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Multimethod psychological assessment of women undergoing bariatric surgery

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Multimethod psychological assessment of women undergoing bariatric surgery

Original Version

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To my parents, for supporting me in every decision.

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“A madureza sabe o preço exato
dos amores, dos ócios, dos quebrantos,
e nada pode contra sua ciência

e nem contra si mesma. O agudo olfato,
o agudo olhar, a mão, livre de encantos,
se destroem no sonho da existência.”

Carlos Drummond de Andrade
A Ingaia Ciência

ABSTRACT

Colombarolli, M. S. (2023). *Multimethod psychological assessment of women undergoing bariatric surgery.* (Doctoral Thesis). Faculty of Philosophy, Sciences and Letters of Ribeirão Preto, University of São Paulo, Ribeirão Preto, Brazil. Department of Psychology, University of Turin, Turin, Italy.

Obesity is a complex condition in which excessive body weight causes negative consequences for health, and is associated with increase of mortality. Treatment strategies for severe obesity include the bariatric surgery (BS), an intervention in which patients' undergo anatomical and metabolic modifications that promote restriction of food intake and absorption, leading to weight loss (WL). Psychological aspects such as affective and cognitive functioning and personality characteristics, are related to the development and severity of obesity. Psychological assessment is part of the procedures of preparation for BS and usually focus on the presence of psychopathology, which is a risk for insufficient WL. This research aimed to investigate aspects of psychological functioning in patients undergoing BS, in three different studies. The objective of Study 1 was to conduct a meta-analytic review of studies that assessed longitudinal psychological outcomes of patients submitted to bariatric surgery. We identified 751 studies, of which 26 were reviewed, and 12 were included in the meta-analysis. Study 2 compared psychological characteristics related to emotion regulation, executive functions and personality characteristics using a multimethod psychological assessment of 50 women with severe obesity (class III) undergoing BS and 29 normal-weight controls. Participants were assessed using the Difficulties in Emotion Regulation Scale (DERS), the Trail Making Test (TMT) and the Rorschach Performance Assessment System (R-PAS). Study 3 examined the association of various measures of emotion regulation, executive functions and personality to surgery status of 50 women applying for BS, from which 27 dropout of the treatment, and 23 proceeded to BS, and had their WL at 6, 12 and 18 months followed. The main results of Study 1 were that symptoms of anxiety, depression, binge eating, and body image are consistently reduced after surgery, with depressive symptoms accounting for the greater reduction. However, examination of longer follow-ups suggested that psychological functioning returns to baseline after 60 months. On Study 2, we found that patients with obesity self-reported lower levels of mental illness, although they showed poorer performance on the maximal performance

test and increased defensiveness on the typical performance test, indicating that self-report measures are subject to positive impression management. In Study 3, patients who dropped out from treatment had higher initial BMI and worse cognitive flexibility, while for the patients that proceed to surgery, indicators of emotional and cognitive functioning in all measures were associated with WL at 6 and 12 months after surgery, but only R-PAS variables related to psychological resources appeared to be associated with WL at 18 months of surgery. These results suggest that psychological assessment pre-BS should include different types of assessment measures, including maximum and a typical-performance measures, to improve effectiveness of the assessment and reduce effects of positive impression management. Multimethod approach may also contribute to a better understanding of long-term outcomes of BS by providing information on psychological aspects related to insufficient WL.

Key words: Obesity. Bariatric Surgery. Psychological Assessment. Multimethod Assessment. Rorschach.

RESUMO

Colombarolli, M. S. (2023). *Avaliação psicológica multimétodo de mulheres submetidas à cirurgia bariátrica.* (Tese de Doutorado). Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, Brasil. Departamento de Psicologia, Universidade de Turim, Turim, Itália.

A obesidade é uma condição complexa caracterizada pelo excesso de peso corporal, que leva a consequências negativas para a saúde e está associada com o aumento da mortalidade. Dentre as estratégias para seu tratamento está a cirurgia bariátrica (CB), intervenção na qual pacientes com obesidade grau III são submetidos a procedimentos de modificação anatômica que restringe a ingestão e absorção de nutrientes, resultando em perda de peso. Aspectos psicológicos, como o funcionamento afetivo, cognitivo e da personalidade, estão relacionados com o desenvolvimento e gravidade da obesidade. A avaliação psicológica é parte dos procedimentos de preparação para a CB e geralmente tem enfoque em identificar a presença de psicopatologia, a qual está associada à perda de peso insuficiente. Este estudo buscou investigar aspectos do funcionamento longitudinal de pacientes submetidas à CB em três estudos. O Estudo 1 teve por objetivo fazer uma revisão sistemática e meta-analítica de artigos científicos que avaliaram desfechos psicológicos longitudinais em pacientes submetidos à CB. Foram identificados 751 estudos, dos quais 26 foram incluídos na revisão sistemática e 12 na meta-análise. O Estudo 2 buscou comparar características psicológicas relativas à regulação emocional, funções executivas e características de personalidade, a partir de avaliação psicológica multimétodo, em uma amostra de 50 mulheres com obesidade grau III candidatas à CB, em comparação com 29 mulheres eutróficas. As participantes foram avaliadas por meio da Escala de Dificuldades de Regulação Emocional (DERS), Teste de Trilhas (TMT) e Método de Rorschach (Sistema R-PAS). O Estudo 3 investigou a associação entre características de regulação emocional, funções executivas e personalidade com o progresso no tratamento cirúrgico e a perda de peso após 6, 12 e 18 meses da cirurgia, em mulheres com obesidade. Como resultados, o Estudo 1 identificou que sintomas de ansiedade, depressão, compulsão alimentar e imagem corporal reduzem consistentemente após a CB, sendo a redução dos sintomas depressivos a mais significativa. As mudanças tendem a retroceder após 60 meses de cirurgia. No Estudo 2 observou-se que pacientes com obesidade reportam menos adoecimento

mental, apesar de demonstrar pior desempenho em medidas de máximo desempenho, e aumento da defensividade em avaliações de desempenho típico, indicando que instrumentos de autorrelato estão sujeitas a manipulação positiva. No Estudo 3, pacientes que abandonaram o tratamento tinham maior IMC inicial e menos flexibilidade cognitiva. Entre os pacientes que realizaram a CB, indicadores do funcionamento emocional e cognitivo em todas as avaliações foram associados com perda de peso após 6 e 12 meses de tratamento, porém apenas as variáveis do Rorschach se relacionaram com a perda de peso após 18 meses da cirurgia. Tais resultados dão suporte ao uso de diferentes instrumentos na avaliação psicológica para a CB, incluindo medidas de desempenho típico e máximo, a fim de melhorar a validade da avaliação e reduzir os efeitos da manipulação positiva. A abordagem multimétodo pode contribuir, ainda, para melhorar o entendimento dos resultados a longo prazo da CB, uma vez que fornece informações complementares sobre os aspectos psicológicos relacionados à perda de peso insuficiente.

Palavras-chave: Obesidade. Cirurgia bariátrica. Avaliação psicológica. Avaliação multimétodo. Rorschach.

ABSTRACT IN ITALIANO

Colombarolli, M. S. (2023). *Valutazione psicologica di donne che richiedono di sottoporsi la chirurgia bariatrica.* (Tesi di Dottorato). Facoltá di Filosofia, Scienze e Lettere di Ribeirão Preto, Università di São Paulo, Ribeirão Preto, Brasile. Dipartimento di Psicologia, Università degli Studi di Torino, Torino, Italia.

L'obesità è una condizione complessa, in cui l'eccesso di grasso corporeo causa conseguenze negative per la salute ed è associata ad un incremento della mortalità. Fra i trattamenti disponibili per l'obesità severa c'è la chirurgia bariatrica (Bariatric Surgery; BS), un intervento in cui i pazienti sono sottoposti a modifiche anatomiche che riducono l'assimilazione del cibo, con la conseguente perdita di peso (Weight Loss; WL). Vi sono alcuni aspetti psicologici collegati allo sviluppo o alla gravità dell'obesità, come le funzioni affettive e cognitive o le caratteristiche di personalità. La valutazione psicologica fa parte delle procedure di preparazione per la BS, ed è comunemente focalizzata sulla presenza di psicopatologia, considerata un fattore di rischio ad una perdita di peso insufficiente. Questa ricerca ha lo scopo di indagare gli aspetti di funzionamento psicologico in pazienti sottoposti a BS in tre diversi studi. Nello Studio 1, l'obiettivo era condurre una revisione meta-analitica per valutare i risultati di studi longitudinali di pazienti sottoposti a BS. Abbiamo considerato 751 studi, di cui 26 sono stati inclusi nella revisione sistematica e 12 nella meta-analisi. Nello Studio 2, l'obiettivo era confrontare le caratteristiche psicologiche riguardo la regolazione emotiva, funzioni esecutive e caratteristiche di personalità, attraverso un approccio multi-metodo per la valutazione psicologica di 50 donne affette da obesità severa (Classe 3), confrontandogli a un campione di 29 donne normopeso. Le partecipanti sono state valutate usando la Difficulties in Emotion Regulation Scale (DERS), il Trail Making Test (TMT), e il Rorschach Performance Assessment System (R-PAS). Lo Studio 3 ha investigato aspetti di regolazione emotiva, funzioni esecutive e personalità in relazione alla situazione operatoria di 50 donne che hanno richiesto BS, di cui 27 hanno abbandonato il tratamento, e 23 hanno subito l'intervento, per cui la WL a 6, 12 e 18 mesi dalla CB è stata valutata. Come risultati, lo Studio 1 ha trovato che la sintomatologia di ansia, depressione, abbuffate e immagine corporea si è ridotta in modo consistente dopo l'operazione, specialmente per quel che riguarda i sintomi depressivi. Tuttavia, follow-up a distanza temporale maggiore hanno indicato una tendenza a tornare al funzionamento originario

dopo 60 mesi dall'intervento. Nel Studio 2, le pazienti con obesità riportavano livelli di salute mentale superiori, ma una performance inferiore nei test di performance massima, e profili maggiormente coartati nei test di performance tipica, mostrando come le misure self-report siano facilmente soggette a distorsioni in direzione positiva. Nello Studio 3, le pazienti che hanno abbandonato il trattamento avevano un BMI maggiore ed una minore flessibilità cognitiva nel TMT rispetto a quelle che hanno proseguito fino a sottoporsi a BS. In queste, gli indicatori di funzioni emotive e cognitive erano associati alla WL tra i 6 e i 12 mesi dopo l'operazione. Tuttavia, solo le variabili R-PAS indicative di risorse psicologiche erano correlate alla WL a 18 mesi dall'operazione. Questi risultati indicano che la valutazione psicologica pre-BS dovrebbe includere diversi tipi di strumenti diagnostici, inclusi test di performance massima e tipica, per migliorare la sua efficacia e ridurre gli effetti della distorsione degli stili di risposta. L'approccio multi-metodo, inoltre, può contribuire a migliorare la comprensione dei risultati a lungo termine della BS, fornendo informazioni sugli aspetti psicologici responsabili di una perdita di peso insufficiente.

Parole chiave: Obesità. Chirurgia bariatrica. Assessment. Multi-metodo. Rorschach.

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LIST OF ABBREVIATIONS

ABESO	Brazilian Association for Studies of Obesity and Metabolic Syndrome
APA	American Psychological Association
ASMBS	American Society for Metabolic and Bariatric Surgery
BS	Bariatric Surgery
DERS	Difficulties in Emotion Regulation Scale
EF	Executive Functions
ER	Emotion Regulation
IFSO	International Federation for the Surgery of Obesity
R-PAS	Rorschach Performance Assessment System
RIM	Rorschach Inkblot Method
SBCBM	Brazilian Society for Bariatric and Metabolic Surgery
TMT	Trail Making Test
WHO	World Health Organization
WL	Weight Loss

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1 INTRODUCTION

1.1 The Obesity Problem

Excessive body weight is a major problem in industrialized societies. Data from the World Health Organization (WHO, 2021) reveal that about five percent of deaths worldwide are directly related to obesity, and 30% of deaths are associated with obesity-comorbid conditions. Globally, 39% of adults aged 18 years and older are overweight, of which 13% are obese (WHO, 2017) In Brazil, the most recent data reveals that 18.9% of the population is obese (Brasil, 2021).

Obesity is defined as excessive fat accumulation that may impair health (WHO, 2021). It is a multifactorial condition that emerges from environmental, genetic, and behavioral interactions. The Body Mass Index (BMI) is the most used measure of obesity, defined as the person's weight divided by the square of their height (kg/m^2), commonly assumed to be an indirect index of body fat. A BMI greater than 25 kg/m^2 indicates overweight. BMI greater than 30 kg/m^2 is classified as obesity and is considered class I if BMI is between 30 and 34.9 kg/m^2, class II for BMI between 35 and 39.9 kg/m^2, and grade III or severe obesity for BMI > 40 kg/m^2.

Although useful as a population-based estimate of obesity, the BMI is a limited measure of excessive fat accumulation and should be considered carefully in the individual assessment of obesity. Other measures of adiposity, such as waist circumference and changes in metabolism, should be considered to determine the severity of obesity. Common changes associated with excessive body fat are the increase in dyslipidemia, hypertension, and insulin resistance. These conditions are associated with an increased risk of developing noncommunicable diseases (NCD) such as coronary artery disease, Type 2 diabetes (T2D), vascular diseases, obstructive sleep apnea, dementia, and some types of cancer. They are related to poor quality of life (QoL) and increased risk of death, according to the WHO (2021).

Because multiple factors determine obesity, intervention should approach many aspects of its development (Bray & Brouchard, 2014). For instance, environmental factors related to obesity are the western societies' lifestyle, which increases access to sugar and fat-rich foods, promotes a sedentary lifestyle, and limits access to health care, sports, and leisure (Maggi et al., 2015). Lifestyle is also influenced by endogenous, individual aspects, such as genetic

predisposition and psychological factors, which can contribute to eating behavior and increase fat accumulation risk (Gallo & Cheskin, 2021; Hemmingsson, 2014; Macpherson-Sánchez, 2015; Stroebe, 2008; Sutin et al., 2011; Veit et al., 2020).

Therefore, a multidisciplinary approach is usually required to treat obesity, increasing the intervention's costs and complexity. Most health system guidelines and recommendations focus on individual aspects of obesity, and multidisciplinary treatment usually includes pharmacological, nutritional, and behavioral interventions (Bray & Bouchard, 2014). In the last two decades, however, severe obesity has been increasingly treated with a surgical approach for obesity, which opens new perspectives of understanding obesity development and treatment.

1.2 Obesity Surgery: an approach for treatment

According to Eisenbebrg et al. (2022), metabolic and bariatric surgery (BS) is currently the most effective treatment for obesity across all levels of severity (Eisenberg et al., 2022). From the first statement about the matter, published by the American National Institute of Health (NIH) in 1991, a range of surgical procedures was developed to treat severe obesity. Most rely primarily on the reduction of stomachal volume or intestinal bypass, which decreases food intake and absorption of nutrients, leading to weight loss (WL) (Eisenberg et al., 2022; Hubbard & Hall, 1991).

Current guidelines suggest that BS should be recommended to adults (18 to 65 years of age) with obesity class II or III, regardless of the presence and severity of comorbidities. It should also be recommended to patients with class I obesity that did not achieve substantial or durable WL or clinical improvement of comorbidities with nonsurgical interventions. Some evidence also suggests that BS is safe to be applied to severe obesity in the elderly (where risks are carefully considered) and younger patients (children and adolescents with BMI >120% of the 95th percentile with major comorbidities). The Brazilian Society for Metabolic and Bariatric Surgery recommends that BS be indicated to adult patients with class III obesity, or class II obesity and comorbidities, which has failed in previous attempts to control weight with nonsurgical treatments for at least two years (SBCBM, 2017).

The latest data from the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO, 2021), retrieved from 50 countries, report that in 2021 507,298 operations were performed. Before the COVID-19 pandemic, in 2019, the number of

procedures performed across 61 countries was 833,687 (IFSO, 2019). According to the American Society for Metabolic and Bariatric Surgery, in the United States (US) only, 256,000 surgeries were performed in 2019 (ASMBS, 2021). In Brazil, data from 2019 report 68,530 procedures realized, according to Brazilian Association for Bariatric and Metabolic Surgery (SBCBM, 2020).

Prevalence estimates from the World Obesity Federation (2022) projected that, in 2020, about 15% of the world's adult population had obesity, with 17% of the female and 13% of the male population presenting BMI ≥ 30 kg/m2. Nonetheless, 76% of patients submitted to surgery between 2016 and 2020 were women (IFSO, 2021). The higher prevalence of female patients might be related to the fact that women are more likely to pursue health treatment for weight management, which makes it more likely for women to be screened, diagnosed, and counseled to seek out bariatric surgery than men (Cooper et al., 2021). Also, women suffer more social pressure related to body weight and have greater weight dissatisfaction, and women with obesity report reduced health-related QoL, which might increase motivation to seek health care regarding body weight (Song et al., 2016)

The safety and efficacy of BS are well-established in the scientific literature. Longitudinal evidence reveals that BS promotes greater and more durable WL than nonsurgical treatments (Gloy et al., 2013), with additional benefits, like remission of T2D, dyslipidemia, and hypertension up to 10 years after surgery (Adams et al., 2017). Evidence from a meta-analytic review of longitudinal studies reveals that weight loss usually peaks after two years of surgery and remains relatively stable for up to 20 years. The weight loss differs according to the procedure, with mean pooled effect size from 71% of excess weight loss (EWL%) for biliopancreatic diversion (BPS) procedures, 60% EWL for Roux-en-Y Gastric Bypass (RYGB) and 49% EWL for Laparoscopic Adjusted Gastric Band (LAGB) (O'Brien et al., 2019).

Successful WL after surgery is defined as the reduction of 50% of excess weight at 18 months (Nedelcu et al., 2016). However, evidence shows that insufficient WL (<50% EWL) varies between 20 to 40% of cases submitted to surgery (Ansari & Elhag, 2021). Conversely, weight regain (WR) after surgery has many definitions, the most common are the regain of at least 10kg from nadir weight after surgery or the regain of >25% of EWL from nadir weight. Because distinct definitions are applied, its prevalence varies widely in literature, from 4% to 23% of maximum WL 3 to 6 years post-RYGB (King et al., 2020), up to 38% post-LAGB of EWL after surgery (Ansari & Elhag, 2021).

The mechanisms leading to insufficient WL and WR after surgery are multiple. For example, some metabolic adjustments are likely to reduce the potential WL or promote WR through changes in the secretion of gut hormones related to hunger and satiety (Busetto et al., 2021), contributing to dietary non-adherence and imbalance (Magro et al., 2008). Surgical failures such as dilatations of the gastric pouch and gastrojejunostomy stoma outlet also contribute to increased food intake and WR after surgery (Ansari & Elhag, 2021). Additionally, several behavioral aspects are considered important contributors to WR, especially concerning insufficient physical activity and disordered eating behaviors. These factors are directly connected to psychological factors that increase the risk for weight recidivism, such as the presence of psychiatric disorders (Freire et al., 2021), personality features (Hoyt & Walter, 2022; Neff et al., 2021), cognitive and emotional functioning (Efferdinger et al., 2017; Manderino et al., 2015; Spitznagel, Garcia, et al., 2013; Spitznagel et al., 2014).

The individual variations in treatment outcomes have increased attention to individual aspects related to the development and treatment of obesity, especially psychological aspects, and their role in BS outcomes. Therefore, extended and comprehensive investigations of the psychological functioning of patients with severe obesity seeking bariatric surgery and their results after surgery are valuable sources of information about mechanisms related to treatment outcomes.

1.3 Obesity and bariatric surgery: the role of psychological functioning

Obesity is one of the most complex and relevant health issues of our time. The burden it places on health care systems and the economy has recently received much attention from policymakers and scientists from different areas of expertise (OECD, 2019). It is well established in the literature that obesity is a multicomponent condition that requires an understanding of environmental and individual aspects and their interaction at biological, psychological, social, and populational levels, which opens to many research possibilities (Bray & Bouchard, 2014).

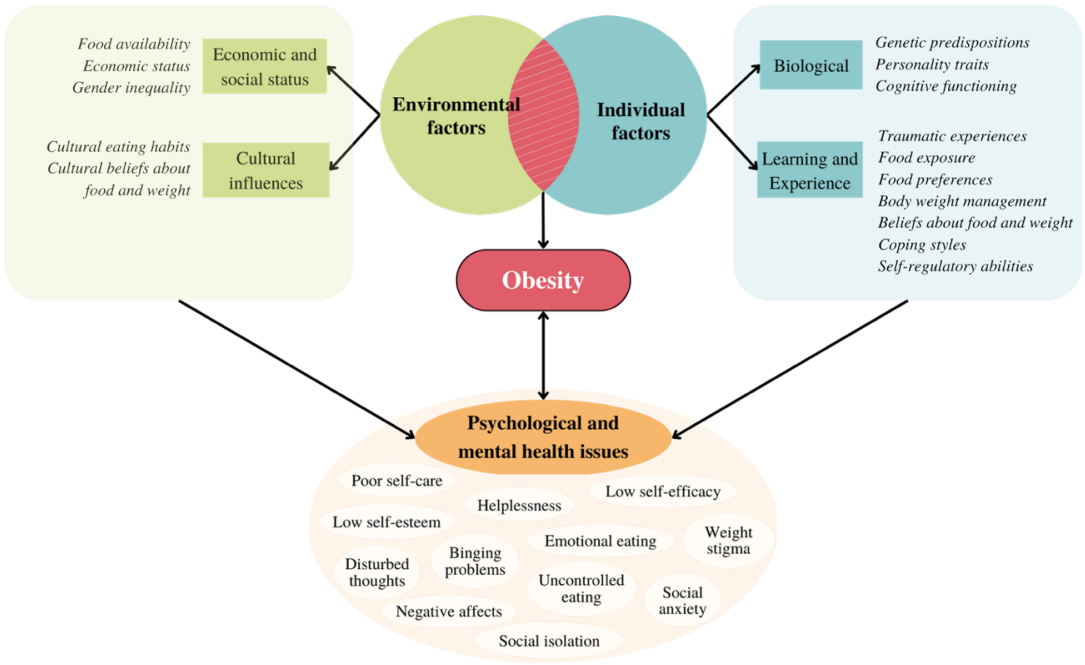
While medical perspectives on obesity development are not new, it was just in recent decades that obesity started to be treated as a populational level threat, and its environmental influences started to be a focus of attention (Bray, 2014). The increasing levels of overweight and obesity in western societies began to be investigated from sociological, economic, and even

climate-change-related perspectives (Ahima, 2014; Kanter & Caballero, 2012; Swinburn et al., 2019).

On the other hand, individual-related aspects have long been studied in health-related sciences (Barr, 1953). Research about genetic predispositions, evolutionary aspects, nutrition, and metabolic and physiological mechanisms of body weight regulation provides extensive evidence about biological factors of obesity (Burger et al., 2015; Hu et al., 2020; Makaronidis & Batterham, 2018; Ochner et al., 2013; Peters et al., 2004; Qasim et al., 2018; Sarma et al., 2021; Wallis & Raffan, 2020). More recently, however, crescent attention has been devoted to the psychological mechanisms influencing eating behavior and, therefore, interfering with body weight regulation mechanisms (Dagher et al., 2017; D'Argenio et al., 2009; Dietrich et al., 2016; Donofry et al., 2020; Houben et al., 2014; Jansen et al., 2015; Keller et al., 2019; Marcus et al., 1985; Moore et al., 2017; Rossetti & Boutrel, 2019; Wierenga et al., 2014).

The psychological aspects associated with obesity are diverse and appear to influence body weight in a variety of ways, and the mechanisms by which psychiatric conditions and obesity are linked have pushed scientific research to understand the role of mental health in obesity. Figure 1 summarizes how psychological functioning might relate to obesity and mental health status.

Figure 1.1 – Environmental and individual factors influencing obesity and psychological issues



One of the most compelling pieces of evidence in favor of the idea of psychological impact on obesity is the vast literature about the association of obesity with mental health conditions and psychopathology (Allison et al., 2009; Chen et al., 2018; Dawes et al., 2016; Dreber et al., 2015; Kalarchian et al., 2007; Malik et al., 2014; Sommer et al., 2021). For instance, a systematic review of 21 studies reporting the relationship between obesity and psychiatric conditions reveals that evidence of a bidirectional association between obesity and depression is consistent across the literature (Rajan & Menon, 2017). In a Brazilian sample of patients with severe obesity (n = 393), the prevalence of any psychiatric disorders assessed with clinical interview was 57.8% (Duarte-Guerra et al., 2015).

Eating psychopathology and eating disorders (EDs) are also frequently associated with obesity development and severity. A prevalence study with 12,337 adults 17 to 100 years of age from the United States (US) showed that 8% of participants with obesity had a diagnosis of an ED during their lifetime, 4%of whom had been diagnosed in the past 12 months (Duncan

et al., 2017). Conversely, studies investigating eating behavior psychopathology found that up to 33% of participants with obesity reported EDs symptoms (Tsekoura et al., 2021). The prevalence is greater among women with overweight and obesity, for which the presence of disordered eating behaviors is about 30%, versus 15% for men (Nagata et al., 2017).

Personality disorders (PDs) also appear to be associated with obesity. An extensive systematic review found evidence that the prevalence of PDs in the population with obesity is higher than those in general populational and increases with BMI, reaching 23.4% of patients with obesity class III. The most common are Cluster C personality disorders, especially obsessive-compulsive PD, characterized by rigidity, perfectionism, restriction of affects, and intimacy avoidance. Avoidant PD, which includes social-related anxiety and inhibition related to the fear of negative evaluation and rejection, is also present in this group (Gerlach et al., 2016).

Besides psychiatric diagnosis and psychopathology, other aspects of psychological functioning were also investigated among individuals with obesity, especially those related to the risk of overeating. Specifically, crescent evidence about the aspects of cognitive and affective functioning related to obesity is available in the literature. For instance, many studies provide evidence for the interaction between obesity and cognitive impairment, such as memory, attention and executive functioning problems indicate an important relationship between cognitive functioning and body weight regulation across the lifespan (Figley et al., 2016; Gunstad et al., 2010; Handley et al., 2016; Setkowicz et al., 2015). Similarly, affective aspects such as emotional awareness, emotion regulation, and impulsivity also seem to play a role in eating behavior and obesity status (Benzerouk et al., 2020; de Campora et al., 2016; Hemmingsson, 2014; Sainsbury et al., 2019; Steward et al., 2019)

The growing interest in how psychological characteristics contribute to the development of obesity and how they affect its treatment makes it a fruitful area of research for psychology. In the present study, we meant to contribute to the knowledge about obesity treatment with bariatric surgery by observing the affective, cognitive, and personality aspects of individuals with obesity applying for surgery. We also investigated what psychological instruments of different natures tell us about patients' functioning, and their progression toward treatment.

This document is the product of the research conducted in the course of my Doctoral Graduation in Psychology, on the concentration area of Psychological Processes and Health. This research was accomplished with the co-tutorship agreement between University of Sao

Paulo (Brazil) and University of Turin (Italy), which provided the means and support for its fulfilment. The research comprised an extensive literature review, data collection and analysis, and discussion of the main findings, integrating expertise and knowledge from both research contexts (Brazilian and Italian). In conducting the research, the main focus was to contribute to the clinical psychology related to obesity.

Therefore, the text is presented in such a way that the reader is initially provided with the theoretical and empirical background on the role of affective, cognitive, and personality aspects of psychological functioning in obesity (Chapter 2). Next, the methodological approaches used are presented, including the research questions, definition of variables of interest, hypothesis, and research methods employed (Chapter 3), followed by the presentation of the three empirical works derived from the research, presented as manuscripts (Chapters 4 to 6). Finally, concluding remarks and considerations about the results achieved and their implications for future studies and the field are presented (Chapter 7).

2 CONCEPTUAL AND EMPIRICAL FOUNDATIONS

Despite the complexity of the obesity problem, the most common explanations at the individual level rely on the simplistic view of the "eat less, exercise more" approach. The reasons one would fail to limit their energy intake at a level that puts them at a condition of risk is somewhat difficult to explain by health professionals, reinforcing stigmatizing views of people with obesity as lazy, weak, and failures. The fact that the behavioral aspects of obesity are so complex and require the comprehension of many levels of individuals' functioning makes it a promising area of research by psychologists.

The understanding of how psychological factors directly affect body metabolism and gene expression of fat accumulation and obesity is still very scarce and limited (Capuron et al., 2011; Peters et al., 2004; Sutin et al., 2010). Therefore, most psychological studies on the relationship between individual factors and obesity rely on its mediation role in eating behavior and lifestyle (Herman & Polivy, 2011). Because at an individual level obesity relates to excessive caloric intake and low-caloric expenditure as a direct result of behaviors, psychology research is digging deep inside the determinants of health and eating behaviors. Although it does not exhaust the whole psychology-obesity relationship, it certainly gives it a good start.

The study of the psychological determinants of health behaviors involves the understanding of the different processes that increases the frequency of healthy behaviors, i.e., behaviors that promote physical and mental well-being (Hall et al., 2013; Kucera et al., 2007). As with any behavior, many aspects are involved in this outcome. At the individual level, the aspects that influence a person's ability to promote and maintain their well-being include the ability to perceive and understand body reactions and changes, to gather information about possible aspects of the environment of their behavior that could explain these reactions, and to be able to plan and apply behavior changing strategies to modify health outcomes, in the short and longer-term (Hall et al., 2018; Neff et al., 2021; Wiers et al., 2018).

How well an individual can employ all these processes depends greatly on their individual predispositions and traits. For instance, children regarded as more conscientious have better health status at midlife, presenting healthier eating and less smoking, indicating that personality traits are important predictors of health behavior (Hampson et al., 2007). Similarly, recent studies analyzing the compliance with authorities' recommended health behaviors regarding COVID-19 spread showed that individuals with higher levels of agreeableness were

more compliant to the recommendations and presented more compassion towards others (Willroth et al., 2021). Another study found that participants that greater beliefs in their own ability to control their health were more aware of risk behaviors associated with chronic diseases, which might contribute to their adherence to treatment approaches (Hamilton & Lobel, 2015). These examples illustrate how individual characteristics, such as personality traits or an individual's beliefs about themselves, influence their attitudes towards their own health, and health treatments.

The current study focuses on three specific psychological processes and their relationship to severe obesity and its treatment: emotion regulation, executive functions, and personality. We sought to understand how these psychological variables might relate to obesity by investigating them in patients with severe obesity and comparing them to individuals with the same socioeconomic and developmental background without obesity. We also aimed to understand the psychological influences on obesity surgery outcomes by understanding how these processes relate to weight loss after bariatric surgery. In the following sections, we provide a thorough narrative synthesis of the evidence about the relationship between affective, cognitive, and personality aspects and obesity and considerations regarding the assessment approach in the field.

2.1 Affective aspects related to obesity

Emotions are psychological experiences involving cognitive, phenomenological, physiological, and behavioral aspects, usually in response to environmental demands for adaptation. Affective states are directly related to our moods and drives and therefore play a significant role in human's ability to control behavior consciously (Gross, 2014). Perspectives on emotional functioning usually include emotion perception, physiological and cognitive processing, and cognitive (mental) and behavioral responses as part of the emotional experience (Smith & Lane, 2015).

Many aspects of the affective experience might be related to obesity. For instance, there is evidence that changes in emotional functioning, such as those related to emotional perception, play a role in obesity. Specifically, interoceptive awareness, which is the processing and central representation of afferent body signals, an essential aspect of emotional perception (Critchley & Garfinkel, 2017), is impaired in individuals with obesity (Herbert & Pollatos, 2014; Madden et al., 2012). Reduced sensitivity to internal signals might impact obesity by two possible

mechanisms. First, the impaired ability to identify precisely internal clues related to bodily needs makes it harder for individuals to differentiate signs of hunger and satiety, which might disturb the regulation of food intake. Another is that these individuals have difficulty distinguishing emotional experiences from physiological signals related to hunger, which can also impact food consumption (Bertin et al., 2019; Herbert, 2020; Willem et al., 2021).

Another aspect of emotional experience studied recently is the hedonic value related to food and eating. Palatability relates to the sensory properties of the food that can evoke pleasure responses in the brain. It is usually associated with energy-dense foods with high-fat and high-carbohydrates content. From an evolutionary standpoint, pleasure related to food consumption increases the capacity to eat larger amounts of food when available, protects the body from starvation, and helps accumulate energy (Rossetti & Boutrel, 2019; Williams, 2019). The hedonic responses related to food consumption are an essential aspect of emotional experience and behavior regulation because it directly affects the motivation to eat, and it has been suggested that it might play a role in increasing levels of obesity (Ehrlich et al., 2019; Soussignan et al., 2019; Stroebe et al., 2008).

One proposed aspect of the relationship between obesity and the increased hedonic value of food is the concept of food addiction. This model assumes that the hedonic response from the consumption of palatable foods increases the frequency of overeating, leading to dysregulation of reward systems, increasing pleasure responses, and generating craving states and withdrawal responses, much like drug-induced responses. This cycle leads to a consistent increase in the consumption of high-palatable foods in an addictive cycle that increases energy intake and, therefore, fat accumulation (Cottone, 2019; Gupta et al., 2020; Jiménez-Murcia et al., 2019; Rossetti & Boutrel, 2019).

Based on the DSM-5 criteria for substance-related and addictive disorders, proposed criteria for food addiction includes the presence of overeating, difficulty in cutting down or stopping eating, time spent in seeking and consuming food, social, emotional, and physical consequences related to overeating, increased tolerance, withdrawal symptoms, craving and impairment (Fernandez-Aranda et al., 2018). The Yale Food Addiction Scale (YFAS) is the most used measure of food addiction validated (Gearhardt et al., 2009, 2016). A systematic review of studies investigating the prevalence of food addiction in various samples found that between 15 to 25% of individuals with obesity and 30 to 50% of patients with severe obesity

seeking bariatric surgery report high levels of food addiction. Comparatively, the prevalence in nonclinical, populational samples varied from 8 to 15% (Oliveira et al., 2021).

Another aspect of affective functioning related to obesity is impulsivity, which refers to the tendency to act motivated by immediate reward instead of considering later and potentially more favorable outcomes (Rochat et al., 2018). Impulsive behavior is an aspect of emotional experience where intense emotions urge the individual to respond promptly, which might incur possible negative consequences. Theoretical models about impulsivity usually pose that it depends on greater sensitivity to emotional arousal and reduced ability to modulate responses (Claes et al., 2005; Fischer et al., 2018).

From that perspective, the relationship between impulsivity and fat accumulation might be related to different mechanisms. One possible mechanism is the inability to control eating behavior when confronted with foods with great hedonic value (which promotes immediate reward), as posed by the food addiction model (Meule et al., 2017; Murphy et al., 2014; Pivarunas & Conner, 2015). Another possibility is that individuals with impulsive traits have higher emotional sensitivity and might feel more compelled to use food to modulate negative emotions or might feel more compelled to overeat when excited (Benzerouk et al., 2020; Tice et al., 2001). Recent evidence reveals that personality traits and cognitive and neural measures of impulsivity are correlated with BMI and that individuals with obesity have greater responsiveness to food cues. Also, some studies point to the evidence that the presence of impulsive-related symptoms, such as gambling and alcohol consumption, is correlated with higher calorie intake in individuals with and without obesity (Ellickson-Larew et al., 2013; Schiff et al., 2015).

Finally, obesity has also been associated with the ability to regulate emotions. Emotion regulation (ER) can be described as the process by which the individual, conscious or unconsciously, influences the experience and expression of emotions to adapt to environmental demands. This influence is related to the ability to modulate emotional and behavioral responses in emotionally demanding situations (Gross, 1999, 2014). There are explicit and implicit processes of ER, the first of which comprise the conscient effort to initiate and monitor emotional states and requires insight and ability on how to modulate behavior; the second encompasses unconscious reactions, automatically evoked from an environmental stimulus, and are not submitted to conscient monitoring or insight (Etkin et al., 2015, 2016). Currently, individual differences on ER are divided into three approaches. The first focuses on the specific

processes of ER (for instance, emotional suppression or emotion reappraisal). The second is based on the ability to cope with stress. The third approach focuses on emotional competencies, which include an array of processes, skills, and competencies that indirectly influence the capacity of ER (John & Eng, 2014).

A large number of studies have investigated the association between ER and disordered eating behaviors and obesity, providing evidence that poor abilities to regulate emotions might increase overeating and therefore increase body weight. For instance, a longitudinal study with mothers and their offspring revealed that difficulties in ER of the mothers were related to problems in breast-feed and predicted greater BMI of the babies at three years of age (de Campora et al., 2016). Similarly, a study with 110 adolescents (aged between 10 and 16) observed that ER was significantly related to emotional eating, suggesting that eating was used as an ER strategy (Vandewalle et al., 2014). A systematic review corroborated this hypothesis by reuniting evidence that emotional dysregulation is consistent across samples with obesity and binge eating disorder, suggesting that negative emotions are probably regulated through eating (Leehr et al., 2015).

This body of evidence points to the influence of emotional aspects on increased body weight and obesity. However, psychological functioning derives from complex interactions of emotions with other individual aspects, especially the ones related to cognitive abilities, which will be explored in the following topic.

2.2 Cognitive aspects related to obesity

Cognitive functions comprise numerous mental resources involved in intellectual and reasoning tasks, and include the ways individuals use cognitive resources to adapt to the environment and deliberately respond to external and internal demands (APA, n.d.). It includes intellectual capacities but, more importantly, how individuals use rational resources in everyday life.

The executive functions (EFs) are the core cognitive processes of regulation of intentional behavior. They include the ability to select and integrate perceptive inputs with information from experience to plan behavioral responses that might favor outcomes (Hofmann et al., 2012). The EFs are the distinctive set of abilities that allow humans to choose their behavior and make decisions based on the expectations of results. Therefore, they are directly

related to many health-related behaviors, such as eating behavior (Bogg & Roberts, 2013; Hall & Fong, 2013).

The theoretical models about the EFs postulate that EFs are comprised of three main components: a) working memory, which is the ability to store relevant information for decision-making for a short period; b) cognitive flexibility, or the ability to intentionally shift the focus of attention and choose the most relevant aspects of the situation in which pay attention; and c) inhibitory control, the ability to inhibit the attention to competing internal and external stimulus that might interfere with adaptation and decision making (Barkley, 1997; Miyake et al., 2000). These components work together to allow the individual to deliberately plan behavioral responses according to the projection of their outcomes and inhibit irrelevant or conflicting thoughts that might make adaptation difficult. For that reason, impairment in these components is related to difficulties in social adaptation and mental health problems, including EDs and disordered eating (Dohle et al., 2018; Syan et al., 2019).

A number of studies have demonstrated the link between EFs and obesity. For instance, some studies identified that patients with obesity had poorer performance in learning and memory tasks and alterations in impulse regulation and reward systems, pointing to a deficit in inhibitory control (Blanco-Gómez et al., 2015; Schiff et al., 2015; Zhang & Coppin, 2018). Another study with 207 adult individuals with obesity (51% female), derived from a community-dwelling population from Canada, showed that poorer performance on the Trail Making Test (TMT) was significantly associated with higher BMI and worse metabolic conditions (Fergenbaum et al., 2009). A systematic review of the literature found evidence that patients with obesity have impairment in EFs, especially working memory, and have an increased risk of developing dementia, including Alzheimer's disease (Handley et al., 2016). Similarly, in a meta-analytic review of 74 studies that assessed EFs with the Wisconsin Card Sorting Test (WCST) and the TMT parts A and B in patients with EDs and obesity, the authors found that EFs were consistently impaired in these patients (Wu et al., 2014).

In samples with severe obesity applying to surgical treatment, evidence reveals that EFs are related to surgical outcomes. For instance, in a study where 30 female patients applying for bariatric surgery were compared to 30 eutrophic women, researchers found positive and significative correlations between BMI and performance on TMT part B, which measures specifically cognitive flexibility. They also found that greater BMI was related to poorer inhibition control in these patients (Cserjési et al., 2009). In another study, researchers

investigated 57 patients submitted to bariatric surgery (87% of which were females) and found evidence that cognitive performance increased after 24 months of surgery, especially those related to EFs. They also observed that the increased performance was related to reducing inflammatory markers and improving comorbidities such as T2D and hypertension (Spitznagel, Alosco, et al., 2013). Similarly, in a systematic review of the literature on cognitive functioning in bariatric patients, the authors found that these patients have moderate cognitive impairment compared to non-obese controls but that the difference in performance was partially reverted after surgery (Spitznagel et al., 2015).

Many hypotheses have been proposed to explain this consistent relationship between obesity and deficits in EFs. For instance, some authors argue that EFs have a central role in self-regulation and that impaired abilities to regulate impulses and control emotional responses might affect eating behavior (Hofmann et al., 2009, 2012). Conversely, regulating negative affect requires cognitive effort and might increase EFs overload, which carries attentional focus to immediate situations and impacts the ability to plan long-term behavior. Consequently, this might increase the risk of using less adaptive strategies for ER and coping, such as eating a rewarding food to immediately reduce anxiety (Heatherton & Baumeister, 1991; Heatherton & Wagner, 2011).

In summary, existing research suggests that the intertwined cognitive and affective aspects that influence self-regulation are a possible clue to understanding the psychological influence on the development and treatment of obesity. Cognitive and affective components are also embedded in personality, a concept that integrates self-regulatory features to determine overall behaviors related to obesity.

2.3 Personality aspects related to obesity

The ways affective and cognitive functioning interact with internal beliefs and motivations give origin to our typical ways of responding to environmental demands. The term "personality" in psychology usually refers to the stable and consistent patterns of individuals' emotional, mental, and behavioral characteristics, including aspects related to their inner traits and predispositions, goals, motives, abilities, and attitudes (John et al., 2008). Including in these patterns are most of the habits and attitudes that, in the long run, might affect people's health.

Research about personality traits and health outcomes shows that personality might affect health through direct and indirect processes (Turiano et al., 2021). For instance, some

personality traits, like Conscientiousness, are associated with healthier behaviors such as increased frequency of exercising, lower levels of alcohol and tobacco consumption, and better adherence to pharmacological and behavioral interventions. Neuroticism, however, is related to the increased use of substances to regulate emotions and increased stress levels, which impair health (Hall et al., 2013; Joireman et al., 2012; Siegrist et al., 2022; Sutin et al., 2011).

Personality seems to relate to health also by direct physiological pathways. Evidence shows that individuals with higher levels of Neuroticism, which usually experience intense negative emotions and emotional distress, usually have increased activation of the hypothalamic-pituitary-adrenal (HPA) axis. This physiological pathway regulates the release of stress-related hormones that prepare the body to cope with threatening situations. However, the hyper-activation of these mechanisms is linked to increased stress and adverse metabolic outcomes, such as elevated cortisol levels and increased blood pressure (DeSoto & Salinas, 2015; Nater et al., 2010; Portella et al., 2005; Tyrka et al., 2005).

Research focusing specifically on the relationship between personality traits and obesity reveals that some personality traits predict BMI over the life course. For instance, a longitudinal study examining the association between personality traits and body weight found that higher Neuroticism and lower Conscientiousness increased vulnerability to overweight and obesity (Brummett et al., 2006). The evidence on the longitudinal predictive value of personality traits on BMI across the lifespan is consistent across the literature. Still, it is believed that this relationship is mediated by the ability to engage in healthier behaviors that affect BMI, such as calory consumption and level of activity (Ellickson-Larew et al., 2013; Munro et al., 2011; Poston et al., 1999).

Some studies also focused on dynamic aspects of personality concerning obesity and its treatment. For instance, one study assessed the personality functioning of patients with obesity submitted to a behavioral modification treatment and observed that emotional difficulties and depressive symptoms assessed with the Rorschach Inkblot Method (Comprehensive System; CS) were highly prevalent in the sample (Elfhag, Rössner, et al., 2004). Also, features related to perceptual and thinking problems were linked to lower weight loss in these patients (Elfhag et al., 2003).

When looking at individuals that undergo BS, many studies investigated the predictive value of personality features in surgery outcomes, with inconsistent results. While some studies found little or no predictive value of personality traits in the WL outcomes of patients submitted

to surgery (Grana et al., 1989a; Larsen et al., 2004; Poston et al., 1999), other studies showed a different trend. For instance, a study conducted in Spain with 139 patients with severe obesity, of both sexes, submitted to surgery found that the personality trait "cooperativeness" of the Temperament and Character Inventory (TCI) was related to greater WL. The authors suggest that individuals with more empathy and tolerance are more socially active and value social support, which helps treatment adherence (Agüera et al., 2015). Another study showed that the "persistence" trait was also related to WL after surgery in a sample with 333 adult patients of both sexes submitted to surgery in a private clinic of Brazil (Gordon et al., 2014). Similarly, a longitudinal study that assessed archival data from 194 patients submitted to surgery in a medical center from the United States (US) revealed that those presenting fewer Anxiety-Related Problems, fewer Alcohol Problems, and moderate elevations in Mania trait in the Personality Assessment Inventory (PAI) showed greater WL after surgery. It has been discussed that self-confidence, ambitiousness, and better coping strategies to deal with negative affects have better outcomes (Hoyt & Walter, 2022).

Studies that assessed dynamic aspects of the personality of bariatric surgery patients with the Rorschach showed that perceptual distortions, poorer resources to control impulses, and emotional immaturity had greater binge eating symptoms, which is a risk factor for weight regain after surgery (Ribeiro et al., 2011a; Venzon & Alchieri, 2014). In a similar study with patients that were treated using a gastric balloon, a less invasive approach for reducing the volume of food ingestion, patients that lost more weight had more psychological resources, fewer problems of interpersonal relationships, and greater emotional maturity on the Rorschach (CS) (Pinto, 2011).

These suggestive, albeit inconclusive, results indicate that, at some level, assessment measures and studies' designs influence how we understand the relationship between psychological factors and obesity. In the case of personality assessment, it seems that results derived from self-reported personality traits diverge and, at some level, contradict those from implicit measures, such as those from the Rorschach. Although this lack of consistency is not uncommon in the field of psychological assessment (Meyer et al., 2018), it might have implications for understanding the psychological functioning of obesity patients.

2.4 Psychological assessment in the obesity surgery

This overview of psychological aspects related to obesity, although non-exhausting, provides evidence that the way we measure broad psychological functions such as cognitive, affective, and personality characteristics in patients with obesity might bring different conclusions. Previews literature reviews show that most of the psychological assessments in this field focus on the severity of psychiatric symptoms, such as anxiety, depression, and eating disorders, using self-report measures or clinical interviews (Flores, 2014; Marek et al., 2016; Pull, 2010). Very few and sparse studies applied varied assessment methods, and investigating the underlying psychological dynamics of patients with obesity is very rare. Many studies focused on the stigmatizing view of the patient with obesity as "psychologically disturbed" (Friedman & Brownell, 1995; Grana et al., 1989b; Wee et al., 2013). The fact that persistent patterns of psychological impairment emerge in research about outcomes of obesity treatment reinforces the idea that the psychological assessment seems poorly used or has limited relevance by professionals working with these patients (Rutledge et al., 2020). Understanding what types of problems lead to these limitations and the possible ways to confront them is an essential feature of psychological research in this field (Marek et al., 2016, 2017; Martin-Fernandez et al., 2021).

2.4.1 Current issues in the psychological assessment of bariatric patients

The limited and conflicting psychological evidence in this field points to how the psychological investigation is conducted among these patients. Previous discussions have been made about how psychological research is frequently focused on the psychometric value of the instruments at the cost of addressing the clinical utility of the assessment methods in specific contexts (McGrath, 2001). In that sense, the somehow erratic results regarding the predictive value of psychological assessment in bariatric surgery may be attributable to two possible standpoints: a *validity* problem and a *scope* problem. The first refers to the ability of the evaluation measures to provide clinically useful information about patients in the bariatric context, including the psychometric properties of the measures in bariatric samples and also factors related to the procedures of the assessment (the *when*, the *how,* and the *why* of the assessment). The second comprises the focus of the assessment carried out in this context, or

the *what* of the assessment. Table 2.1 demonstrates what each of these problems refers to in the context of bariatric surgery assessment.

Table 2.1. Problems related to the reliability and the scope of the psychological assessments in bariatric surgery.

Feature	Definition	Type of problem
When	At what moment of the treatment will the assessment be carried out? How long should the assessment procedures take? How many times should the patient be re-assessed?	Validity
How	In what ways will the patient be assessed? Which types of measures and in which order of administration are the results more consistent, reliable, and precise? Who should be conducting the assessment?	Validity
Why	What is the purpose of the assessment? Is it oriented towards patient-centered goals or treatment-related outcomes? How will the results of the assessment be used in the treatment? What types of procedures are going to be administered based on these results?	Validity / Scope
What	What should be assessed? What specific features of this component or feature are most relevant for the assessment? What type of information is most beneficial to the assessment goals?	Scope

Regarding the reliability problem, any psychological assessment procedure must consider how to measure a specific trait or characteristic of a person and reduce interference of sources of error in this measurement. How these errors are controlled refers to how well *the specific type of measure* (whatever type it is) can capture *this specific feature* of *this specific subject* being assessed in *these specific conditions.* In the bariatric surgery assessment, it means that the measure should be able to determine individuals' specific psychological characteristics, considering that they have a great motivation to be submitted to surgery to treat this very frustrating and unfavorable problem. This subject, therefore, has specific motivations and ways by which the experience of his condition and the possibility of treating it might interfere with the assessment procedures to which he is submitted during pre-surgery procedures. For that reason, the precision of the assessment should contemplate how these motivations, the moment of the assessment, and the type of measure (self-report, informant-report, observation,

performance-based) might affect the measures' ability to capture the characteristic of interest reliably.

The idea of a reliability problem is supported by the fact that patients who undergo bariatric surgery consistently score lower on measures of problematic behavioral characteristics than do patients with obesity who do not undergo surgery (Butt et al., 2021; Rosik, 2005). These data suggest that, at some level, these patients are inclined to hide their problems. Therefore, self-reported measures have a limited ability to capture inherent characteristics that they might consider problematic to reveal (Ambwani et al., 2013; Wedin, 2017). Conversely, some studies indicate that patients with obesity have low self-awareness and are poor informants about their emotional states, with difficulties recognizing and labeling emotions (Aviram-Friedman et al., 2018; Fernandes et al., 2018; Willem et al., 2019, 2021). These results indicate that the way some characteristics are assessed might interfere with the interpretation of data and defy expectations about how specific psychological processes related to obesity.

The scope problem refers to the utility of the measures in the assessment context, i.e., what *specific information* should be obtained and *how that information will be used* for the treatment. In this sense, the bariatric surgery assessment should be focused on specific goals, either patient-centered or treatment-related, and the type of information derived from the evaluation should be used to improve treatment success.

Recent criticism about the utility of psychological assessment in bariatric surgery is related to the inconsistency in defining which goals are relevant to the field (Rutledge et al., 2020). While some assessments are only concerned with describing the presence and severity of psychopathology, others focus on patient-related characteristics that increase the probability of better outcomes and provide insight into practical psychological interventions for this population (Pull, 2010). Although both scopes are valid and relevant, the way psychological assessment has been conducted in the field seems almost erratic until this date. As stated by Meyer et al. (2001),

> the key that determines when assessment is appropriate is the rationale for using specific instruments with a particular patient under a unique set of circumstances to address a distinctive set of referral questions. *An assessment should not be performed if this information cannot be offered to patients, referring clinicians, and third-party payers*. (p. 129).

Previous discussions have addressed the scope problem by offering new perspectives on pre-bariatric evaluation goals. It includes expanding the view from counterindication and predictive factors to focusing on psychosocial and behavioral factors related to initial obesity development and might contribute to poorer surgical outcomes. Also, it has been argued that assessment should include patient-centered goals that are clinically relevant to the treatment, such as improvement of quality of life and other health-related aspects (Rutledge et al., 2020). Although this approach provides fruitful perspectives on improving the utility of psychological assessment pre-bariatric surgery, more research is needed to understand if it enhances the investigation quality of clinically relevant treatment outcomes. The validity problem, however, is closely linked to the ability of these assessment questions to be addressed. Therefore, a deeper look at how assessment procedures are chosen and used is central to improving the quality of information.

2.4.2 The multimethod approach to psychological assessment of bariatric patients

2.4.2.1 An overview of the multimethod psychological assessment in clinical settings

Psychological assessment includes a full array of procedures and techniques that psychologists use to understand individuals' behavior and answer specific clinically-relevant questions (Groth-Marnat, 2009). In doing so, psychologists must "select assessment tools that demonstrate sufficient validity evidence for their uses, sufficient score reliability, and sound psychometric properties" (APA, 2020). Psychological assessment differs from psychological testing as it aims to answer a specific and clinically-relevant question instead of simply providing a nomothetic test score of the individual regarding a particular trait or characteristic and comparing it to some reference sample. In that sense, validity evidence should not rely solely on the instrument's psychometric properties but on its ability to answer the clinical demands of the assessment properly (McGrath, 2001).

A consensus in the assessment literature is that no clinical question can be meaningfully answered by only one source of information (Mihura, 2012). This results from two problems: a) the inherent underrepresentation of a construct when assessed by a single method (Meyer, 2001); and b) because the context of assessment, individual characteristics, and specific questions to be answered altogether influence the validity of the measure, i.e., its ability to provide a relevant response to the clinical issue being addressed (APA, 2020). Moreover,

attention has been applied to understanding the processes engaged in different types of assessment measures and what it informs about the construct being assessed in the last decades (Meyer & Kurtz, 2006). Data gathered from various tests usually provides the clinician with a more comprehensive set of information that enriches the interpretation of results and their practical implications (Bornstein, 2007). A taxonomy of test categories and the underlying processes it requires was proposed by Bornstein (2007) and is summarized in Table 2.

Table 2.2. Classification of psychological tests according to the processes elicited by each type of measure.

Test category	Definition	Processes engaged
Self-report or self-attribution	It consists of a series of descriptive sentences where the individual is asked to attribute the degree to which they identify, or the frequency to which they engage, in specific behaviors.	Introspection, memory recollection, conscious motivation, deliberate self-representation
Performance-based or Stimulus attribution	In these tests, a series of ambiguous, evocative stimuli are presented to which the individual is asked to attribute meaning.	Attention, perceptive integration, memory recollection, cognitive style, response inhibition, language, affective states, behavioral expression
Constructive	The person is required to create or construct an image or description based on specific parameters provided by the tester	Attention, memory recollection, cognitive style, behavioral abilities
Behavioral or Observational	This type of test measures indexes of a person's behavior exhibited in vivo through a direct observation or specific assessment tool	It depends on the specific behavior being measured
Informant-report	Test scores are derived from informant ratings or judgments of a person's pattern of behaviors	Informants' memory recollection, information biases, cognitive styles, motivations, and affective states

Note. Based on Meyer and Kurtz (2006) and Bornstein (2007).

The multimethod psychological assessment, therefore, consists of an approach to the clinical assessment that deliberately includes different test methods to address different processes underlying relevant psychological characteristics of interest and provide a more meaningful interpretation of assessment results. This method strengthens psychological assessment quality by minimizing the inherent limitations of different methods and offering

information about test scores divergences and convergences that helps the clinician to understand patients' functioning in a dynamic and integrated way (Bornstein, 2014).

Multimethod assessment is beneficial for addressing different types of bias that might emerge from the clinical assessment. The first one refers to the inherent characteristics of the construct being measured using specific lenses. As described in Table 2.2, the processes underlying test scores provide the assessor with the possibility to interpret fundamental aspects of the responses on the measured construct and, therefore, possible sources of scores' bias, such as self-perception biases, memory distortions, or cognitive and information-processing style. For instance, it is known that the measure of implicit processes is better carried with performance-based measures, as opposed to self- or informant-report scales, because of the inherent problem of attribution error due to observation bias, personal motives, and heuristic errors in memory recollection. However, when individuals' beliefs and motives are an essential focus of the assessment, self-attribution tests might be more valuable, as they capture individuals' perceptions, narratives, and underlying affective influences on how they perceive themselves.

Beyond processes underlying test scores, other individual and contextual factors might interfere with the validity of assessment results. For example, assessment scores might be influenced by respondents' moods or anxiety levels, which interfere with the retrieval of mnemonic information and therefore impair individuals' typical way of processing test stimuli. Also, the testing context, including reasons for the referral to assessment, conditions of the assessment, relationship with the assessor, possible consequences and expectations from the assessment procedures, and results, can influence how individuals respond to assessment tasks. In bariatric surgery settings, all these aspects are possibly implicated in how results are obtained, as the next section will elucidate.

2.4.2.2 Contributions of the multimethod psychological assessment to bariatric surgery

Despite the consistent evidence supporting the usefulness of multimethod psychological assessment over unimodal practices, it is still not a dominant practice in psychological research (Bornstein, 2014). The bariatric surgery assessment is not an exception in that sense, considering that usually facilities that treat obesity patients rely on limited human and material resources, which calls for cost-effective procedures regarding psychological assessment (Bauchowitz et al., 2005; Marek et al., 2016). As presented in previous sections, however, the

cost-effectiveness of current psychological assessment practices is under scrutiny as it continues to provide inconsistent results and derive information with limited utility for obesity treatment (Greenberg et al., 2009; Rutledge et al., 2020).

Aspects related to the scope and validity of assessment measures in this context must be addressed by researchers to overcome these issues. In that sense, when looking specifically at validity issues, the multimethod psychological assessment provides a possible strategy to improve the way psychological characteristics are measured and interpreted in the bariatric surgery field. Recent reviews show that the use of psychological tests is limited in the area, and assessments usually rely on single instruments assessing broadband characteristics or symptom assessment scales (American Psychological Association & APA Task Force on Psychological Assessment and Evaluation Guidelines, 2020; Marek et al., 2016). Although psychometrically sound measures are available, they do not necessarily provide a comprehensive picture of the psychological aspects involving the treatment of obesity, as previously discussed.

One possible contribution of multimethod psychological assessment to the field of bariatric surgery is to provide clinicians with an integrated framework for the interpretation of patients' dynamics and characteristics that were possibly related to weight gain and, therefore, their risk of unsuccessful outcomes after surgery (Bornstein, 2016; Mihura, 2012). Current assessment practices rely greatly on assessing psychopathology. Still, consistent evidence implicates that self-regulatory and personality processes are straightly related to obesity development and severity and might mediate the relationship between obesity and psychopathology (Claudon et al., 2012; Federico et al., 2019; Hoyt & Walter, 2022; Micanti et al., 2017; Monell et al., 2020; Parcet et al., 2020; Schäfer et al., 2017; Stapleton et al., 2020; Strimas, 2021; Wolz et al., 2015). Similarly, many studies with patients submitted to surgery provide evidence that the individuals' ability to adapt to changes after surgery and adhere to behavioral and clinical interventions are better predictors of weight-loss maintenance than specific psychopathology (Carlson, 2017; Eynde et al., 2021; Hout et al., 2005, 2009; Raman et al., 2013; Robitzsch et al., 2020). This capacity relies greatly upon patients' characteristics and functioning and should be adequately known and engaged by clinicians during treatment for optimal results.

Another possible contribution of the multimethod approach is to reduce the effect of impression management and response style on the results of the psychological assessment of these patients (Bornstein, 2016). Previous studies suggest that patients being assessed during

pre-surgical preparation are motivated to manage their responses to psychological tests and picture what they consider to be a less-problematic version of themselves by denying symptoms and behavioral problems (Ambwani et al., 2013; Wedin, 2017). Weight stigma and the great frustration process related to the treatment of obesity may motivate these patients to manipulate (deliberately or not) the way of responding to assessment questions (Puhl et al., 2017; Roberto et al., 2012; Wee et al., 2013; Weineland et al., 2013). The multimethod approach provides a unique possibility to assess the role of these motivations in the response process of these patients, as well as increment the interpretation of test results of different natures by understanding how conceptions about self and others and the context of assessment represent the attitudes and motivations of the patients towards treatment.

Finally, the multimethod assessment might provide insight into how patients with obesity respond to different types of measures and how these processes relate specifically to obesity. In that sense, it might address the specific goal of understanding the underlying psychological processes related to obesity in an integrated way, which is still a non-answered question in psychological literature about obesity (Bean et al., 2008; Collins et al., 2016; Hemmingsson, 2014; Hout et al., 2004; Robinson et al., 2020). This has important implications for how we understand the psychological determinants of obesity and might contribute to prevention and treatment strategies that reduce the impact of this health condition on individuals and societies.

In the current research, we aimed to contribute to this field by applying a multimethod psychological assessment of patients undergoing bariatric surgery and providing initial evidence about its informative potential on the comprehension of obesity surgery outcomes. The next chapter presents the methodological approach for chasing these goals.

3 METHODOLOGICAL CONSIDERATIONS

The aim of the present study was to deepen the understanding of psychological aspects related to severe obesity and to find out how they associate with BS outcomes. To this end, we adopted a multimethod psychological assessment approach in which instruments of distinct natures and objectives assessed different facets of cognitive and affective functioning. In this section, we present the main objectives of this study and the methodological design used to achieve these objectives.

3.1 Goals

The main goal of the present study was to investigate aspects of psychological functioning associated with emotion regulation, executive functions, and personality characteristics in women with severe obesity (class III) undergoing bariatric surgery compared with eutrophic women. We aimed to identify the association of the assessed variables with the weight-loss in the patients who underwent surgery.

The secondary goals of this study were:

1. To systematically and meta-analytically review the literature about the longitudinal outcomes related to the psychological functioning of patients submitted to bariatric surgery;
    a. To describe and compare women with class III obesity to eutrophic women regarding the severity of psychopathology, depressive and anxiety symptoms using the SRQ-2,0, PHQ-9, and the BAI;
    b. Emotion regulation difficulties with DERS;
    c. Cognitive processes related to executive functions with the Trail Making Test (TMT);
    d. Personality functioning using the Rorschach Inkblot Method (R-PAS);
2. To describe and compare women with class III obesity that proceeds to bariatric surgery to those that drop out from treatment;
3. To investigate the relationship between women's psychological functioning before surgery and their longitudinal weight loss after 6, 12, and 18 months of surgery.

3.2 Design

The present research is comprised by three different studies, each using a specific methodological approach to achieve its goals, as follows:

Study 1: This study was a systematic review with meta-analysis of longitudinal psychological outcomes of bariatric surgery (Chapter 4).

Study 2: This study was a cross-sectional study with a case-control design that compared psychological variables related to emotion regulation, executive functions and personality in a clinical group of women with severe obesity versus a non-clinical, community dwelling sample of women (Chapter 5).

Study 3: This was a prospective longitudinal study examining the association between pre-surgery assessment variables and weight loss at 6, 12, and 18 months after surgery (Chapter 6)

3.3 Variables of interest

In the current investigation, the psychological functioning of patients was described by specific variables related to affective, cognitive, and personality processes, defined as follows.

3.3.1 Emotion regulation (affective functioning)

Emotional functioning was defined as the competencies of emotion regulation, according to the multidimensional model of Gratz and Roemer (2004). This approach defines emotion regulation as a set of competencies consisting of a) acknowledging and comprehension of emotional states; b) acceptance of emotional experiences; c) the ability to control impulsive behaviors when experiencing intense emotions; d) the capacity to apply goal-directed behavior under intense emotional states; d) ability to flexibly use ER strategies according to situational demands.

These competencies are measured by the Difficulties in Emotion Regulation Scale (DERS, Gratz & Roemer, 2004). It is a self-report instrument in which individuals refer to their difficulties related to each of the competencies, which provides a general index of their perceived ability to regulate emotions.

3.3.2 Executive functions (cognitive functioning)

Cognitive functioning was outlined as the cognitive processes related to the ability to voluntarily control complex behavior, defined as executive functions. These processes include many components, including attention, memory, and information processing.

In the current study, we sought to capture these abilities by measuring two specific aspects of executive functions: a) processing speed, which is an inherent marker of the cognitive efficacy in processing perceptual stimuli, and b) cognitive flexibility, or the ability to shift attention and reasoning to different stimuli to favor adaptability to contextual demands. These two aspects of cognitive functioning were measured using the Trail Making Test (TMT, Strauss, Sherman, & Spreen, 2006), a measure of maximum performance in which individuals are required to visually scan and connect a sequence of numbers and letters in crescent and alphabetic order as fast as possible.

3.3.3 Personality processes

This conceptually broad term refers to a series of traits and characteristics that influence how one thinks, feels, and behaves. How these traits are measured provides different perspectives on the personality processes, which can be implicit or explicit, conscious or unconscious. This study focused on the personality features that emerge from the combination of implicit processes and deliberate strategies during a typical performance task involving stimulus attribution, verbal communication, and interactive behavior (Bornstein, 2012; Meyer, 2017).

These features were assessed by the Rorschach Inkblot Method, using the Rorschach Performance Assessment System (R-PAS, (Meyer et al., 2011), a behavioral experiment in which personality processes are engaged, and the examiner can observe the "personality in action", being therefore characterized as a typical performance measure. The test provides information about four domains of personality function, related to: a) engagement and cognitive processing, which refers to the way individuals possess and apply psychological resources to problem-solving; b) perception and thinking problems, or the way one can observe and mentally process external information in a more accurate or distorted manner; c) stress and distress, or the impact that implicit affective processes have in the way the person deals with environmental

demands; and d) self and others representation, which captures aspects related individuals' needs and expectations when interacting with others.

3.4 Hypotheses

We aimed to test the following hypotheses:

Hypothesis I: Women with severe obesity applying to bariatric surgery have higher levels of clinical symptoms related to anxiety and depression, more difficulties in emotion regulation, and poorer performance of executive functions compared with eutrophic women.

Hypothesis II: Women with severe obesity who apply for surgery present indicators of poorer emotional processing and fewer cognitive resources on the Rorschach, compared with eutrophic women.

Hypothesis III: Women who drop out from surgery have more (and more severe) clinical symptoms, greater emotion dysregulation, and worse cognitive performance.

Hypothesis IV: Women reporting less difficulty with emotion regulation and better cognitive performance lose more weight at all follow-up visits after bariatric surgery.

Because the investigation of the relationship between Rorschach and weight loss is exploratory, we did not formulate any preliminary hypothesis about this association.

3.5 Considerations about impact of COVID-19 on the research

In the process to carry on this research, considerations should be made about the procedures taken to achieve the goals of these studies. Initially, this research aimed to investigate various characteristics of psychological functioning in patients undergoing obesity surgery, in comparison with non-clinical participants with the same socioeconomic background. To this end, we conducted a psychological assessment of patients of a public service in Brazil that offers treatment for severe obesity using bariatric surgery. Additionally, we aimed to follow the patients who underwent surgery, in order to investigate the prospective value of the variables assessed by using a longitudinal approach. For this, we planned to obtain data from follow-up visits of patients after surgery up to 24 months after surgery. Another goal of this study was to integrate a sample of Brazilian and Italian patients assessed with multimethod assessment procedures and to assess the impact of cultural background on

outcomes. These goals were to be achieved in collaboration with researchers from a bariatric surgery center in Italy.

However, the pandemic COVID-19 posed a challenge to the continuation of the original research. At the time of the global outbreak of the COVID-19 pandemic, the initial evaluation of bariatric surgery service patients and nonclinical participants was nearly complete. Although the sample size was limited, it was possible to address one of the main goals of this research, which was to assess the psychological functioning of patients undergoing surgery compared with a nonclinical, community-based sample.

However, the remaining objectives, i.e., longitudinal study and cross-cultural comparison, could only be partially achieved because of the limitations imposed by the pandemic. In particular, the study of patients undergoing surgery was suspended due to the restrictions in place in both countries (Brazil and Italy). In addition, many of the patients studied could not undergo surgery because all elective procedures were suspended from 2020 to mid-2021. Furthermore, follow-up visits of patients that were previously submitted to surgery were suspended, and services provided limited care to patients with critical outcomes. Therefore, it was not possible to conduct a longitudinal study of patients scheduled for surgery after December 2019 and to obtain a sufficient sample from Italy for cross-cultural comparison.

In that context, and bearing in mind the exigences of a doctoral research, we considered the outcomes of bariatric surgery from a longitudinal perspective by systematically reviewing the literature on outcomes related to patient psychological functioning in studies using a longitudinal design. Although this solution does not answer the specific initial research questions, we believe it contributes to the field by using a robust methodological approach to investigate quantitatively the relationship between psychological functioning and bariatric surgery.

In the following chapters, the manuscripts resulting from the current investigation are presented, each focusing on a main objective of this research. For each study, a detailed methodological design and discussion of the results are given. Later, a comprehensive discussion of all the results derived from this research and their implications for the field follows.

4 MANUSCRIPT 1: LONG-TERM PSYCHOLOGICAL FUNCTIONING OF BARIATRIC PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF LONGITUDINAL STUDIES

Submitted to the International Journal of Behavioral Medicine

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Abstract

Bariatric surgery (BS) is a widely used option to treat chronic severe obesity but its longitudinal impacts on psychological functioning are still unclear, as inconsistent evidence of outcomes are available. The aim of the present study was to systematically review the literature on long-term psychological outcomes of patients with obesity submitted to bariatric surgery. Following PRISMA guidelines, we conducted a literature search on PsycINFO, PubMed, Scopus, and SciELO. Eligible studies assessed adult bariatric patients pre and post-surgery using standardized psychological measures. We performed random-effects meta-analysis of within-study standardized mean difference (SMD) outcomes at 6, 12, 24, or 36-48 months of surgery. We identified 751 studies, of which 26 were reviewed, and 12 were included in the meta-analysis. Assessment measures varied widely between studies. Symptoms of anxiety, depression, binge eating, and body image concerns are consistently reduced after surgery (SMD -0.62), with depressive symptoms accounting for the greater impact of difference from baseline (SMD -0.93; meta-regression effect = -0.69, $p<0.001$). Longer follow-ups indicate a tendency to return to baseline functioning at 60 months. We discuss the role of assessment measures in the results and their impact on the limited understanding of the psychological influence on the long-term management of obesity.

Keywords: bariatric surgery, psychological assessment, systematic review, meta-analysis

4.1 Introduction

Obesity is a burden on health care systems worldwide, and its treatment remains a challenge for medical professionals (Donini et al., 2014; Mechanick et al., 2013; Qasim et al., 2018). Many factors, including physiological, social, and psychological, are associated with the development and severity of obesity (Collins et al., 2016; Holvoet, 2012; Sarma et al., 2021; Wolfe et al., 2016). In severe cases, the risk of morbidity and mortality increases significantly, so surgical treatment is often the ultimate and most extreme means to control obesity and its consequences on health.

Since its initial approval by the Food and Drug Administration (FDA) as a safe and effective treatment for morbid obesity more than two decades ago, bariatric surgery has become a widely used tool in the fight against the obesity epidemic (Ogden et al., 2019). The literature on its efficacy is extensive, and there is evidence of its role in improving patients' overall metabolic health and quality of life (Roth et al., 2020). However, in recent years, research on the long-term outcomes of surgery has shown that a substantial number of patients do not achieve optimal weight loss after surgery or have difficulty maintaining the lost weight in the long term. Reports of weight regain are accumulating, and the variables related to this outcome have become a source of investigation in this area (Conceição et al., 2018; Himes et al., 2015).

As within other behavioral health conditions, the role of psychological variables in the development and severity of obesity, and thus their influence on long-term surgical management of obesity, is not fully understood. There is evidence that a number of psychological variables are present in individuals with severe obesity, such as increased levels of anxiety (Dreber et al., 2015; Edwards-Hampton et al., 2014; Lin et al., 2013; Rydén et al., 2003), depression (Dziurowicz-Kozłowska et al., 2005; Faulconbridge & Bechtel, 2014; Markowitz et al., 2008), emotion dysregulation (Andrei et al., 2018; Dalrymple et al., 2018; Efferdinger et al., 2017; Görlach et al., 2016), poorer executive functioning (Favieri et al., 2019; Handley et al., 2016; Syan et al., 2019), more eating behavior pathology (Gianini et al., 2013; J. I. Hrabosky et al., 2008; Jiménez-Murcia et al., 2019; Roehrig et al., 2009), a history of trauma-related disorders (D'Argenio et al., 2009; Luo et al., 2020; Osadchiy et al., 2019), and neurotic-related personality features (Capuron et al., 2011; Claes et al., 2013; Sutin et al., 2011). Many studies have attempted to examine the impact of psychological symptoms on bariatric surgery outcomes, but inconsistent results were found regarding the presence of such variables

– before or after the surgery – and poorer surgical outcomes (Andrés & Saldaña, 2013; Franks & Kaiser, 2008; Rutledge et al., 2020).

The difficulty in understanding the relationship between psychological functioning and bariatric surgery outcomes may be related to several factors regarding the way these variables are treated in scientific research. For example, the assessment of psychological variables in this field is very heterogeneous, as different instruments are used to evaluate the psychological functioning of these patients, such as self-report scales, structured interviews, or projective measures. The literature consistently indicates that there is no consensus on which variables should be reviewed and which measurement tools should be used in psychological assessment related to surgery. Patients' psychological functioning is usually assessed in the context of psychological "clearance" to surgery, which is generally based solely on the assessment of psychiatric symptoms that are considered risk factors for surgical outcomes, such as substance use or psychotic disorders (Rutledge et al., 2020). Reassessment of psychological variables after surgery is also not very common in bariatric surgery facilities because it increases costs, and its benefits are not very well established (Al-Hadithy et al., 2014; Andrés & Saldaña, 2013).

Another problem contributing to this lack of understanding is the difficulty in defining a "good" outcome in the context of surgery. For example, weight is often considered the most important outcome variable, but many weight-loss parameters have been proposed to define surgery outcomes as good (Beek et al., 2012; Belligoli et al., 2020; Roth et al., 2020). In addition, most studies rely on quality of life (QoL) outcomes to measure the impact of treatment on patient mental health (Bužgová et al., 2016; Federico et al., 2019), but other key variables related to mental and behavioral health changes after bariatric surgery are not commonly considered in studies of long-term outcomes of surgery.

Thus, psychological factors could also play a role in achieving and maintaining weight loss in the context of regaining weight after surgery. In addition, the effects of surgery on other aspects of obesity are unclear, particularly with regard to long-term psychological outcomes. For example, patients with severe obesity who have undergone surgery report more psychopathology (Malik et al., 2014; Segura-Serralta et al., 2019), emotion dysregulation (de Campora et al., 2016; Görlach et al., 2016; Ivezaj et al., 2017), and disordered eating behaviors (Crowley et al., 2012; Yu et al., 2021). Because it is impossible to determine whether these difficulties are a cause or a consequence of weight status, observing long-term outcomes related to these variables may be a clue to understanding longitudinal changes in psychological

functioning in patients who undergo massive weight loss after surgery. Also, because recent publications address the longitudinal changes on mental health status (Dawes et al., 2016) and psychopathology (Gill et al., 2018)after bariatric surgery, these studies focus on psychiatric symptoms and their impact on outcomes of surgery.

Therefore, the present study aims to address three aspects of the psychological functioning of individuals with obesity that undergo bariatric surgery. First, we aimed to systematically review the literature on the longitudinal psychological outcomes of patients submitted to bariatric surgery in order to understand what types of psychological variables and methods are currently used in the assessment of the long-term outcomes of surgical treatment and what they reveal about psychological impacts of the obesity surgery. Second, we aimed to assess changes in psychological functioning from baseline according to follow-up point, using a meta-analytic approach. Finally, we discuss how assessment practices might impact the way evidence is gathered in the field and how it could influence the current approach for psychological evaluation and intervention in obesity treatment.

4.2 Methods

The following literature review followed the procedures described in the PRISMA protocol for systematic reviews (Page et al., 2021). We searched the literature for studies addressing the longitudinal assessment of psychological outcomes associated with bariatric surgery.

4.2.1 Eligibility Criteria

For narrative synthesis, studies were considered eligible for inclusion if they reported original research examining longitudinal psychological assessment of bariatric surgery patients using standardized psychological measures. Specifically, inclusion criteria comprised: a) assessment of psychological variables (e.g., personality, adjustment, abilities, interests, cognitive functioning, or functioning in other areas of life) of adult patients who underwent surgery pre and post-surgery; b) publication language in English, Spanish, Portuguese, and Italian. Exclusion criteria comprised a) different studies designs, such as theoretical studies, reviews, clinical protocols, case studies, and cross-sectional studies, and b) samples of patients with obesity who were not treated surgically and samples of adolescents and elderly.

For quantitative synthesis, studies were eligible if presented an assessment measure of psychological characteristics (or symptoms) that were presented in at least two studies, so SMD could be calculated for the measure. We did not include QoL studies for this approach, as they include different aspects of health that are not strictly linked to psychological function, and because estimation of longitudinal effects have been published in recent study (Małczak et al., 2021).

4.2.2 Search strategy and selection process

Data were collected from the PsycINFO, PubMed, Scopus, and SciELO databases in March 2021. Searches were performed using the terms: “bariatric surgery” AND “psychological assessment” [PsycINFO] or (“psychological” AND “assessment”) [other databases], in any search field, with no specific filters applied. We applied a broader search strategy, considering terms of the American Psychological Association (APA) Thesaurus definition of “psychological assessment” as the “assessment of a patient/client by interviews, observations, or psychological tests to evaluate personality, adjustment, abilities, interests, cognitive functioning, or functioning in other areas of life”). Less specific term should be able to capture assessment broader psychological functioning, including, but not restricted to psychopathology. Also, unrestricted field search should be able to retrieve articles that mention psychological assessment or evaluation at any point of the text.

Duplicates were removed using the EndNote Web application and later exported to Rayyan for abstract screening. After the abstract screening, the full texts of the studies were retrieved and reviewed. Authors MC and LL independently reviewed the abstracts and full texts to apply the inclusion criteria, and any divergences were analyzed by SP and resolved by consensus.

4.2.3 Data collection and synthesis

4.2.3.3 Systematic Review

Data from the studies were independently extracted into a Microsoft Excel spreadsheet by authors MC and LL. Sample description and methodological information were collected from each study, including patient age and gender, type of surgical technique, number of

participants at baseline and at each follow-up, body mass index (BMI) pre and post-surgery, psychological measures used, the timing of first and last follow-up, and key study outcomes related to psychological functioning and percent weight loss (%WL). When multiple samples were analyzed in a study (e.g., a control sample that did not receive surgery or control samples of any type), only the data from the sample that received surgical treatment were extracted. Only the data from the most recent time point were included if multiple time points were reported. The percentage of WL, if not available, was measured individually for each study using the proportion of mean BMI of pre- and post-surgery (BMI post- divided by BMI pre-surgery). Only psychological measurements with standardized procedures and quantitative scoring were considered for the review.

4.2.3.4 Meta-analysis

From the list of studies included in the systematic review, we included in the meta-analysis only studies that included a standardized measure of psychological symptoms presented in at least two studies. Besides sample information and measures described in the systematic review, we also collected the number of participants, means, and SD of measures at each time point (not just the last one). Also, if available, *M* and *SD* of change from each time point and baseline were extracted, as well as *t* statistics and *p*-value of pre- and post-surgery difference, and correlations between baseline and follow-up results. This information was used to calculate effect sizes, as described below.

4.2.4 Effect measures

Meta-analysis results were based on the standardized mean difference between studies (SMD-within) and were calculated using Cochrane's Guideline approach (Higgins et al., 2019). For this, we used Pearson's correlation (*r*) between baseline and follow-up of each study to calculate the pooled standard deviation of measures. When *r* was not available, we used dependent sample *t*-value to calculate it. As specific correlation values were not available for all studies, we used the same value of *r* for all studies using the same instrument, as they were the only known value of *r* available.

4.2.5 Quality Assessment

Study quality was assessed using the National Institutes of Health (NIH) quality assessment tool for before-after (Pre-Post) studies without a control group (Institute, 2014), which includes 12 methodological design questions that are useful to analyze the risk of study bias and its internal validity. This assessment was performed independently by authors MC and LL, and any disagreements were discussed and resolved by consensus. Because the NIH quality assessment tool did not include a standard cut-off point for determining quality, we used our best judgment to critically appraise risk of bias and quality of evidence.

4.2.6 Synthesis methods

4.2.6.1 Systematic Review

All included studies were synthesized in the systematic review summary table. This included authorship and year of publication, surgical techniques, sample description (gender, age, and BMI at admission and follow-up), the timing of first and last assessment, percentual of weight-loss (%WL), psychological measures used in the assessment, and main outcomes related to long-term psychological functioning.

The assessment time at follow-up was converted to months when reported in years and rounded up to the nearest value with respect to time points between 6 and 60 months after surgery. This time frame was chosen because follow-up protocols for bariatric surgery typically require patients to be clinically reassessed monthly for the first six months and early in the second year, up to 60 months after surgery.

4.2.6.2 Meta-analysis

For the meta-analysis, the studies were grouped according to the time points of follow-up, i.e., at 6 months, 12 months, and ≥24 months. While patients experience greater weight loss during the first 12 to 18 months after surgery, this stabilizes between 24 and 36 months. Between 48 and 60 months, weight loss may decrease, and metabolic and behavioral adjustments may put patients at the risk of regaining weight (O'Kane et al., 2016). Studies rarely report follow-up of more than five years after surgery, and there are rare data on long-term BMI outcomes in patients who have undergone surgery (Bjørklund et al., 2020).

The sampling variance was calculated using the usual large-sample approximation. Both were estimated through the R package metafor (Viechtbauer, 2010). To explore potential sources of between-study heterogeneity, we analyzed two types of synthesis meta-analyses: by follow-up point and by psychological dimension assessed. Forest plot of SMD-within at each follow-up and overall results are provided.

We fitted random-effects meta-analyses to yield unconditional inferences beyond the included studies (Hedges & Vevea, 1998). We applied the restricted maximum likelihood estimator along with the Knapp and Hartung adjustment to generate confidence intervals with properties closer to nominal (Veroniki et al., 2019). Statistical heterogeneity was assessed using τ^2 (between-study variance) and I^2. All analyses were conducted in R (R Environment version 4.1.2).

4.3 Results

4.3.1 Systematic Review

The flow diagram in figure 1 shows the process of selecting included studies. The initial search of the databases identified a total of 751 entries. After the exclusion of duplicates (k = 82), the abstracts of the remaining records were screened (k = 669) to apply inclusion criteria. At this point, studies were excluded (k = 380) if their abstracts did not report using samples of patients who had undergone a bariatric surgery that had undergone psychological assessment before and after surgery. The full text was analyzed for the remaining potential studies (k = 289) to assess eligibility. Of these records, we were unable to retrieve the full text of 10 studies after contacting library services and emailing the authors directly. The remaining 278 entries were reviewed in full. We excluded studies that did not have a longitudinal design (reviews, cohort studies, cross-sectional studies), that did not report results of empirical research (editorials, theoretical studies, protocols), that focused on other types of patients or interventions (not obese and not submitted to bariatric surgery), that did not describe psychological outcomes or did not use standardized measures for the assessment, or that were published in different languages. Studies that used psychological measures but did not report outcome data (as in studies that focused on psychometric validation of measures) or those that did not appropriately describe sample information (e.g., sample's mean age or gender

distribution) were also excluded. The final sample included 26 longitudinal studies reporting data on psychological functioning in bariatric surgery patients before and after the surgery.

Figure 4.1 – PRISMA flow-chart of included studies.

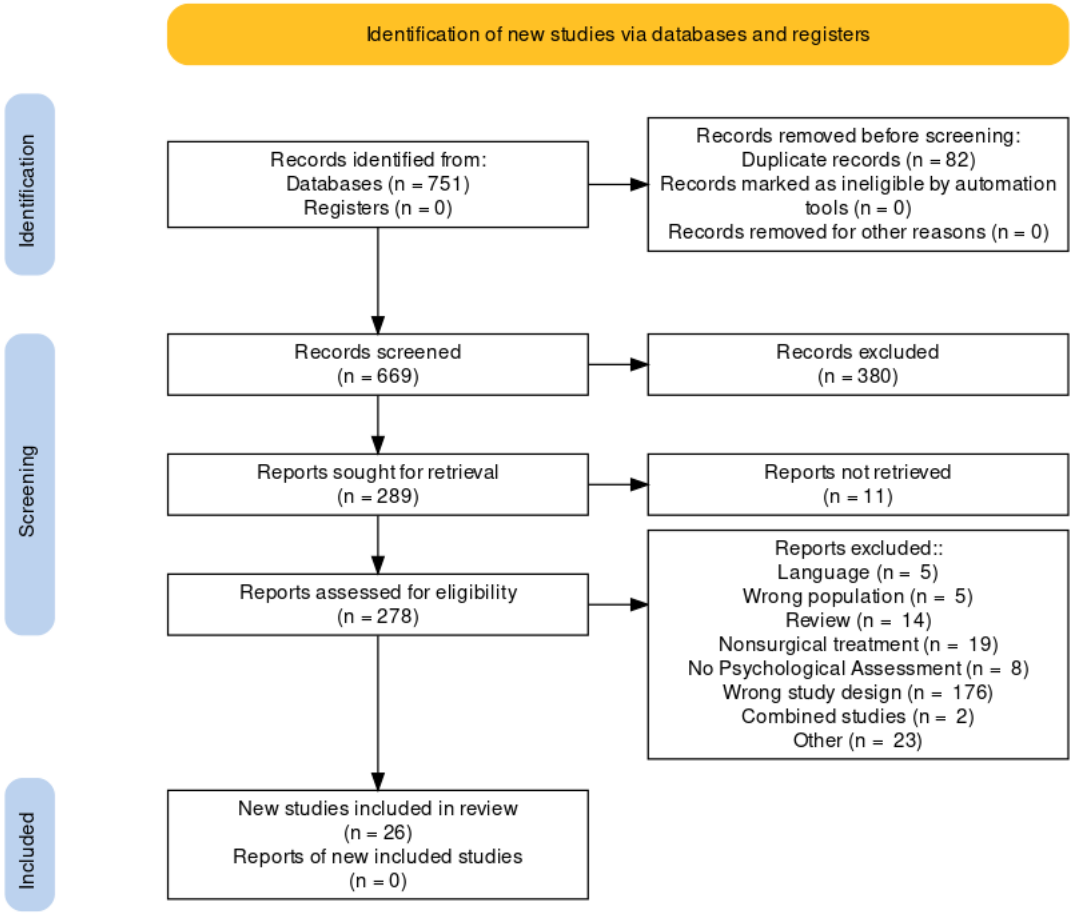


Table 4.1 provides a summary of the included studies, with a description of their sample(s) (gender, age, BMI at baseline and follow-up), psychological measures, timepoints of assessment, percent BMI reduction (%WL), and main outcomes related to psychological functioning. The combined sample includes 78% of women with a mean age of 40 years and a mean BMI of 48.5 kg/m2 before surgery. Mean BMI loss (%WL) ranged from 21 to 39% in the included samples, and RYGB was the most common surgical technique used. Assessment techniques primarily included self-reports of quality of life (k = 10), depression (k = 11), anxiety (k = 9), eating behavior (k = 8), self-esteem (k = 3), body image (k = 2), psychopathology (k = 2), cognitive function (k = 1), and sexual function (k = 1). Some studies

reported the use of projective methods (such as the Rorschach test and Pfister's Color Pyramids) to assess personality (k = 3), and one study presented cognitive assessment results using a performance-based measure of cognitive functioning. Follow-up of patients after surgery occurred between 6 (k = 8) and 12 months (k = 9) after surgery. After this first year, patients were reassessed at 18 months (k = 1), 24 months (k = 3), 36 (k = 2), 48 (k = 1), and 60 (k =2) months.

Table 4.1. Summary of methodological characteristics and main findings of studies.

Author (year)	N (%F)	Age Mean (SD)	Baseline BMI (SD)	Assessment (First, last follow-up)	Measures	Follow-up N	Follow-up BMI (SD)	Type of surgery	%WL	Main outcomes
Adams et al. (2010)	420 (84%)	43.4 (12.5)	47.7 (9.4)	Pre-surgery; 24 months	IWQOL-Lite, SF-36	402	31.9 (6.4)	RYGB	-33%	RYGB surgery was highly effective for weight loss, improved health-related quality of life, and resolution of major obesity-associated complications measured at 2 years.
Andersen et al. (2010)	50 (56%)	37.9 (7.9)	51.7 (7.5)	Pre-surgery; 24 months	HADS, SF-36	44	31.7 (5.7)	BPD	-39%	Anxiety and depression were high before surgery but were normalized one and two years afterwards. Improvement in self-reported physical health was associated with statistically significant reductions in the symptoms of anxiety and depression.
Assimakopoulos et al. (2011)	59 (100%)	36.0 (9.5)	51.9 (9.9)	Pre-surgery; 12 months	HADS, FSFI	59	31.8 (4.9)	BPD (BMI >50 kg/m^2); RYGB or LSG (BMI <50 kg/m^2)	-39%	Significant reductions in BMI, depression, and sexual pain levels and significant improvements in sexual desire, arousal, lubrication, satisfaction, and total sexual function postoperatively.
Bryant et al. (2013)	12 (75%)	36.0 (2.0)	45.3 (1.9)	Pre-surgery; 12 months	TFEQ-R18	12	30.3 (1.8)	RYGB	-33%	The TFEQ-R18 factors of emotional eating and uncontrolled eating significantly decrease after RYGB surgery but that cognitive restraint was not significantly changed.
Buddeberg-Fischer et al. (2006)	63 (70%)	43.5 (9.8)	44.7 (6.1)	Pre-surgery, Post-surgery 36 months	HADS, BSQ, Psychosocial Assessment Questionnaire (PAssQ)	63	34.9 (5.5)	Not specified	-22%	Patients reported better physical and psychological well-being after 1 year. After 4,5 years, both surgically-treated and non-surgical patients showed lower psychological symptom scores than at T0.

Burgmer et al. (2014)	148 (68%)	38.8 (10.2)	50.7 (8.0)	Pre-surgery; 48 months	HADS, SF-36, RSE	101	39.3 (7.3)	VGB (n = 97), LAGB (n = 51)	-22%	Significant improvements in depressive symptoms, physical dimension of quality of life, and self-esteem with peak 1 year after surgery. Mental health improved significantly during the 4-year follow-up period. Parallel to weight regain, psychological improvements showed a slow but not significant decline over time.
Bužgová et al. (2016)	68 (66%)	44.2 (9.6)	42.6 (5.4)	Pre-surgery; 12 months	WHOQOL-BREF, HADS	68	32.5 (5.5)	LSG, LGCP	-24%	QoL improved as early as 3 months after bariatric surgery and is associated with weight reduction and lower levels of anxiety and depression, but not with other clinical parameters.
Capuron et al. (2011)	101 (100%)	37.8 (11.2)	48.8 (9.2)	Pre-surgery; 12 months	NEO-PI-R, TFEQ	70	34.5 (1.1)	RYGB	-29%	Relationship between adiposity, inflammation and affectivity was found. Decreases in adiposity were associated with decreases in adipokines and inflammatory markers, and with improvements in emotional status and eating behavior. Inflammatory factors were related to neuroticism scores, independently of BMI.
Dziurowicz-Kozłowska et al. (2005)	11 (73%)	39.1 (10.6)	45.7 (5.3)	Pre-surgery, Post-surgery 6 months	Nottingham Health Profile	11	36.1 (4.6)	VGB (n = 10), LAGB (n = 57)	-21%	Surgical treatment resulted in positive changes in energy, pain, physical mobility and in the influence of the current health on paid employment, jobs around the house, social life, sex life, interests and hobbies, holidays. This changes occur in relatively short period of time after BS.
Erden et al. (2016)	51 (65%)	36.2 (10.6)	47.7 (7.6)	Pre-surgery; 6 months	SCID-IV, BDI, BAI, SF-36	51	33.4 (7.1)	LSG	-30%	BED was diagnosed in 18 patients (35%) before BS. After surgery, no patients had BED. Depression and anxiety improved compared to preoperative period. Six months after

										the surgery, the QoL improved for all participants (with or without BED).
Galioto et al. (2015)	82 (82%)	43.6 (10.2)	46.3 (5.5)	Pre-surgery; 12 months	Integneuro	82	30.2 (5.3)	RYGB	-35%	Improvements in both cognitive function and glycemic control were observed. There was a small effect of improved glycemic control on improved aspects of attention and executive function following BS.
García et al. (2015)	44 (77%)	39.6 (9.5)	51.3 (6.9)	Pre-surgery; 60 months	Moorehead-Ardelt QoL-II, BAROS	44	36.8 (5.9)	VGB	-28%	Assessment at 1 year and 5 years after surgery showed improved comorbidity and quality of life of patients with obesity.
Giel et al. (2014)	17 (65%)	41.8 (8.6)	48.3 (6.5)	Pre-surgery; 6 months	SCID-IV, EDE-Q, FCQ-T	17	36.4 (6.0)	LSG	-25%	Six months after BS patients showed attentional bias toward nonfood cues, lower food craving, and rated food cues as less pleasant. Altered food cue processing was found after BS, which may indicate that increased cognitive control reduced food reward.
Hrabosky et al. (2006)	109 (89%)	42.5 (10.4)	51.5 (7.6)	Pre-surgery, Post-surgery 12 months	BSQ, EDE-Q	109	33.0 (5.6)	Not specified	-36%	Considerable improvements in BMI and body image after BS. Changes in body dissatisfaction and weight concern correlated marginally, with changes in BMI, while changes in shape concern did not correlate with changes in BMI.
Leombruni et al. (2007)	38 (84%)	39.8 (9.9)	43.5 (5.5)	Pre-surgery, Post-surgery 6 months	EDI-2, BES, BDI, STAXI, SCL-90, TCI	38	33.0 (5.3)	VGB	-24%	Between T0 and T6 patients showed a significant weight loss and an improvement in several dimensions of EDI-2, BDI, and BSQ, and increase in frequency of vomiting. Self-directedness (TCI) and Body Dissatisfaction (EDI-2) were predictors of short-term weight loss. Self-transcendence (TCI) is associated with surgery side-effects.

Machado et al. (2008)	50 (86%)	42.4 (9.7)	48.5 (7.4)	Pre-surgery, Post-surgery 36 months	Color Pyramid Test of Pfister	50	29.4 (5.2)	RYGB	-39%	Symptoms of binge eating were present before and after surgery. Compulsive behavior was related to difficulties in dealing with emotions, anxiety, depression and impaired emotional structure, as well as impulsivity, control, and rigidity of personality.
Maddi et al. (2001)	52 (89%)	38.35 (9.7)	48.4 (7.1)	Pre-surgery, Post-surgery 12 months	MMPI-2	52	NA	Not specified	NA	Decreases in pathological preoccupation with physical symptoms (Hypocondriasis and Psychaesthenia scales), depression (Depression scale), expression of psychological problems in physical symptoms (Conversion Hysteria scale), extreme distrust and mental confusion (Paranoia and Schizophrenia scales), and social avoidance (Social Introversion scale) 12 months post-surgery.
Masheb et al. (2006)	145 (89%)	42.1 (10.3)	51.6 (7.5)	Pre-surgery, Post-surgery 6 months	EDE-Q, BSQ, RSE, BDI	145	NA	Not specified	Not reported	Overevaluation and body image dissatisfaction (BID) both improved after BS, and were significantly correlated with each other before and after surgery. Longitudinal associations differed, with BID, but not overevaluation, not related to fluctuations in negative affect.
Peterhänsel et al. (2017)	130 (72%)	47.4 (10.4)	49.9 (8.0)	Pre-surgery; 12 months	NEO-FFI, EDE-Q, BDI-II, SF-12	130	35.9 (6.7)	RYGB (86%), LSG (13%)	-28%	Two subtypes of personality emerged: an ‘emotionally dysregulated/undercontrolled’ cluster defined by high neuroticism and external orientation and a ‘resilient/high functioning’ cluster with the opposite pattern. Before BS, the first reported more eating disorder and depressive symptoms and less HRQoL. Differences persisted regarding depression and HRQoL

										until 12 months after surgery, but not for weight loss and eating disorders.
Ribeiro et al. (2011)	16 (100%)	43.0 (9.5)	50.6 (6.9)	Pre-surgery; Post-surgery 7 months	Interview, Rorschach	16	36.7 (5.9)	Not specified	-28%	Important emotional distress and defensiveness were present before surgery. After surgery, applied more cognitive effort to deal with affective content and showed a more mature affective functioning, although experience of distress was present.
Ribeiro et al. (2018)	281 (83%)	40.7 (9.8)	50.9 (7.4)	Pre-surgery; Post-surgery 60 months	BDI, BAI, ECAP	44	31.8 (9.1)	Not specified	-38%	Anxiety, depression, and binge eating symptoms were reduced after 2 years of surgery. Patients reassessed between 2 and 5 years of surgery presented an increase in these symptoms, with a transient effect of weight loss or bariatric surgery on these symptoms.
Rojas et al. (2011)	20 (25%)	44.1 (9.2)	42.6 (5.1)	Pre-surgery; Post-surgery 6 months	Grid Technique (*Tecnica de la Rejilla*), OQ-45.2, STAI	17	30.2 (5.0)	RYGB (n = 13), LAGB (n = 7)	-29%	After surgery, the scores of self-esteem, well-being, flexibility, attraction, self-acceptance, confidence and guilt improved. Anxiety and depressive symptoms assessment were in the normal range before and after surgery. After surgery, there was a significant decrease in depressive scores but not significant changes in anxiety.
Tækker et al. (2019)	40 (85%)	40.1 (9.2)	44.0 (6.8)	Pre-surgery; Post-surgery 18 months	COBI, SCL-90-R, Interview	40	30.7 (4.9)	LSG	-30%	Patients were classified according the psychosocial profile as “low”, “some” or “high-risk” to be submitted to the surgery. High-risk group showed significantly poorer mental health, that persisted 18 months after surgery. All three risk groups maintained a significant decline in psychiatric symptoms, with no differences among the three groups.

Van der Hofstadt Román et al. (2017)	191 (75%)	45.2 (10.0)	49.2 (7.1)	Pre-surgery; Post-surgery 24 months	SF-36, OP-53	88	31.0 (5.4)	Not specified	-37%	QoL were significatively improved after surgery, and sustained at 24 months after surgery. There were no significant differences on the QoL of patients submitted to diverse types of surgical techniques.
Xavier et al. (2010)	20 (75%)	40.5 (10.3)	54.5 (7.8)	Pre-surgery; Post-surgery 6 months	BAROS	20	39.9 (7.1)	RYGB	-27%	QoL of patients significatively improved after surgery. However, this increase was not correlated to amount of weight loss.

Note. BPD, biliopancreatic diversion; LAGB, laparoscopic adjustable gastric banding; RYGB, Roux-en-Y gastric bypass; VBG, vertical-banded gastroplasty; GBS, gastric bypass surgery; LSG, laparoscopic sleeve gastrectomy; BSQ, Binge Scale Questionnaire.

Information concerning the risk of bias in included studies is reported in Table 4.2. Studies of poorer quality were those that did not clearly specify the inclusion criteria for participants and those that did not include a detailed description of the patients undergoing surgical treatment (Erden et al., 2016; Giel et al., 2014a; J. Hrabosky et al., 2006; Maddi et al., 2001; Peterhänsel et al., 2017; Ribeiro et al., 2018; Rojas, Brante, Miranda, & Pérez-Luco, 2011). Another source of bias was the loss of more than 20% of the sample at follow-up in studies considered poor quality (Buddeberg-Fischer et al., 2006; Burgmer et al., 2014; Capuron et al., 2011; Giel et al., 2014a; Ribeiro et al., 2018; Rojas, Brante, Miranda, & Prez-Luco, 2011; Tækker et al., 2018). The lack of a multiple series design was also a methodologic weakness in most lower-quality studies (Buddeberg-Fischer et al., 2006; Capuron et al., 2011; Erden et al., 2016; Giel et al., 2014b; Maddi et al., 2001; Masheb et al., 2006; Peterhänsel et al., 2017; Ribeiro et al., 2018; Tækker et al., 2018).

Table 4.2. Rating of the risk of bias and quality of each study according to National Institutes of Health (NIH) quality assessment tool.

Author	1	2	3	4	5	6	7	8	9	10	11	12	Quality
Adams et al. (2010)	Y	Y	Y	Y	NA	Y	N	N	Y	Y	N	NA	Fair
Andersen et al. (2010)	Y	Y	Y	N	NA	Y	Y	N	Y	Y	Y	NA	Good
Assimakopoulos et al. (2011)	Y	Y	Y	NA	NA	Y	Y	N	Y	Y	N	NA	Fair
Bryant et al. (2013)	Y	N	Y	NA	N	Y	Y	N	Y	Y	Y	NA	Fair
Buddeberg-Fischer et al. (2006)	Y	Y	Y	N	NA	Y	Y	N	N	Y	N	NA	Poor
Burgmer et al. (2014)	Y	Y	Y	NA	NA	Y	NA	N	N	Y	Y	NA	Poor
Bužgová et al. (2016)	Y	Y	Y	NA	NA	Y	Y	N	Y	Y	Y	NA	Good
Capuron et al. (2011)	Y	Y	Y	NA	NA	NA	Y	N	N	Y	N	NA	Poor
Dziurowicz-Kozłowska et al. (2005)	Y	Y	Y	NA	NA	Y	Y	N	Y	Y	N	NA	Fair
Erden et al. (2016)	Y	N	Y	NA	NA	Y	Y	N	Y	Y	N	NA	Poor
Galioto et al. (2015)	Y	Y	Y	N	NA	Y	Y	N	Y	Y	N	NA	Fair
García et al. (2015)	Y	Y	Y	NA	NA	N	Y	NA	Y	N	Y	NA	Poor
Giel et al. (2014)	Y	N	Y	N	NA	Y	Y	N	N	Y	N	NA	Poor
Hrabosky et al. (2006)	Y	N	Y	NA	NA	N	Y	NA	Y	Y	Y	NA	Poor
Leombruni et al. (2007)	Y	Y	Y	N	NA	Y	Y	N	Y	Y	Y	NA	Good
Machado et al. (2008)	Y	Y	Y	N	NA	NA	Y	N	Y	Y	Y	NA	Fair
Maddi et al. (2001)	Y	N	Y	NA	NA	NA	NA	N	Y	Y	N	NA	Poor
Masheb et al. (2006)	Y	Y	Y	NA	NA	NA	Y	NA	Y	Y	N	NA	Poor
Peterhänsel et al. (2017)	Y	N	Y	NA	NA	NA	Y	N	Y	Y	N	NA	Poor
Ribeiro et al. (2011)	Y	Y	Y	NA	NA	Y	Y	NA	Y	Y	Y	NA	Good
Ribeiro et al. (2018)	Y	N	N	NA	N	NA	N	N	N	Y	N	NA	Poor
Rojas et al. (2011)	Y	N	Y	NA	NA	Y	Y	N	N	Y	Y	NA	Poor
Tækker et al. (2019)	Y	Y	Y	NA	NA	Y	Y	NA	N	Y	N	NA	Poor
Van der Hofstadt Román et al. (2017)	Y	Y	Y	N	NA	Y	Y	N	Y	Y	N	NA	Fair
Xavier et al. (2010)	Y	Y	Y	N	NA	Y	Y	NA	N	Y	Y	NA	Fair

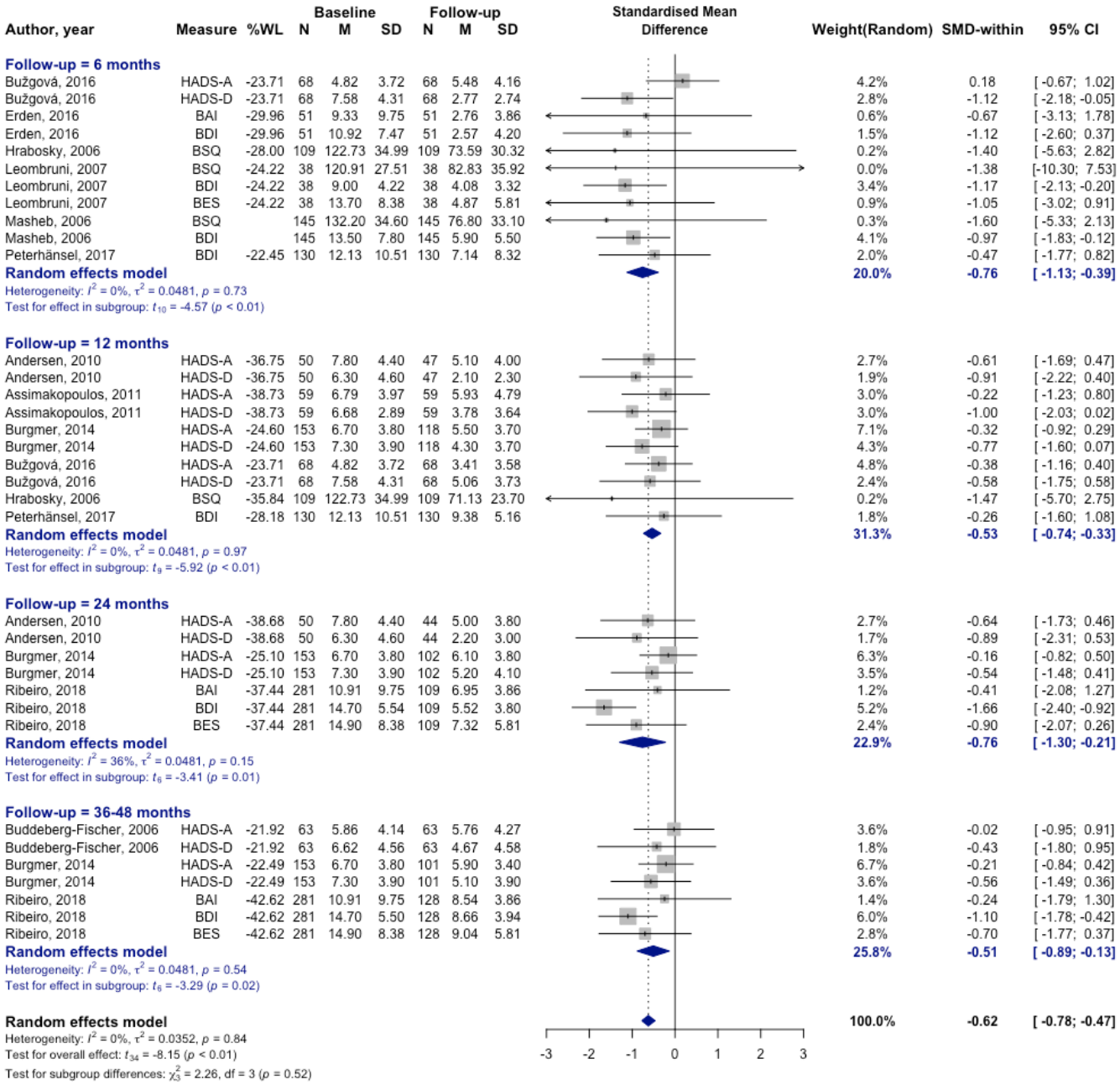
Disordered eating behaviors seem to have greater effects in the first 6 months after surgery and appear to be related to the ability to regulate emotions (Bryant et al., 2013; Capuron et al., 2011; Peterhänsel et al., 2017). However, values trended toward pre-surgery values 24 months after surgery (Buddeberg-Fischer et al., 2006; RIBEIRO et al., 2018). Personality functioning was assessed with several instruments, and overall longitudinal results indicated a relationship between levels of neuroticism and the affective component of personality and surgery outcomes. Specifically, metabolic markers appear to influence the ability to regulate emotions and the ability to use cognitive resources to adapt to post-surgery life changes (Capuron et al., 2011; Leombruni et al., 2007; Machado et al., 2008; Peterhänsel et al., 2017; Ribeiro et al., 2011). Accordingly, studies using the MMPI-2 showed a significant reduction in pathological features after surgery (Maddi et al., 2001). Patients with more psychopathology before surgery (assessed with the SCL-90 and the SCID) tended to lose more weight, but improvement in psychopathology after surgery did not correlate with WL (Erden et al., 2016). Conversely, cognitive function improved modestly after surgery and appears to be mediated by improvement in metabolic status (Galioto et al., 2014). Body image and self-esteem were also correlated to weight-loss and improved significantly in the first 6-12 months after surgery (Burgmer et al., 2014; J. I. Hrabosky et al., 2008; Masheb et al., 2006; Rojas, Brante, Miranda, & Prez-Luco, 2011), as did sexual function (Assimakopoulos et al., 2011) and psychosocial status (Buddeberg-Fischer et al., 2006).

4.3.2 Meta-analysis

The overall effect of psychological change before and after surgery and change at each follow-up is presented in the quantitative synthesis, according to follow-up times, and are presented in a forest plot (Fig. 2). A total of 12 studies were included in the meta-analysis. Combined, studies report data of 1204 participants at baseline and 909 at follow-up. Measures were included if repeated in at least two studies, and quantitative synthesis included data assessed using the following instruments: Beck Anxiety Inventory (BAI) and Hospital Anxiety and Depression Scale (HADS-A), which measure anxiety symptoms; Beck Depression Symptoms (BDI) and Hospital Anxiety and Depression Scale (HADS-D), to assess depressive symptoms; Binge Eating Scale (BES), for binge eating symptoms; and Body Shape Questionnaire (BSQ), that measure binge eating symptoms. Although included in three studies,

EDE-Q data reported in studies were incomplete, and it was not possible to retrieve the mean and variance of general scores, so this measure was not included in the analysis.

Figure 4.2 – Forest plot of effects estimates of changes in psychological symptoms after bariatric surgery, according to time of follow-up.



At 6-months of follow-up, six studies assessing anxiety, depression, binge eating, and body image symptoms were assessed. Random effects SMD at 6-months was 0.76 (95% CI, -1.13, -0.39) with low levels of between-study heterogeneity ($\tau^2 = 0$, p = 0.73). At this time point, the mean %WL of patients was -26% of baseline BMI. When looking at 12-months follow-up, six studies assessing anxiety, depressive and body image symptomatology were included, and subgroup random effects was -0.53 (SMD [95% CI], -0.74, -0.33; $\tau^2 = 0$, $p = 0.97$), and mean %WL at this point of -31%.

At 24 months, outcomes of anxiety, depression, and binge eating symptoms were assessed, with random effect SMD of -0.76 (95% CI, -1.30, -0.21; $\tau^2 = 0$, $p = 0.15$), and mean %WL of all studies of -34%. For long-term follow-up, studies assessed patients between 36 and 48 months regarding anxiety, depression, and binge eating symptoms with a random effect SMD of -0.51 (95% CI, -0.13, 0.08; $\tau^2 = 0$, $p = 0.54$), with mean %WL of -35%. When all results were combined, the overall random effects model SMD of change from baseline was -0.62 (95% CI, -0.78, -0.47). The overall heterogeneity was also low ($\tau^2 = 0$, $p = 0.84$) and differences between subgroups were significant ($X^2 = 9.76$, p = 0.02).

We also investigate the random effects model for change from baseline in each specific dimension of psychological functioning. Results are displayed in Table 4.3. Studies presented low heterogeneity ($\tau^2 = 0$, $p = 0.84$), and groups were significantly different ($X^2 = 240.27$, $p < 0.001$). Meta-regression analysis using a mixed-effects model showed that the psychological dimension accounted for 100% of studies' heterogeneity (R^2) and reveal to be a significant moderator of effect sizes ($F = 14.566$, $p < 0.001$).

Table 4.3. Random effects model for subgroups based on dimension of psychological functioning assessed with meta-regression of mixed-effects model.

Dimension	*k*	SMD	95% CI	τ^2, I^2
Anxiety	12	-0.25	[-0.38, -0.11]	0, 0%
Body Image	4	-1.50	[-1.65, -1.34]	0, 0%
Depression	16	-0.93	[-1.13, -0.73]	0, 0%
Binge Eating	3	-0.83	[-1.23, -0.43]	0, 0%
Meta-regression	Estimate	SE	*t*	*p*
Intercept	-0.246	0.076	-3.217	0.003
Body Image	-1.249	-.681	-1.833	0.076
Depression	-0.686	0.107	-6.398	<.001
Binge Eating	-0.583	0.232	-2.508	0.018

4.4 Discussion

Our objective was to systematically review the literature on long-term outcomes of psychological functioning in patients who have undergone bariatric surgery. We found 25 studies that addressed longitudinal psychological outcomes of patients after bariatric surgery, of which 11 were included in the meta-analysis. Overall, the studies assessing long-term outcomes of psychological aspects in bariatric surgery differed substantially in terms of psychological variables of interest, assessment instruments, and sample size. Most of them focused on short-term follow-up between 6 months and one year after surgery. In general, psychopathology and disordered eating behaviors tend to decrease after surgery, but these improvements are less consistent in the longer term (Assimakopoulos et al., 2011; Masheb et al., 2006). The exception is QoL, which consistently improved from baseline up to 60 months after surgery (Burgmer et al., 2014; Román et al., 2017).

The meta-analysis was based on results from the most commonly used measures to assess patients at follow-up, mainly focused on symptoms of depression, anxiety, binge eating, and body image concerns, using the Hospital Anxiety and Depression Scale (HADS), Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), the Binge Eating Scale (BES) and the Body Shape Questionnaire (BSQ). Results of the random-effects model of the change from

baseline showed that these symptoms are consistently improved after surgery. The moderator effect of each category of psychological symptoms on change reveals that reduction of depressive symptoms accounts for the higher effect on change, followed by symptoms of binge eating. When looking at the relationship between WL and improvement of symptoms, we observe that WL tends to increase progressively at each follow-up point (-26%, -31%, -34%, and -35%, respectively at 6, 12, 24, and 36 to 48 months), whereas the improvement of symptoms remains relatively stable from 6 to 48 months (-0.76, -0.53, -0.76, -0.51 at 6, 12, 24 and 36-48 months, respectively) after surgery. This suggests that WL does not play a key role in the improvement of symptoms.

This finding is in line with previous studies that assess the prevalence of depressive and anxiety disorders after surgery, showing that improvements in depressive symptoms are more intense in the short- and medium-term (Müller et al., 1920), while the prevalence of anxiety disorders are not significantly changed in short- and medium-term follow-up (Zwaan et al., 2011). Also, previous studies show that depressive symptoms may be related to weight loss after surgery, but not anxiety symptoms (Andersen et al., 2010).

In our review, longitudinal studies of eating behaviors in patients who underwent BS found that disordered eating, such as binge eating (Leombruni et al., 2007), emotional eating (Bryant et al., 2013; Capuron et al., 2011), food craving and attentional bias toward food cues tended to decrease significantly after surgery (Giel et al., 2014b), but most of these changes were studied in the shorter follow-up period (up to 12 months after BS). Long-term follow-up of patients showed that eating disorder symptomatology seemed to stabilize and possibly regress to pre-surgery functioning in the long term (Ribeiro et al., 2018) and that weight loss did not correlate with improvements in eating behaviors (Buddeberg-Fischer et al., 2006). Evidence consistently suggests that eating psychopathology after surgery increases the risk of weight regain (Mauro et al., 2019). However, evidence on longitudinal outcomes after 48 months might clarify this relationship in the long term.

The literature still lacks a clear understanding of how eating behaviors evolve in BS patients. Data suggest that eating pathology after surgery is still influenced by psychological variables related to self-regulation, such as emotional regulation and cognitive restraint, and that these may be important mediators of eating patterns and attitudes after surgery (Smith et al., 2019). It is plausible to assume that dysregulated eating behavior as a strategy of self-regulation, which was once associated with the development of obesity in these patients, may

regress after surgery if patients do not address these mediating factors in the long term (Martin-Fernandez et al., 2021; Williams-Kerver et al., 2019), but further studies are needed to clarify this hypothesis.

Similarly, body image and self-esteem also improved in the immediate follow-up, but these changes stabilized and tended to return to pre-surgery levels in the long term (J. I. Hrabosky et al., 2006; Masheb et al., 2006). Preview studies suggest that these variables are related to self-regulation, too. Specifically, there is evidence that body image dissatisfaction and weight-related self-esteem are influenced by anxiety symptoms and negative affect (Felske et al., 2021; Kamody et al., 2018). In addition, low self-esteem may play a role in emotion dysregulation and negative self-evaluation, which increases impulsivity and binge-eating (Cella et al., 2019), revealing a complex interaction between all these variables in these patients. It is also noteworthy that massive weight loss can affect self-esteem and body image dissatisfaction, leading to extreme body changes, such as excess skin, which can also increase dissatisfaction and worsen self-esteem in the long term (Ivezaj & Grilo, 2018).

With regard to personality functioning, this review shows that neuroticism is the variable most commonly associated with surgical outcomes. On the one hand, patients with high neuroticism scores tend to have worse outcomes at short-term follow-up (Peterhänsel et al., 2017); on the other hand, neuroticism scores seem to be influenced by weight loss via metabolic pathways and decrease after surgery (Capuron et al., 2011). Assessment with different types of measurement instruments showed that not only did personality-related psychopathology decrease after surgery (Maddi et al., 2001), but also the use of cognitive and rational resources related to personality increased after weight loss (Ribeiro et al., 2011). The only study that assessed personality functioning in the long-term follow-up of BS found that patients' expressions of anger and aggressiveness increased at 36 months after surgery, supporting the hypothesis of impaired regulatory mechanisms after surgery (Machado et al., 2008).

Although theoretical approaches vary, studies of personality functioning in these patients show that neuroticism, a marker of emotional distress and vulnerability, is related to emotional dysregulation and emotional eating in patients with obesity (Bordignon et al., 2017; Peterhänsel et al., 2017; Vainik et al., 2013). Similarly, some studies show that conscientiousness, usually understood as a trait of diligence and discipline related to cognitive

resources and self-control, is a predictor of weight loss in patients with obesity undergoing surgery (Siegrist et al., 2022; Spitznagel et al., 2013).

General and weight-related QoL is the second most commonly assessed variable of psychological outcome related to BS and apparently the one that has the strongest and most persistent effects after weight loss. A recent meta-analysis reveals that effects are consistent up to five years after surgery, and RYGB produces a higher effect on the improvement of QoL (Małczak et al., 2021). Physical-related QoL seems to be more strongly associated with WL than mental-health-related QoL (Burgmer et al., 2014; Román et al., 2017). This could be due to the social and physical burden of obesity, which marginalizes people with obesity in our society, that have fewer opportunities to socialize, work, and access health services, apart from being judged and discriminated against for their body (Puhl et al., 2017). For this reason, the massive weight loss promoted by surgery could be an opportunity for these patients to feel more included in social structures and services, thus increasing their overall QoL.

Although much is known about the relationship between eating and health behaviors and psychological functioning, and its implications on obesity development and treatment, there is still no consensus in the scientific literature about how these factors should be approached by professionals in the context of surgical treatment of obesity. For example, (Rutledge et al., 2020) suggest that the field should focus more on patient-centered goals, and patient assessment should rely on relevant and sensitive aspects of change for patients during postoperative care. In addition, psychological assessment should be used as a treatment tool and not just as a means to decide or predict whether or not patients will be successful in weight loss, as successful obesity treatment should not be limited to weight reduction.

From our perspective, two major limitations in the field should be addressed to better overcome current gaps in the relationship between psychological functioning and weight-loss surgery. First is the fact that most of the available data about these patients are based on self-report measures. Indeed, there is evidence that self-report instruments do not have strong associations with peer-reported information (Mihura, 2012). Also, performance-based instruments that allow clinical assessment without the influence of participants' own beliefs and expectations about how they should appear in a particular assessment context are a useful tool that has yet to be widely used in the field (Finn, 2011; Meyer et al., 2018). In addition, there are some that people with obesity tend to be unaware of their own emotional functioning and behavior, which increases the risk of self-report bias (Casagrande et al., 2020; Monte et al.,

2020). With this in mind, it is noteworthy that the field should strive to expand its data collection strategies to capture aspects of psychological functioning that are not adequately addressed by self-report instruments.

The second limitation is the lack of consistent follow-up of patients after 48 months of surgery. Although bariatric surgery is a useful and reliable tool to treat excess body weight, the treatment of obesity goes beyond the treatment of body weight, for which surgery does not always have the same degree of effectiveness, and very little data is available to understand how the surgery outcomes evolve in the longer-term. Although researchers and practitioners in the field recognize the complexity of the obesity phenomenon and understand the need for chronic intervention to control it, the literature shows that outcomes are still heavily biased toward body weight as a marker of obesity treatment success. However, our study shows that surgery does not directly influence other patient-related aspects, including psychological functioning and behavior, even when a reduction in body weight is achieved. In other words, obesity is not treated by surgery alone, but for some patients, surgery may be ineffective in reducing and controlling body weight in the long term if other aspects of psychological functioning related to obesity are not adequately treated.

This study has some limitations that should be noted. First, our study focused on the longitudinal literature on psychological functioning before and after surgery and excluded longitudinal studies that focused exclusively on psychological functioning after surgery and did not include baseline data before surgery. Therefore, it is possible that other relevant psychological outcomes were not included in the results discussed here. Another limitation is that the studies relied on data from female samples, which constitute the majority of the samples studied, and gender differences in psychological functioning may play a role in the results described. Therefore, it is recommended that future studies consider gender differences in psychological outcomes after BS. Finally, the heterogeneity of the studies and the diversity of variables and measures did not allow the use of a meta-analytic approach. Therefore, an association between psychological variables and WL at different time points is hypothesized, and we encourage future studies to explore other methodological approaches in the literature to obtain more consistent measures of this association.

In conclusion, our study aimed to review the literature on the long-term psychological functioning of patients who underwent bariatric surgery, focusing on longitudinal studies that examined psychological variables before and after surgery. Although the data in this review are

limited, they provide evidence that patients have a significant reduction of psychological symptoms related to depression, anxiety, binge eating, and body dissatisfaction up to 48 months after surgery; after that time, key aspects of psychological functioning such as self-esteem, affectivity, and psychopathology seem to return to pre-surgery levels. We encourage researchers and practitioners to improve psychological assessment to include other types of instruments that do not rely solely on self-report, possibly through a multi-method approach, in order to improve comprehension of the underlying psychological functioning of patients with obesity. This may have important implications for capturing the risk of weight regain, return to problematic behaviors associated with obesity, and the impact of chronic obesity on mental health.

4.5 References

Al-Hadithy, N., Welbourn, R., Aditya, H., Stewart, K., & Soldin, M. (2014). A preliminary report on the development of a validated tool for measuring psychosocial outcomes for massive weight loss patients. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, *67*(11), 1523–1531. https://doi.org/10.1016/j.bjps.2014.07.004

Andersen, J., Aasprang, A., Bergsholm, P., Sletteskog, N., Våge, V., & Natvig, G. (2010). Anxiety and depression in association with morbid obesity: changes with improved physical health after duodenal switch. *Health and Quality of Life Outcomes*, *8*(1), 52–52. https://doi.org/10.1186/1477-7525-8-52

Andrei, F., Nuccitelli, C., Mancini, G., Reggiani, G. M., & Trombini, E. (2018). Emotional intelligence, emotion regulation and affectivity in adults seeking treatment for obesity. *Psychiatry Research*, *269*(August), 191–198. https://doi.org/10.1016/j.psychres.2018.08.015

Andrés, A., & Saldaña, S. (2013). *Psychological assessment of bariatric surgery candidates* (pp. 19–61). https://www.scopus.com/inward/record.uri?eid=2-s2.0-84892089411&partnerID=40&md5=e7beb345ddec8a446f3b09b0306a57c9

Assimakopoulos, K., Karaivazoglou, K., Panayiotopoulos, S., Hyphantis, T., Iconomou, G., & Kalfarentzos, F. (2011). Bariatric Surgery is Associated with Reduced Depressive Symptoms and Better Sexual Function in Obese Female Patients: A One-Year Follow-Up Study. *Obesity Surgery*, *21*(3), 362–366. https://doi.org/10.1007/s11695-010-0303-z

Beek, E. S. J. van der, Geenen, R., Heer, F. A. G. de, Molen, A. B. M. van der, & Ramshorst, B. van. (2012). Quality of Life Long-Term after Body Contouring Surgery following Bariatric Surgery. *Plastic and Reconstructive Surgery*, *130*(5), 1133–1139. https://doi.org/10.1097/prs.0b013e318267d51d

Belligoli, A., Bettini, S., Segato, G., & Busetto, L. (2020). Predicting Responses to Bariatric and Metabolic Surgery. *Current Obesity Reports*, *9*(3), 373–379. https://doi.org/10.1007/s13679-020-00390-1

Bjørklund, G., Semenova, Y., Pivina, L., & Costea, D.-O. (2020). Follow-up after bariatric surgery: A review. *Nutrition*, *78*, 110831–110831. https://doi.org/10.1016/j.nut.2020.110831

Bordignon, S., Aparício, M. J. G., Bertoletti, J., & Trentini, C. M. (2017). Personality characteristics and bariatric surgery outcomes: a systematic review. *Trends in Psychiatry and Psychotherapy*, *39*(2), 124–134. https://doi.org/10.1590/2237-6089-2016-0016

Bryant, E. J., King, N. A., Falkén, Y., Hellström, P. M., Holst, J. J., Blundell, J. E., & Näslund, E. (2013). Relationships among tonic and episodic aspects of motivation to eat, gut peptides, and weight before and after bariatric surgery. *Surgery for Obesity and Related Diseases*, *9*(5), 802–808. https://doi.org/10.1016/j.soard.2012.09.011

Buddeberg-Fischer, B., Klaghofer, R., Krug, L., Buddeberg, C., Müller, M. K., Schoeb, O., & Weber, M. (2006). Physical and Psychosocial Outcome in Morbidly Obese Patients with and without Bariatric Surgery: a 4½-Year Follow-up. *Obesity Surgery*, *16*(3), 321–330. https://doi.org/10.1381/096089206776116471

Burgmer, R., Legenbauer, T., Müller, A., Zwaan, M. de, Fischer, C., & Herpertz, S. (2014). Psychological Outcome 4 Years after Restrictive Bariatric Surgery. *Obesity Surgery*, *24*(10), 1670–1678. https://doi.org/10.1007/s11695-014-1226-x

Bužgová, R., Bužga, M., Holéczy, P., & Zonča, P. (2016). Evaluation of Quality of Life, Clinical Parameters, and Psychological Distress after Bariatric Surgery: Comparison of the Laparoscopic Sleeve Gastrectomy and Laparoscopic Greater Curvature Plication. *Bariatric Surgical Practice and Patient Care*, *11*(4), 169–176. https://doi.org/10.1089/bari.2016.0022

De Campora, G. de, Larciprete, G., Delogu, A. M., Meldolesi, C., & Giromini, L. (2016). A longitudinal study on emotional dysregulation and obesity risk: From pregnancy to 3 years of age of the baby. *Appetite*, *96*, 95–101. https://doi.org/10.1016/j.appet.2015.09.012

Capuron, L., Poitou, C., Machaux-Tholliez, D., Frochot, V., Bouillot, J.-L., Basdevant, A., Layé, S., & Clément, K. (2011). Relationship between adiposity, emotional status and eating behaviour in obese women: role of inflammation. *Psychological Medicine*, *41*(7), 1517–1528. https://doi.org/10.1017/s0033291710001984

Casagrande, M., Boncompagni, I., Forte, G., Guarino, A., & Favieri, F. (2020). Emotion and overeating behavior: effects of alexithymia and emotional regulation on overweight and obesity. *Bulimia and Obesity*, *25*(5), 1333–1345. https://doi.org/10.1007/s40519-019-00767-9

Cella, S., Cipriano, A., Giardiello, C., & Cotrufo, P. (2019). Relationships between self-esteem, interoceptive awareness, impulse regulation, and binge eating. Path analysis in bariatric

surgery candidates. *Clinical Neuropsychiatry*, *16*(5–6), 213–220. https://doi.org/10.36131/clinicalnpsych2019050604

Claes, L., Vandereycken, W., Vandeputte, A., & Braet, C. (2013). Personality Subtypes in Female Pre-Bariatric Obese Patients: Do They Differ in Eating Disorder Symptoms, Psychological Complaints and Coping Behaviour? *European Eating Disorders Review*, *21*(1), 72–77. https://doi.org/10.1002/erv.2188

Collins, J., Meng, C., & Eng, A. (2016). Psychological Impact of Severe Obesity. *Current Obesity Reports*, *5*(4), 435–440. https://doi.org/10.1007/s13679-016-0229-4

Conceição, E., Pinto-Bastos, A., Lourdes, M. de, Brandão, I., Teixeira, C., & Machado, P. P. P. (2018). Psychological, behavioral, and weight-related aspects of patients undergoing reoperative bariatric surgery after gastric band: comparison with primary surgery patients. *Surgery for Obesity and Related Diseases*, *14*(5), 603–610. https://doi.org/10.1016/j.soard.2018.02.011

Crowley, N. M., LePage, M. L., Goldman, R. L., O'Neil, P. M., Borckardt, J. J., & Byrne, T. K. (2012). The food craving questionnaire-trait in a bariatric surgery seeking population and ability to predict post-surgery weight loss at six months. *Eating Behaviors*, *13*(4), 366–370. https://doi.org/10.1016/j.eatbeh.2012.07.003

Dalrymple, K. L., Clark, H., Chelminski, I., & Zimmerman, M. (2018). The Interaction Between Mindfulness, Emotion Regulation, and Social Anxiety and Its Association with Emotional Eating in Bariatric Surgery Candidates. *Mindfulness*, *9*(6), 1780–1793. https://doi.org/10.1007/s12671-018-0921-4

D'Argenio, A., Mazzi, C., Pecchioli, L., Lorenzo, G. D., Siracusano, A., & Troisi, A. (2009). Early trauma and adult obesity: Is psychological dysfunction the mediating mechanism? *Physiology & Behavior*, *98*(5), 543–546. https://doi.org/10.1016/j.physbeh.2009.08.010

Dawes, A. J., Maggard-Gibbons, M., Maher, A. R., Booth, M. J., Miake-Lye, I., Beroes, J. M., & Shekelle, P. G. (2016). Mental Health Conditions Among Patients Seeking and Undergoing Bariatric Surgery: A Meta-analysis. *JAMA*, *315*(2), 150–163. https://doi.org/10.1001/jama.2015.18118

Donini, L. M., Grave, R. D., Caretto, A., Lucchin, L., Melchionda, N., Nisoli, E., Sbraccia, P., Lenzi, A., & Cuzzolaro, M. (2014). From simplicity towards complexity: the Italian multidimensional approach to obesity. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *19*(3), 387–394. https://doi.org/10.1007/s40519-013-0097-9

Dreber, H., Reynisdottir, S., Angelin, B., & Hemmingsson, E. (2015). Who is the Treatment-Seeking Young Adult with Severe Obesity: A Comprehensive Characterization with Emphasis on Mental Health. *PLOS ONE*, *10*(12), e0145273–e0145273. https://doi.org/10.1371/journal.pone.0145273

Dziurowicz-Kozłowska, A., Lisik, W., Wierzbicki, Z., & Kosieradzki, M. (2005). *Health-related quality of life after the surgical treatment of obesity. 56 Suppl 6*(SUPPL. 6), 127–134. http://www.ncbi.nlm.nih.gov/pubmed/16340046

Edwards-Hampton, S. A., Madan, A., Wedin, S., Borckardt, J. J., Crowley, N., & Byrne, K. T. (2014). A Closer Look at the Nature of Anxiety in Weight Loss Surgery Candidates. *The International Journal of Psychiatry in Medicine*, *47*(2), 105–113. https://doi.org/10.2190/pm.47.2.b

Efferdinger, C., König, D., Klaus, A., & Jagsch, R. (2017). Emotion regulation and mental well-being before and six months after bariatric surgery. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *22*(2), 353–360. https://doi.org/10.1007/s40519-017-0379-8

Erden, S. Ç., Seyit, H., Yazısız, V., Uyar, E. T., Akçakaya, R. Ö., Beşirli, A., Alış, H., Karamustafalıoğlu, O., & Yücel, B. (2016). Binge Eating Disorder Prevalence in Bariatric Surgery Patients: Evaluation of Presurgery and Postsurgery Quality of Life, Anxiety and Depression Levels. *Bariatric Surgical Practice and Patient Care*, *11*(2), 61–66. https://doi.org/10.1089/bari.2015.0045

Faulconbridge, L. F., & Bechtel, C. F. (2014). Depression and Disordered Eating in the Obese Person. *Current Obesity Reports*, *3*(1), 127–136. https://doi.org/10.1007/s13679-013-0080-9

Favieri, F., Forte, G., & Casagrande, M. (2019). The Executive Functions in Overweight and Obesity: A Systematic Review of Neuropsychological Cross-Sectional and Longitudinal Studies. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.02126

Federico, A., Spalatro, A. V., Giorgio, I., Enrica, M., Daga, G. A., & Secondo, F. (2019). Personality and psychopathology differences between bariatric surgery candidates, subjects with obesity not seeking surgery management, and healthy subjects. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *24*(4), 623–631. https://doi.org/10.1007/s40519-019-00690-z

Felske, A. N., Williamson, T. M., Scurrey, S. R. M., Telfer, J. A., Campbell, T. S., & Rash, J. A. (2021). The Influence of Weight-Related Self-Esteem and Symptoms of Depression on Shape and Weight Concerns and Weight-Loss 12 Months After Bariatric Surgery. *Obesity Surgery*, *31*(3), 1062–1072. https://doi.org/10.1007/s11695-020-05097-9

Finn, S. E. (2011). Journeys Through the Valley of Death: Multimethod Psychological Assessment and Personality Transformation in Long-Term Psychotherapy. *Journal of Personality Assessment*, *93*(2), 123–141. https://doi.org/10.1080/00223891.2010.542533

Franks, S. F., & Kaiser, K. A. (2008). Predictive factors in bariatric surgery outcomes: What is the role of the preoperative psychological evaluation? *Primary Psychiatry*, *15*(8), 74–83. http://www.scopus.com/inward/record.url?scp=49949094934&partnerID=8YFLogxK

Galioto, R., Garcia, S., Spitznagel, M. B., Strain, G., Devlin, M., Crosby, R. D., Mitchell, J. E., & Gunstad, J. (2014). The Mini-Mental State Exam (MMSE) is not sensitive to cognitive impairment in bariatric surgery candidates. *Surgery for Obesity and Related Diseases*, *10*(3), 553–557. https://doi.org/10.1016/j.soard.2013.09.010

Gianini, L. M., White, M. A., & Masheb, R. M. (2013). Eating pathology, emotion regulation, and emotional overeating in obese adults with binge eating disorder. *Eating Behaviors*, *14*(3), 309–313. https://doi.org/10.1016/j.eatbeh.2013.05.008

Giel, K. E., Rieber, N., Enck, P., Friederich, H.-C., Meile, T., Zipfel, S., & Teufel, M. (2014a). Effects of laparoscopic sleeve gastrectomy on attentional processing of food-related information: Evidence from eye-tracking. *Surgery for Obesity and Related Diseases*, *10*(2), 277–282. https://doi.org/10.1016/j.soard.2013.09.012

Giel, K. E., Rieber, N., Enck, P., Friederich, H.-C., Meile, T., Zipfel, S., & Teufel, M. (2014b). Effects of laparoscopic sleeve gastrectomy on attentional processing of food-related information: Evidence from eye-tracking. *Surgery for Obesity and Related Diseases*, *10*(2), 277–282. https://doi.org/10.1016/j.soard.2013.09.012

Gill, H., Kang, S., Lee, Y., Rosenblat, J. D., Brietzke, E., Zuckerman, H., & McIntyre, R. S. (2018). The Long-Term Effect of Bariatric Surgery on Depression and Anxiety. *Journal of Affective Disorders*, *246*, 886–894. https://doi.org/10.1016/j.jad.2018.12.113

Görlach, M. G., Kohlmann, S., Shedden-Mora, M., Rief, W., & Westermann, S. (2016). Expressive Suppression of Emotions and Overeating in Individuals with Overweight and Obesity. *European Eating Disorders Review*, *24*(5), 377–382. https://doi.org/10.1002/erv.2452

Handley, J. D., Williams, D. M., Caplin, S., Stephens, J. W., & Barry, J. (2016). Changes in Cognitive Function Following Bariatric Surgery: a Systematic Review. *Obesity Surgery*, *26*(10), 2530–2537. https://doi.org/10.1007/s11695-016-2312-z

Hedges, L. V., & Vevea, J. L. (1998). Fixed-and random-effects models in meta-analysis. *Psychological Methods*, *3*(4), 486.

Himes, S. M., Grothe, K. B., Clark, M. M., Swain, J. M., Collazo-Clavell, M. L., & Sarr, M. G. (2015). Stop Regain: A Pilot Psychological Intervention for Bariatric Patients Experiencing Weight Regain. *Obesity Surgery*, *25*(5), 922–927. https://doi.org/10.1007/s11695-015-1611-0

Holvoet, P. (2012). Stress in Obesity and Associated Metabolic and Cardiovascular Disorders. *Scientifica*, *2012*, 1–19. https://doi.org/10.6064/2012/205027

Hrabosky, J. I., Masheb, R. M., White, M. A., Rothschild, B. S., Burke-Martindale, C. H., & Grilo, C. M. (2006). A Prospective Study of Body Dissatisfaction and Concerns in Extremely Obese Gastric Bypass Patients: 6- and 12-Month Postoperative Outcomes. *Obesity Surgery*, *16*(12), 1615–1621. https://doi.org/10.1381/096089206779319527

Hrabosky, J. I., White, M. A., Masheb, R. M., Rothschild, B. S., Burke-Martindale, C. H., & Grilo, C. M. (2008). Psychometric Evaluation of the Eating Disorder Examination-Questionnaire for Bariatric Surgery Candidates. *Obesity*, *16*(4), 763–769. https://doi.org/10.1038/oby.2008.3

Hrabosky, J., Masheb, R., White, M., Rothschild, B., Burke-Martindale, C., & Grilo, C. (2006). A Prospective Study of Body Dissatisfaction and Concerns in Extremely Obese Gastric Bypass Patients: 6- and 12-Month Postoperative Outcomes. *Obesity Surgery*, *16*(12), 1615–1621. https://doi.org/10.1381/096089206779319527

Ivezaj, V., & Grilo, C. M. (2018). The complexity of body image following bariatric surgery: a systematic review of the literature. *Obesity Reviews*, *19*(8), 1116–1140. https://doi.org/10.1111/obr.12685

Ivezaj, V., Kessler, E. E., Lydecker, J. A., Barnes, R. D., White, M. A., & Grilo, C. M. (2017). Loss-of-control eating following sleeve gastrectomy surgery. *Surgery for Obesity and Related Diseases*, *13*(3), 392–398. https://doi.org/10.1016/j.soard.2016.09.028

Jiménez-Murcia, S., Agüera, Z., Paslakis, G., Munguia, L., Granero, R., Sánchez-González, J., Sánchez, I., Riesco, N., Gearhardt, A. N., Dieguez, C., & al., et. (2019). Food Addiction in Eating Disorders and Obesity: Analysis of Clusters and Implications for Treatment. *Nutrients*, *11*(11), 2633–2633. https://doi.org/10.3390/nu11112633

Kamody, R. C., Thurston, I. B., Decker, K. M., Kaufman, C. C., Sonneville, K. R., & Richmond, T. K. (2018). Relating shape/weight based self-esteem, depression, and anxiety with weight and perceived physical health among young adults. *Body Image*, *25*, 168–176. https://doi.org/10.1016/j.bodyim.2018.04.003

Leombruni, P., Pierò, A., Dosio, D., Novelli, A., Abbate-Daga, G., Morino, M., Toppino, M., & Fassino, S. (2007). Psychological Predictors of Outcome in Vertical Banded Gastroplasty: a 6 Months Prospective Pilot Study. *Obesity Surgery*, *17*(7), 941–948. https://doi.org/10.1007/s11695-007-9173-4

Lin, H.-Y., Huang, C.-K., Tai, C.-M., Lin, H.-Y., Kao, Y.-H., Tsai, C.-C., Hsuan, C.-F., Lee, S.-L., Chi, S.-C., & Yen, Y.-C. (2013). Psychiatric disorders of patients seeking obesity treatment. *BMC Psychiatry*, *13*(1), 1–1. https://doi.org/10.1186/1471-244x-13-1

Luo, Q., Zhang, L., Huang, C.-C., Zheng, Y., Kanen, J. W., Zhao, Q., Yao, Y., Quinlan, E. B., Jia, T., Banaschewski, T., & al., et. (2020). Association between childhood trauma and risk for obesity: a putative neurocognitive developmental pathway. *BMC Medicine*, *18*(1), 278–278. https://doi.org/10.1186/s12916-020-01743-2

Machado, C. E., Zilberstein, B., Cecconello, I., & Monteiro, M. (2008). Compulsão alimentar antes e após a cirurgia bariátrica. *ABCD. Arquivos Brasileiros de Cirurgia Digestiva (São Paulo)*, *21*(4), 185–191. https://doi.org/10.1590/s0102-67202008000400007

Maddi, S. R., Fox, S. R., Harvey, R. H., Lu, J. L., Khoshaba, D. M., & Persico, M. (2001). Reduction in Psychopathology following Bariatric Surgery for Morbid Obesity. *Obesity Surgery*, *11*(6), 680–685. https://doi.org/10.1381/09608920160558605

Małczak, P., Mizera, M., Lee, Y., Pisarska-Adamczyk, M., Wysocki, M., Bała, M. M., Witowski, J., Rubinkiewicz, M., Dudek, A., Stefura, T., Torbicz, G., Tylec, P., Gajewska, N., Vongsurbchart, T., Su, M., Major, P., & Pędziwiatr, M. (2021). Quality of Life After Bariatric Surgery—a Systematic Review with Bayesian Network Meta-analysis. *Obesity Surgery*, *31*(12), 5213–5223. https://doi.org/10.1007/s11695-021-05687-1

Malik, S., Mitchell, J. E., Engel, S., Crosby, R., & Wonderlich, S. (2014). Psychopathology in bariatric surgery candidates: A review of studies using structured diagnostic interviews. *Comprehensive Psychiatry*, *55*(2), 248–259. https://doi.org/10.1016/j.comppsych.2013.08.021

Markowitz, S., Friedman, M. A., & Arent, S. M. (2008). Understanding the relation between obesity and depression: Causal mechanisms and implications for treatment. *Clinical Psychology: Science and Practice*, *15*(1), 1–20. https://doi.org/10.1111/j.1468-2850.2008.00106.x

Martin-Fernandez, K. W., Martin-Fernandez, J., Marek, R. J., Ben-Porath, Y. S., & Heinberg, L. J. (2021). Associations among psychopathology and eating disorder symptoms and behaviors in post-bariatric surgery patients. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *26*(8), 2545–2553. https://doi.org/10.1007/s40519-021-01111-w

Masheb, R. M., Grilo, C. M., Burke-Martindale, C. H., & Rothschild, B. S. (2006). Evaluating oneself by shape and weight is not the same as being dissatisfied about shape and weight: A longitudinal examination in severely obese gastric bypass patients. *International Journal of Eating Disorders*, *39*(8), 716–720. https://doi.org/10.1002/eat.20311

Mauro, M. F. F. P., Papelbaum, M., Brasil, M. A. A., Carneiro, J. R. I., Coutinho, E. S. F., Coutinho, W., & Appolinario, J. C. (2019). Is weight regain after bariatric surgery associated with psychiatric comorbidity? A systematic review and meta-analysis. *Obesity Reviews*, *20*(10), 1413–1425. https://doi.org/10.1111/obr.12907

Mechanick, J. I., Youdim, A., Jones, D. B., Garvey, W. T., Hurley, D. L., McMahon, M. M., Heinberg, L. J., Kushner, R., Adams, T. D., Shikora, S., & al., et. (2013). Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient-2013 update: Cosponsored by american association of clinical endocrinologists, The obesity society, and american society fo. *Obesity*, *21*(S1), S1–S27. https://doi.org/10.1002/oby.20461

Meyer, G. J., Katko, N. J., Mihura, J. L., Klag, M. J., & Meoni, L. A. (2018). The Incremental Validity of Self-Report and Performance-Based Methods for Assessing Hostility to Predict Cardiovascular Disease in Physicians. *Journal of Personality Assessment*, *100*(1), 68–83. https://doi.org/10.1080/00223891.2017.1306780

Mihura, J. L. (2012). The Necessity of Multiple Test Methods in Conducting Assessments: The Role of the Rorschach and Self-Report. *Psychological Injury and Law*, *5*(2), 97–106. https://doi.org/10.1007/s12207-012-9132-9

Monte, C. D., Renzi, A., Paone, E., Silecchia, G., Solano, L., & Trani, M. D. (2020). Alexithymia and obesity: Controversial findings from a multimethod assessment. *European Review for Medical and Pharmacological Sciences*, *24*(2), 831–836. https://doi.org/10.26355/eurrev_202001_20066

Müller, A., Hase, C., Pommnitz, M., & Zwaan, M. de. (1920). Depression and Suicide After Bariatric Surgery. *Current Psychiatry Reports*, *21*(9), 84. https://doi.org/10.1007/s11920-019-1069-1

National Heart, Lung and Blood Institute. (2014). *Quality assessment tool for before-after (pre-post) studies with no control group*. https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools

Ogden, J., Ratcliffe, D., & Snowdon-Carr, V. (2019). British Obesity Metabolic Surgery Society endorsed guidelines for psychological support pre- and post-bariatric surgery. *Clinical Obesity*, *9*(6). https://doi.org/10.1111/cob.12339

O'Kane, M., Parretti, H. M., Hughes, C. A., Sharma, M., Woodcock, S., Puplampu, T., Blakemore, A. I., Clare, K., MacMillan, I., Joyce, J., & al., et. (2016). Guidelines for the follow-up of patients undergoing bariatric surgery. *Clinical Obesity*, *6*(3), 210–224. https://doi.org/10.1111/cob.12145

Osadchiy, V., Mayer, E. A., Bhatt, R., Labus, J. S., Gao, L., Kilpatrick, L. A., Liu, C., Tillisch, K., Naliboff, B., Chang, L., & al., et. (2019). History of early life adversity is associated with increased food addiction and sex-specific alterations in reward network connectivity in obesity. *Obesity Science & Practice*, *5*(5), 416–436. https://doi.org/10.1002/osp4.362

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., & al., et. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *International Journal of Surgery*, *88*, 105906–105906. https://doi.org/10.1016/j.ijsu.2021.105906

Peterhänsel, C., Linde, K., Wagner, B., Dietrich, A., & Kersting, A. (2017). Subtypes of Personality and 'Locus of Control' in Bariatric Patients and their Effect on Weight Loss, Eating Disorder and Depressive Symptoms, and Quality of Life. *European Eating Disorders Review*, *25*(5), 397–405. https://doi.org/10.1002/erv.2534

Puhl, R. M., Quinn, D. M., Weisz, B. M., & Suh, Y. J. (2017). The Role of Stigma in Weight Loss Maintenance Among U.S. Adults. *Annals of Behavioral Medicine*, *51*(5), 754–763. https://doi.org/10.1007/s12160-017-9898-9

Qasim, A., Turcotte, M., Souza, R. J. de, Samaan, M. C., Champredon, D., Dushoff, J., Speakman, J. R., & Meyre, D. (2018). On the origin of obesity: identifying the biological,

environmental and cultural drivers of genetic risk among human populations. *Obesity Reviews*, *19*(2), 121–149. https://doi.org/10.1111/obr.12625

Ribeiro, G. A. N. de A., Giapietro, H. B., Belarmino, L. B., & Salgado-Junior, W. (2018). Depression, Anxiety, and Binge Eating Before and After Bariatric Surgery: Problems That Remain. *ABCD. Arquivos Brasileiros de Cirurgia Digestiva (São Paulo)*, *31*(1), e1356–e1356. https://doi.org/10.1590/0102-672020180001e1356

RIBEIRO, G. A. N. de A., GIAPIETRO, H. B., BELARMINO, L. B., & Salgado-Junior, W. (2018). DEPRESSION, ANXIETY, AND BINGE EATING BEFORE AND AFTER BARIATRIC SURGERY: PROBLEMS THAT REMAIN. *ABCD. Arquivos Brasileiros de Cirurgia Digestiva (São Paulo)*, *31*(01), e1356. https://doi.org/10.1590/0102-672020180001e1356

Ribeiro, G. A. N. de A., Santos, J. E. dos, & Loureiro, S. R. (2011). Perfil psicológico de mulheres e a cirurgia bariátrica: Estudo exploratório. *Revista Interamericana de Psicología/Interamerican Journal of Psychology*, *45*(2), 169–176. https://www.redalyc.org/articulo.oa?id=28422741007

Roehrig, M., Masheb, R. M., White, M. A., Rothschild, B. S., Burke-Martindale, C. H., & Grilo, C. M. (2009). Chronic Dieting Among Extremely Obese Bariatric Surgery Candidates. *Obesity Surgery*, *19*(8), 1116–1123. https://doi.org/10.1007/s11695-009-9865-z

Rojas, C., Brante, M., Miranda, E., & Pérez-Luco, R. (2011). Descripción de manifestaciones ansiosas, depresivas y autoconcepto en pacientes obesos mórbidos, sometidos a cirugía bariátrica. *Revista Médica de Chile*, *139*(5), 571–578. https://doi.org/10.4067/s0034-98872011000500002

Rojas, C., Brante, M., Miranda, E., & Prez-Luco, R. (2011). Descripcin de manifestaciones ansiosas, depresivas y autoconcepto en pacientes obesos mrbidos, sometidos a ciruga baritrica. *Revista Mdica de Chile*, *139*(5), 571–578. https://doi.org/10.4067/s0034-98872011000500002

Román, C. J. V. der H., Cubas, S. E., Tirado-González, S., Pérez-Martínez, E., Sebastian, S. O., Caballero, J. L. E., Rodríguez-Marín, J., & Leal-Costa, C. (2017). Changes in quality of life in patients undergoing bariatric surgery following 24-months: comparison between gastric bypass and tubular vertical gastrectomy. *Anales Del Sistema Sanitario de Navarra*, *40*(2), 199–209. https://doi.org/10.23938/assn.0032

Roth, A. E., Thornley, C. J., & Blackstone, R. P. (2020). Outcomes in Bariatric and Metabolic Surgery: an Updated 5-Year Review. *Current Obesity Reports*, *9*(3), 380–389. https://doi.org/10.1007/s13679-020-00389-8

Rutledge, T., Ellison, J. K., & Phillips, A. S. (2020). Revising the bariatric psychological evaluation to improve clinical and research utility. *Journal of Behavioral Medicine*, *43*(4), 660–665. https://doi.org/10.1007/s10865-019-00060-1

Rydén, A., Sullivan, M., Torgerson, J. S., Karlsson, J., Lindroos, A.-K., & Taft, C. (2003). Severe obesity and personality: a comparative controlled study of personality traits. *International Journal of Obesity*, *27*(12), 1534–1540. https://doi.org/10.1038/sj.ijo.0802460

Sarma, S., Sockalingam, S., & Dash, S. (2021). Obesity as a multisystem disease: Trends in obesity rates and obesity-related complications. *Diabetes, Obesity and Metabolism*, *23*(S1), 3–16. https://doi.org/10.1111/dom.14290

Segura-Serralta, M., Perpiñá, C., Ciscar, S., Blasco, L., Espert, R., Romero-Escobar, C., Domínguez, J. R., & Oltra-Cucarella, J. (2019). Executive functions and emotion regulation in obesity and eating disorders. *Nutricion Hospitalaria*, *36*(1), 167–172. https://doi.org/10.20960/nh.02016

Siegrist, M., Bearth, A., & Hartmann, C. (2022). The impacts of diet-related health consciousness, food disgust, nutrition knowledge, and the Big Five personality traits on perceived risks in the food domain. *Food Quality and Preference*, *96*, 104441. https://doi.org/10.1016/j.foodqual.2021.104441

Smith, K. E., Orcutt, M., Steffen, K. J., Crosby, R. D., Cao, L., Garcia, L., & Mitchell, J. E. (2019). Loss of Control Eating and Binge Eating in the 7 Years Following Bariatric Surgery. *Obesity Surgery*, *29*(6), 1773–1780. https://doi.org/10.1007/s11695-019-03791-x

Spitznagel, M. B., Alosco, M., Strain, G., Devlin, M., Cohen, R., Paul, R., Crosby, R. D., Mitchell, J. E., & Gunstad, Ph. D. J. (2013). Cognitive function predicts 24-month weight loss success after bariatric surgery. *Surgery for Obesity and Related Diseases*, *9*(5), 765–770. https://doi.org/10.1016/j.soard.2013.04.011

Sutin, A. R., Ferrucci, L., Zonderman, A. B., & Terracciano, A. (2011). Personality and obesity across the adult life span. *Journal of Personality and Social Psychology*, *101*(3), 579–592. https://doi.org/10.1037/a0024286

Syan, S. K., Owens, M. M., Goodman, B., Epstein, L. H., Meyre, D., Sweet, L. H., & MacKillop, J. (2019). Deficits in executive function and suppression of default mode network in obesity. *NeuroImage: Clinical*, *24*, 102015. https://doi.org/10.1016/j.nicl.2019.102015

Tækker, L., Christensen, B. J., & Lunn, S. (2018). From bingeing to cutting: the substitution of a mal-adaptive coping strategy after bariatric surgery. *Journal of Eating Disorders*, *6*(1), 24. https://doi.org/10.1186/s40337-018-0213-3

Vainik, U., Dagher, A., Dubé, L., & Fellows, L. K. (2013). Neurobehavioural correlates of body mass index and eating behaviours in adults: A systematic review. *Neuroscience & Biobehavioral Reviews*, *37*(3), 279–299. https://doi.org/10.1016/j.neubiorev.2012.11.008

Veroniki, A. A., Jackson, D., Bender, R., Kuss, O., Langan, D., Higgins, J. P. T., Knapp, G., & Salanti, G. (2019). Methods to calculate uncertainty in the estimated overall effect size from a random-effects meta-analysis. *Research Synthesis Methods*, *10*(1), 23–43. https://doi.org/10.1002/jrsm.1319

Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software*, *36*(3), 1–48. https://doi.org/https://doi.org/10.18637/jss.v036.i03

Williams-Kerver, G. A., Steffen, K. J., & Mitchell, J. E. (2019). Eating Pathology After Bariatric Surgery: an Updated Review of the Recent Literature. *Current Psychiatry Reports*, *21*(9), 86–86. https://doi.org/10.1007/s11920-019-1071-7

Wolfe, B. M., Kvach, E., & Eckel, R. H. (2016). Treatment of Obesity. *Circulation Research*, *118*(11), 1844–1855. https://doi.org/10.1161/circresaha.116.307591

Yu, Y., Kalarchian, M. A., Ma, Q., & Groth, S. W. (2021). Eating patterns and unhealthy weight control behaviors are associated with loss-of-control eating following bariatric surgery. *Surgery for Obesity and Related Diseases*, *17*(5), 976–985. https://doi.org/10.1016/j.soard.2021.01.008

Zwaan, M. de, Enderle, J., Wagner, S., Mühlhans, B., Ditzen, B., Gefeller, O., Mitchell, J. E., & Müller, A. (2011). Anxiety and depression in bariatric surgery patients: A prospective, follow-up study using structured clinical interviews. *Journal of Affective Disorders*, *133*(1–2), 61–68. https://doi.org/10.1016/j.jad.2011.03.025

5 MANUSCRIPT 2: SELF-REPORTS DON'T TELL THE WHOLE STORY: A STUDY OF CANDIDATES FOR BARIATRIC SURGERY USING A MULTIMETHOD APPROACH

Submitted to Psychological Injury and Law

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Abstract

The increasing obesity rates in the last decades pose a challenge to health care providers, and bariatric surgery is an important tool for treating severe obesity. Because various psychological factors are known to influence the long-term outcome of bariatric surgery and failure of bariatric surgery can lead to psychological harm, candidates for bariatric surgery usually undergo thorough psychological evaluations before being approved for surgery. However, the information obtained through these evaluations comes primarily from self-report measures, which are largely influenced by the ability and willingness of individuals to focus on and describe their own psychological characteristics. To examine the extent to which different assessment methods yield different psychological profiles of bariatric surgery-seeking patients, 50 patients with obesity (BMI = 44.9 ± 6.4 kg/m^2) seeking bariatric surgery and 29 eutrophic controls (n = 29; BMI = 23.1 ± 2.8 kg/m^2) were administered: (a) some self-report measures assessing psychopathology and emotion regulation; (b) a maximal performance (neuropsychological) test; and (c) a typical performance (personality) test. Statistical analyses showed that when compared to the control group, patients with obesity self-reported lower levels of mental illness, although they showed poorer performance on the maximal performance test and increased defensiveness on the typical performance test. We conclude that the use of a multimethod approach and the assessment of positive response bias are crucial in pre-surgery evaluations.

Keywords: bariatric surgery, multimethod assessment, Rorschach.

5.1 Introduction

Obesity is a health condition in which excess body fat increases physical and metabolic burden, which may pose a risk for increased morbidity and mortality (Maggi et al., 2015). Multiple aspects concur with the increased adiposity, such as genetic predisposition, cultural context, and social conditions, including opportunities to lead an active life and access nutritious foods (Ahima, 2016). Eating and nutritional habits are a key aspect of obesity risk and development and emerge in the context of personal experiences with food, which include emotions, memories, thoughts, and behaviors related to food choices and eating (Robinson et al., 2020).

Obesity rates have increased notably in recent decades (OECD, 2019). At the same time, it has recently become clear to professionals that deciphering the influence of certain factors on the development and exacerbation of obesity is essential for the appropriate management of obesity risks (Campos et al., 2011; Malik et al., 2020). Therefore, the contribution of psychological factors to disordered eating and obesity has received increasing attention in the scientific literature (Robinson et al., 2020).

Bariatric surgery is a procedure for the treatment of severe obesity in which individuals with a body weight greater than 40 kg/m2 or 35 kg/m2 with concomitant diseases undergo surgical reduction of their gastrointestinal apparatus to reduce the intake and absorption of calories (Vetter et al., 2011). These procedures are recommended for patients with severe obesity who had not responded to previous treatments to control body weight with nonsurgical, pharmacologic, or behavioral therapies (Wolfe et al., 2016). Although the evidence for the effectiveness of surgery in reducing weight and improving patients' metabolism and physical health is compelling, some studies report rates of weight regain and inadequate weight loss after surgery ranging from 20% to 38% of patients (Amundsen et al., 2017; King et al., 2020; Roth et al., 2020; Velapati et al., 2018)

In particular, a large number of studies show that the presence of psychopathology increases the risk of regaining weight after surgery (Cambi et al., 2021; King et al., 2020; Mauro et al., 2019; Testa et al., 2019). Indeed, meta-analytic results show that eating-related psychopathology is associated with worse weight-loss outcomes in patients undergoing surgery (Mauro et al., 2019). Other problems, such as the presence of depressive symptoms and specific personality characteristics, also appear to be associated with weight-regain (Amundsen et al., 2017; Ansari & Elhag, 2021; Freire et al., 2021; Martin-Fernandez et al., 2021).

In addition, some other aspects of psychological functioning may also influence the outcomes of bariatric surgery. For example, several studies have shown that emotional eating and loss of control over eating are associated with poorer surgical outcomes (Geller et al., 2020; Meany et al., 2013; Ogden et al., 2011; Sarwer et al., 2019; Williamson et al., 2018; Yu et al., 2021). Moreover, individuals with impaired cognitive abilities also present worse trajectories of weight loss after surgery (Galioto et al., 2015; Spitznagel et al., 2013, 2014). Furthermore, personality aspects such as *demoralization*, *dysfunctional negative emotions*, *antisocial behavior*, *hypomanic activation* scales of the Minnesota Multiphasic Personality Inventory (MMPI-2-RF; (Ben-Porath & Tellegen, 2008), and *anxiety-related disorders* and *alcohol problems*, and *mania* scales of the Personality Assessment Inventory (PAI; Morey, 1991, 2007) have also been associated with poorer surgical outcomes (Hoyt & Walter, 2022; Martin-Fernandez et al., 2021).

In a recent publication, Rutledge et al. (2020) discuss the limitations of current assessment practices related to bariatric surgery and the lack of a general "psychological profile" that could be generalized and predict worse outcomes after surgery. The authors argue that psychological assessment in this context should improve its utility by focusing on patient-centered goals related to treatment and not just psychopathology (Rutledge et al., 2020). However, it is important to emphasize that most of the evidence for the influence of the psychological factors described above on the outcomes of bariatric surgery is based on the results of regular assessment procedures adopted by clinical obesity treatment programs, which rely primarily on self-reports (Marek et al., 2016). Because the source of information is an essential aspect of how psychological characteristics are measured and interpreted, it is strongly recommended that assessors collect data from multiple types of measures to obtain a more reliable and valid interpretation of assessment results (Bornstein, 2016).

5.1.1 This Study

Because most of the literature on the psychological functioning of patients undergoing bariatric surgery focuses on psychopathology (Marek et al., 2016; Pull, 2010), we sought to examine aspects of emotional, cognitive, and personality functioning as well. More importantly, while available studies have relied primarily on information collected using self-report measures, we also wanted to analyze information provided by other types of tests, namely "maximal performance" tests, i.e., highly structured tasks in which the test-taker is observed

while exerting full effort and concentration, and “typical performance” tests, i.e., tests that assess the test-taker’s psychological functioning in a less structured context in which the evaluee can rely on their own preferences in accomplishing the presented task(s).

We hypothesized that individuals with obesity would have greater difficulty regulating emotions and lower levels of cognitive flexibility compared with eutrophic individuals, as well as present lower levels of psychological resources and poorer self-presentation. However, we also anticipated that the different types of tests included in our study would likely yield different results because they assess the same individuals from different perspectives. More generally, thus, we aimed to contribute to understanding the advantages associated with assessing candidates for bariatric surgery using a multimethod psychological approach.

5.2 Method

5.2.1 Study Design

In this study, we used a cross-sectional design to examine characteristics of personality functioning, emotion regulation, and executive functioning in individuals with obesity who were applying to bariatric surgery and in normal weight control subjects. We used the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (Ghaferi et al., 2021) to report the methods and findings of the studies.

5.2.2 Setting

This study included a clinical sample of patients who applied for bariatric surgery at a reference university hospital in Brazil and a normal weight control sample. Patients were recruited after being regularly assessed by all team professionals and giving informed consent for bariatric surgery. Matched control subjects were recruited in the community sample via social media announcements and personal contacts of the researchers to identify eligible participants for the study.

5.2.3 Participants

For the patient group, participants were eligible if they were clinically approved for bariatric surgery and met all team requirements, i.e., 18 years of age or older and a BMI > 40 kg/m^2 or >35 kg/m^2 with clinical comorbidities, without clinically significant psychiatric symptoms or neurological impairment. They were required to lose 15% of their baseline weight and attend regular monthly educative group meetings before surgery. These groups were focused on education about the surgery and provided information about the procedures, pre- and post-surgery care, and long-term consequences of the surgery.

Additional inclusion criteria for the patient group were: female patients who were clinically stable according to the team's assessment, had no current psychiatric symptoms, and regularly attended group meetings. We selected only female patients because they are the majority of bariatric patients (Cooper et al., 2021; Fischer et al., 2014) and to reduce the effect of gender on the administered measures, as some of them might be sensitive to gender differences.

For the normal weight sample, women were eligible if they had no current or past history of obesity, no self-reported metabolic diseases (such as diabetes, hypercholesterolemia, thyroid disease, etc), no current diagnosis of a psychiatric disorder, and matched the clinical sample in age and education.

5.2.4 Variables

The obesity status of the clinical sample was determined by regular assessment of height and weight during clinical consultation with a physician to assess eligibility for bariatric surgery. For participants in the normal weight comparison sample, weight status was determined by self-report of current weight and height.

The psychological variables of interest in this study focused on cognitive and affective functioning. Specifically, we examined multidimensional emotion regulation, i.e., the ability to understand and cope with intense emotional states; executive functions, specifically speed processing and cognitive flexibility; and personality characteristics, or the typical way the test-taker perceives, thinks, and responds to their environment.

5.2.5 Measures

All participants were assessed with the following measures:

Sociodemographic and health status. We obtained participants' sociodemographic status, including age, marital status, years of education, current weight, and height (as determined by a physician for the clinical sample and by self-report for the normal weight sample). Health status, including chronic metabolic disease, obesity, or cardiovascular disease in the family history and personal episodes of brain injury, was recorded, too. The clinical sample was also asked about the development of obesity, previous treatments, and highest lifetime weight.

Economic status. It was assessed using the Brazilian Association of Research Companies (ABEP, 2016)'s tool to estimate the purchasing power of Brazilian families based on the consumption of goods and the educational level of the family provider. It classifies the economic situation according to seven levels, with the medium-higher economic status referred to as A, B1 and B2, the lower classes as C1, C2, D and E.

Self-report Questionnaire (SRQ-20). This 20-item scale was developed by the World Health Organization (WHO, 1994) to assess non-psychotic symptoms in a primary care setting. We used the Brazilian adapted and validated version from (Santos et al., 2009). The instrument provides a cut-off score of seven points to determine the presence of possible mental disorders. In the present sample, the scale showed good reliability (Cronbach's alpha = .963).

Patient Health Questionnaire (PHQ-9). The Brazilian adaptation of this instrument (Osório et al., 2009) was used to screen for depressive symptoms. It includes nine items based on the DSM-IV criteria for depressive episodes. Patients are asked about the frequency of occurrence of symptoms in the last two weeks, with scores ranging from none (0 points) to almost every day (3 points). Scores equal to or greater than 10 points indicate a possible depressive episode. The Cronbach's alpha in the current sample was .870, indicating good reliability.

Beck Anxiety Inventory (BAI). The Brazilian adapted version of this measure (Cunha, 2011) was used to assess the intensity of symptoms of anxiety in the past week using a 4-Likert point scale ranging from zero (symptoms did not bother me at all) to four (symptoms bothered me a lot). Brazilian sensitivity studies report cut-off scores of 20 to 30 points indicating moderate anxiety, whereas higher scores indicate severe anxiety. In this sample, we used a

value of 20 points as the cut-off for classification between clinical and normal weight anxiety. Reliability in this sample was excellent, with a Cronbach's alpha of .901.

Difficulties in Emotion Regulation Scale (DERS-16). This multidimensional self-report measure assesses five factors of emotion dysregulation: lack of clarity about emotional states (clarity), non-acceptance of emotional responses (non-acceptance), difficulty in engaging in goal-directed behaviors while experiencing intense emotions (goals), limited access to strategies of emotion regulation (strategies), and difficulty in controlling impulses (Impulses). Respondents are asked to examine the frequency with which each statement applies to them on a 5-point Likert scale ranging from "almost never" to "almost always". A Brazilian adaptation of the 16-item was published by (Miguel et al., 2016), and normative age- and gender-adjusted T-Scores for Brazilian population were used according to procedures described by Colombarolli et al. (2022). In this sample, the reliability of the total sample was excellent, with Cronbach's alpha of .960. Reliability for individual scales ranged from .844 (Impulse) to .916 (Clarity).

Trail Making Test (TMT). This neuropsychological test measures two aspects of executive functions: processing speed is measured in TMT-A, in which subjects must connect a series of numbers (1 to 25) scattered on a sheet in crescentic order; and cognitive flexibility in TMT-B, in which subjects are asked to connect a series of letters and numbers alternately (A to L and 1 to 13) in alphabetical and crescentic order, respectively, without removing the pencil from the sheet. We used the original standard administration (Strauss et al., 2006) scores on each part are measured in seconds to complete the task, and errors are not considered in scoring, where lower execution time in each part indicates better performance. Normative comparisons were based on the study by Hamdan e Hamdan (2009) which provides normal weight normative parameters based on a sample of 314 adults aged 18 to 81 years and with an educational level of 10.9 years.

Rorschach Performance Assessment System (R-PAS). The Rorschach Inkblot Method (RIM) consists of 10 cards with inkblot designs that are shown to the test-taker with the request to answer respond to the question "What might this be?" Responding to these relatively ambiguous stimuli provides the individual with a structured context in which verbal and nonverbal behaviors represent their typical way of perceiving, thinking about and responding to the environment, revealing their problem-solving abilities. We used the standard R-PAS guidelines to administer and interpret the RIM (Meyer et al., 2011). Unlike other RIM systems,

R-PAS is intended to meet evidence-based requirements so that it can be used high-stakes assessment contexts (Viglione et al., 2022; see also Ales et al., 2022).

Interpretatively-relevant R-PAS scores provide the overall characteristics of the test-taker's personality in five dimensions: Administration behaviors and observations, Cognitive Engagement and Processing, Perception and Thinking Problems, Stress and Distress, and Self and Others Representations. Raw scores are normalized to a mean of 100 and a standard deviation of 15 points, representing the individual's performance compared to the international normative reference values of the R-PAS method. In addition, because the number and complexity of the responses of a Rorschach protocol influence all R-PAS summary scores (Meyer et al., 2011), R-PAS also offers Complexity-Adjusted scores, i.e., scores that remove from summary R-PAS scores the effects of unusually high or unusually low respondent engagement.

To assess interrater reliability, an individual blind to the scores coded by the primary investigator independently recoded 33 of all Rorschach protocols, and intraclass correlation coefficients (ICC) were calculated by considering the summary scores. Results revealed that ICCs ranged from .27 (MAH) to .99 (R), with a mean ICC of .72 (SD = .18). Based on Cicchetti (1994) benchmarks for interpreting ICC values, of the 60 variables included in R-PAS summary output, 30 had excellent interrater reliability (ICC > .74), 14 had good interrater reliability (ICC > .60), 12 had fair interrater reliability (ICC>.40), and 4 had poor interrater reliability (ICC ≤ .40). The four variables with poor interrater reliability were: Mutuality of Autonomy Health (MAH) (ICC = .27); Mp/(Ma+Mp) (ICC = .34); proportion of passive movement (p/(a+p)) (ICC = .35); and Color Shading Blend (CBlend) (ICC = .37). Accordingly, the results of these four variables should be interpreted with caution.

5.2.6 Procedures

Ethical considerations. This research was submitted and approved by the ethics committee of the University of São Paulo (register n. 66591717.4.0000.5407). All eligible participants were informed of the research goals and procedures, and those who accepted to participate provided written consent.

Data collection. Participants were assessed individually by a trained psychologist proficient in all measures (author M. C.) in a single session. Participants from the clinical sample were assessed at the hospital's facility, and the normal weight sample was assessed in

a private room without interference from the stimulus of the tasks. All measures were administered in the following order: socioeconomic interview, SRQ-20, PHQ-9, BAI, DERS-16, R-PAS, and TMT.

5.2.7 Data analysis

Data of all participants were inserted into a Microsoft Excel spreadsheet and a dataset was created that contained all variables to be analyzed. Data were then analyzed in SPSS 28.0 (IBM). Descriptive statistics, including skewness and kurtosis, were examined to verify the distribution of scores in the two groups according to the parameters of Kim (2013). We used the square root transformation to obtain normalized values of skewed variables, according to the recommendations of Tabachnick e Fidell (2019). Total scores of PHQ-9, BAI, and DERS (all subscales) had skewed distributions, and after normalization procedures, only DERS scores remained non-normally distributed. For the R-PAS, the raw standard scores of IntCont, V, CBlend, T, and PER were skewed, and the normalization process was unsuccessful. We proceeded by using both parametric and nonparametric analyses in all non-normally distributed variables, and if there were no differences between the results, we reported the results of the parametric statistics.

As noted above, the reliability of all measures in the sample was assessed using Cronbach's alpha for self-report measures, and ICCs for the Rorschach. For the main analyses, we computed a series of independent t-test analyses and compared the scores generated by the obese and control groups. Specifically, we compared the mean raw scores generated by the two groups on clinical symptoms scales (SRQ-20, PHQ-9 and DERS). In addition, for each scale, we also compared the number of individuals with scores above versus below the target cut-off(s), using chi-square analyses. Whenever possible, t-test comparisons were made using standardized scores. As such, for the DERS, age and gender-adjusted T-Scores were generated according to procedures described by Colombarolli et al. (2022). For the R-PAS, standardized scores and complexity-adjusted scores were examined. Raw scores of TMT-A and B (time) were used to compare cognitive flexibility between groups, and two one-sample t-tests were used to compare mean scores of each group to the normative reference values. A significance level of 95% ($p < .05$) was considered for all analyses.

5.3 Results

5.3.1 Sample description

During recruiting period, circa 250 patients applied and had their recommendations for surgery approved in the hospital where the research was carried out. Of these, 150 were women, and 52 were men. Of the 150 eligible patients from the bariatric surgery facility, 54 were invited during a regular follow-up visit, from which three refused participation and one dropped out before completing research protocol measures. The final clinical sample was comprised of 50 participants.

For the normal weight sample, we obtained 21 responses from social media publications, and the leading researcher directly contacted 33 people from the community to invitate for participating in the research. Of the 54 eligible participants invited to participate, one refused to participate, one was excluded due to clinical manifestations during the assessment, and 23 were not able to attend the assessment session. The final normal weight sample was comprised of 29 women.

A description of the sample's socioeconomic status is presented in Table 5.1. Participants in the clinical and normal weight samples were matched for age and educational level. They differed significantly regarding BMI, with the clinical sample's mean referring to class III obesity, while the normal weight sample had a mean BMI in the normal range.

Table 5.1. Socioeconomic status of participants in clinical and nonclinical samples.

Variable	Bariatric Patients (n = 50)		Normal weight (n = 29)				
	M (SD)	*Min/Max*	*M (SD)*	*Min/Max*	*t*	*p*	*d*
Age	39.4 (10.5)	22/60	36.1 (13.0)	18.0/60.0	1.282	.204	.30
Education	10.4 (3.5)	3/17	11.5 (3.8)	3.0/18.0	-1.340	.184	-.31
BMI[a]	44.9 (6.4)	35.6/58.9	23.1 (2.8)	16.9/28.5	20.912	<.001	4.1
	n	*%*	*n*	*%*	X^2	*p*	
Marital Status							
Single	11	22	13	45			
Married	36	72	14	48	9.425[b]	.01	
Divorced	2	4	2	7			
Widow	1	2	-	-			
Socioeconomic status[c]							
Medium-high	15	30	14	48	2.639	.08	
Low	35	70	15	52			

Note. BMI, Body Mass Index
[a] Levene's test indicated violation of assumption of equal variances, statistics are based on Welch's comparison test.
[b] Marital status were grouped into three groups: single, married and other to perform X^2 analysis.
[c] Medium-high socioeconomic level are those in A, B1 and B2; Low socioeconomic level are C1, C2, D and E according to Brazilian Economic Classification Criteria for estimate economic status (ABEP, 2016).

The clinical sample differed from the normal weight sample regarding marital status, but were no significantly different socioeconomically. While the majority of the participants in the clinical sample were married (72%) and from low-income level (36% and 35%, respectively), normal weight participants were almost equally married or single (45% and 48% respectively) and more equally distributed along all economic levels.

5.3.2 Clinical symptoms

Mean scores on clinical symptoms scales (SRQ-20, PHQ-9 and BAI) were significantly different for scores of depression and marginally significant for general non-psychotic psychopathology and anxiety, with the normal weight sample presenting higher mean scores in all measures (Table 5.2). Groups did not differ in terms of the proportion of clinical cases,

except for general psychopathology assessed through SRQ-20, where the normal weight sample presented more psychopathology ($X^2 = 5.570$, $p = .018$). Regardless of the differences, the mean scores of both groups were below clinical threshold for the Brazilian samples.

Table 5.2. Comparison of scores in clinical symptoms between bariatric patients and nonclinical group (N = 79).

Measure	Bariatric (n = 50)			Normal weight (n = 29)					
	M	*SD*	*Min/Max*	*M*	*SD*	*Min/Max*	*t*	*p*	*d*
SRQ-20	3.3	3.2	0/14	5.2	4.3	0/14	-2.014	.050	-.508
PHQ-9	2.6	4.5	0/24	5.2	6.6	0/23	-2.170	.033	-.507
BAI	4.9	8.7	0/39	7.7	8.6	0/26	-1.916	.059	-.447

SRQ-20, Self-Report Questionnaire; PHQ-9, Patient Health Questionnaire; BAI, Beck Anxiety Inventory

5.3.3 Emotion regulation

Ajusted T-Scores on DERS revealed that the clinical sample presented lower difficulties regulating emotions than the normal weight sample, as presented in Table 5.3. When looking at the total mean raw scores, groups were also significantly different (Bariatric, $M = 23.8$, $SD = 12.4$; Normal weight, $M = 34.0$, $SD = 15.5$; $t = -3.034$, $p = .004$, $d = -.75$).

Table 5.3. Comparison between clinical and nonclinical normative adjusted T-scores on DERS.

DERS	Bariatric (n = 50)		Normal weight (n = 29)				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Clarity	41.7	7.1	47.5	9.7	-2.809	.007	-.71
Nonacceptance	41.1	6.9	45.1	10.6	-1.847	.072	-.48
Goals	38.1	8.1	44.3	10.2	-2.995	.004	-.38
Impulses	37.1	6.7	41.3	8.5	-2.290	.026	-.56
Strategies	38.7	8.0	43.8	10.3	-2.319	.025	-.57
Total	36.2	8.6	42.7	10.8	-2.761	.008	-.68

Note. Both *t*-test and Mann-Whitney analyses yielded similar results, so the parametric statistics are reported here.

The age and gender-adjusted standardized T-scores revealed that bariatric patients reported 1.5 SD below the normative reference sample, referring to lower difficulties in goal-oriented behavior when experiencing intense emotions and less difficulties in controlling impulses. They reported less difficulties in all dimensions of emotion regulation and total emotion dysregulation scores compared to the normative and the eutrophic sample, with groups differing significantly in all but one dimension (nonacceptance of emotions).

5.3.4 Executive functions

Performance on executive function measures revealed that groups did not differ significantly on speed processing and cognitive flexibility, as shown in Table 5.4. When comparing to the normative reference community sample of adults with 9 to 11 years of education (Hamdam & Hamdam, 2009), the scores from TMT-A were not significantly different from normative reference scores (Bariatric: t = 1.334, p = .188, d = .19; Normal weight: t = -.045, p = .965, d = -.01). For the TMT-B, however, the group with obesity presented lower performance of cognitive flexibility, with a significant and medium effect size difference (Bariatric: t = 3.298, p = .002, d = .47; Normal weight: t = 1.915, p = .066, d = .356).

Table 5.4. Comparison between clinical and nonclinical sample on measures of cognitive flexibility

Measure	Bariatric (n = 50)		Normal weight (n = 29)				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
TMT-A[a]	40.4	17.0	37.1	15.8	.862	.391	.201
TMT-B[a]	106.0	65.2	96.4	58.5	.653	.515	.153

[a] Average time in seconds

5.3.5 Personality characteristics

R-PAS variables on page 1 and page 2 were compared between samples to verify differences between groups and discrepancies with normative expectations, using raw standard scores. A significant moderate difference was found in the Complexity scores of patients with obesity when compared to controls. Raw standard scores of 84.2 (SD = 13.1) indicate that they

presented Complexity below 1.5 SD of normative reference values. We investigated if components of Complexity, namely location, space and object (LSO), content or determinant complexity were different between groups. Comparison showed that bariatric and eutrophic did not differ in LSO complexity (t = -.946, p = .35, d = -.22), but bariatric showed significantly lower levels of content complexity (M = 85.3; SD = 11.2 for bariatric group; M = 90.7, SD = 11.1 for eutrophic; t = -2.086, p = .04, d = .48) and determinant complexity (M = 85.1; SD = 12.7 for bariatric group; M = 91.2, SD = 11.8 for eutrophic; t = -2.124, p = .01, d = .49).

As recommended by R-PAS guidelines, due to these low scores, we compared groups using the Complexity-adjusted scores in order to adjust effect of low engagement on interpretation. The results in Table 5.5 reveal that the bariatric sample provided more responses with the Synthesis of objects (Sy) than the normal weight sample. On the other hand, passive movement responses were higher in the normal weight sample, as were the proportion of responses on cards 8, 9, and 10, which were marginally significant. On the Stress and Distress domain, responses with achromatic color were marginally significant, with higher scores presented by the eutrophic individuals. Reduced levels of AGC in the clinical sample remained marginally significant compared to the control group.

Table 5.5. Comparison between clinical and nonclinical samples' Page 1 and Page 2 Complexity Adjusted Standard Scores.

R-PAS Variable		Bariatric			Normal weight					
		N	*M*	*SD*	*N*	*M*	*SD*	*t*	*p*	*d*
Engagement and Cognitive Processing										
Page 1	R	49	100.3	10.0	29	100.2	12.7	.067	.946	.016
	F%	49	102.4	14.7	29	98.7	13.8	1.111	.270	.26
	Blend	49	96.1	8.6	29	96.9	7.2	-.447	.656	-.105
	Sy	49	103.1	6.1	29	99.9	6.9	2.153	**.034**	.505
	MC	49	100.5	9.7	29	101.1	9.8	-.279	.781	-.065
	MC-PPD	49	103.3	12.3	29	102.4	12.4	.321	.749	.075
	M	49	103.6	9.5	29	100.9	11.0	1.125	.264	.264
	M/MC	39	114.8	16.9	26	106.0	18.8	1.539	.128	.36
	CF+C/SumC	14	109.1	13.0	13	110.1	12.1	-.544	.588	-.127
Page 2	W%	49	99.9	11.9	29	99.8	15.7	.046	.963	.011
	Dd%[a]	49	93.5	11.7	29	93.8	14.2	-.121	.904	-.028
	SI	49	92.6	7.7	29	93.7	10.0	-.506	.614	-.119
	IntCont	49	95.1	10.6	29	95.9	13.4	-.277	.782	-.065
	Vg%	49	97.3	14.0	29	97.8	16.1	-.130	.897	-.031
	V[a]	49	94.5	5.7	29	96.2	6.8	-1.153	.254	-.284
	FD[a]	49	101.2	6.1	29	103.4	9.2	-1.307	.195	-.306

	R8910%	49	**89.1**	15.5	29	95.1	12.2	-1.765	**.082**	-.414
	WSumC	49	95.4	10.9	29	98.7	13.4	-1.176	.243	-.275
	C[a]	49	102.4	10.6	29	107.4	14.5	-1.619	.112	-.411
	Mp/(Ma+Mp)	32	106.2	14.0	17	111.0	12.3	-2.078	**.041**	-.487
Perception and Thinking Problems										
Page 1	EII-3	49	110.5	13.0	29	109.7	14.6	.264	.793	.062
	TP-Comp	49	113.1	15.2	29	113.2	15.0	-.018	.986	-.004
	WSumCog	49	102.5	11.4	29	102.6	13.9	-.007	.994	-.002
	SevCog	49	99.3	10.9	29	100.6	13.2	-.476	.636	-.111
	FQ-%	49	114.9	16.7	29	115.1	15.4	-.040	.969	-.009
	WD-%	49	107.9	15.0	29	108.7	14.7	-.216	.830	-.051
	FQo%	49	90.3	12.4	29	91.1	14.6	-.251	.803	-.059
	P	49	98.0	14.5	29	96.4	14.8	.462	.646	.108
Page 2	FQu% [a]	49	99.4	12.4	29	97.2	14.2	.711	.479	.167
Stress and Distress										
Page 1	m	49	99.4	10.5	29	97.7	10.4	.692	.491	.162
	Y	49	101.3	11.0	29	98.7	9.5	1.051	.296	.246
	MOR	49	99.3	12.4	29	97.3	11.0	.690	.493	.162
	SC-Comp	49	96.3	11.1	29	95.2	12.3	.422	.675	.099
Page 2	PPD	49	100.1	8.3	29	101.0	8.2	-.453	.652	-.106
	YTVC'	49	96.8	9.2	29	99.3	10.0	-1.122	.265	-.263
	CBlend[a]	49	93.6	5.4	29	92.1	2.9	1.587	.117	.322
	C'	49	96.0	9.9	29	101.3	13.8	-1.946	**.055**	-.456
	CritCont%[a]	49	96.7	15.7	29	100.6	10.1	.423	.673	.099
Self and Other Representation										
Page 1	ODL	49	105.0	14.0	29	100.0	15.5	1.444	.153	.338
	SR [a]	49	92.2	8.5	29	96.1	10.6	-1.666	.102	-.412
	MAP/MAHP	49	95.1	9.5	29	93.5	8.1	1.108	.272	.259
	PHR/GPHR	44	106.9	13.8	27	106.0	17.7	.086	.931	.02
	M-	49	102.3	10.8	29	103.1	11.1	-.291	.772	-.068
	AGC	49	**87.3**	9.5	29	91.7	10.3	-1.890	**.063**	-.443
	V-Comp	49	96.6	8.9	29	96.1	9.2	.216	.830	.051
	H	49	103.9	12.6	29	103.8	13.0	.037	.970	.009
	COP[a]	49	107.3	7.8	29	105.8	11.6	.607	.547	.157
	MAH[a]	49	97.2	8.8	29	99.2	12.1	-.792	.432	-.201
Page 2	SumH	49	103.5	9.6	29	104.3	10.1	-.357	.722	-.084
	NPH/SumH	49	96.1	9.3	29	97.2	9.9	.664	.509	.156
	p/(a+p)	49	106.8	9.8	29	106.9	11.5	-1.010	.316	-.237
	AGM[a]	49	98.2	7.9	29	96.5	7.0	.978	.332	.222
	T[a]	49	92.6	4.9	29	94.7	7.6	-1.307	.198	-.341
	PER	49	96.3	9.1	29	94.9	6.5	.700	.486	.164
	An	49	106.3	13.4	29	106.8	15.4	-.134	.893	-.032

[a] Assumption of equal variances violated in Levene's test. Welch's t test reported

5.4 Discussion

The aim of the present study was to compare the psychological functioning of women with obesity who were about to undergo bariatric surgery with eutrophic controls, using a multimethod approach to conduct the psychological assessment. More specifically, we assessed our participants' clinical symptoms, emotion regulation, cognitive flexibility, and personality characteristics of our participants using multiple sources of information, i.e., self-report, maximal performance, and typical performance measures. Overall, the results of our analyses showed that patients with obesity self-reported lower levels of mental illness, although they performed worse on the maximal performance test (TMT) and were more defensive on the typical performance test (R-PAS).

Of particular note is the fact that individuals seeking bariatric surgery self-reported *fewer* depression and anxiety symptoms and *fewer* non-psychotic psychiatric symptoms compared with eutrophic participants. Indeed, it is commonly reported in the literature that patients with obesity tend to be *more* affected by psychiatric symptoms (Carpenter et al., 2000; Dreber et al., 2015; Duarte-Guerra et al., 2015), so the pattern of findings observed in our study points in the opposite direction compared with the existing literature. On the one hand, the obese patients involved in our study were in an outpatient facility preparing for surgery, had already been assessed by a psychologist, and received appropriate care during visits and group meetings for a long period. All of these may have contributed to the reduction in psychiatric symptoms (Kalarchian & Marcus, 2015) and may help explain this counterintuitive finding. However, in our opinion, a more important factor is that our patient group likely exhibited a positive response bias, as we discuss in more detail below.

Contrary to our hypothesis, individuals in the clinical sample not only self-reported *fewer* clinical symptoms than controls, but also *lower* levels of emotion dysregulation than would be expected from nonclinical individuals. In fact, the patient group's DERS scores were significantly lower compared to both the control group and normative expectations (Colombarolli et al., 2022; Miguel et al., 2016). Although the aims and procedures of the study were explained in detail and patients knew that our psychological assessment would not affect their status in relation to surgery, we could not think of a reasonable explanation for why the clinical sample might have even *better* emotion regulation skills than controls and normative reference samples. In our opinion, the most likely explanation for this controversial result is that patients portrayed themselves more positively and less pathologically (positive response

bias), possibly because they suspected that their surgery might be denied if they showed psychological vulnerability on our assessment – although we made it clear that this would not happen. Indeed, research studies have repeatedly shown that patients with obesity tend to have higher levels of alexithymia and lower ability to regulate emotions compared with nonclinical controls (de Campora et al., 2016; Giromini et al., 2012; Sim & Zeman, 2005, 2006; Whiteside et al., 2007). While the fact that the patients in our study had already spent some time in an outpatient facility could (perhaps) explain the lack of significant differences in emotion regulation compared with controls, it is highly unlikely that this brief experience contributed to these patients' ability to regulate their emotions even *better* than controls and normative samples. In our opinion, the most likely explanation for this controversial result remains the possibility that a positive response bias was present.

Consistent with this explanation, previous studies have described the presence of a positive response bias in individuals seeking to undergo bariatric surgery. For example, patients being considered for bariatric surgery have been reported to downplay their depressive symptoms (Fabricatore et al., 2007) and tobacco use (Wolvers et al., 2020) and to understate symptoms and difficulties related to their mental health in self-report measures such as the MMPI (Walfish, 2007).

In addition, it has been reported that patients who apply for bariatric surgery often have lower scores on the DERS than patients with severe obesity who do not apply for surgery. For example, in a study examining the relationship between emotion regulation difficulties and interoceptive awareness in moderate and severe obesity, Willem et al. (2019) found that the mean DERS score in patients with severe obesity was 90.9 (±26.1). Similarly, Czepczor-Bernat et al. (2020) assessed a sample of women with overweight and obesity without a current Axis I diagnosis and found that the mean DERS score in this sample was 95.0 (±27.2). In contrast, in several studies of patients seeking bariatric surgery (Benzerouk et al., 2021; Taube-Schiff et al., 2015), mean DERS scores were consistently lower, ranging from 61.0 (±22.5) (Dalrymple et al., 2018) to 81.2 (±23.3) (Ouellette et al., 2017). Since the latter patients are somewhat motivated to present themselves in a less problematic manner, this further supports the idea of positive impression management.

To some extent, the fact that in our study the performance on the TMT of the patient group was not better than that of the control group also provides some support for the hypothesis that some positive response bias in self-report measures occurred in our patient sample. Indeed,

the scores observed on a test of maximal performance are not sensitive to the direct influence of the evaluee's response bias because "best" performance is precisely the goal of these tasks, so one cannot pretend to be better than the test scores suggest.

More specifically, although the obese and normal-weight participants did not differ significantly on the TMT, obese participants performed significantly worse on the TMT-B, with a medium effect size, when compared with normative expectations (Cserjési et al., 2009; Perpiñá et al., 2017; Syan et al., 2019). This is consistent with previous studies showing that cognitive flexibility, a skill related to executive functions, is generally impaired in individuals with obesity, with possible explanations related to impaired cognitive function due to metabolic pathways (Ho et al., 2018; Mulhauser et al., 2021; Yang et al., 2018). In addition, studies suggest that poorer performance on measures of executive functions may be a risk factor for developing obesity (Groppe & Elsner, 2015; Reinert et al., 2013). Studies have also shown that cognitive impairment in patients undergoing bariatric surgery may predict the course of weight loss, as it may affect their ability to plan appropriately and adhere to post-surgery recommendations (Cortese et al., 2013; Galioto et al., 2016; Spitznagel et al., 2013, 2014).

Regarding personality characteristics, our results showed that bariatric patients presented significantly less complex Rorschach protocols compared with normal-weight controls. This also supports the hypothesis that psychological resources are likely to be limited in patients with severe obesity. In R-PAS, the way someone responds to the task reflects their typical way of perceiving, thinking, and interacting with the context, while relying primarily on internal resources. For this reason, R-PAS is usually conceived as a typical performance (Meyer, 2017; Meyer & Eblin, 2012). In this context, Complexity scores provide information about how much cognitive effort and engagement someone puts into the task, i.e., how many psychological resources they actually use when responding to the task (Ales et al., 2019). Lower Complexity scores could indicate a low availability of such resources, but also a response style in which the person tends to give oversimplified and impoverished responses in order to reveal less about themselves (Meyer et al., 2011).

Although these results taken together support the likely presence of intentional positive impression management in bariatric surgery patients (Ambwani et al., 2013), another possible explanation for these results may be found in the presence of impairment in emotional processing in patients with morbid obesity. In other words, it is possible that the observed downplaying of their problems is related to the fact that these obese patients were unable to

adequately evaluate their own emotional difficulties. Indeed, there is ample evidence that patients with obesity have greater difficulty perceiving and understanding their emotional states, and therefore can poorly inform their own affective functioning (Andrei et al., 2018; Fernandes et al., 2018). These patients tend to be less sensitive to emotion-related stimuli, have more difficulty perceiving internal cues related to emotional experiences, and have less ability to manage their own emotional changes (Giel et al., 2016; Manderino et al., 2015; Willem et al., 2019). This lack of emotional awareness could explain the lower emotion dysregulation scores in the clinical sample and also influence the reduced achromatic color and aggressive content (which could be related to the experience of distress and anger). In this sense, Fernandes et al. (2018) argue that patients with obesity might have difficulty dealing with negative emotions and therefore have a defensive approach to them, which could reflect a low awareness of emotional experiences. Moreover, some studies show that interoceptive sensitivity is related to emotional states and that it is also reduced in obesity, which could further exacerbate unawareness of emotions (Löffler et al., 2018; Pollatos & Schandry, 2008; Scarpazza & Pellegrino, 2018).

In any case, the results of the present study should be considered in light of some limitations. First, the small sample size of the normal-weight sample could make the statistical analysis less powerful in finding significant differences with smaller effect sizes, which could have implications for interpreting the practical differences between people with severe obesity and eutrophics. In addition, the clinical sample included patients from a specific context in a public tertiary care facility and was limited to women, which may not be representative of the entire population with obesity undergoing bariatric surgery. Because public health programs for bariatric surgery typically target populations with lower socioeconomic status, they are also likely to be more vulnerable to psychological and health problems beyond their obesity status, which may influence our interpretation of the results.

Nonetheless, our results provide important evidence for the potential of a multimethod approach to better understand patients in the context of bariatric surgery. Because most of the data we have on the psychological functioning of this population is based on self-reports, either from scales or interviews, this has profound implications for how we can understand and support this population. We believe that our findings contribute to the understanding of the psychological aspects of obesity and its impact on surgical treatment, and that multimethod psychological assessment should be used to improve the validity and effectiveness of

assessment and thus also improve psychological care in the context of obesity treatment. Indeed, evidence suggests that patients who underreport problems are more likely to be readmitted 30 days after surgery with unspecific complaints (Heinberg et al., 2017). Thus, symptom concealment has important implications for the ability of professionals to provide appropriate care and address important aspects of psychological functioning that are essential to the treatment of obesity. In this context, positive response bias poses a substantial challenge to conducting appropriate psychological assessment (Wedin, 2017), so a multimethod assessment that includes maximal and typical performance measures is most likely beneficial.

5.5 References

Ahima, R. S. (2014). *Obesity epidemiology, pathogenesis, and treatment: A multidisciplinary approach*. CRC Press.

Ales, F., Giromini, L., & Zennaro, A. (2019). Complexity and Cognitive Engagement in the Rorschach Task: An Eye-Tracking Study. *Journal of Personality Assessment*, *0*, 1–13. https://doi.org/10.1080/00223891.2019.1575227

Ambwani, S., Boeka, A. G., Brown, J. D., Byrne, T. K., Budak, A. R., Sarwer, D. B., Fabricatore, A. N., Morey, L. C., & O'Neil, P. M. (2013). Socially desirable responding by bariatric surgery candidates during psychological assessment. *Surgery for Obesity and Related Diseases*, *9*, 300–305. https://doi.org/10.1016/j.soard.2011.06.019

Amundsen, T., Strømmen, M., & Martins, C. (2017). Suboptimal Weight Loss and Weight Regain after Gastric Bypass Surgery—Postoperative Status of Energy Intake, Eating Behavior, Physical Activity, and Psychometrics. *Obesity Surgery*, *27*, 1316–1323. https://doi.org/10.1007/s11695-016-2475-7

Andrei, F., Nuccitelli, C., Mancini, G., Reggiani, G. M., & Trombini, E. (2018). Emotional intelligence, emotion regulation and affectivity in adults seeking treatment for obesity. *Psychiatry Research*, *269*(August), 191–198. https://doi.org/10.1016/j.psychres.2018.08.015

Ansari, W. E., & Elhag, W. (2021). Weight Regain and Insufficient Weight Loss After Bariatric Surgery: Definitions, Prevalence, Mechanisms, Predictors, Prevention and Management Strategies, and Knowledge Gaps—a Scoping Review. *Obesity Surgery*, *31*, 1755–1766. https://doi.org/10.1007/s11695-020-05160-5

Associação Brasileira de Empresas de Pesquisa. (2016). *Critério de Classificação Econômica Brasil*. https://www.abep.org/Servicos/Download.aspx?id=12. https://www.abep.org/criterio-brasil

Benjestorf, S. T., Viglione, D. J., Lamb, J. D., & Giromini, L. (2013). Suppression of Aggressive Rorschach Responses Among Violent Offenders and Nonoffenders. *Journal of Interpersonal Violence*, *28*(15), 2981–3003. https://doi.org/10.1177/0886260513488688

Ben-Porath, Y. S., & Tellegen, A. (2008). *Minnesota Multiphasic Personality Inventory-2-Restructured Form: Manual for administration, scoring and interpretation*. University of Minnesota Press.

Benzerouk, F., Guénin, M., Gierski, F., Raucher-Chéné, D., Barrière, S., Bertin, E., & Kaladjian, A. (2021). Contributing roles of depression, anxiety, and impulsivity dimensions in eating behaviors styles in surgery candidates. *Journal of Eating Disorders*, *9*, 1–8. https://doi.org/10.1186/s40337-021-00503-8

Bornstein, R. F. (2016). Toward an Integrative Perspective on the Person: Opportunities and Challenges of Multimethod Assessment. In R. E. Erard & F. B. Evans (Eds.), *The Rorschach in Multimethod Forensic Assessment: Conceptual Foundations and Practical Applications* (1st Edition). Routledge.

Butt, M., Wagner, A., & Rigby, A. (2021). Associations of Social Desirability on Psychological Assessment Outcomes for Surgical Weight Loss Patients. *Journal of Clinical Psychology in Medical Settings*, *28*(2), 384–393. https://doi.org/10.1007/s10880-020-09725-5

Cambi, M. P. C., Baretta, G. A. P., Magro, D. D. O., Boguszewski, C. L., Ribeiro, I. B., Jirapinyo, P., & Moura, D. T. H. de. (2021). Multidisciplinary Approach for Weight Regain—how to Manage this Challenging Condition: an Expert Review. *Obesity Surgery*. https://doi.org/10.1007/s11695-020-05164-1

Campos, P., Wright, J., & Gard, M. (2011). *The Obesity Epidemic*. *5*, 37–69. https://doi.org/10.4324/9780203619308

Carpenter, K. M., Hasin, D. S., Allison, D. B., & Faith, M. S. (2000). Relationships between obesity and DSM-IV major depressive disorder, suicide ideation, and suicide attempts: Results from a general population study. *American Journal of Public Health*, *90*, 251–257. https://doi.org/10.2105/ajph.90.2.251

Charek, D. B., Meyer, G. J., Mihura, J. L., & O'Gorman, E. T. (2020). Correspondence of Maximum and Typical Performance Measures of Cognitive Processing. *Assessment*, *27*, 803–809. https://doi.org/10.1177/1073191118793531

Cicchetti, D. V. (1994). Guidelines, Criteria, and Rules of Thumb for Evaluating Normed and Standardized Assessment Instruments in Psychology. *Psychological Assessment*, *6*(4), 284–290. https://doi.org/10.1037/1040-3590.6.4.284

Colombarolli, M. S., Miguel, F. K., & Giromini, L. (2022). Age and gender adjusted Brazilian normative reference data for the 16-item version of Difficulties in Emotion Regulation Scale (DERS-16). *Applied Psychology Bulletin*. https://doi.org/10.26387/bpa.293.2

Cortese, S., Comencini, E., Vincenzi, B., Speranza, M., & Angriman, M. (2013). Attention-deficit/hyperactivity disorder and impairment in executive functions: a barrier to weight loss in individuals with obesity? *BMC Psychiatry*, *13*, 286. https://doi.org/10.1186/1471-244x-13-286

Cserjési, R., Luminet, O., Poncelet, A.-S., & Lénárd, L. (2009). Altered executive function in obesity. Exploration of the role of affective states on cognitive abilities. *Appetite*, *52*(2), 535–539. https://doi.org/10.1016/j.appet.2009.01.003

Cunha, J. A. (2011). *Manual da versão em português das Escalas Beck*.

Czepczor-Bernat, K., Brytek-Matera, A., Gramaglia, C., & Zeppegno, P. (2020). The moderating effects of mindful eating on the relationship between emotional functioning and eating styles in overweight and obese women. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *25*(4), 841–849. https://doi.org/10.1007/s40519-019-00740-6

Dalrymple, K. L., Clark, H., Chelminski, I., & Zimmerman, M. (2018). The Interaction Between Mindfulness, Emotion Regulation, and Social Anxiety and Its Association with Emotional Eating in Bariatric Surgery Candidates. *Mindfulness*, *9*(6), 1780–1793. https://doi.org/10.1007/s12671-018-0921-4

Dreber, H., Reynisdottir, S., Angelin, B., & Hemmingsson, E. (2015). Who is the Treatment-Seeking Young Adult with Severe Obesity: A Comprehensive Characterization with Emphasis on Mental Health. *PLOS ONE*, *10*(12), e0145273–e0145273. https://doi.org/10.1371/journal.pone.0145273

Duarte-Guerra, L. S., Coêlho, B. M., Santo, M. A., & Wang, Y.-P. (2015). Psychiatric Disorders Among Obese Patients Seeking Bariatric Surgery: Results of Structured Clinical Interviews. *Obesity Surgery*, *25*(5), 830–837. https://doi.org/10.1007/s11695-014-1464-y

Elfhag, K. (2010). A Synthesis of Recent Research on Obesity with the Rorschach and Suggestions for the Future. *Rorschachiana*, *31*, 117–142. https://doi.org/10.1027/1192-5604/a000008

Elfhag, K., Carlsson, A. M., & Rössner, S. (2003). Subgrouping in obesity based on Rorschach personality characteristics. *Scandinavian Journal of Psychology*, *44*(5), 399–407. https://doi.org/10.1046/j.1467-9450.2003.00360.x

Exner, J. E., & Erdberg, P. (2005). *The Rorschach, Advanced Interpretation*. John Wiley & Sons.

Fabricatore, A. N., Sarwer, D. B., Wadden, T. A., Combs, C. J., & Krasucki, J. L. (2007). Impression management or real change? Reports of depressive symptoms before and after the preoperative psychological evaluation for bariatric surgery. *Obesity Surgery*, *17*, 1213–1219. https://doi.org/10.1007/s11695-007-9204-1

Fernandes, J., Ferreira-Santos, F., Miller, K., & Torres, S. (2018). Emotional processing in obesity: a systematic review and exploratory meta-analysis. *Obesity Reviews*, *19*(1), 111–120. https://doi.org/10.1111/obr.12607

Freire, C. C., Zanella, M. T., Segal, A., Arasaki, C. H., Matos, M. I. R., & Carneiro, G. (2021). Associations between binge eating, depressive symptoms and anxiety and weight regain after Roux-en-Y gastric bypass surgery. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *26*(1), 191–199. https://doi.org/10.1007/s40519-019-00839-w

Galioto, R., Alosco, M. L., Spitznagel, M. B., Strain, G., Devlin, M., Cohen, R., Crosby, R. D., Mitchell, J. E., & Gunstad, J. (2015). Glucose regulation and cognitive function after bariatric surgery. *Journal of Clinical and Experimental Neuropsychology*, *37*, 402–413. https://doi.org/10.1080/13803395.2015.1023264

Galioto, R., Bond, D., Gunstad, J., Pera, V., Rathier, L., & Tremont, G. (2016). Executive functions predict weight loss in a medically supervised weight loss programme. *Obesity Science & Practice*, *2*, 334–340. https://doi.org/10.1002/osp4.70

Geller, S., Dahan, S., Levy, S., Goldzweig, G., Hamdan, S., & Abu-Abeid, S. (2020). Body Image and Emotional Eating as Predictors of Psychological Distress Following Bariatric Surgery. *Obesity Surgery*, *30*, 1417–1423. https://doi.org/10.1007/s11695-019-04309-1

Georgiadou, E., Gruner-Labitzke, K., KÃ¶hler, H., Zwaan, M. de, MÃ¼ller, A., Köhler, H., Zwaan, M. de, & Müller, A. (2014). Cognitive function and nonfood-related impulsivity in post-bariatric surgery patients. *Frontiers in Psychology*, *5*. https://doi.org/10.3389/fpsyg.2014.01502

Ghaferi, A. A., Schwartz, T. A., & Pawlik, T. M. (2021). STROBE Reporting Guidelines for Observational Studies. *JAMA Surgery*, *156*(6), 577–578. https://doi.org/10.1001/jamasurg.2021.0528

Giel, K. E., Hartmann, A., Zeeck, A., Jux, A., Vuck, A., Gierthmuehlen, P. C. G., Wetzler-Burmeister, E., Sandholz, A., Marjanovic, G., & Joos, A. (2016). Decreased Emotional Perception in Obesity. *European Eating Disorders Review*, *24*, 341–346. https://doi.org/10.1002/erv.2444

Groppe, K., & Elsner, B. (2015). The influence of hot and cool executive function on the development of eating styles related to overweight in children. *Appetite*, *87*, 127–136. https://doi.org/10.1016/j.appet.2014.12.203

Hamdan, A. C., & Hamdan, E. M. L. R. (2009). Effects of age and education level on the Trail Making Test in a healthy Brazilian sample. *Psychology & Neuroscience*, *2*, 199–203. https://doi.org/10.3922/j.psns.2009.2.012

Heinberg, L. J., Marek, R., Haskins, I. N., Bucak, E., Hanipah, Z. N., & Brethauer, S. (2017). 30-day readmission following weight loss surgery: can psychological factors predict nonspecific indications for readmission? *Surgery for Obesity and Related Diseases*, *13*, 1376–1381. https://doi.org/10.1016/j.soard.2017.04.004

Ho, M.-C., Chen, V. C.-H., Chao, S.-H., Fang, C.-T., Liu, Y.-C., & Weng, J.-C. (2018). Neural correlates of executive functions in patients with obesity. *PeerJ*, *6*, e5002. https://doi.org/10.7717/peerj.5002

Hoyt, T., & Walter, F. A. (2022). The Relationship of Presurgical Personality Assessment Inventory Scales to BMI Following Bariatric Surgery. *Health Psychology*, *41*(3), 184–192. https://doi.org/10.1037/hea0001142

Kalarchian, M. A., & Marcus, M. D. (2015). Psychosocial interventions pre and post bariatric surgery. *European Eating Disorders Review*, *23*, 457–462. https://doi.org/10.1002/erv.2392

Kim, H.-Y. (2013). Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative Dentistry & Endodontics*, *38*, 52. https://doi.org/10.5395/rde.2013.38.1.52

King, W. C., Hinerman, A. S., & Courcoulas, A. P. (2020). Weight regain after bariatric surgery: a systematic literature review and comparison across studies using a large reference sample. *Surgery for Obesity and Related Diseases*, *16*(8), 1133–1144. https://doi.org/10.1016/j.soard.2020.03.034

Löffler, A., Foell, J., & Bekrater-Bodmann, R. (2018). Interoception and Its Interaction with Self, Other, and Emotion Processing: Implications for the Understanding of Psychosocial Deficits in Borderline Personality Disorder. *Current Psychiatry Reports*, *20*. https://doi.org/10.1007/s11920-018-0890-2

Lokken, K. L., Boeka, A. G., Yellumahanthi, K., Wesley, M., & Clements, R. H. (2010). Cognitive performance of morbidly obese patients seeking bariatric surgery. *American Surgeon*, *76*, 55–59. https://www.scopus.com/inward/record.uri?eid=2-s2.0-77949315978&partnerID=40&md5=8a9dfc6a3c053874d0f607040d1ba0eb

Maggi, S., Busetto, L., Noale, M., Limongi, F., & Crepaldi, G. (2015). Obesity: Definition and Epidemiology. In *Multidisciplinary Approach to Obesity* (pp. 31–39). Springer.

Malik, V. S., Willet, W. C., & Hu, F. B. (2020). Nearly a decade on — trends, risk factors and policy implications in global obesity. *Nature Reviews Endocrinology*, *16*, 615–616. https://doi.org/10.1038/s41574-020-00411-y

Manderino, L., Spitznagel, M. B., Strain, G., Devlin, M., Cohen, R., Crosby, R. D., Mitchell, J. E., & Gunstad, J. (2015). Cognitive dysfunction predicts poorer emotion recognition in bariatric surgery candidates. *Obesity Science & Practice*, *1*(2), 97–103. https://doi.org/10.1002/osp4.9

Marek, R. J., Heinberg, L. J., Lavery, M., Rish, J. M., & Ashton, K. (2016). A Review of Psychological Assessment Instruments for Use in Bariatric Surgery Evaluations. *Psychological Assessment*, *28*(9), 1142–1157. https://doi.org/10.1037/pas0000286

Martin-Fernandez, K. W., Marek, R. J., Heinberg, L. J., & Ben-Porath, Y. S. (2021). Six-year bariatric surgery outcomes: the predictive and incremental validity of presurgical

psychological testing. *Surgery for Obesity and Related Diseases*, *17*(5), 1008–1016. https://doi.org/10.1016/j.soard.2021.01.012

Mauro, M. F. F. P., Papelbaum, M., Brasil, M. A. A., Carneiro, J. R. I., Coutinho, E. S. F., Coutinho, W., & Appolinario, J. C. (2019). Is weight regain after bariatric surgery associated with psychiatric comorbidity? A systematic review and meta-analysis. *Obesity Reviews*, *20*(10), 1413–1425. https://doi.org/10.1111/obr.12907

Meany, G., Conceição, E., & Mitchell, J. E. (2013). Binge Eating, Binge Eating Disorder and Loss of Control Eating: Effects on Weight Outcomes after Bariatric Surgery. *European Eating Disorders Review*, *22*(2), 87–91. https://doi.org/10.1002/erv.2273

Meyer, G. J. (2017). What Rorschach performance can add to assessing and understanding personality. *International Journal of Personality Psychology*, *3*, 36–49. http://ijpp.rug.nl/article/viewFile/29881/27195

Meyer, G. J., & Eblin, J. J. (2012). An Overview of the Rorschach Performance Assessment System (R-PAS). *Psychological Injury and Law*, *5*, 107–121. https://doi.org/10.1007/s12207-012-9130-y

Meyer, G. J., Erard, R. E., Erdberg, P., Mihura, J. L., & Viglione, D. J. (2011). *Rorschach Performance Assessment System: Administration, coding, interpretation, and technical manual*. Rorschach Performance Assessment System LLC.

Miguel, F. K., Giromini, L., Colombarolli, M. S., Zuanazzi, A. C., & Zennaro, A. (2016). A Brazilian Investigation of the 36- and 16-Item Difficulties in Emotion Regulation Scales. *Journal of Clinical Psychology*, *73*(9), 1146–1159. https://doi.org/10.1002/jclp.22404

Mihura, J. L., Meyer, G. J., Dumitrascu, N., & Bombel, G. (2013). The validity of individual Rorschach variables: Systematic reviews and meta-analyses of the comprehensive system. *Psychological Bulletin*, *139*, 548–605. https://doi.org/10.1037/a0029406

Morey, L. C. (1991). *Personality Assessment Inventory (PAI): Professional manual*. Psychological Assessment Resources.

Morey, L. C. (2007). *Personality Assessment Inventory (PAI): Professional manual* (2nd ed.). Psychological Assessment Resources.

Mulhauser, K., Reynolds, E. L., Callaghan, B. C., Fierro, C., Giordani, B., & Votruba, K. (2021). Executive Functioning in Extreme Obesity: Contributions from Metabolic Status, Medical Comorbidities, and Psychiatric Factors. *Obesity Surgery*, *31*(6), 2669–2681. https://doi.org/10.1007/s11695-021-05319-8

Ogden, J., Avenell, S., & Ellis, G. (2011). Negotiating control: Patients' experiences of unsuccessful weight-loss surgery. *Psychology & Health*, *26*, 949–964. https://doi.org/10.1080/08870446.2010.514608

Osório, F. de L., Mendes, A. V., Crippa, J. A., Loureiro, S. R., Mendes, A. V., Crippa, J. A., Loureiro, S. R., Osório, F. D. L., Mendes, A. V., Crippa, J. A., & Loureiro, S. R. (2009). Study of the discriminative validity of the PHQ-9 and PHQ-2 in a sample of brazilian women in the context of primary health care. *Perspectives in Psychiatric Care*, *45*, 216–227. https://doi.org/10.1111/j.1744-6163.2009.00224.x

Ouellette, A.-S., Rodrigue, C., Lemieux, S., Tchernof, A., Biertho, L., & Bégin, C. (2017). An examination of the mechanisms and personality traits underlying food addiction among individuals with severe obesity awaiting bariatric surgery. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *22*(4), 633–640. https://doi.org/10.1007/s40519-017-0440-7

Perpiñá, C., Segura, M., & Sánchez-Reales, S. (2017). Cognitive flexibility and decision-making in eating disorders and obesity. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *22*(3), 435–444. https://doi.org/10.1007/s40519-016-0331-3

Pollatos, O., & Schandry, R. (2008). Emotional processing and emotional memory are modulated by interoceptive awareness. *Cognition and Emotion*, *22*, 272–287. https://doi.org/10.1080/02699930701357535

Pull, C. B. (2010). Current psychological assessment practices in obesity surgery programs: what to assess and why. *Current Opinion in Psychiatry*, *23*(1), 30–36. https://doi.org/10.1097/yco.0b013e328334c817

Reinert, K. R. S., Po'e, E. K., & Barkin, S. L. (2013). The relationship between executive function and obesity in children and adolescents: a systematic literature review. *Journal of Obesity*, *2013*, 820956. https://doi.org/10.1155/2013/820956

Ribeiro, G. A. N. de A., Santos, J. E. dos, & Loureiro, S. R. (2011). Perfil psicológico de mulheres e a cirurgia bariátrica: Estudo exploratório. [Psychological profile of women and the bariatric surgery: Exploratory study.]. *Revista Interamericana de Psicología*, *45*, 169–176.

Robinson, E., Roberts, C., Vainik, U., & Jones, A. (2020). The psychology of obesity: An umbrella review and evidence-based map of the psychological correlates of heavier body weight. *Neuroscience & Biobehavioral Reviews*, *119*, 468–480. https://doi.org/10.1016/j.neubiorev.2020.10.009

Roth, A. E., Thornley, C. J., & Blackstone, R. P. (2020). Outcomes in Bariatric and Metabolic Surgery: an Updated 5-Year Review. *Current Obesity Reports*, *9*(3), 380–389. https://doi.org/10.1007/s13679-020-00389-8

Rutledge, T., Ellison, J. K., & Phillips, A. S. (2020). Revising the bariatric psychological evaluation to improve clinical and research utility. *Journal of Behavioral Medicine*, *43*(4), 660–665. https://doi.org/10.1007/s10865-019-00060-1

Santos, K. O. B., Araújo, T. M. D., & Oliveira, N. F. D. (2009). Estrutura fatorial e consistência interna do Self-Reporting Questionnaire (SRQ-20) em população urbana. *Cadernos de Saúde Pública*, *25*, 214–222. https://doi.org/10.1590/s0102-311x2009000100023

Sarwer, D. B., Allison, K. C., Wadden, T. A., Ashare, R., Spitzer, J. C., McCuen-Wurst, C., LaGrotte, C., Williams, N. N., Edwards, M., Tewksbury, C., & Wu, J. (2019). Psychopathology, disordered eating, and impulsivity as predictors of outcomes of bariatric surgery. *Surgery for Obesity and Related Diseases*, *15*, 650–655. https://doi.org/10.1016/j.soard.2019.01.029

Scarpazza, C., & Pellegrino, G. di. (2018). Alexithymia, embodiment of emotions and interoceptive abilities. In *Current Developments in Alexithymia: A Cognitive and Affective Deficit* (pp. 35–51). https://www.scopus.com/inward/record.uri?eid=2-s2.0-85048381867&partnerID=40&md5=ab25a51b9bf6577e2292b9f3c2b4ddac

Spitznagel, M. B., Alosco, M., Galioto, R., Strain, G., Devlin, M., Sysko, R., Crosby, R. D., Mitchell, J. E., & Gunstad, J. (2014). The Role of Cognitive Function in Postoperative Weight Loss Outcomes: 36-Month Follow-Up. *Obesity Surgery*, *24*(7), 1078–1084. https://doi.org/10.1007/s11695-014-1205-2

Spitznagel, M. B., Alosco, M., Strain, G., Devlin, M., Cohen, R., Paul, R., Crosby, R. D., Mitchell, J. E., & Gunstad, Ph. D. J. (2013). Cognitive function predicts 24-month weight loss success after bariatric surgery. *Surgery for Obesity and Related Diseases*, *9*(5), 765–770. https://doi.org/10.1016/j.soard.2013.04.011

Strauss, E., Sherman, E. M. S., & Spreen, O. (2006). *A Compendium of Neuropsychological Tests: Administration, Norms, and Commentary*. Oxford University Press. https://doi.org/10.1080/09084280701280502

Syan, S. K., Owens, M. M., Goodman, B., Epstein, L. H., Meyre, D., Sweet, L. H., & MacKillop, J. (2019). Deficits in executive function and suppression of default mode network in obesity. *NeuroImage: Clinical*, *24*, 102015. https://doi.org/10.1016/j.nicl.2019.102015

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed., Vol. 5). Pearson.

Taube-Schiff, M., Exan, J. V., Tanaka, R., Wnuk, S., Hawa, R., & Sockalingam, S. (2015). Attachment style and emotional eating in bariatric surgery candidates: The mediating role of difficulties in emotion regulation. *Eating Behaviors*, *18*, 36–40. https://doi.org/10.1016/j.eatbeh.2015.03.011

Testa, G., Granero, R., Siragusa, C., Belligoli, A., Sanna, M., Rusconi, M. L., Angeli, P., Vettor, R., Foletto, M., Busetto, L., Fernández-Aranda, F., & Schiff, S. (2019). Psychological predictors of poor weight loss following LSG: relevance of general psychopathology and impulsivity. *Eating and Weight Disorders*, *25*, 1621–1629. https://doi.org/10.1007/s40519-019-00800-x

Velapati, S. R., Shah, M., Kuchkuntla, A. R., Abu-Dayyeh, B., Grothe, K., Hurt, R. T., & Mundi, M. S. (2018). Weight Regain After Bariatric Surgery: Prevalence, Etiology, and Treatment. *Current Nutrition Reports*, *7*, 329–334. https://doi.org/10.1007/s13668-018-0243-0

Vetter, M. L., Dumon, K. R., & Williams, N. N. (2011). Surgical treatments for obesity. *Psychiatric Clinics of North America*, *34*, 881–893.

Walfish, S. (2007). Reducing Minnesota Multiphasic Personality Inventory defensiveness: effect of specialized instructions on retest validity in a sample of preoperative bariatric patients. *Surgery for Obesity and Related Diseases*, *3*, 184–188. https://doi.org/10.1016/j.soard.2007.01.001

Wedin, S. (2017). "You lie": clinical implications of positive impression management in bariatric surgery patients. *Surgery for Obesity and Related Diseases*, *13*(8), 1382–1383. https://doi.org/10.1016/j.soard.2017.05.004

Willem, C., Gandolphe, M.-C., Roussel, M., Verkindt, H., Pattou, F., & Nandrino, J.-L. (2019). Difficulties in emotion regulation and deficits in interoceptive awareness in moderate and severe obesity. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *24*(4), 633–644. https://doi.org/10.1007/s40519-019-00738-0

Williamson, T. M., Campbell, T. S., Telfer, J. A., & Rash, J. A. (2018). Emotion Self-Regulation Moderates the Association Between Symptoms of ADHD and Weight Loss After Bariatric Surgery. *Obesity Surgery*, *28*, 1553–1561. https://doi.org/10.1007/s11695-017-3037-3

Wolfe, B. M., Kvach, E., & Eckel, R. H. (2016). Treatment of Obesity. *Circulation Research*, *118*(11), 1844–1855. https://doi.org/10.1161/circresaha.116.307591

Wolvers, P. J. D., Bruin, S. C., Mairuhu, W. M., Leeuw-Terwijn, M. de, Hutten, B. A., Brandjes, D. P. M., & Gerdes, V. E. A. (2020). Self-Reported Smoking Compared to Serum Cotinine in Bariatric Surgery Patients: Smoking Is Underreported Before the Operation. *Obesity Surgery*, *30*, 23–37. https://doi.org/10.1007/s11695-019-04128-4

World Health Organization. (1994). A user's guide to the Self Reporting Questionnaire (SRQ). *Geneva: World Health Organization*, 1–84.

Yang, Y., Shields, G. S., Guo, C., & Liu, Y. (2018). Executive function performance in obesity and overweight individuals: A meta-analysis and review. *Neuroscience & Biobehavioral Reviews*, *84*, 225–244. https://doi.org/10.1016/j.neubiorev.2017.11.020

Yu, Y., Kalarchian, M. A., Ma, Q., & Groth, S. W. (2021). Eating patterns and unhealthy weight control behaviors are associated with loss-of-control eating following bariatric surgery. *Surgery for Obesity and Related Diseases*, *17*(5), 976–985. https://doi.org/10.1016/j.soard.2021.01.008

6 MANUSCRIPT 3: EXPLORING THE UTILITY OF THE RORSCHACH TEST IN PREDICTING WEIGHT-LOSS AFTER BARIATRIC SURGERY

Submitted to Rorschachiana

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Abstract

Bariatric surgery (BS) is an effective approach to treat severe obesity, which should be include multidisciplinary care. Prior to surgery, candidates for BS usually undergo a psychological assessment based mostly on self-report of clinical symptoms. However, the results of this assessment are not always sufficient to predict outcomes. Therefore, this study examined the potential of a multimethod approach to assessing patients seeking BS using both self-report and performance-based measures of cognitive and affective functioning. A sample of 50 women who had applied for surgery at a public facility in Brazil was assessed with the Difficulties in Emotion Regulation Scale (DERS), the Rorschach (R-PAS), and the Trail Making Test (TMT). Patients who dropped out before treatment (n = 27) had higher initial BMI and poorer performance on cognitive flexibility at baseline. In the remaining 23 patients who underwent surgery, indicators of emotional and cognitive functioning from all measures were associated with WL at 6 and 12 months after surgery. However, only R-PAS variables regarding psychological resources were associated with WL 18 months after surgery. We discuss the usefulness of the Rorschach as a source of information for patients seeking BS and the implications for current assessment practices in the field.
Key-words: Bariatric Surgery, Rorschach, Multimethod assessment.

6.1 Introduction

Obesity is a complex, multidetermined condition in which excess body fat has negative health consequences and increases the risk of mortality (OECD, 2019). As obesity rates increase worldwide, clinicians and researchers face the challenge of developing effective treatments that reduce the burden of obesity on individuals and healthcare systems (Wolfe et al., 2016). Bariatric surgery (BS) is a very well-established strategy for treating severe forms of obesity and consists of series of surgical procedures aimed at reducing the volume and absorption of calorie intake by intervening in the mechanical and metabolic pathways of fat accumulation (Andrés & Saldaña, 2013). Individuals for whom surgical intervention is indicated usually undergo a comprehensive, multidisciplinary intervention before undergoing surgery, as some conditions may pose a higher risk for surgical complications and poorer surgical outcomes (Doumouras et al., 2020; Eisenberg et al., 2022).

One of the many aspects of focus for individuals seeking to undergo BS is their mental and psychological health (Hensel et al., 2016; Marchitelli et al., 2022). Indeed, there is extensive evidence that individuals with obesity are more psychosocially vulnerable and at increased risk for developing psychiatric disorders (Marek et al., 2014). In addition, individuals with severe obesity typically report poorer health-related quality of life (QoL) (Cherick et al., 2019; Wee et al., 2013). Moreover, psychiatric conditions such as depression, trauma-related disorders, eating disorders, and personality disorders are more common in patients with obesity than in the general population (Duarte-Guerra et al., 2015; Lier et al., 2013). And severity of psychiatric symptoms is generally associated with worse surgical outcomes (Mauro et al., 2019; Sarwer et al., 2019). Therefore, current guidelines for practitioners recommend thatsubjects applying for BS should ideally undergo thorough psychological evaluations as part of the treatment process (Collazo-Clavell et al., 2006; Eisenberg et al., 2022; Lew & Zainal, 2018; Mechanick et al., 2020).

The way psychological assessment is conducted in this context varies widely. The results of a survey of professionals practicing in the United States indicate that BS services typically assess patients before surgery using self-report measures that evaluate (a) the presence of psychiatric symptoms, (b) various personality characteristics, (c) QoL, and (d) eating disorders, with an emphasis on identifying possible counterindications to surgery (Bauchowitz et al., 2005). The lack of consistent evidence on the predictive value of specific psychological variables for surgical outcomes contributes to the lack of uniform recommendations for an

assessment protocol. Therefore, clinical interviews and self-report measures remain the simplest and most widely used solutions in the context of limited human and material resources to provide more comprehensive psychological care for these patients (Lamore et al., 2017; Ratcliffe et al., 2014).

Nonetheless, critiques of the utility of psychological assessment in this context urge a review of current practice (Edwards-Hampton & Wedin, 2015; Sogg & Friedman, 2015). Expanding assessment goals beyond identification of surgical-related risk factors such as psychopathology to also include specific patient-centered outcomes could increase the utility of pre- and post-surgical assessment and help illuminate the role of various psychological aspects in treatment outcomes (Rutledge et al., 2020). In this sense, increasing the types of assessment instruments is a potential way to improve our understanding of the psychological aspects of obesity. For instance, recent evidence shows that neuropsychological performance, but not self-reported psychopathology and binge eating, predict treatment outcomes, pointing to the limitations of self-report measures (Bianciardi et al., 2021). This illustrates how a comprehensive clinical assessment that goes beyond simply formulating a nosographic diagnosis can improve understanding of an individual's functioning and contribute to risk management and treatment planning. Different tools provide information from different perspectives on the same psychological traits and therefore increase the informative value of the assessment (Bornstein, 2011; Meyer et al., 2018; Mihura et al., 2017).

In this perspective, the Rorschach Inkblot Method (RIM) is a well-established tool for assessing cognitive and affective functioning using the stimulus attribution approach (Exner & Erdberg, 2005; Mcgrath, 2008; Meyer et al., 2011). In this task, the presentation of relatively ambiguous stimuli requires the respondent to elaborate meaningful responses about what they might be, thus employing underlying processes related to cognitive style, emotional processing, motivation, and underlying states. The respondent’s performance on this task provides valuable information about the psychological resources one disposes and engages in everyday life demands; therefore, the Rorschach is currently conceived of as a performance-based test (Bornstein, 2012; Meyer, 2017; Mihura, 2012). To date, there is limited evidence to support the usefulness of this measure in assessing patients seeking obesity treatment, and almost none specifically for BS. However, a few studies suggest that Rorschach variables can provide information about the psychological resources patients dispose to cope with the challenges of

treatment (Elfhag, 2010; Elfhag et al., 2003; Elfhag, Rossner, et al., 2004; Ribeiro et al., 2011b; Venzon & Alchieri, 2014).

6.1.1 This Study

Given that published research studies on the psychological functioning of patients seeking BS have relied primarily on self-report data, the potential benefits of a multimethod approach that includes both self-report and performance-based measures have been poorly explored. In addition, no study to date has examined the potential of the Rorschach test using the R-PAS method to predict weight-loss trajectories in patients who receive BS. Therefore, this study aimed to help fill these gaps in the literature by addressing the following two objectives. First, we aimed to describe and compare the cognitive, affective, and personality characteristics of patients seeking BS treatment who eventually underwent BS versus those who dropped out before surgical treatment. Second, we sought to examine the relationship between psychological functioning at baseline, as assessed by a multimethod protocol, and the extent of weight loss (WL) after BS.

Regarding the first of our research questions, we hypothesized that patients who eventually underwent BS would be characterized by greater psychological resources, higher cognitive flexibility, and lower emotional dysregulation at baseline assessment. Regarding the second research question, we hypothesized that the worse the patient's cognitive functioning and emotion regulation skills, the lower the WL would be.

6.2 Method

6.2.1 Study Design

This study used a prospective cross-sectional design to assess patients with obesity seeking BS and to investigate the relationship between baseline data and subsequent weight loss.

6.2.2 Participants

A sample of patients who applied for BS to treat obesity at a reference university hospital in Brazil contributed to this study. All patients had previously undergone a comprehensive examination by the surgical team and were recruited for the research after enrolling in the service for BS. Patients with obesity were eligible for surgical intervention in this facility if they met all requirements for surgical treatment, .i.e.being 18 to 60 years of age, having a BMI > 40 kg/m^2 or >35 kg/m^2 with clinical comorbidities, and not currently presenting clinically significant psychiatric symptoms or neurological impairment. All patients were required to lose 15% of their baseline weight and participate in a monthly educative group during 10 months before being submitted to surgery.

Patients admitted to the service were eligible to participate in the study if they met the additional criteria: being female, absence of current psychiatric diagnosis, and regular attendance at monthly group visits. The decision to enroll female patients only was based on possible gender differences in some of the measures administered. Patients that dropout from treatment or were unable to lose 15% of the baseline weight after 10 months were assigned to the No Surgery group. Those who did proceed to surgery were assigned to the “Surgery group.”

6.2.3 Variables

The psychological assessment focused on variables measuring cognitive and affective functioning using various assessment instruments. Precisely, emotion regulation, i.e., the ability to understand and cope with emotional states, was measured using a self-report scale; cognitive flexibility, i.e., the ability to alternate attention efficiently between different stimuli, was measured using a maximum performance measure; and personality characteristics, i.e., the typical way the individual organizes perceptual stimuli, thinks and responds to the environment, were measured using a typical performance personality measure. Participants' weight status at baseline and follow-up was obtained from medical records and determined by anthropometric measurements at the physician visit.

6.2.4 Measures

All participants were assessed with the following measures:

Sociodemographic and health status. A semi-structured interview was used to collect the sociodemographic status of the participants. The interview included age, marital status, years of education, current weight and height, a comprehensive assessment of health status, including chronic metabolic disease, obesity, or cardiovascular disease in family history and personal episodes of brain injury, and history of obesity status, including previous treatments, and highest lifetime weight.

Economic status. The economic status of participants was assessed using the Brazilian Association of Research Companies (ABEP, 2016) instrument. This measure estimates the purchasing power of Brazilian families, using as parameters the presence of household goods and the educational level of the family provider. The economic situation is classified into A, B1, B2 (medium-higher classes), C1, C2, D and E (lower socioeconomic level).

Self-report Questionnaire (SRQ-20). This 20-item scale, developed by the World Health Organization (WHO, 1994), is a screening tool to assesses non-psychotic symptoms of possible psychopathology. In this study, we used the Brazilian adapted and validated version (Santos et al., 2009), in which a cut-off score of seven points indicates the possible presence of a mental illness. The scale showed excellent reliability in this study (Cronbach's alpha = .963).

Patient Health Questionnaire (PHQ-9). This tool is used to screen for possible depressive symptoms. It contains nine items assessing DSM-IV criteria for depressive disorders. Respondents are asked about the frequency with which they have experienced a list of symptoms in the last two weeks, with scores ranging from none (0 points) to almost every day (3 points). In the Brazilian adaptation study (Osório et al., 2009), total scores of 10 or more points indicate a possible depressive episode. The Cronbach's alpha in the current sample (.870) is indicative of excellent reliability.

Beck Anxiety Inventory (BAI). This widely used tool assesses the intensity of symptoms of anxiety using a 4-point Likert scale ranging from zero (symptoms did not bother me at all) to four (symptoms bothered me a lot). It was adapted by Cunha (2011) for use in Brazilian populations. In Brazilian samples, scores between 20 and 30 indicate moderate anxiety, and higher scores indicate severe anxiety. Reliability in this sample was excellent, with a Cronbach's alpha of .901.

Difficulties in Emotion Regulation Scale (DERS-16). This self-report measure, proposed by Gratz and Roemer (2004), was used to assess emotion dysregulation in its five dimensions: lack of clarity about emotional states (clarity), non-acceptance of emotional

responses (non-acceptance), difficulty in engaging in goal-directed behaviors while experiencing intense emotions (goals), limited access to strategies of emotion regulation (strategies), and difficulty in controlling impulses (impulses). A 5-point Likert scale, ranging from "almost never" to "almost always," assesses the frequency with which the statements apply to the respondent. In this study, the Brazilian adaptation of the 16-item was used (Miguel et al., 2016). In our sample, the reliability of the total sample was excellent (α = .960), and the reliability indices for individual scales ranged from .844 (Impulse) to .916 (Clarity).

Trail Making Test (TMT). This neuropsychological measure was used to assess aspects of executive functioning. Precisely, the TMT-A measures an individual's processing speed by asking them to connect a series of numbers (1 to 25) scattered on a sheet in ascending order; the TMT-B measures cognitive flexibility by asking to connect a series of letters and numbers alternately (A to L and 1 to 13) in alphabetical and ascending order, respectively, without removing the pencil from the sheet. In this study, the original, standard administration (Strauss et al., 2006) was used, and scores for each part were measured in seconds taken to complete the task. A lower execution time in each part means a better performance. We used a Brazilian normative study (Hamdan & Hamdan, 2009) as a normative reference sample to evaluate the performance of our sample. These reference values refer to a sample of 314 adults, aged 18 to 81 years, with an educational level of 10.9 years.

Rorschach Performance Assessment System (R-PAS). The Rorschach Inkblot Method, which has been used worldwide for a hundred years, consists of 10 cards with inkblot designs that are shown to the test-taker with the request to respond to the question, "*What might this be?*". The guidelines of R-PAS were used to administer and interpret the results (Meyer et al., 2011). After administration, the raw and standard scores of the respondents' performance are organized in the interpretive protocol by inserting the individual response codes into the official R-PAS platform (www.r-pas.org). These scores provide the overall characteristics of the test-taker's personality in five dimensions: Administration behaviors and observations, Cognitive Engagement and Processing, Perception and Thinking Problems, Stress and Distress, and Self and Others Representations. Scores are standardized to a mean of 100 and a standard deviation of 15 points, representing the individual's performance compared to the international normative reference values of the R-PAS method. The scores are organized into two pages or groups of scores in the R-PAS interpretive output: Page 1 contains the variables with greater empirical support, and Page 2 contains the variables with less empirical support.

Interrater reliability (IRR) was measured using intraclass correlations (ICC), with results for the 60 variables of R-PAS ranging from .27 (MAH) to .99 (R), with a mean ICC of .72 (*SD* = .18). An excellent IRR (ICC > .74) was obtained for 30 variables, 14 variables showed a good IRR (ICC > .60), 12 had a fair IRR (ICC >.40), and 4 showed a poor IRR (ICC ≤ .40), according to (Cicchetti, 1994) benchmarks for interpreting ICC values. The four variables with poor interrater reliability were: Mutuality of Autonomy Health (MAH) (ICC = .27); Mp/(Ma+Mp) (ICC = .34); the proportion of passive movement (p/(a+p)) (ICC = .35); and Color Shading Blend (CBlend) (ICC = .37). Accordingly, the results of these four variables should be interpreted with caution.

6.2.5 Procedures

Ethical considerations. The research project was approved by the ethics committee of the University of São Paulo (register n. 66591717.4.0000.5407). Eligible participants were informed of the research goals and procedures, and those who accepted to participate signed the informed consent form.

Data collection. All participants were assessed individually in a single session by a trained psychologist (author M. C.) who was proficient on all measures at the time of data collection. The assessment session took place in a private office in the hospital facility. The measures were administered in the following order: socioeconomic interview, SRQ-20, PHQ-9, BAI, DERS-16, R-PAS, and TMT.

6.2.6 Data analysis

A dataset was created in Microsoft Excel. It included the participants' responses to all administered measures and the follow-up data regarding surgery. Statistical analyses were performed using SPSS 28.0 (IBM). For the DERS, scores were transformed into age- and gender-adjusted T-scores following procedures described in Colombarolli et al. (2022). For the TMT, raw time scores in parts A and B were used as measures of cognitive performance. For the R-PAS, profile summary scores were obtained from the online platform, including raw and standardized scores and Complexity-adjusted scores.

The normality of the distribution of the variables used for the analysis was assessed by verifying the distribution of the scores for each variable. According to the parameters of Kim

(2013), the following variables presented non normality problems: PHQ-9, BAI, DERS scales and total scores, and R-PAS variables Pu, SevCog, IntCont, V, CBlend, T. Accordingly, a square-root transformation was applied to these variables to normalize their distribution (Tabachnick & Fidell, 2019). Normalization was successful for all variables except DERS Impulse, and R-PAS variables.

As mentioned earlier, the reliability of self-report measures was inspected by considering internal-consistency assessed via Cronbach's alphas; for R-PAS scores, reliability was inspected by considering inter-rater reliability assessed via intraclass correlation coefficients (ICCs). Independent t-test analyses were used to compare the group of patients that went to surgery (Surgery group) with those that dropped from surgical treatment (No surgery group). For non-normally distributed variables, comparisons were made using both parametric and nonparametric analysis, and if results did not differ, results of parametric statistics were reported along with Cohens' *d* effect size. Due to the reduced sample size, for the correlations we used nonparametric analysis, i.e., Spearman correlations between all variables and weight status at baseline and each follow-up were performed to assess the relationship between psychological functioning and WL after surgery.

6.3 Results

6.3.1 Participants

Recruitment was conducted between 2018 and 2019, before the COVID pandemic. During this time, 150 women applied for bariatric surgery and met the related eligibility criteria; of these 150, 54 also met the criteria for inclusion in our study and were therefore invited to participate. Three of them refused, and one dropped out before completing the measures, so the final sample consisted of 50 participants.

During the period of data collection, 23 participants were able to lose the required 15% of their body weight, attended all group sessions, and underwent surgery (Surgery group). On average, patients waited 11 (±4) months from initial enrollment to surgery. To assess weight loss, weight was collected at 6, 12, 18, and 24 months after surgery, and the numbers of patients at these five time points were 19, 18, 14, and 5, respectively. The mortality of the sample size

at follow-up was due, at least in part, to the pandemic COVID that suspended all hospital visits and therefore made it impossible to record patients' weight status.

Descriptive statistics of the whole sample (N = 50) are presented in Table 6.1. The sample was comprised of women with a mean age of 39.4 (±10.5) years and a mean education level of 10.3 (±3.4) years. The mean BMI at baseline was 44.9 (±6.4) kg/m^2. In both groups, most patients were married and belonged to a medium-high socioeconomic level. When comparing patients who underwent surgery (n = 23) with those who dropped out before surgery (n = 27), there were no differences in age (t = -.584, p = .56, d = -.17) and education (t = -.301, p = .76, d = -.08), but the group that proceeded to surgery had statistically lower body weight at baseline (t = 2.689, p = .01, d = -.76).

Table 6.1. Socioeconomic status of participants applying for surgery, according to surgery status.

Variable	No Surgery (n = 27)		Surgery (n = 23)				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Age	38.6	9.5	40.3	11.7	-.584	.56	-.17
Education	10.2	3.1	10.5	4.0	-.301	.76	-.08
Baseline BMI	47.0	6.7	42.4	5.0	2.689	.01	.76
	n	*%*	*n*	*%*	X^2		*p*
Marital Status							
Single	6	22	5	22			
Married	18	67	18	78	2.789[a]		.25
Divorced	2	7	-	-			
Widow	1	4	-	-			
Socioeconomic status[c]							
Medium-high	19	70	18	78	.402		.53
Low	8	30	5	22			

Note. BMI, Body Mass Index.
[a] Levene's test indicated violation of assumption of equal variances, statistics are based on Welch's comparison test.
[b] Marital status were grouped into three groups: single, married and other to perform X^2 analysis.
[c] Medium-high socioeconomic level are those in A, B1 and B2; Low socioeconomic level are C1, C2, D and E according to Brazilian Economic Classification Criteria for estimate economic status (ABEP, 2016).

Participants in the two groups were screened for psychiatric symptoms with the SRQ-20, the PHQ-9, and the BAI (Table 6.2). The two groups did not differ in the presence of non-psychotic symptoms assessed with the SRQ-20 (t = .200, p = .84, d =.06), the presence of depressive symptoms assessed with the PHQ-9 (t = .749, p = .46, d = .21), or the presence of anxiety assessed with BAI (t = 1.323, p = .19, d = .36).

Table 6.2. Comparison of scores in clinical symptoms between bariatric patients, by surgery status.

Measure	No Surgery (n = 27)			Surgery (n = 23)					
	M	*SD*	*Min/Max*	*M*	*SD*	*Min/Max*	*t*	*p*	*d*
SRQ-20	3.4	3.2	0/12	3.3	3.3	0/14	.200	.84	.06
PHQ-9	3.0	5.4	0/24	2.0	3.2	0/12	.749	.46	.21
BAI	6.3	10.0	0/39	3.2	6.5	0/32	1.323	.19	.36

SRQ-2. Self-Report Questionnaire; PHQ-9, Patient Health Questionnaire; BAI, Beck Anxiety Inventory

6.3.2 Psychological functioning of patients who did versus did not proceed to surgery

As shown in Table 6.3, patients who proceeded to surgery and those who dropped out did not differ significantly on DERS scores. Similarly, the two groups did not differ significantly from each other in TMT performance (Table 6.4). However, for TMT-B, the group that dropped out from surgery performed significantly worse compared with normative expectations, with a large effect size (t = 3.968, p < .01, d = .79). In contrast, the group that underwent surgery showed only a marginally significant difference in TMT-B performance compared with normative reference values (t = 1.985, p = .06, d = .41).

Table 6.3. Comparison between groups regarding adjusted T-scores on DERS.

DERS	No Surgery (n = 27)		Surgery (n = 23)				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Clarity	42.1	8.6	41.2	5.0	.440	.662	.12
Nonacceptance	42.2	8.6	39.8	3.8	1.288	.206	.35
Goals	38.6	9.7	37.4	5.8	.491	.626	.14
Impulses	38.1	8.8	35.9	2.3	1.277	.211	.34
Strategies	39.9	10.1	37.3	4.2	1.221	.230	.33
Total	37.4	10.9	34.8	4.6	1.098	.279	.30

Note. Both *t*-test and Mann-Whitney analysis yielded similar results, so the parametric statistics are reported

Table 6.4. Comparison between groups on measures of cognitive functioning.

Measure	No Surgery (n = 27)		Surgery (n = 23)				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
TMT-A[a]	42.0	13.4	42.2	17.0	-.039	.97	-.01
TMT-B[a]	113.1	47.2	107.5	77.1	.304	.76	.08
					t	*p*	*d*
No Surgery vs. Norms							
TMT-A					1.788	.08	.35
TMT-B					3.968	<.01	.79
Surgery vs. Norms							
TMT-A					1.401	.175	.29
TMT-B					1.985	.06	.41

[a] Average time in seconds

As for R-PAS results, because Complexity scores were 1.5 SD below the normative mean (M = 100), Table 6.5 presents the results of the comparison between the surgery and no surgery groups considering Complexity-Adjusted scores. Again, the two groups did not differ significantly from each other on any of the scores, except for the presence of potential problematic determinants (PPD), which was significantly higher in participants who underwent surgery (t = -2.393, p = .02, d = .69).

Table 6.5. Comparison between groups' Complexity Adjusted Scores on Page 1 and Page 2 R-PAS variables.

R-PAS Variable		No Surgery			Surgery					
		N	*M*	*SD*	*N*	*M*	*SD*	*t*	*p*	*d*
Engagement and Cognitive Processing										
Page 1	R	26	100.9	11.4	23	99.7	8.4	.425	.673	.12
	F%	26	105.9	13.7	23	98.4	15.0	1.817	.076	.52
	Blend	26	94.7	9.2	23	97.7	7.8	-1.210	.232	-.35
	Sy	26	104.1	6.4	23	102.1	5.8	1.135	.262	.32
	MC	26	99.3	10.7	23	101.8	8.4	-.922	.361	-.26
	MC-PPD	26	105.0	13.1	23	101.4	11.3	1.026	.310	.29
	M	26	102.5	10.2	23	104.9	8.7	-.884	.381	-.25
	M/MC	26	105.5	13.2	23	101.9	11.3	-.191	.849	-.05
	CF+C/SumC	26	108.7	15.1	23	107.9	14.7	.201	.842	.06
Page 2	W%	26	100.1	10.8	23	99.7	13.2	.110	.913	.03
	Dd%[a]	26	92.8	10.8	23	94.2	12.9	-.393	.696	-.11
	SI	26	94.4	7.5	23	90.6	7.6	1.763	.084	.51
	IntCont	26	96.0	11.0	23	94.1	10.3	.598	.552	.17
	Vg%	26	96.1	14.5	23	98.7	13.7	-.627	.534	-.18
	V[a]	26	95.0	6.7	23	93.9	4.3	.643	.523	.18
	FD[a]	26	100.9	5.6	23	101.5	6.7	-.314	.755	-.09
	R8910%	26	89.3	17.0	23	89.0	13.9	.060	.952	.02
	WSumC	26	94.7	12.0	23	96.3	9.7	-.512	.611	-.15
	C[a]	26	102.3	10.6	23	102.5	10.8	-.043	.966	-.01
	Mp/(Ma+Mp)	26	105.5	13.2	23	107.1	15.4	-.253	.801	-.07
Perception and Thinking Problems										
Page 1	EII-3	26	108.6	13.6	23	112.7	12.2	-1.119	.269	-.32
	TP-Comp	26	112.7	14.2	23	113.6	16.7	-.199	.843	-.06
	WSumCog	26	101.7	13.3	23	103.5	9.0	-.566	.574	-.16
	SevCog	26	100.7	12.6	23	97.7	8.5	.946	.349	.27
	FQ-%	26	114.1	16.4	23	115.8	17.4	-.354	.725	-.10
	WD-%	26	108.9	15.2	23	106.9	15.0	.467	.643	.13
	FQo%	26	92.5	11.5	23	87.8	13.0	1.343	.186	.38
	P	26	98.5	15.2	23	97.3	14.0	.294	.770	.08
Page 2	FQu%[a]	26	98.2	11.7	23	100.7	13.3	-.714	.479	-.20
Stress and Distress										
Page 1	m	26	100.2	9.5	23	98.5	11.7	.565	.575	.16
	Y	26	99.2	9.6	23	103.6	12.1	-1.421	.162	-.41
	MOR	26	96.9	10.0	23	102.0	14.4	-1.447	.155	-.41
	SC-Comp	26	95.1	10.5	23	97.7	11.8	-.823	.415	-.24
Page 2	PPD	26	97.6	7.2	23	103.0	8.7	-2.393	.021	-.69
	YTVC'	26	94.7	6.7	23	99.3	11.1	-1.766	.084	-.51
	CBlend[a]	26	93.0	4.0	23	94.2	6.7	-.740	.464	-.22
	C'[a]	26	94.5	7.4	23	97.7	12.2	-1.080	.288	-.32
	CritCont%	26	100.0	14.5	23	103.9	13.6	-.979	.332	-.28

Self and Other Representation										
Page 1	ODL	26	102.0	13.1	23	108.3	14.7	-1.582	.120	-.45
	SR	26	92.8	9.7	23	91.6	7.1	.505	.616	.14
	MAP/MAHP	26	93.6	17.1	23	120.5	3.5	-1.377	.175	-.39
	PHR/GPHR	26	104.4	12.5	23	109.6	14.8	-1.576	.122	-.45
	M-	26	101.8	11.3	23	102.9	10.4	-.354	.725	-.10
	AGC	26	89.1	9.1	23	85.3	9.7	1.390	.171	.40
	V-Comp	26	98.3	9.2	23	94.6	8.3	1.491	.143	.43
	H	26	104.9	13.0	23	102.8	12.2	.579	.565	.17
	COP	26	108.7	8.0	23	105.6	7.4	1.410	.165	.40
	MAH [a]	26	99.0	10.2	23	95.1	6.6	1.573	.123	.44
Page 2	SumH	26	105.1	9.7	23	101.7	9.4	1.231	.224	.35
	NPH/SumH	26	97.4	16.2	23	94.1	12.9	-.409	.684	-.12
	p/(a+p)	26	109.3	9.8	23	107.6	14.8	.045	.964	.01
	AGM	26	96.9	7.3	23	99.7	8.5	-1.199	.237	-.35
	T	26	92.2	4.3	23	93.1	5.5	-.607	.547	-.17
	PER	26	95.6	7.7	23	97.0	10.6	-.543	.590	-.16
	An	26	106.6	13.4	23	106.1	13.7	.127	.900	.04

[a] Assumption of equal variances violated in Levene's test. Welch's t test reported

6.3.3 Relationship between psychological functioning and longitudinal WL

Twenty-three participants proceeded to surgery, and their WL was followed up to 24 months after surgery. Mean BMI at six months follow-up (n = 19) was 34.2 (±5.9) kg/m^{2,} and %WL was 27% of baseline weight. At 12 months (n = 19), the mean BMI was 31.6 (±4.9) kg/m^{2,} and patients lost 33% of initial weight. At 18 months (n = 14), the mean BMI was 31.2 (±5.3) kg/m^2 and 36% of WL. And finally, the mean BMI of participants at 24 months of surgery (n = 5) was 32.4 (±6.8) kg/m^{2,} and %WL was 33%.

Given the small sample size and associated low power, we considered medium to high effect sizes (r > .40) to be clinically relevant for the correlation analyses (Dancey & Reidy, 2017), regardless of their associated p-value. In addition, we also considered the 95% confidence intervals (CI) of the correlations. The results of these analyses are presented in Table 6.6.

A longer waiting time before surgery (in months) was positively correlated with poorer performance on the TMT-A (r = .51, p = .01) and B (r = .49, p = .01). On the Rorschach, patients who had waited longer to undergo surgery showed less popular responses (P, r = .46, p = .04) and responses with poorer human representation (PHR/GPHR, r = .40, p = .07). In addition, baseline BMI correlated weakly but significantly with a lower proportion of color-

dominant responses (CF+C/SumC, r = -.33, p = .03) and fewer responses with severe cognitive codes (SevCog, r = -.31, p = .03).

Table 6.6. Spearman's correlations between waiting time for surgery, baseline BMI and %WL at 6, 12 and 18 months after surgery and psychological variables in the group submitted to bariatric surgery.

	Wait for surgery (*n* = 23)			Baseline BMI (*n* = 23)			6 months %WL (*n* = 19)			12 months %WL (*n* = 17)			18 months %WL (*n* = 14)		
	r	*p*	*95% CI*	*r*	*p*	*95% CI*	*r*	*p*	*95% CI*	*r*	*p*	*95% CI*	*r*	*p*	*95% CI*
DERS															
Nonacceptance	.11	.62	[-.33; .51]	.08	.60	[-.22; .36]	.39	.10	[-.09; .72]	.40	.11	[-.11; .75]	.20	.49	[-.39; .67]
Goals	.21	.33	[-.23; .58]	.22	.14	[-.08; .48]	.50	.03	[.05; .78]	.22	.40	[-.31; .64]	-.08	.78	[-.60; .48]
Impulse	.23	.28	[-.21; .60]	.22	.13	[-.08; .49]	.59	.01	[.17; .83]	.22	.39	[-.30; .64]	-.12	.69	[-.62; .46]
Strategies	.21	.33	[-.23; .58]	.19	.20	[-.11; .46]	.40	.09	[-.09; .73]	.27	.29	[-.25; .67]	.17	.57	[-.41; .65]
Clarity	.08	.72	[-.36; .49]	.14	.34	[-.16; .42]	.57	.01	[.14; .82]	.23	.37	[-.29; .65]	-.03	.92	[-.56; .52]
Total	.19	.39	[-.26; .56]	.22	.14	[-.08; .48]	.55	.02	[.11; .81]	.35	.17	[-.17; .72]	.09	.76	[-.48; .60]
TMT															
Part A	.51	.01	[.11; .77]	.06	.69	[-.25; .36]	-.52	.02	[-.79; -.07]	-.40	.12	[-.74; .12]	-.13	.66	[-.63; .45]
Part B	.49	.02	[.08; .75]	.07	.63	[-.23; .37]	-.29	.22	[-.67; .20]	-.43	.08	[-.76; .08]	-.20	.49	[-.67; .38]
R-PAS															
Page 1															
Complexity	-.18	.42	[-.56; .27]	-.19	.19	[-.46; .11]	-.11	.65	[-.55; .37]	-.03	.92	[-.51; .47]	-.19	.52	[-.66; .40]
R	.03	.88	[-.39; .45]	.18	.22	[-.12; .45]	.01	.98	[-.46; .47]	-.17	.52	[-.61; .35]	-.42	.14	[-.78; .17]
F%	.23	.29	[-.21; .60]	.29	.05	[-.01; .54]	.26	.28	[-.23; .65]	.12	.64	[-.39; .58]	.19	.53	[-.40; .66]
Blend	.10	.66	[-.34; .50]	-.27	.07	[-.52; .03]	-.18	.48	[-.59; .32]	-.16	.54	[-.60; .36]	-.13	.67	[-.63; .45]
Sy	-.06	.77	[-.47; .37]	-.18	.23	[-.45; .12]	.00	.99	[-.46; .47]	.07	.80	[-.44; .54]	.01	.97	[-.54; .55]
MC	-.18	.41	[-.56; .26]	-.21	.16	[-.47; .09]	-.15	.56	[-.57; .34]	-.14	.58	[-.59; .38]	-.27	.35	[-.71; .32]
MC-PPD	.11	.62	[-.33; .51]	-.10	.49	[-.39; .20]	.14	.56	[-.35; .57]	.15	.57	[-.37; .60]	.07	.82	[-.49; .59]
M	-.31	.15	[-.65; .13]	-.14	.33	[-.42; .16]	-.10	.70	[-.54; .39]	-.03	.90	[-.52; .47]	-.10	.73	[-.61; .47]
M/MC	-.30	.21	[-.67; .19]	.15	.37	[-.19; .46]	.15	.59	[-.39; .61]	.23	.45	[-.38; .70]	.42	.20	[-.26; .82]
CF+C/SumC	-.08	.71	[-.49; .35]	-.33*	.03	[-.57; -.03]	-.24	.32	[-.64; .25]	-.01	.96	[-.50; .48]	-.06	.83	[-.59; .50]
EII-3	-.01	.95	[-.43; .41]	-.15	.32	[-.43; .15]	-.08	.75	[-.53; .40]	-.06	.82	[-.54; .44]	-.13	.66	[-.63; .44]
TP-Comp	.06	.78	[-.37; .47]	-.12	.44	[-.40; .19]	-.13	.60	[-.56; .36]	-.09	.75	[-.55; .43]	-.10	.74	[-.61; .47]
WSumCog	-.13	.56	[-.52; .31]	-.16	.29	[-.43; .14]	-.24	.33	[-.63; .26]	-.14	.60	[-.59; .38]	-.16	.59	[-.65; .42]

SevCog	-.24	.27	[-.60; .20]	-.31*	.03	[-.56; -.02]	-.18	.45	[-.60; .31]	-.10	.70	[-.57; .41]	-.31	.28	[-.73; .28]
FQ-%	.04	.84	[-.39; .46]	-.03	.82	[-.33; .26]	-.13	.59	[-.56; .35]	-.09	.75	[-.55; .43]	-.05	.87	[-.58; .51]
WD-%	.16	.46	[-.28; .55]	.00	.99	[-.30; .29]	-.17	.49	[-.59; .32]	-.08	.76	[-.55; .43]	-.04	.89	[-.57; .51]
FQo%	-.11	.63	[-.51; .33]	.15	.33	[-.16; .42]	-.15	.53	[-.58; .34]	.03	.92	[-.47; .51]	.21	.48	[-.38; .67]
P	-.46*	.04	[-.72; -.01]	.11	.47	[-.19; .39]	-.10	.69	[-.54; .39]	.03	.91	[-.47; .52]	.28	.33	[-.31; .72]
m	.17	.45	[-.28; .55]	-.27	.07	[-.52; .03]	-.08	.76	[-.52; .40]	.10	.70	[-.41; .57]	.21	.46	[-.37; .68]
Y	-.38	.08	[-.69; .06]	.13	.37	[-.17; .41]	.19	.44	[-.30; .60]	.13	.61	[-.38; .59]	-.16	.58	[-.65; .42]
MOR	-.20	.35	[-.58; .24]	-.03	.84	[-.32; .27]	.31	.20	[-.18; .68]	.05	.85	[-.45; .53]	.19	.51	[-.39; .67]
SC-Comp	.24	.28	[-.21; .60]	.04	.80	[-.26; .33]	.17	.50	[-.33; .59]	.35	.18	[-.18; .72]	.02	.93	[-.53; .56]
ODL	.16	.48	[-.28; .54]	-.03	.83	[-.32; .26]	-.32	.18	[-.69; .17]	-.21	.42	[-.64; .31]	-.18	.55	[-.66; .41]
SR	-.16	.47	[-.54; .28]	.00	.99	[-.30; .29]	-.26	.28	[-.65; .24]	-.10	.70	[-.57; .41]	.09	.75	[-.47; .61]
MAP/MAHP				-.17	.74	[-.87; .76]									
PHR/GPHR	.40	.07	[-.05; .72]	-.05	.76	[-.36; .27]	.08	.76	[-.43; .55]	-.02	.95	[-.54; .51]	-.34	.29	[-.77; .31]
M-	-.11	.62	[-.51; .33]	-.07	.66	[-.35; .23]	-.16	.52	[-.58; .33]	.01	.98	[-.49; .50]	-.11	.71	[-.62; .46]
AGC	-.33	.13	[-.66; .11]	.11	.47	[-.19; .39]	.10	.68	[-.38; .54]	-.02	.93	[-.51; .48]	.01	.97	[-.53; .55]
V-Comp	-.30	.17	[-.64; .14]	.00	.99	[-.29; .30]	.17	.49	[-.32; .59]	.16	.54	[-.36; .61]	-.02	.94	[-.56; .53]
H	-.28	.19	[-.63; .16]	-.20	.18	[-.47; .10]	-.02	.95	[-.48; .45]	-.01	.96	[-.5; .48]	.01	.97	[-.54; .55]
COP	-.19	.39	[-.57; .26]	-.06	.68	[-.35; .24]	-.31	.20	[-.68; .18]	.19	.48	[-.34; .62]	.26	.38	[-.33; .70]
MAH	-.02	.94	[-.44; .41]	-.03	.84	[-.32; .27]	-.46*	.05	[-.76; 0]	.13	.61	[-.39; .59]	.02	.95	[-.53; .56]
Page 2															
W%	-.33	.12	[-.66; .11]	-.06	.71	[-.35; .24]	-.10	.69	[-.54; .39]	-.03	.91	[-.51; .47]	.38	.18	[-.21; .76]
Dd%	-.05	.81	[-.47; .38]	.14	.36	[-.16; .42]	.15	.54	[-.34; .58]	-.12	.66	[-.58; .40]	-.04	.88	[-.57; .51]
SI	-.03	.89	[-.45; .40]	-.12	.43	[-.40; .18]	.32	.18	[-.17; .69]	.50	.04	[0; .79]	.43	.12	[-.14; .79]
IntCont	-.02	.92	[-.44; .40]	-.18	.23	[-.45; .12]	-.39	.10	[-.72; .10]	-.56	.02	[-.83; -.09]			
Vg%	-.19	.39	[-.56; .26]	-.31	.03	[-.56; -.02]	.03	.91	[-.44; .49]	.32	.22	[-.21; .70]	.10	.73	[-.47; .61]
V	.14	.52	[-.30; .53]	.01	.92	[-.28; .31]	-.06	.80	[-.51; .42]	-.11	.67	[-.57; .40]	-.10	.73	[-.61; .47]
FD	.31	.15	[-.13; .65]	-.24	.10	[-.50; .06]	.07	.78	[-.41; .52]	.20	.44	[-.32; .63]	.01	.96	[-.53; .55]
R8910%	.05	.83	[-.38; .46]	.12	.44	[-.19; .40]	-.04	.86	[-.50; .43]	-.34	.19	[-.71; .19]	-.51	.06	[-.82; .05]
WSumC	.12	.58	[-.32; .52]	-.19	.21	[-.46; .12]	-.21	.38	[-.62; .28]	-.32	.21	[-.70; .21]	-.41	.15	[-.78; .17]
C	-.24	.26	[-.60; .20]	-.04	.80	[-.33; .26]	-.37	.12	[-.71; .11]	-.03	.90	[-.52; .47]	-.11	.71	[-.61; .46]
Mp/(Ma+Mp)	-.15	.48	[-.54; .29]	.00	1.0	[-.30; .30]	.18	.47	[-.31; .59]	.01	.97	[-.48; .50]	.02	.95	[-.53; .56]
FQu%	.17	.43	[-.27; .56]	.04	.79	[-.26; .33]	.12	.63	[-.37; .55]	-.16	.55	[-.60; .36]	-.40	.15	[-.78; .18]
PPD	-.30	.16	[-.64; .14]	-.17	.24	[-.45; .13]	-.28	.24	[-.66; .21]	-.20	.45	[-.63; .33]	-.26	.36	[-.71; .33]

YTVC'	.03	.88	[-.4; .45]	-.20	.17	[-.47; .10]	-.28	.24	[-.66; .21]							
CBlend	-.38	.07	[-.69; .05]	-.28	.06	[-.53; .02]	-.31	.20	[-.68; .18]	-.19	.48	[-.62; .34]	.01	.96	[-.53; .55]
C'	-.20	.36	[-.57; .24]	-.25	.09	[-.51; .05]	.45	.05	[-.02; .76]	.25	.34	[-.28; .66]	.15	.61	[-.43; .64]
SumH	-.35	.10	[-.67; .09]	-.08	.57	[-.37; .22]	.04	.87	[-.43; .50]	.09	.73	[-.42; .56]	.19	.52	[-.39; .66]
NPH/SumH	.18	.50	[-.36; .63]	.26	.13	[-.09; .56]	.20	.51	[-.41; .69]	-.05	.86	[-.60; .53]	-.17	.61	[-.71; .49]
p/(a+p)	-.18	.45	[-.57; .29]	.00	.98	[-.32; .31]	.32	.20	[-.20; .70]	.21	.44	[-.35; .66]	.30	.34	[-.34; .76]
AGM	-.08	.71	[-.49; .35]	-.15	.31	[-.43; .15]	.07	.79	[-.41; .52]	-.15	.56	[-.60; .37]	-.24	.42	[-.69; .35]
T	.18	.42	[-.27; .56]	-.24	.11	[-.50; .06]	.00	1.0	[-.47; .47]	-.37	.14	[-.73; .15]	-.31	.28	[-.73; .28]
PER	-.30	.17	[-.64; .14]	.11	.47	[-.19; .39]	-.17	.47	[-.59; .32]	-.27	.30	[-.67; .26]	-.03	.91	[-.57; .52]
An	.06	.78	[-.37; .47]	-.22	.14	[-.48; .08]	.36	.14	[-.13; .70]	.16	.55	[-.36; .60]	-.19	.51	[-.67; .39]

*$p < .05$

Regarding weight-loss after surgery, we found that higher total and subscale (with exception of Nonacceptance) scores of the DERS correlated with higher WL at 6 months (*r* varied from .40 to .59, p ≤ .09). DERS Nonacceptance scores also moderately correlated with WL at 12 months (*r* = .40, *p* = .11). Higher processing speed on TMT-A correlated with WL at 6 months (*r* = -.52, *p* = .02) and 12 months (*r* = -.40, *p* = .12), while cognitive flexibility appeared to correlate only with WL at 12-month (*r* = -.43, *p* = .08). As for R-PAS variables, at 6 months, WL correlated with less mutuality of autonomy health (MAH, *r* = -.46, *p* = .05) and more responses with achromatic color (C', *r* =.45, *p* = .05). At 12 months, WL correlated with more responses involving space integration (SI, *r* = .50, *p* = .04) and less use of intellectualized content (IntCont, *r* = -.56, *p* = .02). After 18 months, %WL appeared to be associated with a lower number of responses (R, *r* = -.42, *p* = .14), a lower proportion of human movement to color responses (*r* = .42, *p* = .20), more responses with space integration (SI, *r* = .43, *p* = .12), a lower proportion of responses at cards 8, 9 and 10 (R8910%, *r* = -.51, *p* = .06), less weighted sum of color responses (WSumC, *r* = -.41, *p* = .15), and less unconventional perception of objects (FQu%, *r* = -.40, *p* = .15).

6.4 Discussion

The aim of the present study was to investigate the characteristics of psychological functioning pre-surgery that are related to the patient's progression toward BS treatment. The investigation took place in a public service where patients applying for surgery were required to lose 15% of their original body weight in order to proceed to surgery. During this period, some patients withdrew from treatment and did not undergo surgery for various reasons, such as not reaching the required weight, dropping out of treatment, or other personal reasons for interrupting. We sought to find out whether patients who proceeded to surgery and those who dropped out differed in some of the psychological aspects assessed before surgery. Our results showed that the two groups (i.e., Surgery vs. No Surgery) did not differ in any of the personality-related domains examined. However, patients who did not proceed to surgery had significantly higher BMI and poorer performance on cognitive flexibility at the baseline, compared with normative expectations. These results partially confirm our hypothesis that patients who do not proceed to surgery have poorer psychological functioning, which seems to be mainly related to cognitive performance. This finding is supported by previous studies indicating that impaired cognitive flexibility and executive functioning are highly associated

with the severity of obesity and negatively affect treatment outcomes (Handley et al., 2016; Lokken et al., 2010; Perpiñá et al., 2017; Spitznagel, Garcia, et al., 2013; Syan et al., 2019; Yang et al., 2018).

In the subgroup of patients who did proceed to surgery, results showed that poorer cognitive performance was associated with a longer waiting time before surgery, which in most cases means a longer period of time required to reach 15% of WL before surgery can be performed. Waiting time was also associated with indicators of unconventional perception and disturbed perception of self and others. This further supports the notion that the severity of obesity is related to poor cognitive functioning, especially the ability to process perceptual information, which could contribute to poorer surgical outcomes. A higher BMI at baseline was also associated with lower emotional reactivity and fewer thought disturbances in these patients. Although this appears to be a counterintuitive finding, it may reflect the low Complexity of the Rorschach protocols and the lack of self-revelation in these patients, which could be due to a lack of psychological resources or a defensive response style (Ambwani et al., 2013; Wolvers et al., 2020). In any case, it is worth pointing out that these results complement previous findings showing that higher BMI is associated with deficits in cognitive flexibility (Cserjési et al., 2009; Wirt et al., 2015), decision making (Navas et al., 2016; Perpiñá et al., 2017), interoceptive sensitivity (Fassino et al., 2004; Herbert & Pollatos, 2014), emotion recognition (Hemmingsson, 2014; Monte et al., 2020; Pink et al., 2019), and emotion regulation (Benzerouk et al., 2020; Steward et al., 2019), as well as with increased psychopathology (Federico et al., 2019; Maddi et al., 2001; Malik et al., 2014; Tambelli et al., 2017).

The analyses focused on the possible predictors of weight loss also yielded some preliminary but interesting results. First, emotional dysregulation was directly associated with greater WL 6 months after surgery, which was an unexpected finding. The opposite was found for cognitive performance, which was inversely correlated with WL at this time point. These results appear to be contradictory, but overall they support the idea that patients with a higher WL six months after surgery were more aware of their emotional functioning or less inclined to hide their difficulties, in contrast to patients who reported very low scores on emotion dysregulation. Indeed, greater self-awareness has been associated with better psychological resources (Heatherton & Baumeister, 1991; Mehl et al., 2017; Schultchen et al., 2019; Werner & Milyavskaya, 2019), which may in turn be reflected in better outcomes regarding WL 6

months after surgery. At this time point, patients with higher WL also showed better performance on processing speed, further supporting the resource availability hypothesis.

Regarding the Rorschach, a greater responsivity to negative emotional stimuli at baseline, as indicated by the number of achromatic color responses, associated with higher WL at follow-up. In addition, lower maturity and healthy interpersonal relationships (MAH) scores also were related to WL, but this result should be considered tentatively as this variable had poor reliability in this study. With respect to the 12 months follow-up, WL was related to difficulty accepting emotions and better performance on executive functions at baseline, suggesting that better cognitive resources, but not emotional resources, play an important role in initial and subsequent WL after surgery. Considering the 18 months follow-up, none of the DERS or TMT baseline scores correlated to WL, but R-PAS variables related to psychological resources did yield moderate correlations. Specifically, greater analytic and cognitive resources, decreased defensiveness, and emotional reactivity correlated with greater WL. These results suggest that cognitive functioning plays a more prominent role in WL trajectories during the initial phase of WL, that is, the first year after surgery. However, over time, other psychological resources, such as a deliberative coping style, the ability to perceive and integrate complex stimuli, and lower emotional reactivity, are important for continued WL.

These results align with previous studies showing that short-term weight loss is similar in most patients. However, one year after surgery, differences in personal characteristics begin to influence weight trajectories. Specifically, internalizing psychopathology, such as negative affectivity, anhedonia, and pessimism, and externalizing problems, such as impulsivity, have been found to correlate to higher BMI in a longitudinal study, at a 5-year follow-up (Marek et al., 2017). In addition, WL trajectories have been found to be similar in primary and revisional BS patients in the first year after surgery and stabilized between 18-24 months after surgery. Disordered eating and grazing behaviors, which are related to impulsiveness and emotional dysregulation, also have been associated with poorer WL outcomes in patients submitted to either primary or revisional BS (Pinto-Bastos et al., 2019). In another study examining the weight trajectories of 115 participants submitted to BS, participants with good and fast WL trajectories scored lower on psychopathology measures. More precisely, they exhibited personality indicators of greater perseveration and interpersonal abilities, a reflective approach to problems, and less impulsiveness. In contrast, participants with low and slow WL trajectories

had the highest levels of psychopathology, psychological immaturity, and impulsive tendencies (García-Ruiz-de-Gordejuela et al., 2017).

Using multiple sources of information in a psychological assessment helps to capture different aspects of psychological functioning, which may explain why the results of different measures correlate with WL in an apparently different pattern (Bornstein, 2015). Multimethod psychological assessment helps overcome the limitations of single instruments and increases the validity of the results and their interpretations by gathering information about distinct facets of psychological phenomena (Mihura, 2012). From this perspective, the current study shows that pre-surgery assessment can be improved by using a combination of self-report and performance-based assessment measures related to affective and cognitive functioning. The use of multiple and different tests helps to capture aspects of individuals' personality and dynamic functioning that cannot always be captured by the self-report measures typically used in this context. In this study, we explored the potential of these different sources of information for understanding WL after surgery. We found moderate effect sizes for some R-PAS variables, even with a very small sample size, suggesting that psychological aspects not necessarily consciously accessible to an individual's understanding or comprehension may enhance understanding of psychological factors related to obesity treatment outcomes.

The current literature on the psychological functioning of patients with obesity relies heavily on assessing the presence of psychopathology and eating behavior (Bauchowitz et al., 2005; Davies, 2007; Edwards-Hampton & Wedin, 2015). While these are essential aspects of the psychological burden associated with many health conditions, such as obesity, they do not provide a complete picture of the full range of psychological aspects involved in this complex and multi-determined condition (Rutledge et al., 2020). The conceptualization of the underlying psychological dynamics associated with an individual's vulnerability to developing severe obesity and their response to various treatment approaches is ongoing. For this reason, the specific methods of knowing in psychological assessment play a critical role in providing clinicians and researchers in the field with helpful information about the phenomena. Current evidence suggests that patients with obesity, particularly those with the most severe obesity, have more inaccurate self-perceptions, which could limit the quality of findings derived from self-report measures (Fernandes et al., 2018; Giel et al., 2016; Willem et al., 2019). In addition, the assessment context could motivate patients to manage their responses to present themselves more positively in self-reports (positive impression management), which may bias test

interpretations (Butt et al., 2021; Fabricatore et al., 2007; Walfish, 2007). Therefore, in both clinical and research settings, a multimethod approach is recommended to increase assessment validity and deepen understanding of patient characteristics related to obesity treatment outcomes.

These results should be considered in light of some limitations. The most important is the small sample size, which limits statistical power and the ability to draw generalizable conclusions. Future studies are needed to replicate our findings in larger, more representative samples of patients undergoing surgery. Second, the fact that the sample is limited to women from a single public service in Brazil limits our understanding of the influence of different cultural, economic, and social backgrounds on obesity status and surgical outcomes. Therefore, additional studies in other cultural contexts and with a more demographically diverse sample would be beneficial. In addition, the assessment context (i.e., before surgery) may have motivated patients to tailor their responses to better represent themselves, which may reduce the reliability of assessment results and interpretation. It is recommended that future studies examine the impact of response style on the validity of assessment results, possibly incorporating validity measures and the ability of multimethod assessment to understand aspects of psychological functioning across different levels of severity of obesity.

In conclusion, this study provides preliminary evidence about the informative potential of R-PAS and TMT variables in the prediction of the outcomes of patients submitted to BS. Specifically, a performance-based personality measure might enhance the validity of the assessment of the cognitive and affective aspects of patients with severe obesity. It may also help to understand underlying psychological elements that cannot always be captured with self-report measures. Also, assessment of cognitive performance might improve ability to detect risk of treatment dropout or insufficient WL more than self-reported symptoms. For that reasons, clinicians and researchers are encouraged to include performance measures in regular psychological assessments of BS patients.

6.5 References

Ambwani, S., Boeka, A. G., Brown, J. D., Byrne, T. K., Budak, A. R., Sarwer, D. B., Fabricatore, A. N., Morey, L. C., & O'Neil, P. M. (2013). Socially desirable responding by bariatric surgery candidates during psychological assessment. *Surgery for Obesity and Related Diseases*, *9*, 300–305. https://doi.org/10.1016/j.soard.2011.06.019

Andrés, A., & Saldaña, C. (2013). A multidisciplinary approach to bariatric surgery. *A Multidisciplinary Approach to Bariatric Surgery*, 1–191. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84892001122&partnerID=40&md5=6546779a0d2b24816cfad66799b4f496

Associação Brasileira de Empresas de Pesquisa. (2016). *Critério de Classificação Econômica Brasil*. https://www.abep.org/Servicos/Download.aspx?id=12. https://www.abep.org/criterio-brasil

Bauchowitz, A. U., Gonder-Frederick, L. A., Olbrisch, M. E., Azarbad, L., Ryee, M.-Y. Y., Woodson, M., Miller, A., & Schirmer, B. (2005). Psychosocial evaluation of bariatric surgery candidates: A survey of present practices. *Psychosomatic Medicine*, *67*, 825–832. https://doi.org/10.1097/01.psy.0000174173.32271.01

Benzerouk, F., Djerada, Z., Bertin, E., Barrière, S., Gierski, F., & Kaladjian, A. (2020). Contributions of Emotional Overload, Emotion Dysregulation, and Impulsivity to Eating Patterns in Obese Patients with Binge Eating Disorder and Seeking Bariatric Surgery. *Nutrients*, *12*(10), 3099. https://doi.org/10.3390/nu12103099

Bianciardi, E., Raimondi, G., Samela, T., Innamorati, M., Contini, L. M., Procenesi, L., Fabbricatore, M., Imperatori, C., & Gentileschi, P. (2021). Neurocognitive and Psychopathological Predictors of Weight Loss After Bariatric Surgery: A 4-Year Follow-Up Study. *Frontiers in Endocrinology*, *12*, 662252. https://doi.org/10.3389/fendo.2021.662252

Bornstein, R. F. (2011). Toward a Process-Focused Model of Test Score Validity: Improving Psychological Assessment in Science and Practice. *Psychological Assessment*, *23*, 532–544. https://doi.org/10.1037/a0022402

Bornstein, R. F. (2012). Rorschach score validation as a model for 21st-century personality assessment. *Journal of Personality Assessment*, *94*, 26–38. https://doi.org/10.1080/00223891.2011.627961

Bornstein, R. F. (2015). Personality Assessment in the Diagnostic Manuals: On Mindfulness, Multiple Methods, and Test Score Discontinuities. *Journal of Personality Assessment*, *97*, 446–455. https://doi.org/10.1080/00223891.2015.1027346

Butt, M., Wagner, A., & Rigby, A. (2021). Associations of Social Desirability on Psychological Assessment Outcomes for Surgical Weight Loss Patients. *Journal of Clinical Psychology in Medical Settings*, *28*(2), 384–393. https://doi.org/10.1007/s10880-020-09725-5

Cherick, F., Te, V., Anty, R., Turchi, L., Benoit, M., Schiavo, L., & Iannelli, A. (2019). Bariatric Surgery Significantly Improves the Quality of Sexual Life and Self-esteem in Morbidly Obese Women. *Obesity Surgery*, *29*, 1576–1582. https://doi.org/10.1007/s11695-019-03733-7

Cicchetti, D. V. (1994). Guidelines, Criteria, and Rules of Thumb for Evaluating Normed and Standardized Assessment Instruments in Psychology. *Psychological Assessment*, *6*(4), 284–290. https://doi.org/10.1037/1040-3590.6.4.284

Collazo-Clavell, M. L., Clark, M. M., McAlpine, D. E., & Jensen, M. D. (2006). Assessment and preparation of patients for bariatric surgery. *Mayo Clinic Proceedings*, *81*, S11–S17. https://www.scopus.com/inward/record.uri?eid=2-s2.0-33749253322&doi=10.1016%2FS0025-6196%2811%2961176-2&partnerID=40&md5=5406d622ced176afd9767fd036e5a85d

Cserjési, R., Luminet, O., Poncelet, A.-S., & Lénárd, L. (2009). Altered executive function in obesity. Exploration of the role of affective states on cognitive abilities. *Appetite*, *52*(2), 535–539. https://doi.org/10.1016/j.appet.2009.01.003

Dancey, C. P., & Reidy, J. (2017). *Statistics Without Maths for Psychology* (7th ed.). Pearson.

Davies, M. (2007). Psychological assessment of candidates for bariatric surgery. *Irish Journal of Psychological Medicine*, *24*, 99–102. https://doi.org/10.1017/s0790966700010399

Doumouras, A. G., Hong, D., Lee, Y., Tarride, J. E., Paterson, J. M., & Anvari, M. (2020). Association Between Bariatric Surgery and All-Cause Mortality: A Population-Based Matched Cohort Study in a Universal Health Care System. *Annals of Internal Medicine*, *173*, 694–703. https://doi.org/10.7326/m19-3925

Duarte-Guerra, L. S., Coêlho, B. M., Santo, M. A., & Wang, Y.-P. (2015). Psychiatric Disorders Among Obese Patients Seeking Bariatric Surgery: Results of Structured Clinical Interviews. *Obesity Surgery*, *25*(5), 830–837. https://doi.org/10.1007/s11695-014-1464-y

Edwards-Hampton, S. A., & Wedin, S. (2015). Preoperative psychological assessment of patients seeking weight-loss surgery: Identifying challenges and solutions. *Psychology Research and Behavior Management*, *8*, 263–272. https://doi.org/10.2147/prbm.s69132

Eisenberg, D., Shikora, S. A., Aarts, E., Aminian, A., Angrisani, L., Cohen, R. V., Luca, M. D., Faria, S. L., Goodpaster, K. P. S., Haddad, A., Himpens, J. M., Kow, L., Kurian, M., Loi, K., Mahawar, K., Nimeri, A., O'Kane, M., Papasavas, P. K., Ponce, J., … Kothari, S. N. (2022). 2022 American Society for Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO): Indications for Metabolic and Bariatric Surgery. *Surgery for Obesity and Related Diseases*, *18*(12), 1345–1356. https://doi.org/10.1016/j.soard.2022.08.013

Elfhag, K. (2010). A Synthesis of Recent Research on Obesity with the Rorschach and Suggestions for the Future. *Rorschachiana*, *31*, 117–142. https://doi.org/10.1027/1192-5604/a000008

Elfhag, K., Carlsson, A. M., & Rössner, S. (2003). Subgrouping in obesity based on Rorschach personality characteristics. *Scandinavian Journal of Psychology*, *44*(5), 399–407. https://doi.org/10.1046/j.1467-9450.2003.00360.x

Elfhag, K., Rossner, S., Lindgren, T., Andersson, I., & Carlsson, A. M. (2004). Rorschach personality predictors of weight loss with behavior modification in obesity treatment. *Journal of Personality Assessment*, *83*, 293–305. https://doi.org/10.1207/s15327752jpa8303_11

Exner, J. E., & Erdberg, P. (2005). *The Rorschach, Advanced Interpretation*. John Wiley & Sons.

Fabricatore, A. N., Sarwer, D. B., Wadden, T. A., Combs, C. J., & Krasucki, J. L. (2007). Impression management or real change? Reports of depressive symptoms before and after the preoperative psychological evaluation for bariatric surgery. *Obesity Surgery*, *17*, 1213–1219. https://doi.org/10.1007/s11695-007-9204-1

Fassino, S., Pierò, A., Gramaglia, C., & Abbate-Daga, G. (2004). Clinical, Psychopathological and Personality Correlates of Interoceptive Awareness in Anorexia nervosa, Bulimia nervosa and Obesity. *Psychopathology*, *37*(4), 168–174. https://doi.org/10.1159/000079420

Federico, A., Spalatro, A. V., Giorgio, I., Enrica, M., Daga, G. A., & Secondo, F. (2019). Personality and psychopathology differences between bariatric surgery candidates, subjects with obesity not seeking surgery management, and healthy subjects. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *24*(4), 623–631. https://doi.org/10.1007/s40519-019-00690-z

Fernandes, J., Ferreira-Santos, F., Miller, K., & Torres, S. (2018). Emotional processing in obesity: a systematic review and exploratory meta-analysis. *Obesity Reviews*, *19*(1), 111–120. https://doi.org/10.1111/obr.12607

García-Ruiz-de-Gordejuela, A., Agüera, Z., Granero, R., Steward, T., Llerda-Barberá, A., López-Segura, E., Vilarrasa, N., Sanchez, I., Jiménez-Murcia, S., Virgili, N., López-Urdiales, R., Bernabe, M. M., Garrido, P., Monseny, R., Monasterio, C., Salord, N., Pujol-Gebelli, J., Menchón, J. M., & Fernández-Aranda, F. (2017). Weight Loss Trajectories in Bariatric Surgery Patients and Psychopathological Correlates. *European Eating Disorders Review*, *25*(6), 586–594. https://doi.org/10.1002/erv.2558

Giel, K. E., Hartmann, A., Zeeck, A., Jux, A., Vuck, A., Gierthmuehlen, P. C. G., Wetzler-Burmeister, E., Sandholz, A., Marjanovic, G., & Joos, A. (2016). Decreased Emotional Perception in Obesity. *European Eating Disorders Review*, *24*, 341–346. https://doi.org/10.1002/erv.2444

Hamdan, A. C., & Hamdan, E. M. L. R. (2009). Effects of age and education level on the Trail Making Test in a healthy Brazilian sample. *Psychology & Neuroscience*, *2*, 199–203. https://doi.org/10.3922/j.psns.2009.2.012

Handley, J. D., Williams, D. M., Caplin, S., Stephens, J. W., & Barry, J. (2016). Changes in Cognitive Function Following Bariatric Surgery: a Systematic Review. *Obesity Surgery*, *26*(10), 2530–2537. https://doi.org/10.1007/s11695-016-2312-z

Heatherton, T. F., & Baumeister, R. F. (1991). Binge Eating as Escape From Self-Awareness. *Psychological Bulletin*, *110*(1), 86–108. https://doi.org/10.1037/0033-2909.110.1.86

Hemmingsson, E. (2014). Psychoemotional distress in weight gain. *Obesity Reviews*, *15*(9), 769–779. https://doi.org/10.1111/obr.12197

Hensel, J., Selvadurai, M., Anvari, M., & Taylor, V. (2016). Mental Illness and Psychotropic Medication use Among People Assessed for Bariatric Surgery in Ontario, Canada. *Obesity Surgery*, *26*, 1531–1536. https://doi.org/10.1007/s11695-015-1905-2

Herbert, B. M., & Pollatos, O. (2014). Attenuated interoceptive sensitivity in overweight and obese individuals. *Eating Behaviors*, *15*(3), 445–448. https://doi.org/10.1016/j.eatbeh.2014.06.002

Lamore, K., Kaci, S. S., Czernichow, S., Bretault, M., Bouillot, J. L., Naudé, A. J., Gribe-Ouaknine, S., Carette, C., & Flahault, C. (2017). Mental Health Support Provided Throughout the Bariatric Surgery Clinical Pathway in French Specialized Care Centers for Obesity. *Obesity Surgery*, *27*, 802–810. https://10.1007/s11695-016-2498-0

Lew, H. Y. F., & Zainal, K. A. (2018). Agreement of screening tools with established questionnaires used in psychological assessment of bariatric patients. *Proceedings of Singapore Healthcare*, *27*, 243–250. https://doi.org/10.1177/2010105818766960

Lier, H. Ø., Biringer, E., Stubhaug, B., & Tangen, T. (2013). Prevalence of psychiatric disorders before and 1 year after bariatric surgery: The role of shame in maintenance of psychiatric disorders in patients undergoing bariatric surgery. *Nordic Journal of Psychiatry*, *67*, 89–96. https://doi.org/10.3109/08039488.2012.684703

Lokken, K. L., Boeka, A. G., Yellumahanthi, K., Wesley, M., & Clements, R. H. (2010). Cognitive performance of morbidly obese patients seeking bariatric surgery. *American Surgeon*, *76*, 55–59. https://www.scopus.com/inward/record.uri?eid=2-s2.0-77949315978&partnerID=40&md5=8a9dfc6a3c053874d0f607040d1ba0eb

Maddi, S. R., Fox, S. R., Harvey, R. H., Lu, J. L., Khoshaba, D. M., & Persico, M. (2001). Reduction in Psychopathology following Bariatric Surgery for Morbid Obesity. *Obesity Surgery*, *11*(6), 680–685. https://doi.org/10.1381/09608920160558605

Malik, S., Mitchell, J. E., Engel, S., Crosby, R., & Wonderlich, S. (2014). Psychopathology in bariatric surgery candidates: A review of studies using structured diagnostic interviews. *Comprehensive Psychiatry*, *55*(2), 248–259. https://doi.org/10.1016/j.comppsych.2013.08.021

Marchitelli, S., Ricci, E., Mazza, C., Roma, P., Tambelli, R., Casella, G., Gnessi, L., & Lenzi, A. (2022). Obesity and Psychological Factors Associated with Weight Loss after Bariatric Surgery: A Longitudinal Study. *Nutrients*, *14*(13), 2690. https://doi.org/10.3390/nu14132690

Marek, R. J., Ben-Porath, Y. S., Ashton, K., & Heinberg, L. J. (2014). Minnesota multiphasic personality inventory-2 restructured form (MMPI-2-RF) scale score differences in bariatric surgery candidates diagnosed with binge eating disorder versus BMI-matched controls. *International Journal of Eating Disorders*, *47*, 315–319. https://doi.org/10.1002/eat.22194

Marek, R. J., Ben-Porath, Y. S., Dulmen, M. H. M. van, Ashton, K., & Heinberg, L. J. (2017). Using the presurgical psychological evaluation to predict 5-year weight loss outcomes in bariatric surgery patients. *Surgery for Obesity and Related Diseases*, *13*(3), 514–521. https://doi.org/10.1016/j.soard.2016.11.008

Mauro, M. F. F. P., Papelbaum, M., Brasil, M. A. A., Carneiro, J. R. I., Coutinho, E. S. F., Coutinho, W., & Appolinario, J. C. (2019). Is weight regain after bariatric surgery associated with psychiatric comorbidity? A systematic review and meta-analysis. *Obesity Reviews*, *20*(10), 1413–1425. https://doi.org/10.1111/obr.12907

Mcgrath, R. E. (2008). The Rorschach in the Context of Performance-Based Personality Assessment. *Journal of Personality Assessment*, *90*, 465–475. https://doi.org/10.1080/00223890802248760

Mechanick, J. I., Apovian, C., Brethauer, S., Garvey, W. T., Joffe, A. M., Kim, J., Kushner, R. F., Lindquist, R., Pessah-Pollack, R., Seger, J., Urman, R. D., Adams, S., Cleek, J. B., Correa, R., Figaro, M. K., Flanders, K., Grams, J., Hurley, D. L., Kothari, S., … Still, C. D. (2020). Clinical practice guidelines for the perioperative nutrition, metabolic, and nonsurgical support of patients undergoing bariatric procedures – 2019 update: cosponsored by American Association of Clinical Endocrinologists/American College of Endocrinology,. *Surgery for Obesity and Related Diseases*, *16*, 175–247. https://doi.org/10.1016/j.soard.2019.10.025

Mehl, N., Bergmann, S., Klein, A. M., Daum, M., Klitzing, K. von, & Horstmann, A. (2017). Cause or consequence? Investigating attention bias and self-regulation skills in children at risk for obesity. *Journal of Experimental Child Psychology*, *155*, 113–127. https://doi.org/10.1016/j.jecp.2016.11.003

Meyer, G. J. (2017). What Rorschach performance can add to assessing and understanding personality. *International Journal of Personality Psychology*, *3*, 36–49. http://ijpp.rug.nl/article/viewFile/29881/27195

Meyer, G. J., Erard, R. E., Erdberg, P., Mihura, J. L., & Viglione, D. J. (2011). *Rorschach Performance Assessment System: Administration, coding, interpretation, and technical manual*. Rorschach Performance Assessment System LLC.

Meyer, G. J., Katko, N. J., Mihura, J. L., Klag, M. J., & Meoni, L. A. (2018). The Incremental Validity of Self-Report and Performance-Based Methods for Assessing Hostility to Predict Cardiovascular Disease in Physicians. *Journal of Personality Assessment*, *100*(1), 68–83. https://doi.org/10.1080/00223891.2017.1306780

Miguel, F. K., Giromini, L., Colombarolli, M. S., Zuanazzi, A. C., & Zennaro, A. (2016). A Brazilian Investigation of the 36- and 16-Item Difficulties in Emotion Regulation Scales. *Journal of Clinical Psychology*, *73*(9), 1146–1159. https://doi.org/10.1002/jclp.22404

Mihura, J. L. (2012). The Necessity of Multiple Test Methods in Conducting Assessments: The Role of the Rorschach and Self-Report. *Psychological Injury and Law*, *5*(2), 97–106. https://doi.org/10.1007/s12207-012-9132-9

Mihura, J. L., Dumitrascu, N., Roy, M., & Meyer, G. J. (2017). The Centrality of the Response Process in Construct Validity: An Illustration via the Rorschach Space Response. *Journal of Personality Assessment*, *0*, 1–17. https://doi.org/10.1080/00223891.2017.1306781

Monte, C. D., Renzi, A., Paone, E., Silecchia, G., Solano, L., & Trani, M. D. (2020). Alexithymia and obesity: Controversial findings from a multimethod assessment. *European Review for Medical and Pharmacological Sciences*, *24*(2), 831–836. https://doi.org/10.26355/eurrev_202001_20066

Navas, J. F., Vilar-López, R., Perales, J. C., Steward, T., Fernández-Aranda, F., & Verdejo-García, A. (2016). Altered decision-making under risk in obesity. *PLoS ONE*, *11*. https://doi.org/10.1371/journal.pone.0155600

OECD. (2019). The Heavy Burden of Obesity. *OECD Health Policy Studies*. https://doi.org/10.1787/67450d67-en

Osório, F. de L., Mendes, A. V., Crippa, J. A., Loureiro, S. R., Mendes, A. V., Crippa, J. A., Loureiro, S. R., Osório, F. D. L., Mendes, A. V., Crippa, J. A., & Loureiro, S. R. (2009). Study of the discriminative validity of the PHQ-9 and PHQ-2 in a sample of brazilian women in the context of primary health care. *Perspectives in Psychiatric Care*, *45*, 216–227. https://doi.org/10.1111/j.1744-6163.2009.00224.x

Perpiñá, C., Segura, M., & Sánchez-Reales, S. (2017). Cognitive flexibility and decision-making in eating disorders and obesity. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *22*(3), 435–444. https://doi.org/10.1007/s40519-016-0331-3

Pink, A. E., Lee, M., Price, M., & Williams, C. (2019). A serial mediation model of the relationship between alexithymia and BMI: The role of negative affect, negative urgency and emotional eating. *Appetite*, *133*, 270–278. https://doi.org/10.1016/j.appet.2018.11.014

Pinto-Bastos, A., Lourdes, M. de, Brandão, I., Machado, P. P. P., & Conceição, E. M. (2019). Weight loss trajectories and psychobehavioral predictors of outcome of primary and reoperative bariatric surgery: a 2-year longitudinal study. *Surgery for Obesity and Related Diseases*, *15*(7), 1104–1112. https://doi.org/10.1016/j.soard.2019.04.018

Ratcliffe, D., Ali, R., Ellison, N., Khatun, M., Poole, J., & Coffey, C. (2014). Bariatric psychology in the UK National Health Service: Input across the patient pathway. *BMC Obesity*, *1*, 1–7. https://doi.org/10.1186/s40608-014-0020-6

Ribeiro, G. A. N. de A., Santos, J. E. dos, & Loureiro, S. R. (2011). Perfil Psicológico de Mulheres e a Cirurgia Bariátrica: Estudo Exploratório. *Revista Interamericana de Psicología/Interamerican Journal of Psychology*, *45*, 169–176. https://www.redalyc.org/articulo.oa?id=28422741007

Rutledge, T., Ellison, J. K., & Phillips, A. S. (2020). Revising the bariatric psychological evaluation to improve clinical and research utility. *Journal of Behavioral Medicine*, *43*(4), 660–665. https://doi.org/10.1007/s10865-019-00060-1

Santos, K. O. B., Araújo, T. M. D., & Oliveira, N. F. D. (2009). Estrutura fatorial e consistência interna do Self-Reporting Questionnaire (SRQ-20) em população urbana. *Cadernos de Saúde Pública*, *25*, 214–222. https://doi.org/10.1590/s0102-311x2009000100023

Sarwer, D. B., Allison, K. C., Wadden, T. A., Ashare, R., Spitzer, J. C., McCuen-Wurst, C., LaGrotte, C., Williams, N. N., Edwards, M., Tewksbury, C., & Wu, J. (2019). Psychopathology, disordered eating, and impulsivity as predictors of outcomes of bariatric surgery. *Surgery for Obesity and Related Diseases*, *15*, 650–655. https://doi.org/10.1016/j.soard.2019.01.029

Schultchen, D., Bayer, J., Kühnel, J., Melchers, K. G., & Pollatos, O. (2019). Interoceptive accuracy is related to long-term stress via self-regulation. *Psychophysiology*, *56*. https://doi.org/10.1111/psyp.13429

Sogg, S., & Friedman, K. E. (2015). Getting Off on the Right Foot: The Many Roles of the Psychosocial Evaluation in the Bariatric Surgery Practice. *European Eating Disorders Review*, *23*, 451–456. https://doi.org/10.1002/erv.2395

Spitznagel, M. B., Garcia, S., Miller, L. A., Strain, G., Devlin, M., Wing, R., Cohen, R., Paul, R., Crosby, R., Mitchell, J. E., & Gunstad, J. (2013). Cognitive function predicts weight loss after bariatric surgery. *Surgery for Obesity and Related Diseases*, *9*(3), 453–459. https://doi.org/10.1016/j.soard.2011.10.008

Steward, T., Picó-Pérez, M., Mestre-Bach, G., Martínez-Zalacaín, I., Suñol, M., Jiménez-Murcia, S., Fernández-Formoso, J. A., Vilarrasa, N., García-Ruiz-de-Gordejuela, A., Heras, M. V. de las, Custal, N., Virgili, N., Lopez-Urdiales, R., Menchón, J. M., Granero, R., Soriano-Mas, C., & Fernandez-Aranda, F. (2019). A multimodal MRI study of the neural mechanisms of emotion regulation impairment in women with obesity. *Translational Psychiatry*, *9*(1), 194. https://doi.org/10.1038/s41398-019-0533-3

Strauss, E., Sherman, E. M. S., & Spreen, O. (2006). *A Compendium of Neuropsychological Tests: Administration, Norms, and Commentary*. Oxford University Press. https://doi.org/10.1080/09084280701280502

Syan, S. K., Owens, M. M., Goodman, B., Epstein, L. H., Meyre, D., Sweet, L. H., & MacKillop, J. (2019). Deficits in executive function and suppression of default mode network in obesity. *NeuroImage: Clinical*, *24*, 102015. https://doi.org/10.1016/j.nicl.2019.102015

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed., Vol. 5). Pearson.

Tambelli, R., Cerniglia, L., Cimino, S., Ballarotto, G., Paciello, M., Lubrano, C., Marchitelli, S., Gnessi, L., & Lenzi, A. (2017). An exploratory study on the influence of psychopathological risk and impulsivity on BMI and perceived quality of life in obese patients. *Nutrients*, *9*, 431. https://doi.org/10.3390/nu9050431

Venzon, C. N., & Alchieri, J. C. (2014). Indicadores de Compulsão Alimentar Periódica em Pós-operatório de Cirurgia Bariátrica. *Psico*, *45*(2), 239–249. https://doi.org/10.15448/1980-8623.2014.2.14806

Walfish, S. (2007). Reducing Minnesota Multiphasic Personality Inventory defensiveness: effect of specialized instructions on retest validity in a sample of preoperative bariatric patients. *Surgery for Obesity and Related Diseases*, *3*, 184–188. https://doi.org/10.1016/j.soard.2007.01.001

Wee, C. C., Davis, R. B., Huskey, K. W., Jones, D. B., & Hamel, M. B. (2013). Quality of Life Among Obese Patients Seeking Weight Loss Surgery: The Importance of Obesity-Related Social Stigma and Functional Status. *Journal of General Internal Medicine*, *28*(2), 231–238. https://doi.org/10.1007/s11606-012-2188-0

Werner, K. M., & Milyavskaya, M. (2019). Motivation and self-regulation: The role of want-to motivation in the processes underlying self-regulation and self-control. *Social and Personality Psychology Compass*, *13*(1), e12425. https://doi.org/10.1111/spc3.12425

Willem, C., Gandolphe, M.-C., Roussel, M., Verkindt, H., Pattou, F., & Nandrino, J.-L. (2019). Difficulties in emotion regulation and deficits in interoceptive awareness in moderate and severe obesity. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *24*(4), 633–644. https://doi.org/10.1007/s40519-019-00738-0

Wirt, T., Schreiber, A., Kesztyus, D., & Steinacker, J. M. (2015). Early life cognitive abilities and body weight: cross-sectional study of the association of inhibitory control, cognitive flexibility, and sustained attention with BMI percentiles in primary school children. *Journal of Obesity*, *2015*, 534651. https://doi.org/10.1155/2015/534651

Wolfe, B. M., Kvach, E., & Eckel, R. H. (2016). Treatment of Obesity. *Circulation Research*, *118*(11), 1844–1855. https://doi.org/10.1161/circresaha.116.307591

Wolvers, P. J. D., Bruin, S. C., Mairuhu, W. M., Leeuw-Terwijn, M. de, Hutten, B. A., Brandjes, D. P. M., & Gerdes, V. E. A. (2020). Self-Reported Smoking Compared to Serum Cotinine in Bariatric Surgery Patients: Smoking Is Underreported Before the Operation. *Obesity Surgery*, *30*, 23–37. https://doi.org/10.1007/s11695-019-04128-4

World Health Organization. (1994). A user's guide to the Self Reporting Questionnaire (SRQ). *Geneva: World Health Organization*, 1–84.

Yang, Y., Shields, G. S., Guo, C., & Liu, Y. (2018). Executive function performance in obesity and overweight individuals: A meta-analysis and review. *Neuroscience & Biobehavioral Reviews*, *84*, 225–244. https://doi.org/10.1016/j.neubiorev.2017.11.020

7 CONCLUSIONS

Obesity is a complex condition in which individual and environmental aspects interact, causing the dysregulation of body weight. Psychological aspects influence behaviors that can contribute to the development of obesity and its treatment. Therefore, this study aimed to contribute to the knowledge about the psychological aspects related to severe obesity by investigating characteristics of psychological functioning of women with severe obesity (class III) undergoing bariatric surgery, in comparison to eutrophic women. We specifically focused on the characteristics of emotion regulation, executive functions and personality characteristics. We additionally aimed to identify the how the assessed psychological variables would relate to the patients' weight-loss after surgery.

Each of the three manuscripts presented addresses one of the specific goals that guided this investigation. The first manuscript sought to systematically review the literature on the long-term psychological functioning of patients undergoing bariatric surgery. The second manuscript focused on the comparative analysis of the psychological functioning of women with class III obesity applying for bariatric surgery versus eutrophic women. The third manuscript examined the relationship of various psychological characteristics to the treatment course of patients undergoing bariatric surgery.

In summary, three broad conclusions derive from the presented results:

1) Up to 48 months after surgery, there is a significant reduction in psychological symptoms, particularly depression, anxiety, binge eating, and body dissatisfaction; thereafter, aspects of psychological functioning such as self-esteem, affectivity, and psychopathology appear to return to pre-surgery levels.
2) Individuals with severe obesity who apply for BS respond differently to self-report instruments and to measures that capture implicit psychological processes (typical- and maximum-performance instruments). Responses to self-report instruments are likely affected by the response style of patients applying for surgery. More precisely, it appears that the responses of BS candidates to self-report instruments are characterized by a positive response bias, which could be related to the socially desirable response behavior and/or the limited self-perception of these patients.
3) The information provided by different sources of information is related differently with WL outcomes, which suggests that psychological processes not directly under

individuals' conscious control might be more informative of long-term outcomes than self-reported characteristics.

These findings have important implications for the field of bariatric surgery assessment. First, the evidence on the limited long-term effects of BS on psychological functioning points to the possibility that psychological problems could onset or reappear some years after surgery, which can represent a risk for weight regain. This has important implications for how psychological assessment is planned and used in the field, and for its potential to provide information about patients' weaknesses and strengths that should be considered in the treatment of obesity.

Another implication of this study is the demonstration that self-report measures, especially those assessing psychopathology and emotional functioning, are vulnerable to positive response bias in BS patients. This finding complements previous evidence about the effects of socially desirable responding in this context, and thus emphasizes that assessment protocols that are restricted to self-report measures are limited. The hypothesis of positive impression management seems to best explain these results. However, impaired cognitive abilities, low self-esteem, and reduced psychological resources could also influence how individuals respond to these measures.

Nonetheless, the different information derived from self-report and performance-based measures enhance the understanding of the psychological functioning of patients undergoing surgery by providing complementary information characteristics. Therefore, they help to increase the validity of the assessment by offsetting the limitations of self-report measures and highlighting possible psychological outcomes of patients on medium- and long-term after surgery, which has important implications for treatment planning.

Overall, this study contributes to the literature on psychological assessment of bariatric surgery patients by providing insights relevant to assessment recommendations for the field. Obesity is a challenging, chronic health condition that requires long-term management. The involvement of psychological aspects in this condition requires that clinical psychologists support treatment through evidence-based procedures of assessment and intervention. We advocate that multimethod psychological assessment is a strategy for improving effectiveness and utility in the assessment of bariatric patients, as it has been in many other areas of psychological assessment in which it is used. In this way, psychological evaluation provides

important insights into the long-term management of these patients for clinicians and healthcare providers in this field.

In addition, clinicians should keep in mind that obesity treatment is not just about reducing body weight, but about the totality of environmental and individual aspects that contribute to body weight dysregulation. At the individual level, this means that psychological characteristics that once contributed to the onset and severity of obesity can interfere with treatment progression if not addressed properly, and are therefore an essential component of obesity treatment. Therefore, beyond the WL and the immediate health and psychological improvements promoted by surgery, the long-term success of obesity treatment should consider long-term and broader positive effects on patients' health behaviors.

In interpreting these results, some limitations of the study should be noted. The most important one relates to the low statistical power of our analyses, which is due to the small sample size. In addition, the multiple significance tests performed in these studies as well as the a large number of variables considered in this research also increase the probability of a type II error. Thus, additional research on the usefulness of a multimethod psychological assessment in larger samples of BS patients would be beneficial. Another limitation regards the generalizability of the results, as the sample came from a single center of bariatric surgery, from the Brazilian public health system. Patients applying for bariatric surgery can have different backgrounds, and it is common for patients from public health systems to differ from those treated in the private context. Future studies should address the characteristics of patients applying for surgery in other cultural and socioeconomic contexts, and assess the effect of these variables on outcomes.

Another limitation concerns the variables examined in this study, which are limited to important affective and cognitive variables and personality dynamics. Although these variables are relevant, they do not include all possible relevant variables that can be assessed in this population. Moreover, it is possible that other self-report measures that capture other aspects of emotion regulation, affective functioning, and psychopathology would yield different results. The extent to which this affects the conclusions of the study should be the focus of future studies. In addition, follow-up of all patients would help to understand the impact of time on outcomes, both in those who underwent surgery and in those who discontinued it or opted for other treatments.

In light of the findings reported, future research is encouraged to address other questions of relevance for the field. In particular, an important question is whether there is a psychological profile that poses a risk for severe obesity and whether it has implications for treatment. Our study suggests that it is possible that some implicit measures, such as the maximum performance and typical performance tests that we used, could shed light on understanding the underlying dynamics of patients with obesity and their impact on surgical outcome.

In this sense, another suggestion for further studies would be to investigate how psychological functioning evolves throughout the obesity treatment process, taking into account the very long-term outcomes (five or more years) of patients undergoing bariatric surgery treatment. Because the weight regain rates are not despisable, it is important to understand how the process of weight loss and regain impacts psychological health and the implications for obesity management in patients with recidivist obesity.

Future research should also focus attention on the response process of patients applying for bariatric surgery. The identification of positive reponse bias in the different types of measures requires that researchers investigate the nature and motivations behind the patient response process. The use of measures that include validity scales is encouraged to control for the effect of response manipulation.

It is important to note that the results presented here come from the Doctoral research in Psychology, conducted in co-tutorship between the University of São Paulo (Brazil) and the University of Turin (Italy), in an agreement signed in 2019. At the University of São Paulo, the research group Psychodiagnostics Research Center provided technical and operational support for the development of the research. The research included a 17-month doctoral exchange period in the Evidence-Based Psychological Assessment research group of the Department of Psychology at the University of Turin. This period was financially supported by the Coordination of Superior Level Staff Improvement (CAPES), with a Doctoral Exchange Scholarship (CAPES-PRINT - 88887.466456/2019-00), and by the University of Turin, with a mobility and cultural exchange grant (UA.A200.ADIR.A500.COTUTATEN). This opportunity contributed notably to the improvement of the quality of the work and provided access to academic knowledge and expertise that could be shared with other Brazilian researchers.

In conclusion, the present study sought to contribute to the field of clinical psychology applied to the context of obesity treatment by investigating different approaches to the psychological assessment of patients applying for bariatric surgery. Despite the methodological

and contextual limitations described above, we expect that the results and discussion presented here will help improve current practice in the managment of patients with obesity by providing clinicians and researchers with insights into psychological assessment in this context.

8 REFERENCES

Adams, T. D., Davidson, L. E., Litwin, S. E., Kim, J., Kolotkin, R. L., Nanjee, M. N., Gutierrez, J. M., Frogley, S. J., Ibele, A. R., Brinton, E. A., Hopkins, P. N., McKinlay, R., Simper, S. C., & Hunt, S. C. (2017). Weight and Metabolic Outcomes 12 Years after Gastric Bypass. *The New England Journal of Medicine*, *377*(12), 1143–1155. https://doi.org/10.1056/nejmoa1700459

Agüera, Z., García-Ruiz-De-Gordejuela, A., Vilarrasa, N., Sanchez, I., Baño, M., Camacho, L., Granero, R., Jiménez-Murcia, S., Virgili, N., Lopez-Urdiales, R., Bernabe, M. M. G. D., Garrido, P., Monasterio, C., Steward, T., Pujol-Gebelli, J., Fernández-Aranda, F., & Menchõn, J. M. (2015). Psychological and personality predictors of weight loss and comorbid metabolic changes after bariatric surgery. *European Eating Disorders Review*, *23*, 509–516. https://doi.org/10.1002/erv.2404

Ahima, R. S. (2014). *Obesity epidemiology, pathogenesis, and treatment: A multidisciplinary approach*. CRC Press.

Al-Hadithy, N., Welbourn, R., Aditya, H., Stewart, K., & Soldin, M. (2014). A preliminary report on the development of a validated tool for measuring psychosocial outcomes for massive weight loss patients. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, *67*(11), 1523–1531. https://doi.org/10.1016/j.bjps.2014.07.004

Ales, F., Giromini, L., & Zennaro, A. (2019). Complexity and Cognitive Engagement in the Rorschach Task: An Eye-Tracking Study. *Journal of Personality Assessment*, *0*, 1–13. https://doi.org/10.1080/00223891.2019.1575227

Allison, D. B., Newcomer, J. W., Dunn, A. L., Blumenthal, J. A., Fabricatore, A. N., Daumit, G. L., Cope, M. B., Riley, W. T., Vreeland, B., Hibbeln, J. R., & Alpert, J. E. (2009). Obesity Among Those with Mental Disorders. A National Institute of Mental Health Meeting Report. *American Journal of Preventive Medicine*, *36*, 341–350. https://doi.org/10.1016/j.amepre.2008.11.020

Ambwani, S., Boeka, A. G., Brown, J. D., Byrne, T. K., Budak, A. R., Sarwer, D. B., Fabricatore, A. N., Morey, L. C., & O'Neil, P. M. (2013). Socially desirable responding by bariatric surgery candidates during psychological assessment. *Surgery for Obesity and Related Diseases*, *9*, 300–305. https://doi.org/10.1016/j.soard.2011.06.019

American Psychological Association, & APA Task Force on Psychological Assessment and Evaluation Guidelines. (2020). *APA Guidelines for Psychological Assessment and Evaluation*. https:/ /www.apa.org/about/policy/guidelines-psychological-assessment-evaluation.pdf

American Society for Metabolic and Bariatric Surgery. (2021). *Metabolic and Bariatric Surgery*. https://asmbs.org/resources/metabolic-and-bariatric-surgery

Amundsen, T., Strømmen, M., & Martins, C. (2017). Suboptimal Weight Loss and Weight Regain after Gastric Bypass Surgery—Postoperative Status of Energy Intake, Eating Behavior, Physical Activity, and Psychometrics. *Obesity Surgery*, *27*, 1316–1323. https://doi.org/10.1007/s11695-016-2475-7

Andersen, J., Aasprang, A., Bergsholm, P., Sletteskog, N., Våge, V., & Natvig, G. (2010). Anxiety and depression in association with morbid obesity: changes with improved physical health after duodenal switch. *Health and Quality of Life Outcomes*, *8*(1), 52–52. https://doi.org/10.1186/1477-7525-8-52

Andrei, F., Nuccitelli, C., Mancini, G., Reggiani, G. M., & Trombini, E. (2018). Emotional intelligence, emotion regulation and affectivity in adults seeking treatment for obesity. *Psychiatry Research*, *269*(August), 191–198. https://doi.org/10.1016/j.psychres.2018.08.015

Andrés, A., & Saldaña, C. (2013). A multidisciplinary approach to bariatric surgery. *A Multidisciplinary Approach to Bariatric Surgery*. Nova Science Publishers, Inc.1–191. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84892001122&partnerID=40&md5=6546779a0d2b24816cfad66799b4f496

Ansari, W. E., & Elhag, W. (2021). Weight Regain and Insufficient Weight Loss After Bariatric Surgery: Definitions, Prevalence, Mechanisms, Predictors, Prevention and Management Strategies, and Knowledge Gaps—a Scoping Review. *Obesity Surgery*, *31*, 1755–1766. https://doi.org/10.1007/s11695-020-05160-5

Assimakopoulos, K., Karaivazoglou, K., Panayiotopoulos, S., Hyphantis, T., Iconomou, G., & Kalfarentzos, F. (2011). Bariatric Surgery is Associated with Reduced Depressive Symptoms and Better Sexual Function in Obese Female Patients: A One-Year Follow-Up Study. *Obesity Surgery*, *21*(3), 362–366. https://doi.org/10.1007/s11695-010-0303-z

Associação Brasileira de Empresas de Pesquisa. (2016). *Critério de Classificação Econômica Brasil*. https://www.abep.org/Servicos/Download.aspx?id=12. https://www.abep.org/criterio-brasil

Aviram-Friedman, R., Astbury, N., Ochner, C. N., Contento, I., & Geliebter, A. (2018). Neurobiological evidence for attention bias to food, emotional dysregulation, disinhibition and deficient somatosensory awareness in obesity with binge eating disorder. *Physiology and Behavior*, *184*, 122–128. https://doi.org/10.1016/j.physbeh.2017.11.003

Barkley, R. A. (1997). Behavioral inhibition, sustained attention, and executive functions: constructing a unifying theory of ADHD. *Psychological Bulletin*, *121*(1), 65–94. https://doi.org/10.1037/0033-2909.121.1.65

Barr, D. P. (1953). Health and Obesity. *The New England Journal of Medicine*, *248*(23), 967–970. https://doi.org/10.1056/nejm195306042482303

Bauchowitz, A. U., Gonder-Frederick, L. A., Olbrisch, M. E., Azarbad, L., Ryee, M.-Y. Y., Woodson, M., Miller, A., & Schirmer, B. (2005). Psychosocial evaluation of bariatric

surgery candidates: A survey of present practices. *Psychosomatic Medicine*, *67*, 825–832. https://doi.org/10.1097/01.psy.0000174173.32271.01

Bean, M. K., Stewart, K., & Olbrisch, M. E. (2008). Obesity in America: Implications for Clinical and Health Psychologists. *Journal of Clinical Psychology in Medical Settings*, *15*, 214–224. https://doi.org/10.1007/s10880-008-9124-9

Beek, E. S. J. van der, Geenen, R., Heer, F. A. G. de, Molen, A. B. M. van der, & Ramshorst, B. van. (2012). Quality of Life Long-Term after Body Contouring Surgery following Bariatric Surgery. *Plastic and Reconstructive Surgery*, *130*(5), 1133–1139. https://doi.org/10.1097/prs.0b013e318267d51d

Belligoli, A., Bettini, S., Segato, G., & Busetto, L. (2020). Predicting Responses to Bariatric and Metabolic Surgery. *Current Obesity Reports*, *9*(3), 373–379. https://doi.org/10.1007/s13679-020-00390-1

Ben-Porath, Y. S., & Tellegen, A. (2008). *Minnesota Multiphasic Personality Inventory-2-Restructured Form: Manual for administration, scoring and interpretation*. University of Minnesota Press.

Benjestorf, S. T., Viglione, D. J., Lamb, J. D., & Giromini, L. (2013). Suppression of Aggressive Rorschach Responses Among Violent Offenders and Nonoffenders. *Journal of Interpersonal Violence*, *28*(15), 2981–3003. https://doi.org/10.1177/0886260513488688

Benzerouk, F., Djerada, Z., Bertin, E., Barrière, S., Gierski, F., & Kaladjian, A. (2020). Contributions of Emotional Overload, Emotion Dysregulation, and Impulsivity to Eating Patterns in Obese Patients with Binge Eating Disorder and Seeking Bariatric Surgery. *Nutrients*, *12*(10), 3099. https://doi.org/10.3390/nu12103099

Bertin, E., Benzerouk, F., Gavlak, B., Bernard, D., Gagnayre, R., & Foucaut, A. M. (2019). Body misperception: A complex, multifaceted issue to be taken into consideration in obesity. *Cahiers de Nutrition et de Diététique*, *54*(6), e1–e8. https://doi.org/10.1016/j.cnd.2019.06.001

Bianciardi, E., Raimondi, G., Samela, T., Innamorati, M., Contini, L. M., Procenesi, L., Fabbricatore, M., Imperatori, C., & Gentileschi, P. (2021). Neurocognitive and Psychopathological Predictors of Weight Loss After Bariatric Surgery: A 4-Year Follow-Up Study. *Frontiers in Endocrinology*, *12*, 662252. https://doi.org/10.3389/fendo.2021.662252

Bjørklund, G., Semenova, Y., Pivina, L., & Costea, D.-O. (2020). Follow-up after bariatric surgery: A review. *Nutrition*, *78*, 110831–110831. https://doi.org/10.1016/j.nut.2020.110831

Blanco-Gómez, A., Ferré, N., Luque, V., Cardona, M., Gispert-Llauradó, M., Escribano, J., Closa-Monasterolo, R., & Canals-Sans, J. (2015). Being overweight or obese is associated with inhibition control in children from six to ten years of age. *Acta Paediatrica*, *104*, 619–625. https://doi.org/10.1111/apa.12976

Bogg, T., & Roberts, B. W. (2013). Duel or diversion? Conscientiousness and executive function in the prediction of health and longevity. *Annals of Behavioral Medicine*, *45*, 400–401. https://doi.org/10.1007/s12160-013-9468-8

Bordignon, S., Aparício, M. J. G., Bertoletti, J., & Trentini, C. M. (2017). Personality characteristics and bariatric surgery outcomes: a systematic review. *Trends in Psychiatry and Psychotherapy*, *39*(2), 124–134. https://doi.org/10.1590/2237-6089-2016-0016

Bornstein, R. F. (2011). Toward a Process-Focused Model of Test Score Validity: Improving Psychological Assessment in Science and Practice. *Psychological Assessment*, *23*, 532–544. https://doi.org/10.1037/a0022402

Bornstein, R. F. (2012). Rorschach score validation as a model for 21st-century personality assessment. *Journal of Personality Assessment*, *94*, 26–38. https://doi.org/10.1080/00223891.2011.627961

Bornstein, R. F. (2015). Personality Assessment in the Diagnostic Manuals: On Mindfulness, Multiple Methods, and Test Score Discontinuities. *Journal of Personality Assessment*, *97*, 446–455. https://doi.org/10.1080/00223891.2015.1027346

Bornstein, R. F. (2016). Toward an Integrative Perspective on the Person: Opportunities and Challenges of Multimethod Assessment. In R. E. Erard & F. B. Evans (Eds.), *The Rorschach in Multimethod Forensic Assessment: Conceptual Foundations and Practical Applications* (1st Edition). Routledge.

Brasil. Ministério da Saúde. Departamento de Análise em Saúde e Vigilância de Doenças Não Transmissíveis. (2021). *Vigitel Brasil 2021 : vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico : estimativas sobre frequência e distribuição sociodemográfica de fatores de risco e proteção para doenças crônicas nas capitais dos 26 estados brasileiros e no Distrito Federal em 2021*. Ministério da Saúde.

Bray, G. A., & Bouchard, C. (Eds.). (2014). *Handbook of Obesity: Epidemology, Etiology, and Physiopathology* (Vol. 1). CRC Press.

Brummett, B. H., Babyak, M. A., Williams, R. B., Barefoot, J. C., Costa, P. T., & Siegler, I. C. (2006). NEO personality domains and gender predict levels and trends in body mass index over 14 years during midlife. *Journal of Research in Personality*, *40*(3), 222–236. https://doi.org/10.1016/j.jrp.2004.12.002

Bryant, E. J., King, N. A., Falkén, Y., Hellström, P. M., Holst, J. J., Blundell, J. E., & Näslund, E. (2013). Relationships among tonic and episodic aspects of motivation to eat, gut peptides, and weight before and after bariatric surgery. *Surgery for Obesity and Related Diseases*, *9*(5), 802–808. https://doi.org/10.1016/j.soard.2012.09.011

Buddeberg-Fischer, B., Klaghofer, R., Krug, L., Buddeberg, C., Müller, M. K., Schoeb, O., & Weber, M. (2006). Physical and Psychosocial Outcome in Morbidly Obese Patients with and without Bariatric Surgery: a 4½-Year Follow-up. *Obesity Surgery*, *16*(3), 321–330. https://doi.org/10.1381/096089206776116471

Burger, K. S., Shearrer, G. E., & Sanders, A. J. (2015). Brain-Based Etiology of Weight Regulation. *Current Diabetes Reports*, *15*(11), 100. https://doi.org/10.1007/s11892-015-0667-5

Burgmer, R., Legenbauer, T., Müller, A., Zwaan, M. de, Fischer, C., & Herpertz, S. (2014). Psychological Outcome 4 Years after Restrictive Bariatric Surgery. *Obesity Surgery*, *24*(10), 1670–1678. https://doi.org/10.1007/s11695-014-1226-x

Busetto, L., Bettini, S., Makaronidis, J., Roberts, C. A., Halford, J. C. G., & Batterham, R. L. (2021). Mechanisms of weight regain. *European Journal of Internal Medicine*, *93*, 3–7. https://doi.org/10.1016/j.ejim.2021.01.002

Butt, M., Wagner, A., & Rigby, A. (2021). Associations of Social Desirability on Psychological Assessment Outcomes for Surgical Weight Loss Patients. *Journal of Clinical Psychology in Medical Settings*, *28*(2), 384–393. https://doi.org/10.1007/s10880-020-09725-5

Bužgová, R., Bužga, M., Holéczy, P., & Zonča, P. (2016). Evaluation of Quality of Life, Clinical Parameters, and Psychological Distress after Bariatric Surgery: Comparison of the Laparoscopic Sleeve Gastrectomy and Laparoscopic Greater Curvature Plication. *Bariatric Surgical Practice and Patient Care*, *11*(4), 169–176. https://doi.org/10.1089/bari.2016.0022

Cambi, M. P. C., Baretta, G. A. P., Magro, D. D. O., Boguszewski, C. L., Ribeiro, I. B., Jirapinyo, P., & Moura, D. T. H. de. (2021). Multidisciplinary Approach for Weight Regain—how to Manage this Challenging Condition: an Expert Review. *Obesity Surgery*. https://doi.org/10.1007/s11695-020-05164-1

De Campora, G. de, Larciprete, G., Delogu, A. M., Meldolesi, C., & Giromini, L. (2016). A longitudinal study on emotional dysregulation and obesity risk: From pregnancy to 3 years of age of the baby. *Appetite*, *96*, 95–101. https://doi.org/10.1016/j.appet.2015.09.012

Campos, P., Wright, J., & Gard, M. (2011). *The Obesity Epidemic*. *5*, 37–69. https://doi.org/10.4324/9780203619308

Capuron, L., Poitou, C., Machaux-Tholliez, D., Frochot, V., Bouillot, J.-L., Basdevant, A., Layé, S., & Clément, K. (2011). Relationship between adiposity, emotional status and eating behaviour in obese women: role of inflammation. *Psychological Medicine*, *41*(7), 1517–1528. https://doi.org/10.1017/s0033291710001984

Carlson, S. M. S. (2017). The Readiness to Change for Bariatric Surgery Assessment Tool: Validity, Factor Structure, and Reliability. *Research and Theory for Nursing Practice*, *31*(4), 393–401. https://doi.org/10.1891/1541-6577.31.4.393

Carpenter, K. M., Hasin, D. S., Allison, D. B., & Faith, M. S. (2000). Relationships between obesity and DSM-IV major depressive disorder, suicide ideation, and suicide attempts: Results from a general population study. *American Journal of Public Health*, *90*, 251–257. https://doi.org/10.2105/ajph.90.2.251

Casagrande, M., Boncompagni, I., Forte, G., Guarino, A., & Favieri, F. (2020). Emotion and overeating behavior: effects of alexithymia and emotional regulation on overweight and obesity. *Bulimia and Obesity*, *25*(5), 1333–1345. https://doi.org/10.1007/s40519-019-00767-9

Cella, S., Cipriano, A., Giardiello, C., & Cotrufo, P. (2019). Relationships between self-esteem, interoceptive awareness, impulse regulation, and binge eating. Path analysis in bariatric surgery candidates. *Clinical Neuropsychiatry*, *16*(5–6), 213–220. https://doi.org/10.36131/clinicalnpsych2019050604

Charek, D. B., Meyer, G. J., Mihura, J. L., & O'Gorman, E. T. (2020). Correspondence of Maximum and Typical Performance Measures of Cognitive Processing. *Assessment*, *27*, 803–809. https://doi.org/10.1177/1073191118793531

Chen, V. C.-H., Liu, Y.-C., Chao, S.-H., McIntyre, R. S., Cha, D. S., Lee, Y., & Weng, J.-C. (2018). Brain structural networks and connectomes: the brain–obesity interface and its impact on mental health. *Neuropsychiatric Disease and Treatment*, *14*, 3199–3208. https://doi.org/10.2147/ndt.s180569

Cherick, F., Te, V., Anty, R., Turchi, L., Benoit, M., Schiavo, L., & Iannelli, A. (2019). Bariatric Surgery Significantly Improves the Quality of Sexual Life and Self-esteem in Morbidly Obese Women. *Obesity Surgery*, *29*, 1576–1582. https://doi.org/10.1007/s11695-019-03733-7

Cicchetti, D. V. (1994). Guidelines, Criteria, and Rules of Thumb for Evaluating Normed and Standardized Assessment Instruments in Psychology. *Psychological Assessment*, *6*(4), 284–290. https://doi.org/10.1037/1040-3590.6.4.284

Claes, L., Vandereycken, W., & Vertommen, H. (2005). Impulsivity-related traits in eating disorder patients. *Personality and Individual Differences*, *39*, 739–749. https://doi.org/10.1016/j.paid.2005.02.022

Claes, L., Vandereycken, W., Vandeputte, A., & Braet, C. (2013). Personality Subtypes in Female Pre-Bariatric Obese Patients: Do They Differ in Eating Disorder Symptoms, Psychological Complaints and Coping Behaviour? *European Eating Disorders Review*, *21*(1), 72–77. https://doi.org/10.1002/erv.2188

Claudon, P., Roché-Bauchet, G., Guirkinger, B., Lighezzolo-Alnot, J., & Ziegler, O. (2012). Représentation de soi et vécu de l'espace corporel chez des sujets obèses sévères en attente de chirurgie bariatrique. [Self representation and subjective bodily space in severely obese patients waiting for bariatric surgery.]. *Annales Médico-Psychologiques*, *170*, 628–635. https://doi.org/https://doi.org/10.1016/j.amp.2012.02.022

Collazo-Clavell, M. L., Clark, M. M., McAlpine, D. E., & Jensen, M. D. (2006). Assessment and preparation of patients for bariatric surgery. *Mayo Clinic Proceedings*, *81*, S11–S17. https://www.scopus.com/inward/record.uri?eid=2-s2.0-33749253322&doi=10.1016%2FS0025-6196%2811%2961176-2&partnerID=40&md5=5406d622ced176afd9767fd036e5a85d

Collins, J., Meng, C., & Eng, A. (2016). Psychological Impact of Severe Obesity. *Current Obesity Reports*, *5*(4), 435–440. https://doi.org/10.1007/s13679-016-0229-4

Colombarolli, M. S., Miguel, F. K., & Giromini, L. (2022). Age and gender adjusted Brazilian normative reference data for the 16-item version of Difficulties in Emotion Regulation Scale (DERS-16). *Applied Psychology Bulletin*. https://doi.org/10.26387/bpa.293.2

Conceição, E., Pinto-Bastos, A., Lourdes, M. de, Brandão, I., Teixeira, C., & Machado, P. P. P. (2018). Psychological, behavioral, and weight-related aspects of patients undergoing reoperative bariatric surgery after gastric band: comparison with primary surgery patients. *Surgery for Obesity and Related Diseases*, *14*(5), 603–610. https://doi.org/10.1016/j.soard.2018.02.011

Cooper, A. J., Gupta, S. R., Moustafa, A. F., & Chao, A. M. (2021). Sex/Gender Differences in Obesity Prevalence, Comorbidities, and Treatment. *Current Obesity Reports*, *10*(4), 458–466. https://doi.org/10.1007/s13679-021-00453-x

Cortese, S., Comencini, E., Vincenzi, B., Speranza, M., & Angriman, M. (2013). Attention-deficit/hyperactivity disorder and impairment in executive functions: a barrier to weight loss in individuals with obesity? *BMC Psychiatry*, *13*, 286. https://doi.org/10.1186/1471-244x-13-286

Cottone, P. (2019). *Compulsive Eating Behavior and Food Addiction*. Academic Press. https://doi.org/10.1016/c2017-0-04645-1

Critchley, H. D., & Garfinkel, S. N. (2017). Interoception and emotion. *Current Opinion in Psychology*, *17*, 7–14. https://doi.org/10.1016/j.copsyc.2017.04.020

Crowley, N. M., LePage, M. L., Goldman, R. L., O'Neil, P. M., Borckardt, J. J., & Byrne, T. K. (2012). The food craving questionnaire-trait in a bariatric surgery seeking population and ability to predict post-surgery weight loss at six months. *Eating Behaviors*, *13*(4), 366–370. https://doi.org/10.1016/j.eatbeh.2012.07.003

Cserjési, R., Luminet, O., Poncelet, A.-S., & Lénárd, L. (2009). Altered executive function in obesity. Exploration of the role of affective states on cognitive abilities. *Appetite*, *52*(2), 535–539. https://doi.org/10.1016/j.appet.2009.01.003

Cunha, J. A. (2011). *Manual da versão em português das Escalas Beck*. Casa do Psicólogo.

Czepczor-Bernat, K., Brytek-Matera, A., Gramaglia, C., & Zeppegno, P. (2020). The moderating effects of mindful eating on the relationship between emotional functioning and eating styles in overweight and obese women. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *25*(4), 841–849. https://doi.org/10.1007/s40519-019-00740-6

D'Argenio, A., Mazzi, C., Pecchioli, L., Lorenzo, G. D., Siracusano, A., & Troisi, A. (2009). Early trauma and adult obesity: Is psychological dysfunction the mediating mechanism? *Physiology & Behavior*, *98*(5), 543–546. https://doi.org/10.1016/j.physbeh.2009.08.010

Dagher, A., Neseliler, S., & Han, J.-E. (2017). Decision Neuroscience. *V: Genetic and Hormonal Influences on Motivation and Social Behavior*, 397–409. https://doi.org/10.1016/b978-0-12-805308-9.00032-4

Dalrymple, K. L., Clark, H., Chelminski, I., & Zimmerman, M. (2018). The Interaction Between Mindfulness, Emotion Regulation, and Social Anxiety and Its Association with Emotional Eating in Bariatric Surgery Candidates. *Mindfulness*, *9*(6), 1780–1793. https://doi.org/10.1007/s12671-018-0921-4

Dancey, C. P., & Reidy, J. (2017). *Statistics Without Maths for Psychology* (7th ed.). Pearson.

Davies, M. (2007). Psychological assessment of candidates for bariatric surgery. *Irish Journal of Psychological Medicine*, *24*, 99–102. https://doi.org/10.1017/s0790966700010399

Dawes, A. J., Maggard-Gibbons, M., Maher, A. R., Booth, M. J., Miake-Lye, I., Beroes, J. M., & Shekelle, P. G. (2016). Mental Health Conditions Among Patients Seeking and Undergoing Bariatric Surgery: A Meta-analysis. *JAMA*, *315*(2), 150–163. https://doi.org/10.1001/jama.2015.18118

DeSoto, M. C., & Salinas, M. (2015). Neuroticism and cortisol: The importance of checking for sex differences. *Psychoneuroendocrinology*, *62*, 174–179. https://doi.org/10.1016/j.psyneuen.2015.07.608

Dietrich, A., Hollmann, M., Mathar, D., Villringer, A., & Horstmann, A. (2016). Brain regulation of food craving: relationships with weight status and eating behavior. *International Journal of Obesity*, *40*(6), 982–989. https://doi.org/10.1038/ijo.2016.28

Dohle, S., Diel, K., & Hofmann, W. (2018). Executive functions and the self-regulation of eating behavior: A review. *Appetite*, *124*, 4–9. https://doi.org/10.1016/j.appet.2017.05.041

Donini, L. M., Grave, R. D., Caretto, A., Lucchin, L., Melchionda, N., Nisoli, E., Sbraccia, P., Lenzi, A., & Cuzzolaro, M. (2014). From simplicity towards complexity: the Italian multidimensional approach to obesity. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *19*(3), 387–394. https://doi.org/10.1007/s40519-013-0097-9

Donofry, S. D., Stillman, C. M., & Erickson, K. I. (2020). A review of the relationship between eating behavior, obesity, and functional brain network organization. *Social Cognitive and Affective Neuroscience*, *15*(10), 1157–1181. https://doi.org/10.1093/scan/nsz085

Doumouras, A. G., Hong, D., Lee, Y., Tarride, J. E., Paterson, J. M., & Anvari, M. (2020). Association Between Bariatric Surgery and All-Cause Mortality: A Population-Based Matched Cohort Study in a Universal Health Care System. *Annals of Internal Medicine*, *173*, 694–703. https://doi.org/10.7326/m19-3925

Dreber, H., Reynisdottir, S., Angelin, B., & Hemmingsson, E. (2015). Who is the Treatment-Seeking Young Adult with Severe Obesity: A Comprehensive Characterization with Emphasis on Mental Health. *PLOS ONE*, *10*(12), e0145273–e0145273. https://doi.org/10.1371/journal.pone.0145273

Dreber, H., Reynisdottir, S., Angelin, B., & Hemmingsson, E. (2015). Who is the Treatment-Seeking Young Adult with Severe Obesity: A Comprehensive Characterization with Emphasis on Mental Health. *PLOS ONE*, *10*(12), e0145273–e0145273. https://doi.org/10.1371/journal.pone.0145273

Duarte-Guerra, L. S., Coêlho, B. M., Santo, M. A., & Wang, Y.-P. (2015). Psychiatric Disorders Among Obese Patients Seeking Bariatric Surgery: Results of Structured Clinical Interviews. *Obesity Surgery*, *25*(5), 830–837. https://doi.org/10.1007/s11695-014-1464-y

Duncan, A. E., Ziobrowski, H. N., & Nicol, G. (2017). The Prevalence of Past 12-Month and Lifetime DSM-IV Eating Disorders by BMI Category in US Men and Women. *European Eating Disorders Review*, *25*(3), 165–171. https://doi.org/10.1002/erv.2503

Dziurowicz-Kozłowska, A., Lisik, W., Wierzbicki, Z., & Kosieradzki, M. (2005). *Health-related quality of life after the surgical treatment of obesity. 56 Suppl 6*(SUPPL. 6), 127–134. http://www.ncbi.nlm.nih.gov/pubmed/16340046

Edwards-Hampton, S. A., & Wedin, S. (2015). Preoperative psychological assessment of patients seeking weight-loss surgery: Identifying challenges and solutions. *Psychology Research and Behavior Management*, *8*, 263–272. https://doi.org/10.2147/prbm.s69132

Efferdinger, C., König, D., Klaus, A., & Jagsch, R. (2017). Emotion regulation and mental well-being before and six months after bariatric surgery. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *22*(2), 353–360. https://doi.org/10.1007/s40519-017-0379-8

Ehrlich, S., King, J. A., & Boehm, I. (2019). Editorial: To Eat or Not to Eat: Advancing the Neuroscience of Hedonic Versus Controlled Eating Across Weight and Eating Disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *58*(2), 151–153. https://doi.org/10.1016/j.jaac.2018.07.902

Eisenberg, D., Shikora, S. A., Aarts, E., Aminian, A., Angrisani, L., Cohen, R. V., Luca, M. D., Faria, S. L., Goodpaster, K. P. S., Haddad, A., Himpens, J. M., Kow, L., Kurian, M., Loi, K., Mahawar, K., Nimeri, A., O'Kane, M., Papasavas, P. K., Ponce, J., … Kothari, S. N. (2022). 2022 American Society for Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO): Indications for Metabolic and Bariatric Surgery. *Surgery for Obesity and Related Diseases*, *18*(12), 1345–1356. https://doi.org/10.1016/j.soard.2022.08.013

Elfhag, K. (2010). A Synthesis of Recent Research on Obesity with the Rorschach and Suggestions for the Future. *Rorschachiana*, *31*, 117–142. https://doi.org/10.1027/1192-5604/a000008

Elfhag, K., Carlsson, A. M., & Rössner, S. (2003). Subgrouping in obesity based on Rorschach personality characteristics. *Scandinavian Journal of Psychology*, *44*(5), 399–407. https://doi.org/10.1046/j.1467-9450.2003.00360.x

Elfhag, K., Rössner, S., & Carlsson, A. M. (2004). Degree of body weight in obesity and Rorschach personality aspects of mental distress. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *9*(1), 35–43. https://doi.org/10.1007/bf03325043

Elfhag, K., Rossner, S., Lindgren, T., Andersson, I., & Carlsson, A. M. (2004). Rorschach personality predictors of weight loss with behavior modification in obesity treatment. *Journal of Personality Assessment*, *83*, 293–305. https://doi.org/10.1207/s15327752jpa8303_11

Ellickson-Larew, S., Naragon-Gainey, K., & Watson, D. (2013). Pathological eating behaviors, BMI, and facet-level traits: The roles of Conscientiousness, Neuroticism, and Impulsivity. *Eating Behaviors*, *14*(4), 428–431. https://doi.org/10.1016/j.eatbeh.2013.06.015

Erden, S. Ç., Seyit, H., Yazısız, V., Uyar, E. T., Akçakaya, R. Ö., Beşirli, A., Alış, H., Karamustafalıoğlu, O., & Yücel, B. (2016). Binge Eating Disorder Prevalence in Bariatric Surgery Patients: Evaluation of Presurgery and Postsurgery Quality of Life, Anxiety and Depression Levels. *Bariatric Surgical Practice and Patient Care*, *11*(2), 61–66. https://doi.org/10.1089/bari.2015.0045

Etkin, A., Büchel, C., & Gross, J. J. (2015). The neural bases of emotion regulation. *Nature Reviews Neuroscience*, *16*(11), 693–700. https://doi.org/10.1038/nrn4044

Etkin, A., Büchel, C., & Gross, J. J. (2016). Emotion regulation involves both model-based and model-free processes. *Nature Reviews Neuroscience*, *17*(8), 532–532. https://doi.org/10.1038/nrn.2016.79

Exner, J. E., & Erdberg, P. (2005). *The Rorschach, Advanced Interpretation*. John Wiley & Sons.

Eynde, A. V. den, Mertens, A., Vangoitsenhoven, R., Meulemans, A., Matthys, C., Deleus, E., Lannoo, M., Bruffaerts, R., & Schueren, B. V. der. (2021). Psychosocial Consequences of Bariatric Surgery: Two Sides of a Coin: a Scoping Review. *Obesity Surgery*, *31*(12), 5409–5417. https://doi.org/10.1007/s11695-021-05674-6

Fabricatore, A. N., Sarwer, D. B., Wadden, T. A., Combs, C. J., & Krasucki, J. L. (2007). Impression management or real change? Reports of depressive symptoms before and after the preoperative psychological evaluation for bariatric surgery. *Obesity Surgery*, *17*, 1213–1219. https://doi.org/10.1007/s11695-007-9204-1

Fassino, S., Pierò, A., Gramaglia, C., & Abbate-Daga, G. (2004). Clinical, Psychopathological and Personality Correlates of Interoceptive Awareness in Anorexia nervosa, Bulimia nervosa and Obesity. *Psychopathology*, *37*(4), 168–174. https://doi.org/10.1159/000079420

Faulconbridge, L. F., & Bechtel, C. F. (2014). Depression and Disordered Eating in the Obese Person. *Current Obesity Reports*, *3*(1), 127–136. https://doi.org/10.1007/s13679-013-0080-9

Favieri, F., Forte, G., & Casagrande, M. (2019). The Executive Functions in Overweight and Obesity: A Systematic Review of Neuropsychological Cross-Sectional and Longitudinal Studies. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.02126

Federico, A., Spalatro, A. V., Giorgio, I., Enrica, M., Daga, G. A., & Secondo, F. (2019). Personality and psychopathology differences between bariatric surgery candidates, subjects with obesity not seeking surgery management, and healthy subjects. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *24*(4), 623–631. https://doi.org/10.1007/s40519-019-00690-z

Felske, A. N., Williamson, T. M., Scurrey, S. R. M., Telfer, J. A., Campbell, T. S., & Rash, J. A. (2021). The Influence of Weight-Related Self-Esteem and Symptoms of Depression on Shape and Weight Concerns and Weight-Loss 12 Months After Bariatric Surgery. *Obesity Surgery*, *31*(3), 1062–1072. https://doi.org/10.1007/s11695-020-05097-9

Fergenbaum, J. H., Bruce, S., Lou, W., Hanley, A. J. G., Greenwood, C., & Young, T. K. (2009). Obesity and Lowered Cognitive Performance in a Canadian First Nations Population. *Obesity*, *17*(10), 1957–1963. https://doi.org/10.1038/oby.2009.161

Fernandes, J., Ferreira-Santos, F., Miller, K., & Torres, S. (2018). Emotional processing in obesity: a systematic review and exploratory meta-analysis. *Obesity Reviews*, *19*(1), 111–120. https://doi.org/10.1111/obr.12607

Fernandez-Aranda, F., Karwautz, A., & Treasure, J. (2018). Food addiction: A transdiagnostic construct of increasing interest. *European Eating Disorders Review*, *26*(6), 536–540. https://doi.org/10.1002/erv.2645

Figley, C. R., Asem, J. S. A., Levenbaum, E. L., & Courtney, S. M. (2016). Effects of Body Mass Index and Body Fat Percent on Default Mode, Executive Control, and Salience Network Structure and Function. *Frontiers in Neuroscience*, *10*, 234. https://doi.org/10.3389/fnins.2016.00234

Finn, S. E. (2011). Journeys Through the Valley of Death: Multimethod Psychological Assessment and Personality Transformation in Long-Term Psychotherapy. *Journal of Personality Assessment*, *93*(2), 123–141. https://doi.org/10.1080/00223891.2010.542533

Fischer, S., Wonderlich, J., & Becker, K. D. (2018). Neurobiology of Abnormal Emotion and Motivated Behaviors. In *Neurobiology of Abnormal Emotion and Motivated Behaviors: Integrating Animal and Human Research* (pp. 42–58). Academic Press. https://doi.org/10.1016/b978-0-12-813693-5.00003-4

Flores, C. A. (2014). Psychological assessment for bariatric surgery: current practices. *ABCD. Arquivos Brasileiros de Cirurgia Digestiva (São Paulo)*, *27*(suppl 1), 59–62. https://doi.org/10.1590/s0102-6720201400s100015

Franks, S. F., & Kaiser, K. A. (2008). Predictive factors in bariatric surgery outcomes: What is the role of the preoperative psychological evaluation? *Primary Psychiatry*, *15*(8), 74–83. http://www.scopus.com/inward/record.url?scp=49949094934&partnerID=8YFLogxK

Freire, C. C., Zanella, M. T., Segal, A., Arasaki, C. H., Matos, M. I. R., & Carneiro, G. (2021). Associations between binge eating, depressive symptoms and anxiety and weight regain after Roux-en-Y gastric bypass surgery. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *26*(1), 191–199. https://doi.org/10.1007/s40519-019-00839-w

Friedman, M. A., & Brownell, K. D. (1995). Psychological Correlates of Obesity: Moving to the Next Research Generation. *Psychological Bulletin*, *117*(1), 3–20. https://doi.org/10.1037/0033-2909.117.1.3

Galioto, R., Alosco, M. L., Spitznagel, M. B., Strain, G., Devlin, M., Cohen, R., Crosby, R. D., Mitchell, J. E., & Gunstad, J. (2015). Glucose regulation and cognitive function after bariatric surgery. *Journal of Clinical and Experimental Neuropsychology*, *37*, 402–413. https://doi.org/10.1080/13803395.2015.1023264

Galioto, R., Bond, D., Gunstad, J., Pera, V., Rathier, L., & Tremont, G. (2016). Executive functions predict weight loss in a medically supervised weight loss programme. *Obesity Science & Practice*, *2*, 334–340. https://doi.org/10.1002/osp4.70

Galioto, R., Garcia, S., Spitznagel, M. B., Strain, G., Devlin, M., Crosby, R. D., Mitchell, J. E., & Gunstad, J. (2014). The Mini-Mental State Exam (MMSE) is not sensitive to cognitive impairment in bariatric surgery candidates. *Surgery for Obesity and Related Diseases*, *10*(3), 553–557. https://doi.org/10.1016/j.soard.2013.09.010

Gallo, S., & Cheskin, L. J. (2021). Treatment of Obesity: Beyond the Diet. *Gastroenterology Clinics of North America*, *50*, 113–125. https://doi.org/10.1016/j.gtc.2020.10.003

García-Ruiz-de-Gordejuela, A., Agüera, Z., Granero, R., Steward, T., Llerda-Barberá, A., López-Segura, E., Vilarrasa, N., Sanchez, I., Jiménez-Murcia, S., Virgili, N., López-Urdiales, R., Bernabe, M. M., Garrido, P., Monseny, R., Monasterio, C., Salord, N., Pujol-Gebelli, J., Menchón, J. M., & Fernández-Aranda, F. (2017). Weight Loss Trajectories in Bariatric Surgery Patients and Psychopathological Correlates. *European Eating Disorders Review*, *25*(6), 586–594. https://doi.org/10.1002/erv.2558

Gearhardt, A. N., Corbin, W. R., & Brownell, K. D. (2009). Preliminary validation of the Yale Food Addiction Scale. *Appetite*, *52*(2), 430–436. https://doi.org/10.1016/j.appet.2008.12.003

Gearhardt, A. N., Corbin, W. R., & Brownell, K. D. (2016). Development of the Yale Food Addiction Scale Version 2.0. *Psychology of Addictive Behaviors*, *30*(1), 113–121. https://doi.org/10.1037/adb0000136

Geller, S., Dahan, S., Levy, S., Goldzweig, G., Hamdan, S., & Abu-Abeid, S. (2020). Body Image and Emotional Eating as Predictors of Psychological Distress Following Bariatric Surgery. *Obesity Surgery*, *30*, 1417–1423. https://doi.org/10.1007/s11695-019-04309-1

Georgiadou, E., Gruner-Labitzke, K., KÃ¶hler, H., Zwaan, M. de, MÃ¼ller, A., Köhler, H., Zwaan, M. de, & Müller, A. (2014). Cognitive function and nonfood-related impulsivity in

post-bariatric surgery patients. *Frontiers in Psychology*, *5*. https://doi.org/10.3389/fpsyg.2014.01502

Gerlach, G., Loeber, S., & Herpertz, S. (2016). Personality disorders and obesity: a systematic review. *Obesity Reviews*, *17*(8), 691–723. https://doi.org/10.1111/obr.12415

Ghaferi, A. A., Schwartz, T. A., & Pawlik, T. M. (2021). STROBE Reporting Guidelines for Observational Studies. *JAMA Surgery*, *156*(6), 577–578. https://doi.org/10.1001/jamasurg.2021.0528

Gianini, L. M., White, M. A., & Masheb, R. M. (2013). Eating pathology, emotion regulation, and emotional overeating in obese adults with binge eating disorder. *Eating Behaviors*, *14*(3), 309–313. https://doi.org/10.1016/j.eatbeh.2013.05.008

Giel, K. E., Hartmann, A., Zeeck, A., Jux, A., Vuck, A., Gierthmuehlen, P. C. G., Wetzler-Burmeister, E., Sandholz, A., Marjanovic, G., & Joos, A. (2016). Decreased Emotional Perception in Obesity. *European Eating Disorders Review*, *24*, 341–346. https://doi.org/10.1002/erv.2444

Giel, K. E., Rieber, N., Enck, P., Friederich, H.-C., Meile, T., Zipfel, S., & Teufel, M. (2014a). Effects of laparoscopic sleeve gastrectomy on attentional processing of food-related information: Evidence from eye-tracking. *Surgery for Obesity and Related Diseases*, *10*(2), 277–282. https://doi.org/10.1016/j.soard.2013.09.012

Gill, H., Kang, S., Lee, Y., Rosenblat, J. D., Brietzke, E., Zuckerman, H., & McIntyre, R. S. (2018). The Long-Term Effect of Bariatric Surgery on Depression and Anxiety. *Journal of Affective Disorders*, *246*, 886–894. https://doi.org/10.1016/j.jad.2018.12.113

Gloy, V. L., Briel, M., Bhatt, D. L., Kashyap, S. R., Schauer, P. R., Mingrone, G., Bucher, H. C., & Nordmann, A. J. (2013). Bariatric surgery versus non-surgical treatment for obesity: a systematic review and meta-analysis of randomised controlled trials. *BMJ : British Medical Journal*, *347*(oct22 1), f5934. https://doi.org/10.1136/bmj.f5934

Gordon, P. C., Sallet, J. A., & Sallet, P. C. (2014). The Impact of Temperament and Character Inventory Personality Traits on Long-Term Outcome of Roux-en-Y Gastric Bypass. *Obesity Surgery*, *24*(10), 1647–1655. https://doi.org/10.1007/s11695-014-1229-7

Görlach, M. G., Kohlmann, S., Shedden-Mora, M., Rief, W., & Westermann, S. (2016). Expressive Suppression of Emotions and Overeating in Individuals with Overweight and Obesity. *European Eating Disorders Review*, *24*(5), 377–382. https://doi.org/10.1002/erv.2452

Grana, A. S., Coolidge, F. L., & Merwin, M. M. (1989). Personality profiles of the morbidly obese. *Journal of Clinical Psychology*, *45*, 762–765. https://doi.org/doi:10.1002/1097-4679(198909)45:5<762::AID-JCLP2270450511>3.0.CO;2-E

Greenberg, I., Sogg, S., & Perna, F. M. (2009). Behavioral and Psychological Care in Weight Loss Surgery: Best Practice Update. *Obesity*, *17*(5), 880–884. https://doi.org/10.1038/oby.2008.571

Groppe, K., & Elsner, B. (2015). The influence of hot and cool executive function on the development of eating styles related to overweight in children. *Appetite*, *87*, 127–136. https://doi.org/10.1016/j.appet.2014.12.203

Gross, J. J. (1999). Emotion Regulation: Past, Present, Future. *Cognition and Emotion*, *13*(5), 551–573. https://doi.org/10.1080/026999399379186

Gross, J. J. (2014). Emotion regulation: Conceptual and empirical foundations. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (2nd Edition, pp. 3–20). John Wiley & Sons.

Groth-Marnat, G. (2009). *Handbook of psychological assessment* (5th edition). John Wiley & Sons.

Gunstad, J., Lhotsky, A., Wendell, C. R., Ferrucci, L., & Zonderman, A. B. (2010). Longitudinal Examination of Obesity and Cognitive Function: Results from the Baltimore Longitudinal Study of Aging. *Neuroepidemiology*, *34*(4), 222–229. https://doi.org/10.1159/000297742

Gupta, A., Osadchiy, V., & Mayer, E. A. (2020). Brain–gut–microbiome interactions in obesity and food addiction. *Nature Reviews Gastroenterology & Hepatology*, *17*(11), 655–672. https://doi.org/10.1038/s41575-020-0341-5

Hall, P. A., & Fong, G. T. (2013). Conscientiousness Versus Executive Function as Predictors of Health Behaviors and Health Trajectories. *Annals of Behavioral Medicine*, *45*(3), 398–399. https://doi.org/10.1007/s12160-012-9466-2

Hall, P. A., Bickel, W. K., Erickson, K. I., & Wagner, D. D. (2018). Neuroimaging, neuromodulation, and population health: the neuroscience of chronic disease prevention. *Annals of the New York Academy of Sciences*, *1428*(1), 240–256. https://doi.org/10.1111/nyas.13868

Hall, P. A., Fong, G. T., & Epp, L. J. (2013). Cognitive and personality factors in the prediction of health behaviors: an examination of total, direct and indirect effects. *Journal of Behavioral Medicine*, *37*(6), 1057–1068. https://doi.org/10.1007/s10865-013-9535-4

Hamdan, A. C., & Hamdan, E. M. L. R. (2009). Effects of age and education level on the Trail Making Test in a healthy Brazilian sample. *Psychology & Neuroscience*, *2*, 199–203. https://doi.org/10.3922/j.psns.2009.2.012

Hamilton, J. G., & Lobel, M. (2015). Psychosocial Factors Associated With Risk Perceptions for Chronic Diseases in Younger and Middle-Aged Women. *Women & Health*, *55*(8), 921–942. https://doi.org/10.1080/03630242.2015.1061094

Hampson, S. E., Goldberg, L. R., Vogt, T. M., & Dubanoski, J. P. (2007). Mechanisms by Which Childhood Personality Traits Influence Adult Health Status: Educational Attainment and Healthy Behaviors. *Health Psychology*, *26*(1), 121–125. https://doi.org/10.1037/0278-6133.26.1.121

Handley, J. D., Williams, D. M., Caplin, S., Stephens, J. W., & Barry, J. (2016). Changes in Cognitive Function Following Bariatric Surgery: a Systematic Review. *Obesity Surgery*, *26*(10), 2530–2537. https://doi.org/10.1007/s11695-016-2312-z

Heatherton, T. F., & Baumeister, R. F. (1991). Binge Eating as Escape From Self-Awareness. *Psychological Bulletin*, *110*(1), 86–108. https://doi.org/10.1037/0033-2909.110.1.86

Heatherton, T. F., & Wagner, D. D. (2011). Cognitive neuroscience of self-regulation failure. *Trends in Cognitive Sciences*, *15*(3), 132–139. https://doi.org/10.1016/j.tics.2010.12.005

Hedges, L. V., & Vevea, J. L. (1998). Fixed-and random-effects models in meta-analysis. *Psychological Methods*, *3*(4), 486.

Heinberg, L. J., Marek, R., Haskins, I. N., Bucak, E., Hanipah, Z. N., & Brethauer, S. (2017). 30-day readmission following weight loss surgery: can psychological factors predict nonspecific indications for readmission? *Surgery for Obesity and Related Diseases*, *13*, 1376–1381. https://doi.org/10.1016/j.soard.2017.04.004

Hemmingsson, E. (2014). Psychoemotional distress in weight gain. *Obesity Reviews*, *15*(9), 769–779. https://doi.org/10.1111/obr.12197

Hensel, J., Selvadurai, M., Anvari, M., & Taylor, V. (2016). Mental Illness and Psychotropic Medication use Among People Assessed for Bariatric Surgery in Ontario, Canada. *Obesity Surgery*, *26*, 1531–1536. https://doi.org/10.1007/s11695-015-1905-2

Herbert, B. M. (2020). Interoception and Its Role for Eating, Obesity, and Eating Disorders. *European Journal of Health Psychology*, *27*(4), 188–205. https://doi.org/10.1027/2512-8442/a000062

Herbert, B. M., & Pollatos, O. (2014). Attenuated interoceptive sensitivity in overweight and obese individuals. *Eating Behaviors*, *15*(3), 445–448. https://doi.org/10.1016/j.eatbeh.2014.06.002

Herbert, B. M., & Pollatos, O. (2014). Attenuated interoceptive sensitivity in overweight and obese individuals. *Eating Behaviors*, *15*(3), 445–448. https://doi.org/10.1016/j.eatbeh.2014.06.002

Herman, C. P., & Polivy, J. (2011). Self-Regulation and the Obesity Epidemic. *Social Issues and Policy Review*, *5*(1), 37–69. https://doi.org/10.1111/j.1751-2409.2011.01025.x

Himes, S. M., Grothe, K. B., Clark, M. M., Swain, J. M., Collazo-Clavell, M. L., & Sarr, M. G. (2015). Stop Regain: A Pilot Psychological Intervention for Bariatric Patients Experiencing

Weight Regain. *Obesity Surgery*, *25*(5), 922–927. https://doi.org/10.1007/s11695-015-1611-0

Ho, M.-C., Chen, V. C.-H., Chao, S.-H., Fang, C.-T., Liu, Y.-C., & Weng, J.-C. (2018). Neural correlates of executive functions in patients with obesity. *PeerJ*, *6*, e5002. https://doi.org/10.7717/peerj.5002

Hofmann, W., Friese, M., & Roefs, A. (2009). Three ways to resist temptation: The independent contributions of executive attention, inhibitory control, and affect regulation to the impulse control of eating behavior. *Journal of Experimental Social Psychology*, *45*(2), 431–435. https://doi.org/10.1016/j.jesp.2008.09.013

Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends in Cognitive Sciences*, *16*(3), 174–180. https://doi.org/10.1016/j.tics.2012.01.006

Holvoet, P. (2012). Stress in Obesity and Associated Metabolic and Cardiovascular Disorders. *Scientifica*, *2012*, 1–19. https://doi.org/10.6064/2012/205027

Houben, K., Nederkoorn, C., & Jansen, A. (2014). Eating on impulse: The relation between overweight and food-specific inhibitory control. *Obesity*, *22*(5), E6–E8. https://doi.org/10.1002/oby.20670

Hout, G. C. M. van, Hagendoren, C. A. J. M., Verschure, S. K. M., & Heck, G. L. van. (2009). Psychosocial Predictors of Success After Vertical Banded Gastroplasty. *Obesity Surgery*, *19*(6), 701–707. https://doi.org/10.1007/s11695-008-9446-6

Hout, G. C. M. van, Oudheusden, I. van, & Heck, G. L. van. (2004). Psychological Profile of the Morbidly Obese. *Obesity Surgery*, *14*(5), 579–588. https://doi.org/10.1381/096089204323093336

Hout, G. C. M. van, Verschure, S. K. M., & Heck, G. L. V. (2005). Psychosocial Predictors of Success following Bariatric Surgery. *Obesity Surgery*, *15*(4), 552–560. https://doi.org/10.1381/0960892053723484

Hoyt, T., & Walter, F. A. (2022). The Relationship of Presurgical Personality Assessment Inventory Scales to BMI Following Bariatric Surgery. *Health Psychology*, *41*(3), 184–192. https://doi.org/10.1037/hea0001142

Hrabosky, J. I., Masheb, R. M., White, M. A., Rothschild, B. S., Burke-Martindale, C. H., & Grilo, C. M. (2006). A Prospective Study of Body Dissatisfaction and Concerns in Extremely Obese Gastric Bypass Patients: 6- and 12-Month Postoperative Outcomes. *Obesity Surgery*, *16*(12), 1615–1621. https://doi.org/10.1381/096089206779319527

Hrabosky, J. I., White, M. A., Masheb, R. M., Rothschild, B. S., Burke-Martindale, C. H., & Grilo, C. M. (2008). Psychometric Evaluation of the Eating Disorder Examination-Questionnaire for Bariatric Surgery Candidates. *Obesity*, *16*(4), 763–769. https://doi.org/10.1038/oby.2008.3

Hu, H. H., Branca, R. T., Hernando, D., Karampinos, D. C., Machann, J., McKenzie, C. A., Wu, H. H., Yokoo, T., & Velan, S. S. (2020). Magnetic resonance imaging of obesity and metabolic disorders: Summary from the 2019 ISMRM Workshop. *Magnetic Resonance in Medicine*, *83*(5), 1565–1576. https://doi.org/10.1002/mrm.28103

Hubbard, & Hall. (1991). Gastrointestinal Surgery for Severe Obesity 25-27 March 1991. *Obesity Surgery*, *1*(3), 257–265. https://doi.org/10.1381/096089291765560962

International Federation for the Surgery of Obesity and Metabolic Disorders. (2019). *Fifth IFSO Global Registry Report 2019* (Obesity Surgery). Dendrite Clinical Systems Ltd. https://www.ifso.com/pdf/5th-ifso-global-registry-report-september-2019.pdf

International Federation for the Surgery of Obesity and Metabolic Disorders. (2021). *Sixth IFSO Global Registry Report 2021*. Dendrite Clinical Systems Ltd.

Ivezaj, V., & Grilo, C. M. (2018). The complexity of body image following bariatric surgery: a systematic review of the literature. *Obesity Reviews*, *19*(8), 1116–1140. https://doi.org/10.1111/obr.12685

Ivezaj, V., Kessler, E. E., Lydecker, J. A., Barnes, R. D., White, M. A., & Grilo, C. M. (2017). Loss-of-control eating following sleeve gastrectomy surgery. *Surgery for Obesity and Related Diseases*, *13*(3), 392–398. https://doi.org/10.1016/j.soard.2016.09.028

Jansen, A., Houben, K., & Roefs, A. (2015). A Cognitive Profile of Obesity and Its Translation into New Interventions. *Frontiers in Psychology*, *6*, 1807. https://doi.org/10.3389/fpsyg.2015.01807

Jiménez-Murcia, S., Agüera, Z., Paslakis, G., Munguia, L., Granero, R., Sánchez-González, J., Sánchez, I., Riesco, N., Gearhardt, A. N., Dieguez, C., & al., et. (2019). Food Addiction in Eating Disorders and Obesity: Analysis of Clusters and Implications for Treatment. *Nutrients*, *11*(11), 2633–2633. https://doi.org/10.3390/nu11112633

John, O. P., & Eng, J. (2014). Three approaches to individual differences in affect regulation: Conceptualizations, measures, and findings. In J. J. Gross (Ed.), *Handbook of emotion regulation* (2nd Edition). John Wiley & Sons.

John, O. P., Robins, R. W., & Pervin, L. A. (2008). *Handbook of personality: Theory and research* (O. P. John, R. W. Robins, & L. A. Pervin, Eds.; 3rd Edition). The Guilford Press. https://psycnet.apa.org/record/2008-11667-000

Joireman, J., Shaffer, M. J., Balliet, D., & Strathman, A. (2012). Promotion Orientation Explains Why Future-Oriented People Exercise and Eat Healthy. *Personality and Social Psychology Bulletin*, *38*, 1272–1287. https://doi.org/10.1177/0146167212449362

Kalarchian, M. A., & Marcus, M. D. (2015). Psychosocial interventions pre and post bariatric surgery. *European Eating Disorders Review*, *23*, 457–462. https://doi.org/10.1002/erv.2392

Kalarchian, M. A., Marcus, M. D., Levine, M. D., Courcoulas, A. P., Pilkonis, P. A., Ringham, R. M., Soulakova, J. N., Weissfeld, L. A., & Rofey, D. L. (2007). Psychiatric Disorders Among Bariatric Surgery Candidates: Relationship to Obesity and Functional Health Status. *American Journal of Psychiatry*, *164*(2), 328–334. https://doi.org/10.1176/ajp.2007.164.2.328

Kamody, R. C., Thurston, I. B., Decker, K. M., Kaufman, C. C., Sonneville, K. R., & Richmond, T. K. (2018). Relating shape/weight based self-esteem, depression, and anxiety with weight and perceived physical health among young adults. *Body Image*, *25*, 168–176. https://doi.org/10.1016/j.bodyim.2018.04.003

Kanter, R., & Caballero, B. (2012). Global Gender Disparities in Obesity: A Review. *Advances in Nutrition*, *3*(4), 491–498. https://doi.org/10.3945/an.112.002063

Keller, K. L., Kling, S. M. R., Fuchs, B., Pearce, A. L., Reigh, N. A., Masterson, T., & Hickok, K. (2019). A Biopsychosocial Model of Sex Differences in Children's Eating Behaviors. *Nutrients*, *11*(3), 682. https://doi.org/10.3390/nu11030682

Kim, H.-Y. (2013). Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative Dentistry & Endodontics*, *38*, 52. https://doi.org/10.5395/rde.2013.38.1.52

King, W. C., Hinerman, A. S., & Courcoulas, A. P. (2020). Weight regain after bariatric surgery: a systematic literature review and comparison across studies using a large reference sample. *Surgery for Obesity and Related Diseases*, *16*(8), 1133–1144. https://doi.org/10.1016/j.soard.2020.03.034

Kucera, M., Balaz, D., Kruzliak, P., Ciccocioppo, R., Oravec, S., Rodrigo, L., Zulli, A., Hirnerova, E., Sabaka, P., Komornikova, A., Sabo, J., Slezak, P., & Gaspar, L. (2007). Temporal self-regulation theory: A model for individual health behavior. *Health Psychology Review*, *1*(1), 6–52. https://doi.org/10.1080/17437190701492437

Lamore, K., Kaci, S. S., Czernichow, S., Bretault, M., Bouillot, J. L., Naudé, A. J., Gribe-Ouaknine, S., Carette, C., & Flahault, C. (2017). Mental Health Support Provided Throughout the Bariatric Surgery Clinical Pathway in French Specialized Care Centers for Obesity. *Obesity Surgery*, *27*, 802–810. https://10.1007/s11695-016-2498-0

Larsen, J. K., Geenen, R., Maas, C., Wit, P., Antwerpen, T., Brand, N., & Ramshorst, B. (2004). Personality as a Predictor of Weight Loss Maintenance after Surgery for Morbid Obesity. *Obesity Research*, *12*(11), 1828–1834. https://doi.org/10.1038/oby.2004.227

Leehr, E. J., Krohmer, K., Schag, K., Dresler, T., Zipfel, S., & Giel, K. E. (2015). Emotion regulation model in binge eating disorder and obesity - a systematic review. *Neuroscience & Biobehavioral Reviews*, *49*, 125–134. https://doi.org/10.1016/j.neubiorev.2014.12.008

Leombruni, P., Pierò, A., Dosio, D., Novelli, A., Abbate-Daga, G., Morino, M., Toppino, M., & Fassino, S. (2007). Psychological Predictors of Outcome in Vertical Banded Gastroplasty:

a 6 Months Prospective Pilot Study. *Obesity Surgery*, *17*(7), 941–948. https://doi.org/10.1007/s11695-007-9173-4

Lew, H. Y. F., & Zainal, K. A. (2018). Agreement of screening tools with established questionnaires used in psychological assessment of bariatric patients. *Proceedings of Singapore Healthcare*, *27*, 243–250. https://doi.org/10.1177/2010105818766960

Lier, H. Ø., Biringer, E., Stubhaug, B., & Tangen, T. (2013). Prevalence of psychiatric disorders before and 1 year after bariatric surgery: The role of shame in maintenance of psychiatric disorders in patients undergoing bariatric surgery. *Nordic Journal of Psychiatry*, *67*, 89–96. https://doi.org/10.3109/08039488.2012.684703

Lin, H.-Y., Huang, C.-K., Tai, C.-M., Lin, H.-Y., Kao, Y.-H., Tsai, C.-C., Hsuan, C.-F., Lee, S.-L., Chi, S.-C., & Yen, Y.-C. (2013). Psychiatric disorders of patients seeking obesity treatment. *BMC Psychiatry*, *13*(1), 1–1. https://doi.org/10.1186/1471-244x-13-1

Löffler, A., Foell, J., & Bekrater-Bodmann, R. (2018). Interoception and Its Interaction with Self, Other, and Emotion Processing: Implications for the Understanding of Psychosocial Deficits in Borderline Personality Disorder. *Current Psychiatry Reports*, *20*. https://doi.org/10.1007/s11920-018-0890-2

Lokken, K. L., Boeka, A. G., Yellumahanthi, K., Wesley, M., & Clements, R. H. (2010). Cognitive performance of morbidly obese patients seeking bariatric surgery. *American Surgeon*, *76*, 55–59. https://www.scopus.com/inward/record.uri?eid=2-s2.0-77949315978&partnerID=40&md5=8a9dfc6a3c053874d0f607040d1ba0eb

Luo, Q., Zhang, L., Huang, C.-C., Zheng, Y., Kanen, J. W., Zhao, Q., Yao, Y., Quinlan, E. B., Jia, T., Banaschewski, T., & al., et. (2020). Association between childhood trauma and risk for obesity: a putative neurocognitive developmental pathway. *BMC Medicine*, *18*(1), 278–278. https://doi.org/10.1186/s12916-020-01743-2

Machado, C. E., Zilberstein, B., Cecconello, I., & Monteiro, M. (2008). Compulsão alimentar antes e após a cirurgia bariátrica. *ABCD. Arquivos Brasileiros de Cirurgia Digestiva (São Paulo)*, *21*(4), 185–191. https://doi.org/10.1590/s0102-67202008000400007

Macpherson-Sánchez, A. E. (2015). Integrating Fundamental Concepts of Obesity and Eating Disorders: Implications for the Obesity Epidemic. *American Journal of Public Health*, *105*(4), e71–e85. https://doi.org/10.2105/ajph.2014.302507

Madden, C. E., Leong, S. L., Gray, A., & Horwath, C. C. (2012). Eating in response to hunger and satiety signals is related to BMI in a nationwide sample of 1601 mid-age New Zealand women. *Public Health Nutrition*, *15*(12), 2272–2279. https://doi.org/10.1017/s1368980012000882

Maddi, S. R., Fox, S. R., Harvey, R. H., Lu, J. L., Khoshaba, D. M., & Persico, M. (2001). Reduction in Psychopathology following Bariatric Surgery for Morbid Obesity. *Obesity Surgery*, *11*(6), 680–685. https://doi.org/10.1381/09608920160558605

Maggi, S., Busetto, L., Noale, M., Limongi, F., & Crepaldi, G. (2015). Obesity: Definition and Epidemiology. In *Multidisciplinary Approach to Obesity* (pp. 31–39). Springer.

Magro, D. O., Geloneze, B., Delfini, R., Pareja, B. C., Callejas, F., & Pareja, J. C. (2008). Long-term Weight Regain after Gastric Bypass: A 5-year Prospective Study. *Obesity Surgery*, *18*(6), 648–651. https://doi.org/10.1007/s11695-007-9265-1

Makaronidis, J. M., & Batterham, R. L. (2018). Obesity, body weight regulation and the brain: insights from fMRI. *The British Journal of Radiology*, *91*(1089), 20170910. https://doi.org/10.1259/bjr.20170910

Małczak, P., Mizera, M., Lee, Y., Pisarska-Adamczyk, M., Wysocki, M., Bała, M. M., Witowski, J., Rubinkiewicz, M., Dudek, A., Stefura, T., Torbicz, G., Tylec, P., Gajewska, N., Vongsurbchart, T., Su, M., Major, P., & Pędziwiatr, M. (2021). Quality of Life After Bariatric Surgery—a Systematic Review with Bayesian Network Meta-analysis. *Obesity Surgery*, *31*(12), 5213–5223. https://doi.org/10.1007/s11695-021-05687-1

Malik, S., Mitchell, J. E., Engel, S., Crosby, R., & Wonderlich, S. (2014). Psychopathology in bariatric surgery candidates: A review of studies using structured diagnostic interviews. *Comprehensive Psychiatry*, *55*(2), 248–259. https://doi.org/10.1016/j.comppsych.2013.08.021

Malik, V. S., Willet, W. C., & Hu, F. B. (2020). Nearly a decade on — trends, risk factors and policy implications in global obesity. *Nature Reviews Endocrinology*, *16*, 615–616. https://doi.org/10.1038/s41574-020-00411-y

Manderino, L., Spitznagel, M. B., Strain, G., Devlin, M., Cohen, R., Crosby, R. D., Mitchell, J. E., & Gunstad, J. (2015). Cognitive dysfunction predicts poorer emotion recognition in bariatric surgery candidates. *Obesity Science & Practice*, *1*(2), 97–103. https://doi.org/10.1002/osp4.9

Marchitelli, S., Ricci, E., Mazza, C., Roma, P., Tambelli, R., Casella, G., Gnessi, L., & Lenzi, A. (2022). Obesity and Psychological Factors Associated with Weight Loss after Bariatric Surgery: A Longitudinal Study. *Nutrients*, *14*(13), 2690. https://doi.org/10.3390/nu14132690

Marcus, M. D., Wing, R. R., & Lamparski, D. M. (1985). Binge eating and dietary restraint in obese patients. *Addictive Behaviors*, *10*(2), 163–168. https://doi.org/10.1016/0306-4603(85)90022-x

Marek, R. J., Ben-Porath, Y. S., Ashton, K., & Heinberg, L. J. (2014). Minnesota multiphasic personality inventory-2 restructured form (MMPI-2-RF) scale score differences in bariatric surgery candidates diagnosed with binge eating disorder versus BMI-matched controls. *International Journal of Eating Disorders*, *47*, 315–319. https://doi.org/10.1002/eat.22194

Marek, R. J., Ben-Porath, Y. S., Dulmen, M. H. M. van, Ashton, K., & Heinberg, L. J. (2017). Using the presurgical psychological evaluation to predict 5-year weight loss outcomes in

bariatric surgery patients. *Surgery for Obesity and Related Diseases*, *13*(3), 514–521. https://doi.org/10.1016/j.soard.2016.11.008

Marek, R. J., Heinberg, L. J., Lavery, M., Rish, J. M., & Ashton, K. (2016). A Review of Psychological Assessment Instruments for Use in Bariatric Surgery Evaluations. *Psychological Assessment*, *28*(9), 1142–1157. https://doi.org/10.1037/pas0000286

Markowitz, S., Friedman, M. A., & Arent, S. M. (2008). Understanding the relation between obesity and depression: Causal mechanisms and implications for treatment. *Clinical Psychology: Science and Practice*, *15*(1), 1–20. https://doi.org/10.1111/j.1468-2850.2008.00106.x

Martin-Fernandez, K. W., Marek, R. J., Heinberg, L. J., & Ben-Porath, Y. S. (2021). Six-year bariatric surgery outcomes: the predictive and incremental validity of presurgical psychological testing. *Surgery for Obesity and Related Diseases*, *17*(5), 1008–1016. https://doi.org/10.1016/j.soard.2021.01.012

Martin-Fernandez, K. W., Martin-Fernandez, J., Marek, R. J., Ben-Porath, Y. S., & Heinberg, L. J. (2021). Associations among psychopathology and eating disorder symptoms and behaviors in post-bariatric surgery patients. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *26*(8), 2545–2553. https://doi.org/10.1007/s40519-021-01111-w

Masheb, R. M., Grilo, C. M., Burke-Martindale, C. H., & Rothschild, B. S. (2006). Evaluating oneself by shape and weight is not the same as being dissatisfied about shape and weight: A longitudinal examination in severely obese gastric bypass patients. *International Journal of Eating Disorders*, *39*(8), 716–720. https://doi.org/10.1002/eat.20311

Mauro, M. F. F. P., Papelbaum, M., Brasil, M. A. A., Carneiro, J. R. I., Coutinho, E. S. F., Coutinho, W., & Appolinario, J. C. (2019). Is weight regain after bariatric surgery associated with psychiatric comorbidity? A systematic review and meta-analysis. *Obesity Reviews*, *20*(10), 1413–1425. https://doi.org/10.1111/obr.12907

McGrath, R. E. (2001). Toward More Clinically Relevant Assessment Research. *Journal of Personality Assessment*, *77*(2), 307–332. https://doi.org/10.1207/s15327752jpa7702_12

McGrath, R. E. (2008). The Rorschach in the Context of Performance-Based Personality Assessment. *Journal of Personality Assessment*, *90*, 465–475. https://doi.org/10.1080/00223890802248760

Meany, G., Conceição, E., & Mitchell, J. E. (2013). Binge Eating, Binge Eating Disorder and Loss of Control Eating: Effects on Weight Outcomes after Bariatric Surgery. *European Eating Disorders Review*, *22*(2), 87–91. https://doi.org/10.1002/erv.2273

Mechanick, J. I., Apovian, C., Brethauer, S., Garvey, W. T., Joffe, A. M., Kim, J., Kushner, R. F., Lindquist, R., Pessah-Pollack, R., Seger, J., Urman, R. D., Adams, S., Cleek, J. B., Correa, R., Figaro, M. K., Flanders, K., Grams, J., Hurley, D. L., Kothari, S., … Still, C. D. (2020). Clinical practice guidelines for the perioperative nutrition, metabolic, and

nonsurgical support of patients undergoing bariatric procedures – 2019 update: cosponsored by American Association of Clinical Endocrinologists/American College of Endocrinology,. *Surgery for Obesity and Related Diseases*, *16*, 175–247. https://doi.org/10.1016/j.soard.2019.10.025

Mechanick, J. I., Youdim, A., Jones, D. B., Garvey, W. T., Hurley, D. L., McMahon, M. M., Heinberg, L. J., Kushner, R., Adams, T. D., Shikora, S., & al., et. (2013). Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient-2013 update: Cosponsored by american association of clinical endocrinologists, The obesity society, and american society fo. *Obesity*, *21*(S1), S1–S27. https://doi.org/10.1002/oby.20461

Mehl, N., Bergmann, S., Klein, A. M., Daum, M., Klitzing, K. von, & Horstmann, A. (2017). Cause or consequence? Investigating attention bias and self-regulation skills in children at risk for obesity. *Journal of Experimental Child Psychology*, *155*, 113–127. https://doi.org/10.1016/j.jecp.2016.11.003

Meule, A., Zwaan, M. de, & Müller, A. (2017). Attentional and motor impulsivity interactively predict 'food addiction' in obese individuals. *Comprehensive Psychiatry*, *72*, 83–87. https://doi.org/10.1016/j.comppsych.2016.10.001

Meyer, G. J. (2017). What Rorschach performance can add to assessing and understanding personality. *International Journal of Personality Psychology*, *3*, 36–49. http://ijpp.rug.nl/article/viewFile/29881/27195

Meyer, G. J., & Eblin, J. J. (2012). An Overview of the Rorschach Performance Assessment System (R-PAS). *Psychological Injury and Law*, *5*, 107–121. https://doi.org/10.1007/s12207-012-9130-y

Meyer, G. J., Erard, R. E., Erdberg, P., Mihura, J. L., & Viglione, D. J. (2011). *Rorschach Performance Assessment System: Administration, coding, interpretation, and technical manual*. Rorschach Performance Assessment System LLC.

Meyer, G. J., Katko, N. J., Mihura, J. L., Klag, M. J., & Meoni, L. A. (2018). The Incremental Validity of Self-Report and Performance-Based Methods for Assessing Hostility to Predict Cardiovascular Disease in Physicians. *Journal of Personality Assessment*, *100*(1), 68–83. https://doi.org/10.1080/00223891.2017.1306780

Micanti, F., Iasevoli, F., Cucciniello, C., Costabile, R., Loiarro, G., Pecoraro, G., Pasanisi, F., Rossetti, G., & Galletta, D. (2017). The relationship between emotional regulation and eating behaviour: a multidimensional analysis of obesity psychopathology. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *22*, 105–115. https://doi.org/10.1007/s40519-016-0275-7

Miguel, F. K., Giromini, L., Colombarolli, M. S., Zuanazzi, A. C., & Zennaro, A. (2016). A Brazilian Investigation of the 36- and 16-Item Difficulties in Emotion Regulation Scales. *Journal of Clinical Psychology*, *73*(9), 1146–1159. https://doi.org/10.1002/jclp.22404

Mihura, J. L. (2012). The Necessity of Multiple Test Methods in Conducting Assessments: The Role of the Rorschach and Self-Report. *Psychological Injury and Law*, *5*(2), 97–106. https://doi.org/10.1007/s12207-012-9132-9

Mihura, J. L., Dumitrascu, N., Roy, M., & Meyer, G. J. (2017). The Centrality of the Response Process in Construct Validity: An Illustration via the Rorschach Space Response. *Journal of Personality Assessment*, *0*, 1–17. https://doi.org/10.1080/00223891.2017.1306781

Mihura, J. L., Meyer, G. J., Dumitrascu, N., & Bombel, G. (2013). The validity of individual Rorschach variables: Systematic reviews and meta-analyses of the comprehensive system. *Psychological Bulletin*, *139*, 548–605. https://doi.org/10.1037/a0029406

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The Unity and Diversity of Executive Functions and Their Contributions to Complex "Frontal Lobe" Tasks: A Latent Variable Analysis. *Cognitive Psychology*, *41*(1), 49–100. https://doi.org/10.1006/cogp.1999.0734

Monell, E., Clinton, D., & Birgegård, A. (2020). Self-directed behaviors differentially explain associations between emotion dysregulation and eating disorder psychopathology in patients with or without objective binge-eating. *Journal of Eating Disorders*, *8*(1), 17. https://doi.org/10.1186/s40337-020-00294-4

Monte, C. D., Renzi, A., Paone, E., Silecchia, G., Solano, L., & Trani, M. D. (2020). Alexithymia and obesity: Controversial findings from a multimethod assessment. *European Review for Medical and Pharmacological Sciences*, *24*(2), 831–836. https://doi.org/10.26355/eurrev_202001_20066

Moore, C. F., Sabino, V., Koob, G. F., & Cottone, P. (2017). Pathological Overeating: Emerging Evidence for a Compulsivity Construct. *Neuropsychopharmacology*, *42*(7), 1375–1389. https://doi.org/10.1038/npp.2016.269

Morey, L. C. (1991). *Personality Assessment Inventory (PAI): Professional manual*. Psychological Assessment Resources.

Morey, L. C. (2007). *Personality Assessment Inventory (PAI): Professional manual* (2nd ed.). Psychological Assessment Resources.

Mulhauser, K., Reynolds, E. L., Callaghan, B. C., Fierro, C., Giordani, B., & Votruba, K. (2021). Executive Functioning in Extreme Obesity: Contributions from Metabolic Status, Medical Comorbidities, and Psychiatric Factors. *Obesity Surgery*, *31*(6), 2669–2681. https://doi.org/10.1007/s11695-021-05319-8

Müller, A., Hase, C., Pommnitz, M., & Zwaan, M. de. (1920). Depression and Suicide After Bariatric Surgery. *Current Psychiatry Reports*, *21*(9), 84. https://doi.org/10.1007/s11920-019-1069-1

Munro, I. A., Bore, M. R., Munro, D., & Garg, M. L. (2011). Using personality as a predictor of diet induced weight loss and weight management. *International Journal of Behavioral Nutrition and Physical Activity*, *8*(1), 129. https://doi.org/10.1186/1479-5868-8-129

Murphy, C. M., Stojek, M. K., & MacKillop, J. (2014). Interrelationships among impulsive personality traits, food addiction, and Body Mass Index. *Appetite*, *73*, 45–50. https://doi.org/10.1016/j.appet.2013.10.008

Nagata, J. M., Garber, A. K., Tabler, J. L., Murray, S. B., & Bibbins-Domingo, K. (2017). Prevalence and Correlates of Disordered Eating Behaviors Among Young Adults with Overweight or Obesity. *Journal of General Internal Medicine*, *33*(8), 1337–1343. https://doi.org/10.1007/s11606-018-4465-z

Nater, U. M., Hoppmann, C., & Klumb, P. L. (2010). Neuroticism and conscientiousness are associated with cortisol diurnal profiles in adults—Role of positive and negative affect. *Psychoneuroendocrinology*, *35*(10), 1573–1577. https://doi.org/10.1016/j.psyneuen.2010.02.017

National Heart, Lung and Blood Institute. (2014). *Quality assessment tool for before-after (pre-post) studies with no control group*. https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools

Navas, J. F., Vilar-López, R., Perales, J. C., Steward, T., Fernández-Aranda, F., & Verdejo-García, A. (2016). Altered decision-making under risk in obesity. *PLoS ONE*, *11*. https://doi.org/10.1371/journal.pone.0155600

Nedelcu, M., Khwaja, H. A., & Rogula, T. G. (2016). Weight regain after bariatric surgery—how should it be defined? *Surgery for Obesity and Related Diseases*, *12*(5), 1129–1130. https://doi.org/10.1016/j.soard.2016.04.028

Neff, K. M. H., Schuh, L. M., Saules, K. K., Creel, D. B., Stote, J. J., Schuh, K. M., & Inman, M. (2021). Psychological Functioning and Health Behaviors Associated with Weight Loss Patterns up to 13.7 Years After Weight Loss Surgery. *Journal of Clinical Psychology in Medical Settings*, *28*(4), 833–843. https://doi.org/10.1007/s10880-021-09807-y

O'Brien, P. E., Hindle, A., Brennan, L., Skinner, S., Burton, P., Smith, A., Crosthwaite, G., & Brown, W. (2019). Long-Term Outcomes After Bariatric Surgery: a Systematic Review and Meta-analysis of Weight Loss at 10 or More Years for All Bariatric Procedures and a Single-Centre Review of 20-Year Outcomes After Adjustable Gastric Banding. *Obesity Surgery*, *29*(1), 3–14. https://doi.org/10.1007/s11695-018-3525-0

O'Kane, M., Parretti, H. M., Hughes, C. A., Sharma, M., Woodcock, S., Puplampu, T., Blakemore, A. I., Clare, K., MacMillan, I., Joyce, J., & al., et. (2016). Guidelines for the follow-up of patients undergoing bariatric surgery. *Clinical Obesity*, *6*(3), 210–224. https://doi.org/10.1111/cob.12145

Ochner, C. N., Barrios, D. M., Lee, C. D., & Pi-Sunyer, F. X. (2013). Biological mechanisms that promote weight regain following weight loss in obese humans. *Physiology & Behavior*, *120*, 106–113. https://doi.org/10.1016/j.physbeh.2013.07.009

OECD. (2019). The Heavy Burden of Obesity. *OECD Health Policy Studies*. https://doi.org/10.1787/67450d67-en

Ogden, J., Avenell, S., & Ellis, G. (2011). Negotiating control: Patients' experiences of unsuccessful weight-loss surgery. *Psychology & Health*, *26*, 949–964. https://doi.org/10.1080/08870446.2010.514608

Ogden, J., Ratcliffe, D., & Snowdon-Carr, V. (2019). British Obesity Metabolic Surgery Society endorsed guidelines for psychological support pre- and post-bariatric surgery. *Clinical Obesity*, *9*(6). https://doi.org/10.1111/cob.12339

Oliveira, J., Colombarolli, M. S., & Cordás, T. A. (2021). Prevalence and correlates of food addiction: Systematic review of studies with the YFAS 2.0. *Obesity Research & Clinical Practice*, *15*(3), 191–204. https://doi.org/10.1016/j.orcp.2021.03.014

Osadchiy, V., Mayer, E. A., Bhatt, R., Labus, J. S., Gao, L., Kilpatrick, L. A., Liu, C., Tillisch, K., Naliboff, B., Chang, L., & al., et. (2019). History of early life adversity is associated with increased food addiction and sex-specific alterations in reward network connectivity in obesity. *Obesity Science & Practice*, *5*(5), 416–436. https://doi.org/10.1002/osp4.362

Osório, F. de L., Mendes, A. V., Crippa, J. A., Loureiro, S. R., Mendes, A. V., Crippa, J. A., Loureiro, S. R., Osório, F. D. L., Mendes, A. V., Crippa, J. A., & Loureiro, S. R. (2009). Study of the discriminative validity of the PHQ-9 and PHQ-2 in a sample of brazilian women in the context of primary health care. *Perspectives in Psychiatric Care*, *45*, 216–227. https://doi.org/10.1111/j.1744-6163.2009.00224.x

Ouellette, A.-S., Rodrigue, C., Lemieux, S., Tchernof, A., Biertho, L., & Bégin, C. (2017). An examination of the mechanisms and personality traits underlying food addiction among individuals with severe obesity awaiting bariatric surgery. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *22*(4), 633–640. https://doi.org/10.1007/s40519-017-0440-7

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., & al., et. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *International Journal of Surgery*, *88*, 105906–105906. https://doi.org/10.1016/j.ijsu.2021.105906

Parcet, M. A., Adrián-Ventura, J., Costumero, V., & Ávila, C. (2020). Individual Differences in Hippocampal Volume as a Function of BMI and Reward Sensitivity. *Frontiers in Behavioral Neuroscience*, *14*, 53. https://doi.org/10.3389/fnbeh.2020.00053

Perpiñá, C., Segura, M., & Sánchez-Reales, S. (2017). Cognitive flexibility and decision-making in eating disorders and obesity. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *22*(3), 435–444. https://doi.org/10.1007/s40519-016-0331-3

Peterhänsel, C., Linde, K., Wagner, B., Dietrich, A., & Kersting, A. (2017). Subtypes of Personality and 'Locus of Control' in Bariatric Patients and their Effect on Weight Loss, Eating Disorder and Depressive Symptoms, and Quality of Life. *European Eating Disorders Review*, *25*(5), 397–405. https://doi.org/10.1002/erv.2534

Peters, A., Schweiger, U., Pellerin, L., Hubold, C., Oltmanns, K. M., Conrad, M., Schultes, B., Born, J., & Fehm, H. L. (2004). The selfish brain: competition for energy resources. *Neuroscience & Biobehavioral Reviews*, *28*(2), 143–180. https://doi.org/10.1016/j.neubiorev.2004.03.002

Pink, A. E., Lee, M., Price, M., & Williams, C. (2019). A serial mediation model of the relationship between alexithymia and BMI: The role of negative affect, negative urgency and emotional eating. *Appetite*, *133*, 270–278. https://doi.org/10.1016/j.appet.2018.11.014

Pinto-Bastos, A., Lourdes, M. de, Brandão, I., Machado, P. P. P., & Conceição, E. M. (2019). Weight loss trajectories and psychobehavioral predictors of outcome of primary and reoperative bariatric surgery: a 2-year longitudinal study. *Surgery for Obesity and Related Diseases*, *15*(7), 1104–1112. https://doi.org/10.1016/j.soard.2019.04.018

Pinto, L. K. (2011). *Um estudo com o Psicodiagnóstico de Rorschach sobre o funcionamento psíquico de pacientes que realizaram tratamento para a obesidade*. [Tese de Doutorado]. Universidade de São Paulo.

Pivarunas, B., & Conner, B. T. (2015). Impulsivity and emotion dysregulation as predictors of food addiction. *Eating Behaviors*, *19*, 9–14. https://doi.org/10.1016/j.eatbeh.2015.06.007

Pollatos, O., & Schandry, R. (2008). Emotional processing and emotional memory are modulated by interoceptive awareness. *Cognition and Emotion*, *22*, 272–287. https://doi.org/10.1080/02699930701357535

Portella, M. J., Harmer, C. J., Flint, J., Cowen, P., & Goodwin, G. M. (2005). Enhanced Early Morning Salivary Cortisol in Neuroticism. *American Journal of Psychiatry*, *162*(4), 807–809. https://doi.org/10.1176/appi.ajp.162.4.807

Poston, W. S. C., Ericsson, M., Linder, J., Nilsson, T., Goodrick, G. K., & Foreyt, J. P. (1999). Personality and the prediction of weight loss and relapse in the treatment of obesity. *International Journal of Eating Disorders*, *25*(3), 301–309. https://doi.org/10.1002/(sici)1098-108x(199904)25:3<301::aid-eat8>3.0.co;2-p

Puhl, R. M., Quinn, D. M., Weisz, B. M., & Suh, Y. J. (2017). The Role of Stigma in Weight Loss Maintenance Among U.S. Adults. *Annals of Behavioral Medicine*, *51*(5), 754–763. https://doi.org/10.1007/s12160-017-9898-9

Pull, C. B. (2010). Current psychological assessment practices in obesity surgery programs: what to assess and why. *Current Opinion in Psychiatry*, *23*(1), 30–36. https://doi.org/10.1097/yco.0b013e328334c817

Qasim, A., Turcotte, M., Souza, R. J. de, Samaan, M. C., Champredon, D., Dushoff, J., Speakman, J. R., & Meyre, D. (2018). On the origin of obesity: identifying the biological, environmental and cultural drivers of genetic risk among human populations. *Obesity Reviews*, *19*(2), 121–149. https://doi.org/10.1111/obr.12625

Rajan, T., & Menon, V. (2017). Psychiatric disorders and obesity: A review of association studies. *Journal of Postgraduate Medicine*, *63*(3), 182–190. https://doi.org/10.4103/jpgm.jpgm_712_16

Raman, J., Smith, E., & Hay, P. (2013). The Clinical Obesity Maintenance Model: An Integration of Psychological Constructs including Mood, Emotional Regulation, Disordered Overeating, Habitual Cluster Behaviours, Health Literacy and Cognitive Function. *Journal of Obesity*, *2013*, 240128. https://doi.org/10.1155/2013/240128

Ratcliffe, D., Ali, R., Ellison, N., Khatun, M., Poole, J., & Coffey, C. (2014). Bariatric psychology in the UK National Health Service: Input across the patient pathway. *BMC Obesity*, *1*, 1–7. https://doi.org/10.1186/s40608-014-0020-6

Reinert, K. R. S., Po'e, E. K., & Barkin, S. L. (2013). The relationship between executive function and obesity in children and adolescents: a systematic literature review. *Journal of Obesity*, *2013*, 820956. https://doi.org/10.1155/2013/820956

Ribeiro, G. A. N. de A., Giapietro, H. B., Belarmino, L. B., & Salgado-Junior, W. (2018). Depression, Anxiety, and Binge Eating Before and After Bariatric Surgery: Problems That Remain. *ABCD. Arquivos Brasileiros de Cirurgia Digestiva (São Paulo)*, *31*(1), e1356–e1356. https://doi.org/10.1590/0102-672020180001e1356

Ribeiro, G. A. N. de A., Giapietro, H. B., Belarmino, L. B., & Salgado-Junior, W. (2018). Depression, anxiety, and binge eating before and after bariatric surgery: problems that remain. *ABCD. Arquivos Brasileiros de Cirurgia Digestiva (São Paulo)*, *31*(01), e1356. https://doi.org/10.1590/0102-672020180001e1356

Ribeiro, G. A. N. de A., Santos, J. E. dos, & Loureiro, S. R. (2011). Perfil psicológico de mulheres e a cirurgia bariátrica: Estudo exploratório. *Revista Interamericana de Psicología/Interamerican Journal of Psychology*, *45*(2), 169–176. https://www.redalyc.org/articulo.oa?id=28422741007

Roberto, C. A., Sysko, R., Bush, J., Pearl, R., Puhl, R. M., Schvey, N. A., & Dovidio, J. F. (2012). Clinical Correlates of the Weight Bias Internalization Scale in a Sample of Obese Adolescents Seeking Bariatric Surgery. *Obesity*, *20*(3), 533–539. https://doi.org/10.1038/oby.2011.123

Robinson, E., Roberts, C., Vainik, U., & Jones, A. (2020). The psychology of obesity: An umbrella review and evidence-based map of the psychological correlates of heavier body weight. *Neuroscience & Biobehavioral Reviews*, *119*, 468–480. https://doi.org/10.1016/j.neubiorev.2020.10.009

Robitzsch, A., Schweda, A., Hetkamp, M., Niedergethmann, M., Dörrie, N., Herpertz, S., Hasenberg, T., Tagay, S., Teufel, M., & Skoda, E.-M. (2020). The Impact of Psychological Resources on Body Mass Index in Obesity Surgery Candidates. *Frontiers in Psychiatry*, *11*, 649. https://doi.org/10.3389/fpsyt.2020.00649

Rochat, L., Billieux, J., Gagnon, J., & Linden, M. V. der. (2018). A multifactorial and integrative approach to impulsivity in neuropsychology: insights from the UPPS model of impulsivity. *Journal of Clinical and Experimental Neuropsychology*, *40*(1), 45–61. https://doi.org/10.1080/13803395.2017.1313393

Roehrig, M., Masheb, R. M., White, M. A., Rothschild, B. S., Burke-Martindale, C. H., & Grilo, C. M. (2009). Chronic Dieting Among Extremely Obese Bariatric Surgery Candidates. *Obesity Surgery*, *19*(8), 1116–1123. https://doi.org/10.1007/s11695-009-9865-z

Rojas, C., Brante, M., Miranda, E., & Pérez-Luco, R. (2011). Descripción de manifestaciones ansiosas, depresivas y autoconcepto en pacientes obesos mórbidos, sometidos a cirugía bariátrica. *Revista Médica de Chile*, *139*(5), 571–578. https://doi.org/10.4067/s0034-98872011000500002

Román, C. J. V. der H., Cubas, S. E., Tirado-González, S., Pérez-Martínez, E., Sebastian, S. O., Caballero, J. L. E., Rodríguez-Marín, J., & Leal-Costa, C. (2017). Changes in quality of life in patients undergoing bariatric surgery following 24-months: comparison between gastric bypass and tubular vertical gastrectomy. *Anales Del Sistema Sanitario de Navarra*, *40*(2), 199–209. https://doi.org/10.23938/assn.0032

Rosik, C. H. (2005). Psychiatric Symptoms among Prospective Bariatric Surgery Patients: Rates of Prevalence and their Relation to Social Desirability, Pursuit of Surgery, and Follow-Up Attendance. *Obesity Surgery*, *15*(5), 677–683. https://doi.org/10.1381/0960892053923815

Rossetti, C., & Boutrel, B. (2019). Interactions of hedonic and homeostatic systems in compulsive overeating. In *Compulsive Eating Behavior and Food Addiction: Emerging Pathological Constructs* (pp. 251–291). Elsevier Inc. https://doi.org/10.1016/b978-0-12-816207-1.00009-3

Roth, A. E., Thornley, C. J., & Blackstone, R. P. (2020). Outcomes in Bariatric and Metabolic Surgery: an Updated 5-Year Review. *Current Obesity Reports*, *9*(3), 380–389. https://doi.org/10.1007/s13679-020-00389-8

Rutledge, T., Ellison, J. K., & Phillips, A. S. (2020). Revising the bariatric psychological evaluation to improve clinical and research utility. *Journal of Behavioral Medicine*, *43*(4), 660–665. https://doi.org/10.1007/s10865-019-00060-1

Rydén, A., Sullivan, M., Torgerson, J. S., Karlsson, J., Lindroos, A.-K., & Taft, C. (2003). Severe obesity and personality: a comparative controlled study of personality traits. *International Journal of Obesity*, *27*(12), 1534–1540. https://doi.org/10.1038/sj.ijo.0802460

Sainsbury, K., Evans, E. H., Pedersen, S., Marques, M. M., Teixeira, P. J., Lähteenmäki, L., Stubbs, R. J., Heitmann, B. L., & Sniehotta, F. F. (2019). Attribution of weight regain to emotional reasons amongst European adults with overweight and obesity who regained weight following a weight loss attempt. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *24*(2), 351–361. https://doi.org/10.1007/s40519-018-0487-0

Santos, K. O. B., Araújo, T. M. D., & Oliveira, N. F. D. (2009). Estrutura fatorial e consistência interna do Self-Reporting Questionnaire (SRQ-20) em população urbana. *Cadernos de Saúde Pública*, *25*, 214–222. https://doi.org/10.1590/s0102-311x2009000100023

Sarma, S., Sockalingam, S., & Dash, S. (2021). Obesity as a multisystem disease: Trends in obesity rates and obesity-related complications. *Diabetes, Obesity and Metabolism*, *23*(S1), 3–16. https://doi.org/10.1111/dom.14290

Sarwer, D. B., Allison, K. C., Wadden, T. A., Ashare, R., Spitzer, J. C., McCuen-Wurst, C., LaGrotte, C., Williams, N. N., Edwards, M., Tewksbury, C., & Wu, J. (2019). Psychopathology, disordered eating, and impulsivity as predictors of outcomes of bariatric surgery. *Surgery for Obesity and Related Diseases*, *15*, 650–655. https://doi.org/10.1016/j.soard.2019.01.029

Scarpazza, C., & Pellegrino, G. di. (2018). Alexithymia, embodiment of emotions and interoceptive abilities. In *Current Developments in Alexithymia: A Cognitive and Affective Deficit* (pp. 35–51). https://www.scopus.com/inward/record.uri?eid=2-s2.0-85048381867&partnerID=40&md5=ab25a51b9bf6577e2292b9f3c2b4ddac

Schäfer, L., Hübner, C., Carus, T., Herbig, B., Seyfried, F., Kaiser, S., Schütz, T., Dietrich, A., & Hilbert, A. (2017). Identifying prebariatric subtypes based on temperament traits, emotion dysregulation, and disinhibited eating: A latent profile analysis. *International Journal of Eating Disorders*, *50*(10), 1172–1182. https://doi.org/10.1002/eat.22760

Schiff, S., Amodio, P., Testa, G., Nardi, M., Montagnese, S., Caregaro, L., Pellegrino, G. di, & Sellitto, M. (2015). Impulsivity toward food reward is related to BMI: Evidence from intertemporal choice in obese and normal-weight individuals. *Brain and Cognition*, *110*, 112–119. https://doi.org/10.1016/j.bandc.2015.10.001

Schultchen, D., Bayer, J., Kühnel, J., Melchers, K. G., & Pollatos, O. (2019). Interoceptive accuracy is related to long-term stress via self-regulation. *Psychophysiology*, *56*. https://doi.org/10.1111/psyp.13429

Segura-Serralta, M., Perpiñá, C., Ciscar, S., Blasco, L., Espert, R., Romero-Escobar, C., Domínguez, J. R., & Oltra-Cucarella, J. (2019). Executive functions and emotion regulation in obesity and eating disorders. *Nutricion Hospitalaria*, *36*(1), 167–172. https://doi.org/10.20960/nh.02016

Setkowicz, Z., Gaździńska, A., Osoba, J. J., Karwowska, K., Majka, P., Orzeł, J., Kossowski, B., Bogorodzki, P., Janeczko, K., Wyleżoł, M., & Gazdzinski, S. P. (2015). Does Long-Term High Fat Diet Always Lead to Smaller Hippocampi Volumes, Metabolite Concentrations, and Worse Learning and Memory? A Magnetic Resonance and Behavioral

Study in Wistar Rats. *PLoS ONE*, *10*(10), e0139987. https://doi.org/10.1371/journal.pone.0139987

Siegrist, M., Bearth, A., & Hartmann, C. (2022). The impacts of diet-related health consciousness, food disgust, nutrition knowledge, and the Big Five personality traits on perceived risks in the food domain. *Food Quality and Preference*, *96*, 104441. https://doi.org/10.1016/j.foodqual.2021.104441

Smith, K. E., Orcutt, M., Steffen, K. J., Crosby, R. D., Cao, L., Garcia, L., & Mitchell, J. E. (2019). Loss of Control Eating and Binge Eating in the 7 Years Following Bariatric Surgery. *Obesity Surgery*, *29*(6), 1773–1780. https://doi.org/10.1007/s11695-019-03791-x

Smith, R., & Lane, R. D. (2015). The neural basis of one's own conscious and unconscious emotional states. *Neuroscience & Biobehavioral Reviews*, *57*, 1–29. https://doi.org/10.1016/j.neubiorev.2015.08.003

Sociedade Brasileira de Cirurgia Bariátrica e Metabólica. (2017). *Quem Pode Fazer*. https://www.sbcbm.org.br/quem-pode-fazer/

Sociedade Brasileira de Cirurgia Bariátrica e Metabólica. (2020, October 28). *SBCBM divulga números e pede participação popular para cobertura da cirurgia metabólica pelos planos de saúde*. https://www.sbcbm.org.br/sbcbm-divulga-numeros-e-pede-participacao-popular-para-cobertura-da-cirurgia-metabolica-pelos-planos-de-saude/

Sogg, S., & Friedman, K. E. (2015). Getting Off on the Right Foot: The Many Roles of the Psychosocial Evaluation in the Bariatric Surgery Practice. *European Eating Disorders Review*, *23*, 451–456. https://doi.org/10.1002/erv.2395

Sommer, L. M., Halbeisen, G., Erim, Y., & Paslakis, G. (2021). Two of a Kind? Mapping the Psychopathological Space between Obesity with and without Binge Eating Disorder. *Nutrients*, *13*(11), 3813. https://doi.org/10.3390/nu13113813

Song, H. J., Lee, E.-K., & Kwon, J.-W. (2016). Gender Differences in the Impact of Obesity on Health-Related Quality of Life. *Asia Pacific Journal of Public Health*, *28*(2), 146–156. https://doi.org/10.1177/1010539515626267

Soussignan, R., Schaal, B., & Jiang, T. (2019). Watching happy faces potentiates incentive salience but not hedonic reactions to palatable food cues in overweight/obese adults. *Appetite*, *133*, 83–92. https://doi.org/10.1016/j.appet.2018.10.024

Spitznagel, M. B., Alosco, M., Galioto, R., Strain, G., Devlin, M., Sysko, R., Crosby, R. D., Mitchell, J. E., & Gunstad, J. (2014). The Role of Cognitive Function in Postoperative Weight Loss Outcomes: 36-Month Follow-Up. *Obesity Surgery*, *24*(7), 1078–1084. https://doi.org/10.1007/s11695-014-1205-2

Spitznagel, M. B., Alosco, M., Strain, G., Devlin, M., Cohen, R., Paul, R., Crosby, R. D., Mitchell, J. E., & Gunstad, Ph. D. J. (2013). Cognitive function predicts 24-month weight

loss success after bariatric surgery. *Surgery for Obesity and Related Diseases*, *9*(5), 765–770. https://doi.org/10.1016/j.soard.2013.04.011

Spitznagel, M. B., Garcia, S., Miller, L. A., Strain, G., Devlin, M., Wing, R., Cohen, R., Paul, R., Crosby, R., Mitchell, J. E., & Gunstad, J. (2013). Cognitive function predicts weight loss after bariatric surgery. *Surgery for Obesity and Related Diseases*, *9*(3), 453–459. https://doi.org/10.1016/j.soard.2011.10.008

Spitznagel, M. B., Hawkins, M., Alosco, M., Galioto, R., Garcia, S., Miller, L., & Gunstad, J. (2015). Neurocognitive Effects of Obesity and Bariatric Surgery. *European Eating Disorders Review*, *23*(6), 488–495. https://doi.org/10.1002/erv.2393

Stapleton, P., Spinks, T., & Carter, B. (2020). Psychological Determinants of Continued Obesity One-Year Postbariatric Surgery. *Psychological Reports*, *123*(4), 1044–1063. https://doi.org/10.1177/0033294119844983

Steward, T., Picó-Pérez, M., Mestre-Bach, G., Martínez-Zalacaín, I., Suñol, M., Jiménez-Murcia, S., Fernández-Formoso, J. A., Vilarrasa, N., García-Ruiz-de-Gordejuela, A., Heras, M. V. de las, Custal, N., Virgili, N., Lopez-Urdiales, R., Menchón, J. M., Granero, R., Soriano-Mas, C., & Fernandez-Aranda, F. (2019). A multimodal MRI study of the neural mechanisms of emotion regulation impairment in women with obesity. *Translational Psychiatry*, *9*(1), 194. https://doi.org/10.1038/s41398-019-0533-3

Strauss, E., Sherman, E. M. S., & Spreen, O. (2006). *A Compendium of Neuropsychological Tests: Administration, Norms, and Commentary*. Oxford University Press. https://doi.org/10.1080/09084280701280502

Strimas, R. (2021). *Emotion Regulation Difficulties And Psychopathology In Bariatric Surgery Candidates*. https://doi.org/10.32920/ryerson.14645517

Stroebe, W. (2008). *Dieting, overweight, and obesity: Self-regulation in a food-rich environment.* 93–113. https://doi.org/10.1037/11753-008

Stroebe, W., Papies, E. K., & Aarts, H. (2008). From Homeostatic to Hedonic Theories of Eating: Self-Regulatory Failure in Food-Rich Environments. *Applied Psychology*, *57*(s1), 172–193. https://doi.org/10.1111/j.1464-0597.2008.00360.x

Sutin, A. R., Costa, P. T., Uda, M., Ferrucci, L., Schlessinger, D., & Terracciano, A. (2010). Personality and metabolic syndrome. *AGE*, *32*(4), 513–519. https://doi.org/10.1007/s11357-010-9153-9

Sutin, A. R., Ferrucci, L., Zonderman, A. B., & Terracciano, A. (2011). Personality and obesity across the adult life span. *Journal of Personality and Social Psychology*, *101*(3), 579–592. https://doi.org/10.1037/a0024286

Swinburn, B. A., Kraak, V. I., Allender, S., Atkins, V. J., Baker, P. I., Bogard, J. R., Brinsden, H., Calvillo, A., Schutter, O. D., Devarajan, R., Ezzati, M., Friel, S., Goenka, S., Hammond, R. A., Hastings, G., Hawkes, C., Herrero, M., Hovmand, P. S., Howden, M., … Dietz, W.

H. (2019). The Global Syndemic of Obesity, Undernutrition, and Climate Change: The Lancet Commission report. *The Lancet*, *393*(10173), 791–846. https://doi.org/10.1016/s0140-6736(18)32822-8

Syan, S. K., Owens, M. M., Goodman, B., Epstein, L. H., Meyre, D., Sweet, L. H., & MacKillop, J. (2019). Deficits in executive function and suppression of default mode network in obesity. *NeuroImage: Clinical*, *24*, 102015. https://doi.org/10.1016/j.nicl.2019.102015

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed., Vol. 5). Pearson.

Tækker, L., Christensen, B. J., & Lunn, S. (2018). From bingeing to cutting: the substitution of a mal-adaptive coping strategy after bariatric surgery. *Journal of Eating Disorders*, *6*(1), 24. https://doi.org/10.1186/s40337-018-0213-3

Tambelli, R., Cerniglia, L., Cimino, S., Ballarotto, G., Paciello, M., Lubrano, C., Marchitelli, S., Gnessi, L., & Lenzi, A. (2017). An exploratory study on the influence of psychopathological risk and impulsivity on BMI and perceived quality of life in obese patients. *Nutrients*, *9*, 431. https://doi.org/10.3390/nu9050431

Taube-Schiff, M., Exan, J. V., Tanaka, R., Wnuk, S., Hawa, R., & Sockalingam, S. (2015). Attachment style and emotional eating in bariatric surgery candidates: The mediating role of difficulties in emotion regulation. *Eating Behaviors*, *18*, 36–40. https://doi.org/10.1016/j.eatbeh.2015.03.011

Testa, G., Granero, R., Siragusa, C., Belligoli, A., Sanna, M., Rusconi, M. L., Angeli, P., Vettor, R., Foletto, M., Busetto, L., Fernández-Aranda, F., & Schiff, S. (2019). Psychological predictors of poor weight loss following LSG: relevance of general psychopathology and impulsivity. *Eating and Weight Disorders*, *25*, 1621–1629. https://doi.org/10.1007/s40519-019-00800-x

Tice, D. M., Bratslavsky, E., & Baumeister, R. F. (2001). Emotional Distress Regulation Takes Precedence Over Impulse Control: If You Feel Bad, Do It! *Journal of Personality and Social Psychology*, *80*(1), 53–67. https://doi.org/10.1037/0022-3514.80.1.53

Tsekoura, E., Kostopoulou, E., Fouzas, S., Souris, E., Gkentzi, D., Jelastopulu, E., & Varvarigou, A. (2021). The association between obesity and the risk for development of eating disorders - A large-scale epidemiological study. *European Review for Medical and Pharmacological Sciences*, *25*(19), 6051–6056. https://doi.org/10.26355/eurrev_202110_26883

Turiano, N. A., Belanger, N. M. S., Damitz, R. L., Hill, P. L., & Mroczek, D. K. (2021). Health processes in personality. In J. F. Rauthmann, *The Handbook of Personality Dynamics and Processes* (pp. 1251–1271). Academic Press. https://doi.org/10.1016/b978-0-12-813995-0.00049-2

Tyrka, A. R., Mello, A. F., Mello, M. F., Gagne, G. G., Grover, K. E., Anderson, G. M., Price, L. H., & Carpenter, L. L. (2005). Temperament and hypothalamic-pituitary-adrenal axis function in healthy adults. *Psychoneuroendocrinology*, *31*(9), 1036–1045. https://doi.org/10.1016/j.psyneuen.2006.06.004

Vainik, U., Dagher, A., Dubé, L., & Fellows, L. K. (2013). Neurobehavioural correlates of body mass index and eating behaviours in adults: A systematic review. *Neuroscience & Biobehavioral Reviews*, *37*(3), 279–299. https://doi.org/10.1016/j.neubiorev.2012.11.008

Vandewalle, J., Moens, E., & Braet, C. (2014). Comprehending emotional eating in obese youngsters: the role of parental rejection and emotion regulation. *International Journal of Obesity*, *38*(4), 525–530. https://doi.org/10.1038/ijo.2013.233

Veit, R., Horstman, L. I., Hege, M. A., Heni, M., Rogers, P. J., Brunstrom, J. M., Fritsche, A., Preissl, H., & Kullmann, S. (2020). Health, pleasure, and fullness: changing mindset affects brain responses and portion size selection in adults with overweight and obesity. *International Journal of Obesity*, *44*, 428–437. https://doi.org/10.1038/s41366-019-0400-6

Velapati, S. R., Shah, M., Kuchkuntla, A. R., Abu-Dayyeh, B., Grothe, K., Hurt, R. T., & Mundi, M. S. (2018). Weight Regain After Bariatric Surgery: Prevalence, Etiology, and Treatment. *Current Nutrition Reports*, *7*, 329–334. https://doi.org/10.1007/s13668-018-0243-0

Venzon, C. N., & Alchieri, J. C. (2014). Indicadores de Compulsão Alimentar Periódica em Pós-operatório de Cirurgia Bariátrica. *Psico*, *45*(2), 239–249. https://doi.org/10.15448/1980-8623.2014.2.14806

Veroniki, A. A., Jackson, D., Bender, R., Kuss, O., Langan, D., Higgins, J. P. T., Knapp, G., & Salanti, G. (2019). Methods to calculate uncertainty in the estimated overall effect size from a random-effects meta-analysis. *Research Synthesis Methods*, *10*(1), 23–43. https://doi.org/10.1002/jrsm.1319

Vetter, M. L., Dumon, K. R., & Williams, N. N. (2011). Surgical treatments for obesity. *Psychiatric Clinics of North America*, *34*, 881–893.

Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software*, *36*(3), 1–48. https://doi.org/https://doi.org/10.18637/jss.v036.i03

Walfish, S. (2007). Reducing Minnesota Multiphasic Personality Inventory defensiveness: effect of specialized instructions on retest validity in a sample of preoperative bariatric patients. *Surgery for Obesity and Related Diseases*, *3*, 184–188. https://doi.org/10.1016/j.soard.2007.01.001

Wallis, N., & Raffan, E. (2020). The Genetic Basis of Obesity and Related Metabolic Diseases in Humans and Companion Animals. *Genes*, *11*(11), 1378. https://doi.org/10.3390/genes11111378

Wedin, S. (2017). “You lie”: clinical implications of positive impression management in bariatric surgery patients. *Surgery for Obesity and Related Diseases*, *13*(8), 1382–1383. https://doi.org/10.1016/j.soard.2017.05.004

Wee, C. C., Davis, R. B., Huskey, K. W., Jones, D. B., & Hamel, M. B. (2013). Quality of Life Among Obese Patients Seeking Weight Loss Surgery: The Importance of Obesity-Related Social Stigma and Functional Status. *Journal of General Internal Medicine*, *28*(2), 231–238. https://doi.org/10.1007/s11606-012-2188-0

Weineland, S., Lillis, J., & Dahl, J. (2013). Measuring experiential avoidance in a bariatric surgery population—Psychometric properties of AAQ-W. *Obesity Research & Clinical Practice*, *7*(6), e464–e475. https://doi.org/10.1016/j.orcp.2012.06.002

Werner, K. M., & Milyavskaya, M. (2019). Motivation and self-regulation: The role of want-to motivation in the processes underlying self-regulation and self-control. *Social and Personality Psychology Compass*, *13*(1), e12425. https://doi.org/10.1111/spc3.12425

Wierenga, C. E., Ely, A., Bischoff-Grethe, A., Bailer, U. F., Simmons, A. N., & Kaye, W. H. (2014). Are Extremes of Consumption in Eating Disorders Related to an Altered Balance between Reward and Inhibition? *Frontiers in Behavioral Neuroscience*, *8*, 410. https://doi.org/10.3389/fnbeh.2014.00410

Wiers, R. W., Anderson, K. G., Bockstaele, B. V., Salemink, E., & Hommel, B. (2018). Affect, dual-processing, developmental psychopathology, and health behaviors. In *Affective Determinants of Health Behavior* (pp. 158–184). https://doi.org/10.1093/oso/9780190499037.003.0008

Willem, C., Gandolphe, M.-C., Roussel, M., Verkindt, H., Pattou, F., & Nandrino, J.-L. (2019). Difficulties in emotion regulation and deficits in interoceptive awareness in moderate and severe obesity. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *24*(4), 633–644. https://doi.org/10.1007/s40519-019-00738-0

Willem, C., Nandrino, J.-L., Doba, K., Roussel, M., Triquet, C., Verkindt, H., Pattou, F., & Gandolphe, M.-C. (2021). Interoceptive reliance as a major determinant of emotional eating in adult obesity. *Journal of Health Psychology*, *26*(12), 2118–2130. https://doi.org/10.1177/1359105320903093

Williams-Kerver, G. A., Steffen, K. J., & Mitchell, J. E. (2019). Eating Pathology After Bariatric Surgery: an Updated Review of the Recent Literature. *Current Psychiatry Reports*, *21*(9), 86–86. https://doi.org/10.1007/s11920-019-1071-7

Williams, D. M. (2019). *Darwinian Hedonism and the Epidemic of Unhealthy Behavior*. Cambridge University Press. https://doi.org/10.1017/9781316275047

Williamson, T. M., Campbell, T. S., Telfer, J. A., & Rash, J. A. (2018). Emotion Self-Regulation Moderates the Association Between Symptoms of ADHD and Weight Loss After Bariatric Surgery. *Obesity Surgery*, *28*, 1553–1561. https://doi.org/10.1007/s11695-017-3037-3

Willroth, E. C., Smith, A. M., Shallcross, A. J., Graham, E. K., Mroczek, D. K., & Ford, B. Q. (2021). The Health Behavior Model of Personality in the Context of a Public Health Crisis. *Psychosomatic Medicine*, *83*(4), 363–367. https://doi.org/10.1097/psy.0000000000000937

Wirt, T., Schreiber, A., Kesztyus, D., & Steinacker, J. M. (2015). Early life cognitive abilities and body weight: cross-sectional study of the association of inhibitory control, cognitive flexibility, and sustained attention with BMI percentiles in primary school children. *Journal of Obesity*, *2015*, 534651. https://doi.org/10.1155/2015/534651

Wolfe, B. M., Kvach, E., & Eckel, R. H. (2016). Treatment of Obesity. *Circulation Research*, *118*(11), 1844–1855. https://doi.org/10.1161/circresaha.116.307591

Wolvers, P. J. D., Bruin, S. C., Mairuhu, W. M., Leeuw-Terwijn, M. de, Hutten, B. A., Brandjes, D. P. M., & Gerdes, V. E. A. (2020). Self-Reported Smoking Compared to Serum Cotinine in Bariatric Surgery Patients: Smoking Is Underreported Before the Operation. *Obesity Surgery*, *30*, 23–37. https://doi.org/10.1007/s11695-019-04128-4

Wolz, I., Agüera, Z., Granero, R., Jiménez-Murcia, S., Gratz, K. L., Menchón, J. M., & Fernández-Aranda, F. (2015). Emotion regulation in disordered eating: Psychometric properties of the Difficulties in Emotion Regulation Scale among Spanish adults and its interrelations with personality and clinical severity. *Frontiers in Psychology*, *6*, 907. https://doi.org/10.3389/fpsyg.2015.00907

World Health Organization. (1994). A user's guide to the Self Reporting Questionnaire (SRQ). *Geneva: World Health Organization*, 1–84.

World Health Organization. (2017, July 28). *The Global Health Observatory: Body mass index among adults*. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-overweight-among-adults-bmi-greaterequal-25-(crude-estimate)-(-)

World Health Organization. (2021). *Obesity and overweight*. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

World Obesity Federation. (2022). *World Obesity Atlas 2022*. www.worldobesity.org

Wu, M., Brockmeyer, T., Hartmann, M., Skunde, M., Herzog, W., & Friederich, H.-C. (2014). Set-shifting ability across the spectrum of eating disorders and in overweight and obesity: a systematic review and meta-analysis. *Psychological Medicine*, *44*(16), 3365–3385. https://doi.org/10.1017/s0033291714000294

Yang, Y., Shields, G. S., Guo, C., & Liu, Y. (2018). Executive function performance in obesity and overweight individuals: A meta-analysis and review. *Neuroscience & Biobehavioral Reviews*, *84*, 225–244. https://doi.org/10.1016/j.neubiorev.2017.11.020

Yang, Y., Shields, G. S., Guo, C., & Liu, Y. (2018). Executive function performance in obesity and overweight individuals: A meta-analysis and review. *Neuroscience & Biobehavioral Reviews*, *84*, 225–244. https://doi.org/10.1016/j.neubiorev.2017.11.020

Yu, Y., Kalarchian, M. A., Ma, Q., & Groth, S. W. (2021). Eating patterns and unhealthy weight control behaviors are associated with loss-of-control eating following bariatric surgery. *Surgery for Obesity and Related Diseases*, *17*(5), 976–985. https://doi.org/10.1016/j.soard.2021.01.008

Yu, Y., Kalarchian, M. A., Ma, Q., & Groth, S. W. (2021). Eating patterns and unhealthy weight control behaviors are associated with loss-of-control eating following bariatric surgery. *Surgery for Obesity and Related Diseases*, *17*(5), 976–985. https://doi.org/10.1016/j.soard.2021.01.008

Zhang, Z., & Coppin, G. (2018). To What Extent Memory Could Contribute to Impaired Food Valuation and Choices in Obesity? *Frontiers in Psychology*, *9*, 2523. https://doi.org/10.3389/fpsyg.2018.02523

Zwaan, M. de, Enderle, J., Wagner, S., Mühlhans, B., Ditzen, B., Gefeller, O., Mitchell, J. E., & Müller, A. (2011). Anxiety and depression in bariatric surgery patients: A prospective, follow-up study using structured clinical interviews. *Journal of Affective Disorders*, *133*(1–2), 61–68. https://doi.org/10.1016/j.jad.2011.03.025

APPENDIX A – INFORMED CONSENT FORM

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Venho convidá-lo a participar, como voluntário(a), da pesquisa intitulada "*Regulação emocional, funções executivas e características de personalidade em pacientes candidatos à cirurgia bariátrica*", que tem por objetivo estudar de que forma características de personalidade, a maneira como as pessoas lidam com emoções e como o funcionamento das ideias podem se relacionar com a obesidade. Esta pesquisa está sendo desenvolvida como minha pesquisa de Doutorado no Departamento de Psicologia da Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto (FFCLRP-USP), na Universidade de São Paulo (USP), com orientação da Profª Dra. Sonia Regina Pasian. Para esse trabalho venho convidá-lo(a) a participar de um encontro individual comigo onde irá responder a alguns questionários e instrumentos de avaliação psicológica, estimando-se um tempo de 60 a 90 minutos. A participação nessas atividades poderá lhe causar algum desconforto em função de tratarmos de emoções e de ideias, mas nada diferente de sua rotina de vida. Portanto, consideramos que o risco em sua participação no trabalho é mínimo. Enquanto pesquisadora (responsável pelo estudo) estarei à sua disposição para quaisquer questões. Caso algum desconforto lhe ocorra, você pode falar abertamente comigo, de modo que buscarei as medidas mais atenuar essa situação, podendo orientá-lo sobre serviços de atendimento psicológico existentes a seu alcance, embora realizados em outros locais, no ritmo possível desses serviços.

Se você aceitar participar da pesquisa, não estará obtendo benefícios diretos ou remuneração. Também não terá nenhuma despesa por participar da pesquisa. Ao participar você estará contribuindo para o conhecimento científico sobre o tema da obesidade. Você não terá custos financeiros nesta pesquisa; caso haja despesas com transporte e/ou alimentação, você será ressarcido por mim, porém não receberá nenhuma remuneração por participar dessa pesquisa.

Você tem o direito e a liberdade de desistir da participação em qualquer fase da pesquisa, seja antes ou depois da coleta dos dados, independentemente do motivo e sem nenhum prejuízo a sua pessoa. Você não terá qualquer consequência negativa em deixar de participar do estudo, caso assim julgue mais adequado.

Os resultados da pesquisa serão analisados e publicados em termos totais, procurando-se características comuns entre os participantes. Por isso, sua identidade não será divulgada, sendo garantido o sigilo de suas respostas mesmo quando os dados forem publicados.

Coloco-me disponível para eventuais dúvidas e necessidades, por meio do telefone (92) 99209-3264 e e-mail: maira.colombarolli@gmail.com. Além disso, em caso de dúvidas sobre questões éticas desta pesquisa, você pode entrar em contato com o Comitê de Ética em Pesquisa da Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto – FFCLRP-USP. Avenida Bandeirantes, 3900 - Bloco 23 - Casa 37 - 14040-901 - Ribeirão Preto - SP – Brasil, Fone: (16) 3315-4811, E-mail: *coetp@ffclrp.usp.br*

Desde já agradecida, conto com sua participação.

_____

Prof. Dra. Sonia Regina Pasian
Orientadora – CRP: 06/24.018-0
Docente do Departamento de Psicologia da FFCLRP-USP

_____

Maíra Stivaleti Colombarolli
Aluna de Doutorado

CONSENTIMENTO

A partir das informações recebidas, declaro que fui informado sobre o que as pesquisadoras querem fazer e porque precisam da minha colaboração, e entendi a explicação. Por isso, eu concordo em participar da pesquisa, sabendo que não vou ganhar nada e que posso sair do estudo quando quiser. Este documento é emitido em duas vias que serão ambas assinadas por mim e pelas pesquisadoras, ficando uma via com cada um de nós. _____, ___/___/201__.

_____
Nome Completo

Pesquisadores Responsáveis:

Maíra Stivaleti Colombarolli (CRP 20/05049), Psicóloga e aluna de doutorado do Programa de Pós-Graduação em Psicologia da FFCLRP-USP / E-mail: maira.colombarolli@gmail.com

Profa. Dra. Sonia Regina Pasian – Docente do Programa de Pós Graduação em Psicologia da FFCLRP-USP
Centro de Pesquisas em Psicodiagnóstico – Departamento de Psicologia – Faculdade de Ciências e Letras – Universidade de São Paulo | Av. Bandeirantes, 3900 – Monte Alegre – Ribeirão Preto (SP) – CEP: 14.040-901 E-mail: srpasian@ffclrp.usp.br

APPENDIX B – SOCIODEMOGRAPHIC AND HEALTH STATUS FORM

Nome: _____ Prontuário: _____
Sexo: Masculino ( ) Feminino ( ) Data de Nascimento: _____/_____/_____ Idade: _____
Local de Nascimento: Cidade:_____ Estado: _____ País:_____
Local de Residência: Cidade:_____ Estado: _____ Ingresso no Serviço: _____/_____/_____
Anos de Escolaridade (11 anos até E.M.):_____ anos (Curso Superior? _____)
Profissão/Ocupação: _____ Estado Civil: _____
Religião:

( ) Católica ( ) Espírita ( ) Evangélica ( ) Protestante
( ) Umbanda ( ) Budista ( ) Adventista ( ) Ateu
( ) Espiritualizado, porém sem religião ( ) Outra Qual? _____

DADOS SOCIOECONÔMICOS (ABEP, 2016)

Indicadores de classificação econômica familiar atual, marcar com X:

Itens Domésticos	0	1	2	3	4+
Automóvel					
Empregados mensalistas					
Máquina de lavar (excluir tanquinho)					
Banheiros					
DVDs					
Geladeiras					
Freezers (independente ou duplex)					
Computadores e laptops					
Lava-louças					
Microondas / forno elétrico					
Motocicletas (uso recreativo)					
Máquinas secadoras de roupa					

Água utilizada no domicílio:	
Rede	(1)
Poço ou nascente	(2)
Outro	( )
Rua do domicílio:	
Asfaltada / Pavimentada	(1)
Terra/Cascalho	(2)
Escolaridade do Chefe Financeiro:	
Analfabeto / Fundamental I incompleto	(1)
Fundamental I completo / Fundamental II incompleto	(2)
Fundamental II completo / Médio incompleto	(3)
Médio completo / Superior incompleto	(4)
Superior completo	(5)

Somatório Atual e Classe: ____/____

Associação Brasileira de Empresas de Pesquisa, 2016. Critério de Classificação Econômica Brasil. ABEP. Disponível em: http://www.abep.org/criterio-brasil.

DADOS DE SAÚDE

Peso atual: _____ kg **Altura atual:** _____ m **IMC:** _____ kg/m2

PARA PACIENTES DE PESO NORMAL:

Você já sofreu de sobrepeso ou obesidade em algum período da vida (exceto gravidez)? ( ) Sim ( ) Não

Você já sofreu algum acidente ou queda que resulto em trauma crânio-encefálico (bateu a cabeça) de forma que perdeu a consciência (desmaiou) ou precisou de internação ou tratamento? ( ) Não ( ) Sim

Se sim, há quanto tempo? Como tratou/cuidou? Houve consequências?

_____

PARA PACIENTES OBESOS:

Na idade adulta (depois dos 18 anos), qual foi o seu maior/menor peso (e quando)?

_____

Descreva brevemente seu histórico de peso.

_____

_____

Quando você começou a fazer tratamentos para perda de peso?

_____

Quais métodos anteriores você já usou para tentar emagrecer?

( ) Dietas da moda
( ) Dietas com acompanhamento de nutricionista
( ) Atividade física (com e sem acompanhamento)
( ) Remédios para emagrecer
( ) Psicoterapia
( ) Outros: _____

Você atingiu o seu objetivo de perda de peso em algum deles, em qualquer tentativa anterior? ( ) Sim ( ) Não
Quando? Como? _____

Você tem história familiar de alguma das seguintes doenças?

( ) Hipertensão
( ) Diabetes
( ) Colesterol alto
( ) Doenças cardíacas (infarto)
( ) Doenças vasculares (problemas de circulação, entupimento de veias)
( ) Acidente Vascular Cerebral (derrame)
( ) Obesidade
( ) Doenças neurodegenerativas/demências (Doença de Alzheimer, Doença de Parkinson, outras demências)
( ) Outras:_____

Você já sofreu algum acidente ou queda que resulto em trauma crânio-encefálico (bateu a cabeça) de forma que perdeu a consciência (desmaiou) ou precisou de internação ou tratamento? ( ) Não ( ) Sim

Se sim, há quanto tempo? Como tratou/cuidou? Houve consequências?

_____

TESTE DE TRILHAS PARTE A: _____ PARTE B: _____

OBS: _____

ANNEX 1 – ETHICS COMMITTEE APPROVAL

FFCLRP

Universidade de São Paulo
Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto
Comitê de Ética em Pesquisa

Campus de Ribeirão Preto

Of.CEtP/FFCLRP-USP/057-dgfs.

Ribeirão Preto,14 de julho de 2017.

Prezado(a) Pesquisador(a),

Comunicamos a V. Sa. que o projeto de pesquisa intitulado **"Regulação emocional, funções executivas e características de personalidade em candidatos à cirurgia bariátrica"** foi analisado pelo Comitê de Ética em Pesquisa da FFCLRP-USP, em sua 168ª Reunião Ordinária, realizada em 13.07.2017, e enquadrado na categoria: **APROVADO** (CAAE nº 66591717.4.0000.5407).

Solicitamos que eventuais modificações ou emendas ao projeto de pesquisa sejam apresentadas ao CEP, de forma sucinta, identificando a parte do projeto a ser modificada e suas justificativas. De acordo com a Resolução nº466 de 12/12/2012, devem ser entregues relatórios semestrais e, ao término do estudo, um relatório final sempre via Plataforma Brasil.

Atenciosamente,

Prof.ª Drª. Marina Rezende Bazon
Coordenadora

Ao(À) Senhor(a)
Maíra Stivaleti Colombarolli
Programa de Pós-graduação em Psicologia da FFCLRP/USP

CEP - Comitê de Ética em Pesquisa da FFCLRP USP
Fone: (16) 3315-4811 Avenida Bandeirantes, 3900 - bloco 01 da Administração - sala 07
14040-901 - Ribeirão Preto - SP - Brasil
Homepage: http://www.ffclrp.usp.br - e-mail: coetp@ffclrp.usp.br

ANNEX 2 – SELF-REPORT QUESTIONNAIRE (SRQ-20)

SRQ-20 (SELF-REPORT QUESTIONNAIRE)
QUESTIONÁRIO DE AUTO RELATO

Nome:_____ Data: _____/_____/_____

Instruções

Estas questões são relacionadas a certas dores e problemas que podem ter lhe incomodado nos últimos 30 dias. Se você acha que a questão se aplica a você e você teve o problema descrito nos últimos 30 dias, responda SIM. Por outro lado, se a questão não se aplica a você e você não teve o problema nos últimos 30 dias, responda NÃO.

1. O Sr(a). tem dores de cabeça com frequência?	SIM ( )	NÃO ( )
2. Tem falta de apetite?	SIM ( )	NÃO ( )
3. O Sr(a). dorme mal?	SIM ( )	NÃO ( )
4. O Sr(a). fica com medo com facilidade?	SIM ( )	NÃO ( )
5. Suas mãos tremem?	SIM ( )	NÃO ( )
6. O Sr(a). se sente nervoso(a), tenso(a) ou preocupado(a)?	SIM ( )	NÃO ( )
7. Sua digestão não é boa ou sofre de perturbação digestiva?	SIM ( )	NÃO ( )
8. O Sr(a). não consegue pensar com clareza?	SIM ( )	NÃO ( )
9. Sente-se infeliz?	SIM ( )	NÃO ( )
10. O Sr(a). chora mais que o comum?	SIM ( )	NÃO ( )
11. Acha difícil apreciar (gostar de) suas atividades diárias?	SIM ( )	NÃO ( )
12. Acha difícil tomar decisões?	SIM ( )	NÃO ( )
13. Seu trabalho diário é um sofrimento? Tormento? Tem dificuldade em fazer seu trabalho?	SIM ( )	NÃO ( )
14. O Sr(a). não é capaz de ter um papel útil em sua vida?	SIM ( )	NÃO ( )
15. O Sr(a). perdeu o interesse nas coisas?	SIM ( )	NÃO ( )
16. Acha que é uma pessoa que não vale nada?	SIM ( )	NÃO ( )
17. O pensamento de acabar com sua vida já passou por sua cabeça?	SIM ( )	NÃO ( )
18. O Sr(a). se sente cansado(a) o tempo todo?	SIM ( )	NÃO ( )
19. O Sr(a). tem sensações desagradáveis no estômago?	SIM ( )	NÃO ( )
20. Fica cansado com facilidade?	SIM ( )	NÃO ( )
ESCORE TOTAL		

Santos, K. O. B., de Araújo, T. M., & de Oliveira, N. F. (2009). Estrutura fatorial e consistência interna do Self-Reporting Questionnaire (SRQ-20) em população urbana. *Cad. saúde pública*, *25*(1), 214-222.

ANNEX 3 – PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

QUESTIONÁRIO SOBRE A SAÚDE DO/A PACIENTE – 9
(Portuguese for Brazil version of the PHQ-9)

Nome: _____ Data: _____/_____/_____

Durante as últimas 2 semanas, com que freqüência você foi incomodado/a por qualquer um dos problemas abaixo?	Nenhuma vez	Vários dias	Mais da metade dos dias	Quase todos os dias
1. Pouco interesse ou pouco prazer em fazer as coisas				
2. Se sentir "para baixo", deprimido/a ou sem perspectiva				
3. Dificuldade para pegar no sono ou permanecer dormindo, ou dormir mais do que de costume				
4. Se sentir cansado/a ou com pouca energia				
5. Falta de apetite ou comendo demais				
6. Se sentir mal consigo mesmo/a – ou achar que você é um fracasso ou que decepcionou sua família ou você mesmo/a				
7. Dificuldade para se concentrar nas coisas, como ler o jornal ou ver televisão				
8. Lentidão para se movimentar ou falar, a ponto das outras pessoas perceberem? Ou o oposto – estar tão agitado/a ou irrequieto/a que você fica andando de um lado para o outro muito mais do que de costume				
9. Pensar em se ferir de alguma maneira ou que seria melhor estar morto/a				

ESCORES:

0 + _____+_____+_____

= Total:_____

Se você assinalou qualquer um dos problemas, indique o grau de dificuldade que os mesmos lhe causaram para realizar seu trabalho, tomar conta das coisas em casa ou para se relacionar com as pessoas?

Nenhuma dificuldade	Alguma dificuldade	Muita dificuldade	Extrema dificuldade
☐	☐	☐	☐

OSÓRIO, FL; MENDES, AV; CRIPPA, JAS; LOUREIRO, SR. Study of discriminative validity of the PHQ-9 and PHQ-2 in a sample of Brazilian women in the contexto f primary health care. *Perspectives in Psychiatric Care*, v. 45, p. 216-227, 2009.

ANNEX 4 – DIFFICULTIES IN EMOTION REGULATION SCALE (DERS-16)

ESCALA DE DIFICULDADES DE REGULAÇÃO EMOCIONAL (DERS-16)

Nome:_____ Data: _____/_____/_____

Instruções: Por favor, indique com que frequência as afirmativas se aplicam a você marcando o número apropriado de acordo com a escala abaixo (1-5) no espaço ao lado de cada item.

Escala:

+ FALSO → + VERDADEIRO

1	2	3	4	5
Quase nunca (0-10%)	Às vezes (11-35%)	Cerca de metade do tempo (35-65%)	A maior parte do tempo (66-90%)	Quase sempre (91-100%)

		1	2	3	4	5
1.	Eu tenho dificuldade de compreender meus sentimentos	( )	( )	( )	( )	( )
2.	Fico confuso sobre como estou me sentindo	( )	( )	( )	( )	( )
3.	Quando estou chateado, tenho dificuldade em fazer meu trabalho	( )	( )	( )	( )	( )
4.	Quando estou chateado, fico fora de controle	( )	( )	( )	( )	( )
5.	Quando estou chateado, eu acredito que ficarei me sentindo assim por muito tempo	( )	( )	( )	( )	( )
6.	Quando estou chateado, eu acredito que acabarei me sentindo muito deprimido	( )	( )	( )	( )	( )
7.	Quando estou chateado, tenho dificuldade em me concentrar em outras coisas	( )	( )	( )	( )	( )
8.	Quando estou chateado, me sinto fora de controle	( )	( )	( )	( )	( )
9.	Quando estou chateado, sinto vergonha de mim mesmo por me sentir assim	( )	( )	( )	( )	( )
10.	Quando estou chateado, sinto como se fosse fraco	( )	( )	( )	( )	( )
11.	Quando estou chateado, tenho dificuldade em controlar minhas ações	( )	( )	( )	( )	( )
12.	Quando estou chateado, acredito que não exista nada que eu possa fazer que me faça sentir melhor	( )	( )	( )	( )	( )
13.	Quando estou chateado, fico irritado comigo mesmo por me sentir assim	( )	( )	( )	( )	( )
14.	Quando estou chateado, começo a me sentir muito mal comigo mesmo	( )	( )	( )	( )	( )
15.	Quando estou chateado, tenho dificuldade para pensar sobre outras coisas	( )	( )	( )	( )	( )
16.	Quando estou chateado, eu me sinto sobrecarregado pelas minhas emoções	( )	( )	( )	( )	( )

Miguel, F. K., Giromini, L., Colombarolli, M. S., Zuanazzi, A. C., & Zennaro, A. (2016). A Brazilian Investigation of the 36- and 16-Item Difficulties in Emotion Regulation Scales. *Journal of Clinical Psychology*. http://doi.org/10.1002/jclp.22404

ANNEX 5 – INVITATION SHARED THROUGH SOCIAL MEDIA FOR RECRUITTING NON CLINICAL PARTICIPANTS

Objetivos: *identificar e comparar características de personalidade, funcionamento cognitivo e regulação das emoções em mulheres com e sem obesidade (grau III)*

Público-alvo:

- **MULHERES COM IDADE ENTRE 25 E 50 ANOS**
- **SEM HISTÓRICO DE OBESIDADE** – ATUALMENTE COM PESO NORMAL PARA A SUA ALTURA
- **DISPONIBILIDADE PARA PARTICIPAÇÃO INDIVIDUAL** (em horário agendado)

CONTATO: Maíra Colombarolli (doutoranda)
mcolombarolli@usp.br
WhatsApp: (92) 99209-3264

ANNEX 6 – SUBMISSION CONFIRMATION OF MANUSCRIPT 1

Gmail Maíra Colombarolli <maira.colombarolli@gmail.com>

JBME-D-22-00673 - Submission Confirmation
2 mensagens

International Journal of Behavioral Medicine <em@editorialmanager.com> 8 de dezembro de 2022 às 16:57
Responder a: International Journal of Behavioral Medicine <zyreenamae.liwanag@springernature.com>
Para: Maíra Stivaleti Colombarolli <mcolombarolli@usp.br>

Dear Mrs. Stivaleti Colombarolli,

Thank you for submitting your manuscript,
"Long-term psychological functioning of bariatric patients: A systematic review and meta-analysis of longitudinal studies", to International Journal of Behavioral Medicine

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ANNEX 7 – SUBMISSION CONFIRMATION OF MANUSCRIPT 2

Gmail Maíra Colombarolli <maira.colombarolli@gmail.com>

PIAL-D-23-00002 - Acknowledgement of Receipt

Psychological Injury and Law <em@editorialmanager.com> 16 de janeiro de 2023 às 14:00
Responder a: Psychological Injury and Law <officemanager.gyoungphd@gmail.com>
Para: Maíra Stivaleti Colombarolli <maira.colombarolli@gmail.com>

Dear Ms. Stivaleti Colombarolli:

Thank you for submitting your manuscript, "Self-reports don't tell the whole story: A study of candidates for bariatric surgery using a multimethod approach", to Psychological Injury and Law. The manuscript number is #PIAL-D-23-00002

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With kind regards,

The Editorial Office
Psychological Injury and Law

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ANNEX 8 – SUBMISSION CONFIRMATION OF MANUSCRIPT 3

Gmail Maíra Colombarolli <maira.colombarolli@gmail.com>

Submission Confirmation for Exploring the utility of the Rorschach test in predicting weight-loss after bariatric surgery

1 mensagem

Rorschachiana <em@editorialmanager.com> 23 de janeiro de 2023 às 21:05
Responder a: Rorschachiana <journal@internationalrorschachsociety.com>
Para: Maíra Stivaleti Colombarolli <maira.colombarolli@gmail.com>

Dear Ms Stivaleti Colombarolli,

Thank you for submitting your paper entitled "Exploring the utility of the Rorschach test in predicting weight-loss after bariatric surgery" to Rorschachiana. The manuscript number is ROR-D-23-00002.

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Rorschachiana

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