, 2003; Maggard et al., 2005) and improvements in obesity-related co-morbidities (Maggard et al., 2005). Despite these benefits, 20% of patients fail to maintain weight loss following bariatric surgery approximately 1.5 to 2 years postsurgery (Hsu et al., 1998; Kalarchian et al., 2002). Given that eating psychopathology has been purported as a risk factor for weight loss recidivism in bariatric surgery patients (Kofman, Lent, & Swencionis, 2010; Niego, Kofman, Weiss, & Geliebter,

2007), further understanding of psychological determinants of eating behavior is necessary to enhance bariatric surgery outcomes.

Obese individuals often report engaging in maladaptive emotional eating (Allison & Heshka, 1993; Goossens, Braet, Van Vlierberghe, & Mels, 2009; Masheb & Grilo, 2006; Ricca et al., 2009), and problematic eating behaviors have been found to re-emerge following bariatric surgery. For example, Delin, Watts, and Bassett (1995) found that emotional eating was negatively associated with weight loss two years following bariatric surgery, and Canetti, Berry, and Elizur (2009) found that high endorsement of emotional eating prior to bariatric surgery predicted less weight loss one year after surgery. Emotional eating is a maladaptive way of coping with negative affect and is thought to signify more extensive problems with emotion regulation (Gianini, White, & Masheb, 2013).

Early attachment to caregivers is the foundation for the development of emotion and behavior regulation (Cooper & Warren, 2011; Levitan & Davis, 2010), including eating behavior. Anxious and avoidant attachment styles have been associated with poor emotion regulation

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and subsequent disordered eating in women (Ty & Francis, 2013). Insecure attachment style (e.g. avoidant or anxious attachment) has also been directly associated with higher rates of binge eating in women (Young & Cooper, 2013). And, in adults seeking bariatric surgery, both anxious and avoidant attachment dimensions have been found to be associated with a poor mental quality of life (Sockalingam, Wnuk, Strimas, Hawa, & Okrainec, 2011). However, there is no research to date on attachment and emotional eating in bariatric patients.

The current study examined whether difficulties in emotion regulation mediated the relation between insecure attachment and emotional eating in individuals being assessed for bariatric surgery. First, the direct association between attachment insecurity and emotional eating was assessed (Hypothesis 1). Then the relationship between attachment insecurity and difficulties in emotion regulation was examined (Hypothesis 2), followed by an investigation of the relation between difficulties in emotion regulation and emotional eating (Hypothesis 3). The mediating effect of difficulty in emotion regulation on the relation between attachment insecurity and emotional eating was then assessed (Hypothesis 4). Given the high rates of emotional eating reported in obese individuals seeking bariatric surgery and its association with weight regain postsurgery, it is important to begin to explore what potential mechanisms might underlie emotional eating in this population.

1. Methods

1.1. Participants

Participants included 2120 consecutively referred candidates who were assessed by the Toronto Western Hospital Bariatric Surgery program (TWH-BSP), a Level 1A bariatric surgery Centre of Excellence accredited by the American College of Surgeons and one of two adult bariatric surgery assessment centers within the University of Toronto Bariatric Surgery Collaborative.

1.2. Procedure

Patients were referred to the TWH-BSP through a centralized provincial bariatric surgery registry called the Ontario Bariatric Network if they have a body mass index (BMI) ≥ 40 or ≥ 35 kg/m² with one or more obesity-related co-morbidity. All patients underwent an interdisciplinary pre-bariatric surgery assessment process, which has been described in detail in previous studies (Pitzul et al., 2014; Sockalingam et al., 2013). This study was approved by the Institutional Research Ethics Board at the University Health Network in Toronto, Canada.

1.3. Psychosocial measures

1.3.1. Attachment style

The Experiences in Close Relationships scale [ECR-16; (Brennan, Clark, & Shaver, 1998)] is a 16-item self-report measure that assesses attachment style. The ECR-16 yields anxious (ECR-anxious, $\alpha = .85$) and avoidant (ECR-avoidant, $\alpha = .88$) attachment subscales based upon scoring of 8 items for each attachment style, with higher scores representing greater attachment insecurity.

1.3.2. Difficulties in emotion regulation

The Difficulties in Emotion Regulation Scale [DERS; (Gratz & Roemer, 2004); $\alpha = .94$], is a 36-item self-report measure that assesses difficulties in emotion regulation across multiple domains, with higher scores indicating greater difficulties in emotion regulation. The DERS has been used to study emotional eating in a sample of patients with anorexia nervosa (Racine & Wildes, 2013) as well as those who binge eat (Gianini et al., 2013).

1.3.3. Depression

The Patient Health Questionnaire [PHQ-9; (Spitzer, Kroenke, & Williams, 1999); $\alpha = .88$] is a 9-item self-report measure that has been designed to identify individuals with significant depressive symptoms. It has recently been validated for use in a bariatric population (Cassin et al., 2013).

1.3.4. Anxiety

The Generalized Anxiety Disorder Scale [GAD-7; (Kroenke, Spitzer, Williams, Monahan, & Lowe, 2007); $\alpha = .92$] is a 7-item self-report measure that has been designed to assess individuals with significant symptoms of anxiety. It has high sensitivity (89%) and good specificity (82%) for detecting anxiety disorders (Kroenke et al., 2007).

1.3.5. Eating pathology

Eating pathology was measured using a subscale of the Eating Disorder Examination Questionnaire (EDE-Q; Black & Wilson, 1996). The EDE-Q has a 22-item Global Disordered Eating scale ($\alpha = .87$) and has demonstrated good validity and reliability in measuring eating-related pathology and behaviors and has been used in bariatric surgery patients (Grilo, Masheb, & Wilson, 2001).

1.3.6. Emotional eating

The Emotional Eating Scale [(EES; (Arnow, Kenardy, & Agras, 1995))] is a 25-item self-report questionnaire designed to assess the tendency of individuals to eat in response to emotions. Higher scores indicate a greater reported desire to eat in response to negative mood states. The EES generates three subscales based upon the mean of items reflecting the urge to eat in response to anger/frustration (EES-anger, $\alpha = .92$), anxiety (EES-anxiety, $\alpha = .88$), and depression (EES-depression; $\alpha = .81$). The EES has demonstrated good internal consistency (Arnow et al., 1995; Waller & Osman, 1998), adequate temporal stability (Arnow et al., 1995), and good construct (Arnow et al., 1995) and discriminant validity (Arnow et al., 1995) in adult samples.

1.3.7. Body mass index

Measures of height and weight were collected by a bariatric dietician, and body mass index (BMI) was calculated as weight [kg] / height² [m²].

1.3.8. Sociodemographics

Sociodemographic data included age and gender.

1.4. Statistical analysis

The current model (see Fig. 1) was tested using structural equation modeling (SEM) in Mplus 7 (Muthén & Muthén, 1998–2012). Full information maximum likelihood (FIML) was used to account for missing data. The overall fit of the model was considered adequate if the comparative fit index (CFI) was $> .95$, if the root mean squared error of approximation (RMSEA) was $< .06$ and if the standardized root mean squared residual (SRMR) was $< .08$ (Hu & Bentler, 1999).

2. Results

2.1. Descriptive data and correlations

Two hundred and eighty-eight males and 1095 females (mean age 44.72 years, mean BMI = 49.05 kg/m²) undergoing assessment for bariatric surgery completed at least one of the current study's psychosocial measures and were included in the current study. Although no significant differences in age or BMI were found between patients included in the current analyses and patients excluded ($n = 737$) due to lack of completion of any of the study measures, significant differences in gender were found between these groups (Pearson chi-square (1) = 6.24, $p = .01$), with females comprising 75% of patients excluded from analyses and 79% of patients included from analyses. Means, standard

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