Supplementary Materials

1. Details of clinical scores

1.1. Difficulties in Emotion Regulation Scale

The Difficulties in Emotion Regulation Scale (DERS) [1], is a 36-item self-report measure that assesses difficulties in emotion regulation across multiple domains, with higher scores indicating greater difficulties in emotion regulation. This tool allows to obtain measurements regarding the presence of potential difficulties in the following dimensions: (a) awareness and understanding of emotions, (b) acceptance of emotions, (c) ability to control impulsive behaviors and to behave in accordance with their goals and (d) ability to use flexible emotional regulation strategies appropriate to the context and to the situational demands. It Contains six subscales: (1) NON-ACCEPTANCE (non-acceptance of emotional responses) is formed by items that reflect the tendency to experience negative secondary emotions in response to one's negative emotions, or to have reactions to non-acceptance of their own discomfort, (2) GOALS (difficulty in adopting behaviors goal-oriented) includes items reflecting difficulties in concentrating in performing a task when negative emotions are experienced, (3) IMPULSE (i.e. difficulty in impulse control) notes the difficulty in maintaining control of one's behavior when experiencing negative emotions, (4) AWARENESS (lack of emotional awareness) contains items that underline the tendency to pay attention to emotions and the relative capacity to recognize them (for this reason the answers provided must be reversed in the calculation phase of the score), (5) STRATEGIES (limited access to emotional regulation strategies) reflect the belief that it is particularly difficult to effectively regulate emotions once they have manifested, (6) CLARITY (lack of emotional clarity) includes items which reflect the degree to which people can distinctly understand which emotion they are experimenting.

The 36 DERS items are scored from 1 to 5, where 1 is almost never (0-10%), 2 is sometimes (11-35%), 3 is about half the time (36-65%), 4 is most of the time (66-90%), and 5 is almost always (91-100%). Of the 36 items, 11 are reverse scored.

The DERS has been found to have high internal consistency, good test-retest reliability, and adequate construct and predictive validity [1].

Scores are presented as total scores and as scores for each of the 6 subscales. Higher scores indicate greater problems with emotion regulation. Total scores range from 36 to 180. The clinical range of the DERS total score varies from an average of about 80 to 127 and difficulties in emotional regulation can be scored as Mild (if < 90), Moderate (91-105), or Severe (>105) [1].

1.2. Hamilton Depression Rating Scale (HAM-D)

The questionnaire is designed for adults and is used to rate the severity of their depression by probing mood, feelings of guilt, suicide ideation, insomnia, agitation or retardation, anxiety, weight loss, and somatic symptoms. Each item on the questionnaire is scored on a 3 or 5 point scale. Depression is detected if the total score is >7 with the following classifications: Mild (subthreshold): 8–13, Moderate (mild): 14–18, Severe (moderate): 19–22, Very severe (severe): >23.

1.3. Hamilton Anxiety Rating Scale (HAM-A)

The questionnaire rates the severity of a patient's anxiety. It consists of 14 items designed to assess the severity of a patient's anxiety. Each of the 14 items contains a number of symptoms, and each group of symptoms is rated on a Likert scale 1-4, with 4 being the most severe. A score of 17 or less indicates mild anxiety severity, scores from 25 to 30 indicates moderate to severe anxiety severity.

1.4. Body mass index

Measures of height and weight were collected by a bariatric dietician, and body mass index (BMI) was calculated as weight [kg] / height^2 [m^2].

1.5. Eating behavioral styles

Along with clinical scores, patients were thoroughly monitored during a multi-disciplinary consultation in order to determine surgery eligibility. At first, in brief, smoking, drinking, and eating habits were examined through a general food diary (breakfast, snack, lunch, dinner). Then, through a detailed clinical interview with specific questions for each eating style (**Supplementary Table S1**), a psychiatrist (PL) and psychotherapist (MS) clinically assessed and classified the eating behavior styles of each subject based on their symptoms and clinical history.

1. SICOb criteria

According to the SICOb (the Italian Society of Surgery for Obesity and Metabolic Diseases), bariatric surgery is indicated in patients with:

- BMI> 40 kg/m^2, in the absence of any other comorbidities;
- BMI> 35 kg/m^2, in the presence of comorbidities among those classically considered-rates as associated with obesity, including type 2 diabetes mellitus (T2DM) resistant to medical treatment.

2. Patients' consent

Patients' informed consent was collected through a written document in Italian, where the methods of the study, condition of participation, and privacy issues were addressed. In particular, the aims of this specific study were explained as follows:

"The aim of this observational study is to assess the psychopathological characteristics of patients undergoing bariatric surgery. Factors such as emotional dysregulation and gender will be investigated in relationship with eating styles[2]".

3. Sample size estimation

Patients were recruited in the setting of a larger longitudinal study on predictors of weight regain after bariatric surgery, which is still ongoing. Based on previous literature, the frequency of weight regain after bariatric surgery was estimated to be at least 30%. Hence, a required sample size of 80 patients (precision of 10% and a confidence of 95%) was determined. Given the variability of the phenomenon, we deemed appropriate to enroll at least 100 patients.

Table S1. Assessment of eating behavioral styles.

EATING STYLE	EXAMPLES OF CLINICAL QUESTIONS
Emotional	Does it occur often that a sudden, relentless need of eating arises, satisfied by the ingestion of both sweet and savory foods, until a sensation of extreme stomach fullness?
Binge	Do you consume large quantities of food in a short period of time with the feeling of loss of control, i.e. of not being able to retain yourself?
Qualitative	-Do you find more gratification from a plate overflowing with boiled rice or from a small but tasty food? -Would you say that, for you, food quality (i.e. its taste, appearance, smell…) is remarkably more satisfying than its quantity and it leads you to inappropriate or exaggerate consumption of food based on its quality?
Quantitative	-Do you find more gratification from a plate overflowing with boiled rice or from a small but tasty food? - Would you say that, for you, quantity of food is remarkably more satisfying than its qualitative characteristics (i.e. its taste, appearance, smell…) quantity and it leads you to inappropriate or exaggerate consumption of food based on its quantity?
Gorge	Based on quantity only, would you say that you eat until you feel your stomach tense and extremely full?
Snack	Do you frequently and regularly eat snacks, intended as small quantities of food, between main daily meals?

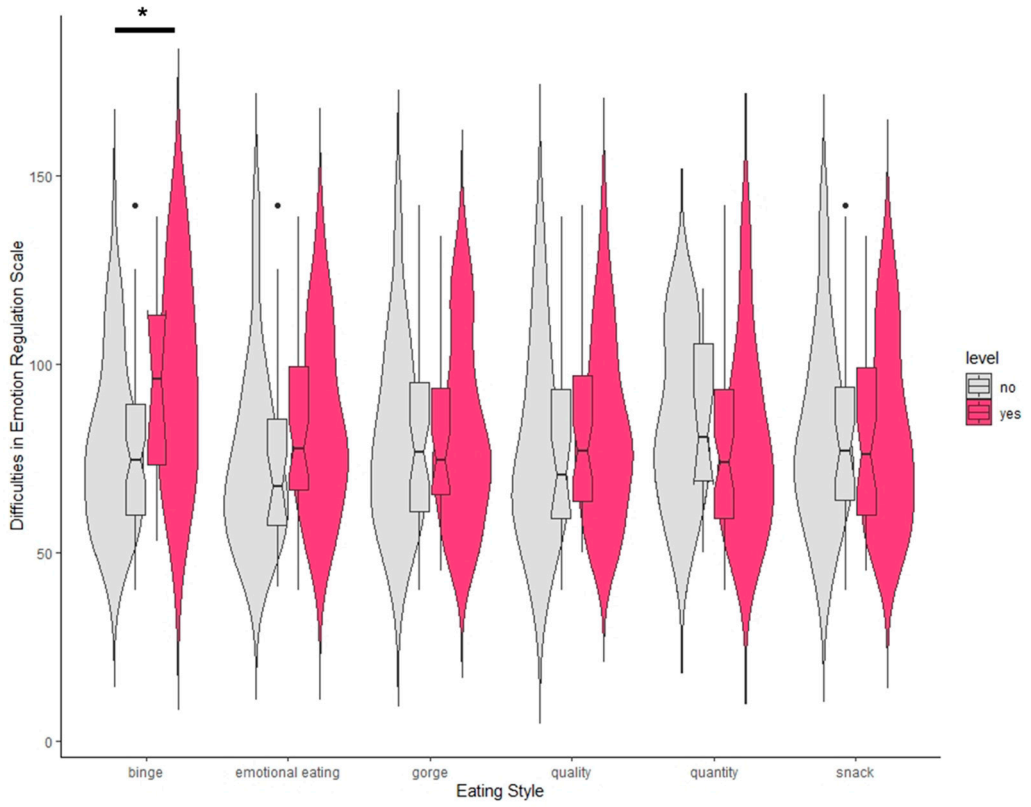

Figure S1. Difficulties in Emotion Regulation by eating style.

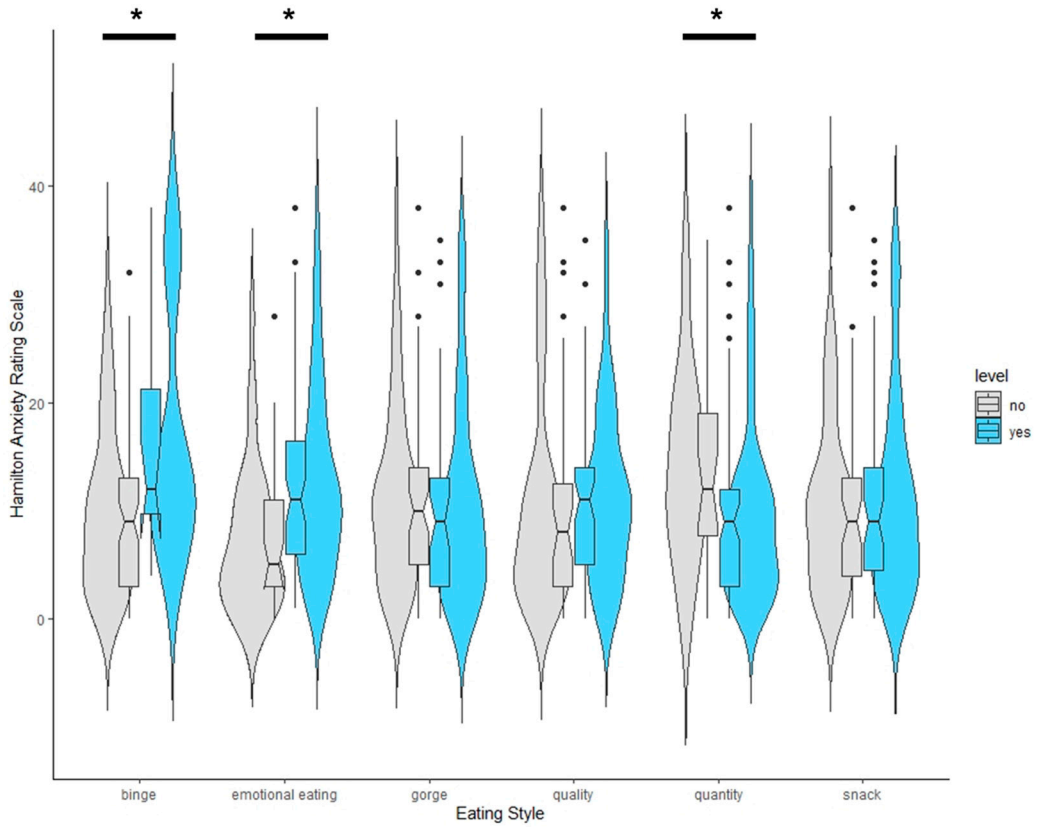

Figure S2. Hamilton Anxiety Rating Scale by eating style.

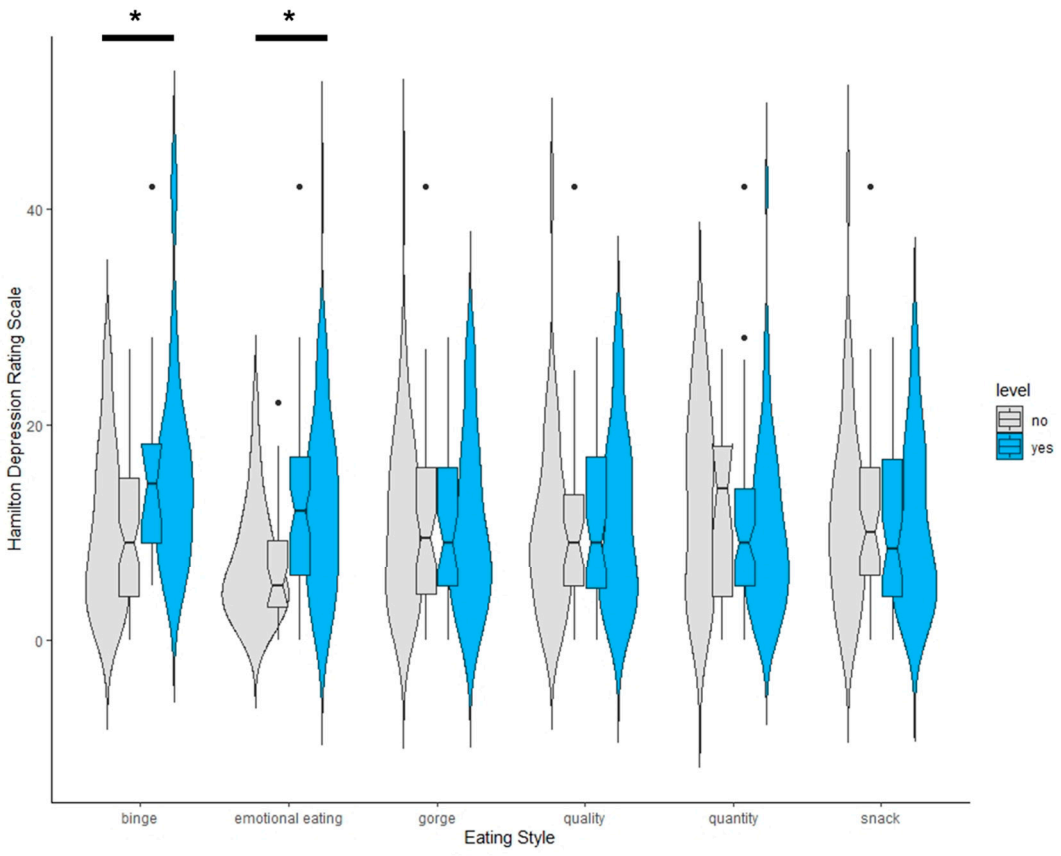

Figure S3. Hamilton Depression Rating Scale by eating style.

2. Further details on eating behavioural styles

When it comes to eating habits, there are a variety of styles that individuals adopt. Specific questions were used to assess the dividing line between quantitative food gratification (when the quality of the taste of food does not represent a priority, as long as it guarantees a feeling of satiety), and qualitative food gratification (when the quality, therefore the taste of food, has a priority over the quantity of it matters that the food is tasty), and whether food is eaten voraciously or rapidly.

Another such style is snacking, which can be defined as a behavior where a person consumes frequent snacks, which are typically any type of food in small quantities, mainly in between meals. This type of eating style is often characterized by frequent assumptions of snacks, particularly in individuals who regularly eat at fast food restaurants. This can lead to an increased intake of calories and an unhealthy pattern of eating. On the other hand, binge eating is a behavior that involves consuming abnormally high quantities of food in a short period of time with a perceived loss of control. This eating pattern can also result in an unhealthy relationship with food, as it often leads to feelings of guilt and shame. According to Micanti and colleagues [3] binge eating style is characterised by high levels of impulsivity, body shape concern and a global dysregulation of emotional regulation system. While for emotional eating behaviour as an eating behavioural style we can define it as (over)eating in response to any kind of not acknowledged or manageable emotion experienced by the individual in a specific triggered or untriggered moment.

On the other hand, gorging (also called prandial hyperphagia) is defined as a eating style that results in the stomach of an individual feeling full and pulled after consuming a substantial quantity of food. Furthermore, Micanti and colleagues [3], also define gorging as eating a large amount of food three times per day. Further details on eating styles are provided in Supplementary Table S1. ("Assessment of eating behavioral styles.").

References

[1] Gratz KL, Roemer L. Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. J Psychopathol Behav Assess, vol. 26, Kluwer Academic/Plenum Publishers; 2004, p. 41–54. https://doi.org/10.1023/B:JOBA.0000007455.08539.94.

[2] Buchwald H, Avidor Y, Braunwald E, Jensen MD, Pories W, Fahrbach K, et al. Bariatric Surgery. JAMA 2004;292:1724. https://doi.org/10.1001/jama.292.14.1724.

[3] Micanti F, Iasevoli F, Cucciniello C, Costabile R, Loiarro G, Pecoraro G, et al. The relationship between emotional regulation and eating behaviour: a multidimensional analysis of obesity psychopathology. Eating and Weight Disorders 2017;22:105–15. https://doi.org/10.1007/s40519-016-0275-7.