

# The mediation effect of eating behaviour factors in the relationship between personality traits and Body Mass Index (BMI)

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## Abstract

**Background.** Globally, the tendency to obesity shows an alarming increase, turning into a health problem with multiple and serious implications. Thus, it is necessary to find effective solutions and approaches to solve or prevent it.

**Aims.** The present study aims to investigate the mediating role of emotional eating, uncontrolled eating, and cognitive restriction in the relationship between conscientiousness, neuroticism, and self-esteem on the one hand and BMI on the other.

**Methods.** For this, data were collected from 166 people from a non-clinical population and statistically analyzed.

**Results.** The results we obtained show that neuroticism, conscientiousness and low self-esteem are not directly associated with BMI. However, we found that emotional eating mediates the relationship between the three traits and BMI, in all the analyses. Also, uncontrolled eating mediates these relationships only when tested independently of emotional eating. Cognitive restriction does not mediate these relationships.

**Conclusions.** Thus, our study supports the idea that there are indirect relationships between personality traits and BMI, mediated by emotional eating. As regards uncontrolled eating, we cannot draw definitive conclusions. These conclusions are of interest both for theoretical models, as they may contribute to a better understanding of the relationship between personality traits and body weight, and for practical interventions, as they may indicate which mechanisms can be utilized to reduce the weight problems faced by an increasing number of people.

**Keywords:** personality, conscientiousness, neuroticism, self-esteem, TFEQ, BMI.

## Introduction

Numerous studies, together with the global statistics, support the alarming nature of the rising incidence of obesity, which between 1980 and 2015 doubled in more than seventy countries and remained high in most other nations (it affected a total of 107.7 million children and 603.7 million adults) (Afshin et al., 2017). Between 1990 and 2017, there was a marked increase in the number of deaths caused by a high BMI (Body Mass Index), more than double in both sexes (Dai et al., 2020).

So far, the studies and the results obtained in the fight against what we nowadays call the pandemic phenomenon of obesity, promote an integrative approach (Nutu et al., 2023). It is useful to deepen the knowledge in the field, inclusively through studies like the present one, which investigates the extent to which personality influences body weight, as well as the role the eating behaviour factors play in this relationship.

*Body mass index* (BMI) is the ratio between a person's

weight (in kilograms) and the square of their height (in meters). BMI is a valuable indicator for assessing a person's weight, and is frequently used in clinical or non-clinical studies to determine whether a person falls into the categories of underweight, normal weight, overweight or obese. However, we should mention that as a variable, although it has great utility in global assessments and statistics related to health policies, BMI can sometimes induce certain limitations as it does not take into account aspects such as muscle mass, bone density and the general body constitution or aspects such as the incidence of health risks associated with obesity (Nuttall, 2015; Caballero, 2019)

The most frequently used model in this field is that of the five factors (FFM or Big Five) (Mc Crae & John, 1992). Some personality traits in the Five Factor model, as well as self-esteem, may influence the eating behavior and BMI, and certain traits may be either protective or hazardous factors for overweight and obesity (Gerlach et al., 2015).

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The five domains of personality described by the five-factor model include *openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism*.

*Conscientiousness*, a personality trait that is characterized by self-discipline, organization and responsibility, makes conscientious people pay more attention to their diet, be more motivated to make healthy food choices and also be more physically active and monitor their weight. All these behaviours can contribute to maintaining a healthy body weight or lead to weight loss in the case of overweight people. In various cross-sectional and longitudinal studies, a negative correlation was observed between conscientiousness and body weight (Sutin et al., 2011), conscientiousness being the trait most frequently highlighted in relation to BMI.

*Neuroticism* is a personality trait characterized by the presence of anxiety, stress and excessive emotionality. Thus, in the case of people with high levels of neuroticism, especially accompanied by depression and impulsivity, the tendency to express stress through emotional eating may increase (Elfhag & Morey, 2008), which may lead to weight gain. This phenomenon may be more pronounced among women, as they are more likely to experience social pressures related to their physical appearance.

In addition to the domains of the Big Five model, self-esteem is another psychological factor that has been associated with eating behaviour and weight management. High self-esteem can lead to healthier eating habits and a positive body image, while low self-esteem can lead to behaviours such as emotional eating and a greater likelihood of experiencing weight management problems (Byth et al., 2022; İmre & Toprak, 2023).

Although the relationship between personality traits and BMI seems to be a well-established topic in the specialized literature, when reviewing the research on this aspect, it is observed that there is an inconsistency of results. Jokela et al. (2013) present the conclusions of a meta-analysis which only confirms the relationship between conscientiousness and BMI, while no clear statistical correlations could be identified between the other traits and BMI. Various studies have shown the inconsistency of these relationships and had modest or partial statistical results, as some of the links between personality and BMI are not necessarily visible at the level of the domain of personality, but only at the level of the facets of these traits, or are determined by demographic differences related to gender, age, nationality, etc. (Ellickson-Larew et al., 2013; Vainik et al., 2019; Paans et al., 2016).

A potential explanation could be that personality traits and body weight are distal variables and for this reason, previous studies have failed to systematically capture the relationship between them. The introduction of mediating variables into the proposed model could better explain the relationship between them. Thus, personality traits can influence an individual's eating and physical activity behaviors, indirectly influencing body weight. For example, there are authors (Sutin & Terracciano, 2016) who argue that personality traits influence physical movement (seen as sanogenic behavior involved in maintaining an optimal body weight) to a greater extent than they influence other

behaviors (such as eating habits).

Thus, we propose that some behavioral mechanisms should be introduced in the Personality - BMI relationship, as they would better explain this connection. With this in mind, for the present study we were led to choose the model which constitutes the basis of the Three-Factor Food Questionnaire (Karlsson et al., 2000; Cappelleri et al., 2009).

Furthermore, there are previous studies, although not very extensive, which indicate that emotional eating, cognitive restriction, and uncontrolled eating could mediate the relationship between personality and BMI (Van Strien, 2018; Ha & Lim, 2023).

*Emotional eating, uncontrolled eating, and cognitive restriction in the Personality-BMI relationship*

The Three-Factor Eating Questionnaire assesses three key aspects of the eating behaviour: emotional eating, uncontrolled eating, and cognitive restriction.

*a) Personality traits and emotional eating*

Personality traits mediated by eating behavior factors such as emotional eating, which refers to the tendency to eat in response to negative emotions (Dakanalis et al., 2023), may influence BMI.

In an extensive review of the field, Gerlach et al., (2015) highlight studies showing that individuals with certain personality traits such as high neuroticism or low conscientiousness may tend to engage in dysfunctional eating behaviors (emotional and uncontrolled eating), which can lead to weight gain and obesity. Emotional eating has been associated with overweight and prospective weight gain, the association being even greater when emotional eating is accompanied by an escalation of depressive symptoms and the influence and distress generated by negative events (Annesi & Stewart, 2023).

Thus, individuals with higher levels of neuroticism, characterized by emotional instability and a tendency to experience negative emotions, may be more likely to engage in emotional eating as a way to cope with their emotions (Van Strien et al., 2016). Emotional eating is thus a manifestation of underlying emotional instability and stress intolerance, leading to increased health risks (Frayn & Knäuper, 2018; Ha & Lim, 2023). Investigating the mediating role of physical movement in the emotional eating-BMI equation showed that physically active individuals may still experience the urge to eat in response to emotional stress, but will tend to make healthier food choices (Dohle et al., 2014).

Also, people with higher levels of impulsivity and respectively lower levels of conscientiousness, with an increased sensitivity to rewards, may be more susceptible to emotional or uncontrolled eating, as a possible way to seek comfort and immediate gratification during times of stress or emotional disturbance (Keller & Siegrist, 2015; Elfhag & Morey, 2008).

*b) Personality traits and uncontrolled eating*

*Uncontrolled eating* refers to a lack of control over food consumption, often characterized by excessive consumption (overeating). Since conscientiousness refers to traits such as self-discipline, organization, and goal-oriented behavior, the link between people with high levels of conscientiousness and controlled, more mindful, and

more disciplined eating behaviors can be highlighted.

Previous findings state that a high level of conscientiousness leads to effective food regulation and healthier choices (Keller & Siegrist, 2015). Individuals with high conscientiousness are more likely to establish and follow eating patterns, exhibiting the discipline and restraint necessary to resist compulsive eating tendencies.

There is research (Gilmartin et al., 2022) which suggests a relationship between uncontrolled eating and neuroticism, a link that extends to an individual's mental and physical health (high levels of neuroticism have been associated with an increased risk of developing eating disorders such as binge eating disorder, as well as other psychological conditions).

#### c) Personality traits and cognitive restriction

Another important factor found in the TEFQ is cognitive restriction, which refers to a person's tendency to limit and control the amount and type of food consumed in order to maintain an optimal body weight or to lose weight when this thing is necessary. It has been observed that people with a high level of conscientiousness correlate positively with the cognitive restriction factor, due to the self-regulation and discipline tendencies they display (Keller & Siegrist, 2015).

## Objectives

In the present study we investigate the possible correlations between certain personality traits (neuroticism, conscientiousness, and self-esteem) and BMI.

We also investigate the potential mediating role that eating behaviours (emotional eating, cognitive restraint, and uncontrolled eating) might play between personality traits (neuroticism, conscientiousness, and self-esteem) on the one hand and BMI on the other.

## Hypothesis

We start from the premise of the existence of a relationship between neuroticism, conscientiousness and self-esteem on the one hand and BMI on the other. As a result, we can advance the following hypotheses:

- the relationship between neuroticism and BMI may be mediated by emotional eating, uncontrolled eating, and cognitive restriction;
- the relationship between conscientiousness and BMI may be mediated by emotional eating, uncontrolled eating, and cognitive restriction;
- the relationship between low self-esteem and BMI may be mediated by emotional eating, uncontrolled eating, and cognitive restriction.

## Material and methods

### Research protocol

#### a) Period and place of the research

All the data were collected online, through Google Forms, between June and July 2023. Participants in the study were informed that participation is voluntary and they can withdraw from it at any time. They were also informed that their answers were confidential and would be used strictly for research purposes; afterwards they were asked to express their agreement regarding participation

in the study. In exchange for taking part in the study, the participants received a report on their personality profile (based on the scores on the 5 traits).

#### b) Subjects and groups

The study included 166 subjects (88% women, 12% men), aged between 19 and 70 years ( $m=49.81$ ; standard deviation= $9.08$ ). Of the 166 participants, 83 (50%) are obese, 53 (31.9%) are overweight and 30 (18.1) have a normal BMI (Table I). The sample is one of convenience, selected from the general population of people who do not suffer from mental disorders (diagnosed by a psychiatrist).

**Table I**  
Descriptive statistics.

Gender	Percent
Men	12 %
Women	88 %
Age	
18-44 years	25,9 %
45-64 years	68,7 %
65 years	5,4 %
BMI	
Normal	18,1 %
Overweight	31,9 %
Obesity	50 %

#### c) Used instruments

The following measurement tools were administered to the study participants:

**Edi 3.** To measure self-esteem we used the EDI 3 (Eating Disorder Inventory) tool (Garner, 2004; Miclea et al., 2010). In its original form, the EDI-3 is a self-report tool containing 12 scales that measure clinically relevant constructs for eating disorders. In the present research, we used only the 6 items corresponding to the scale - Low self-esteem, which has a good internal consistency, Cronbach's Alpha = 0.850. Previous research shows that the EDI 3 tool has good psychometric properties in a wide variety of populations (Clausen et al., 2011; Garner, 2004).

**Three-factor eating questionnaire (TFEQ).** We used the Three factor eating questionnaire (TFEQ) (Cappelleri et al., 2009; Karlsson et al., 2000) to measure emotional eating, uncontrolled eating, and cognitive restriction. The tool was translated into Romanian using the back-translation method. The tool has 21 items, of which 9 items measure uncontrolled eating, 6 items measure emotional eating and 6 items measure cognitive restriction. Items 1-20 are measured on a scale from 1 to 4, and item 21 on a scale from 1 to 8. In the present study, the Cronbach's Alpha coefficient value for the uncontrolled eating scale is very good, equal to 0.892. Regarding the emotional eating subscale, the value of the Cronbach Alpha coefficient is excellent, equal to 0.953. For the cognitive restriction scale, the value of the Cronbach Alpha coefficient is acceptable (0.729).

**Personality.** To measure personality traits, we used 50 items measuring the 5 dimensions (agreeableness, conscientiousness, neuroticism, openness to experience and extraversion) from the International Item Set (Iliescu et al., 2015). The items used are measured on a scale from

**Table II**  
Confirmatory factorial analysis.

Items	Chi square (degree of freedom)	CFI	RMSEA	RMR (standardized)
21 items, 3 factors	396.189 (184)	0.906	0.084	0.077
21 items, 2 factors	507.530 (186)	0.857	0.102	0.086
20 items, 3 factors (without 18)	375.401 (165)	0.906	0.088	0.076
19 items, 3 factors (without 17,18)	352.185 (147)	0.907	0.092	0.077
18 items, 3 factors (without 17, 18, 21)	328.170 (128)	0.909	0.096	0.064

Note: CFI - comparative fit index; RMSEA - root mean square error of approximation, RMR - root mean square residual.

**Table III**  
Correlation matrix.

Items	Mean	Standard deviation	BMI	LSE	Csns	Agr	Dsc	Ext	Nrc	EE	CR	UE
BMI	30.50	6.01	1									
LSE	16.72	6.67	0.117	1								
Csns	35.37	6.56	-0.140	-0.460**	1							
Agr	40.55	5.69	-0.056	-0.164*	0.244**	1						
OE	35.97	5.98	0.004	-0.234**	0.298**	0.357**	1					
Ext	31.66	6.95	-0.128	-0.412**	0.225**	0.393**	0.267**	1				
Nrc	27.95	7.63	0.030	0.587**	-0.283**	-0.041	-0.075	-0.405**	1			
EE	17.31	6.40	0.449**	0.340**	-0.280**	-0.031	-0.046	-0.138	0.243**	1		
CR	8.13	2.74	0.136	-0.071	-0.005	-0.030	-0.061	-0.016	0.036	0.296**	1	
UE	23.08	6.85	0.351**	0.367**	-0.351**	-0.058	-0.117	-0.102	0.281**	0.768**	0.270**	1

Note: BMI- Body mass index, LSE- low self-esteem, Csns- Conscientiousness, Agr- Agreeableness, OE - Openness to experience, Ext- Extraversion, Nrc- Neuroticism, EE-emotional eating, CR-cognitive restriction, UE-uncontrolled eating. \*p<0.05, \*\*p<0.01.

1 to 5. Cronbach's alpha coefficient values are 0.873 for Extraversion, 0.867 for Agreeableness, 0.842 for Conscientiousness, 0.905 for Neuroticism and 0.832 for Openness to experience. Thus, we can conclude that the tool has a very high fidelity.

**BMI** was calculated from the participants' self-reported weight and height.

*d) Statistical processing*

Analysis of the factorial structure of the TFEQ

To test the factorial structure of the TFEQ tool, we used the AMOS IBM Statistics program (version 22), using maximum likelihood estimation. First, we tested the 3-factor, 21-item model. The global fit indicators for this model do not have satisfactory values (CFI=0.883). Following the change indices suggested by the statistical program, we correlated the errors for items 8 and 9, and for items 3 and 19. We resorted to this procedure because we believe that they measure the same thing and thus the correlation between the errors can be justified (Byrne, 2010). The global indicators for the resulting model are presented in Table II. Other change indices were considered unwarranted. In the next step, we tested the factor structure of a 2-factor model (cognitive restriction and a combined factor for emotional eating and uncontrolled eating). We resorted to this step because the correlation between emotional eating and uncontrolled eating is very high (r=0.768). The resulting model does not fit the data very well and is inferior to the 3-factor model.

Next, we analyzed the factor loadings of the items.

The weakest factor loading belongs to item 18, which measures cognitive restriction, with a value of 0.345. The tested model, which does not contain item 18, has values of global fit indicators similar to the initial model. Next, we also decided to remove item 17 which has a loading of 0.363. The resulting model shows marginal improvement (CFI changes from 0.906 to 0.907). The last item we decided to remove is item 21 which has a factor loading of 0.401. The final factorial structure (with 18 items) shows a marginal improvement compared to the initial one (CFI changed from 0.906 to 0.909) (Table II). The results are similar to those obtained by Cappelleri et al. (2009), who propose the same structure with 18 items. We decided to keep this last model and perform all analyses using this form of the tool. It should also be noted that the internal consistency value of the cognitive restriction scale increased from 0.729 to 0.778.

*Analytical strategy*

In order to analyze the relationships between personality traits, on the one hand, and the variables related to the eating behavior, on the other hand, we performed simple correlation analyses (Table III). Next, we performed a hierarchical regression analysis, where, in the first block we included control variables (age, gender), and in the second block personality traits (extraversion, conscientiousness, openness to experience, neuroticism, agreeableness and esteem self), the dependent variable being BMI. Next, we were interested in testing the extent to which the 3 factors (emotional eating, uncontrolled eating, and cognitive restraint) mediate the relationship

between personality traits (the 5 factors and self-esteem) and BMI. For this we used the application Hayes Process (Hayes, 2013).

**Results**

Table III shows the correlations between the variables investigated in the study. As it can be seen, the 6 investigated personality traits correlate weakly and statistically insignificantly with BMI, the highest correlation being between conscientiousness and BMI ( $r=-0.14$ ,  $p>0.05$ ), and the lowest being between openness to experience and BMI ( $r=0.004$ ,  $p>0.05$ ). Emotional eating correlates strongly with BMI ( $r=0.449$ ,  $p<0.01$ ), and uncontrolled eating correlates moderately to strongly with BMI ( $r=0.351$ ,  $p<0.01$ ), while cognitive restriction correlates weakly and non-significantly with BMI ( $r=0.136$ ,  $p>0.05$ ). It should also be noted that emotional eating and uncontrolled eating show the same trends of correlations with personality traits, both correlating statistically significantly with low self-esteem, conscientiousness and neuroticism (Table III).

With regard to the relationship between the three factors of the TFEQ, as expected, emotional and uncontrolled eating correlate very strongly ( $r=0.768$ ,  $p<0.01$ ). The correlation between cognitive restriction and emotional eating is moderate ( $r=0.296$ ,  $p<0.01$ ), and the relationship between cognitive restriction and uncontrolled eating is also moderate in magnitude ( $r=0.270$ ,  $p<0.01$ ).

**Table IV**  
Hierarchical regression analysis.

Criterion: BMI	Model 1	Model 2
	$\beta$	$\beta$
Age	0.128 (p=0.5)	0.131 (p=0.110)
Gender	-0.004 (p=0.954)	0.017 (p=0.828)
Extraversion	-	-0.121 (p=0.207)
Agreeableness	-	0.014 (p=0.879)
Openness to experience	-	0.073 (p=0.406)
Neuroticism	-	-0.072 (p=0.480)
Conscientiousness	-	-0.106 (p=0.246)
Low self-esteem	-	0.107 (p=0.318)
<b>R square</b>	<b>0.016</b>	<b>0.057</b>

In order to test the relationship between personality traits and BMI, we also performed a hierarchical regression

analysis, in which we included 2 control variables in the first block (gender and age), and personality traits in the second block (Table IV). Regression analysis allows us to estimate the total variance in BMI explained by personality traits as well as the unique association between each personality trait and BMI. Model 2 explains a reduced variance in BMI, approximately 6%, and the standardized regression coefficients for all personality traits have statistically insignificant values, the highest values being for extraversion ( $\beta=-0.121$ ), low self-esteem ( $\beta=0.107$ ) and conscientiousness ( $\beta=-0.106$ ).

Both correlational and regression analyses show that the 6 personality traits are not directly associated with BMI.

*Mediation analysis*

In order to investigate the mediating relationships, we tested several models in which each personality trait played the role of predictor, each TFEQ dimension played the role of mediator, and BMI played the role of criterion. In the first analysis, the mediators were entered simultaneously (Table V). This allows each mediation effect to be tested, controlling for the other mediators.

Regarding to the relationship between self-esteem and BMI, mediation analyses show that emotional eating mediates this relationship: 95% C.I [0.05; 0.23]. Uncontrolled eating and cognitive restriction do not mediate this relationship. The relationship between neuroticism and BMI is also mediated by emotional eating 95% CI [0.02; 0.16], and uncontrolled eating and cognitive restriction do not mediate this relationship. We obtained the same result for the relationship between conscientiousness and BMI, this relationship being mediated by emotional eating: 95% CI [-0.21; -0.03]. Thus, our hypothesis that emotional eating mediates the relationship between low self-esteem, conscientiousness, and neuroticism, on the one hand, and BMI, on the other hand, is supported by the data. The mediating hypotheses for uncontrolled eating and cognitive restriction are not supported by the data, but given the very high correlation between uncontrolled eating and emotional eating, it is possible that uncontrolled eating is not a mediator, except in the presence of emotional eating.

Next, we decided to test the mediation relationships in which each mediator is entered separately in the analysis (Table VI). This statistical analysis allows the investigation of each mediation effect, ignoring the other mediators.

**Table V**  
Mediation analysis (simultaneous).

Path	Direct effect	Total indirect effect	Mediation via uncontrolled eating (C.I 95%)	Mediation via emotional eating (C.I 95%)	Mediation via cognitive restriction (C.I 95%)
LSE→BMI	-0.03 (p=0.61)	0.14	[-0.07; 0.09]	[0.05; 0.23]	[-0.01; 0.01]
Csns →BMI	-0.01 (p=0.80)	-0.11	[-0.08; 0.07]	[-0.21; -0.03]	[-0.01; 0.02]
Nrc → BMI	-0.06 (p=0.23)	0.09	[-0.05; 0.06]	[0.02; 0.16]	[-0.01; 0.01]
Ext → BMI	-0.05 (p=0.34)	-0.05	[-0.03; 0.02]	[-0.11; 0.01]	[-0.01; 0.01]
Agr → BMI	-0.04 (p=0.55)	-0.01	[-0.02; 0.02]	[-0.09; 0.05]	[-0.01; 0.01]
OE →BMI	0.02 (p=0.71)	-0.02	[-0.04; 0.03]	[-0.09; 0.04]	[-0.01; 0.01]

Note: LSE-Low self-esteem, Csns - Conscientiousness, Nrc - Neuroticism, Ext -Extraversion, Agr - Agreeableness, OE- Openness to experience.

**Table VI**  
Mediation analysis (parallel).

Path	Mediation via uncontrolled eating	Mediation via emotional eating	Mediation via cognitive restriction
LSE→BMI	0.11 95% C.I [0.05; 0,19]	0.14 95% C.I [0.07; 0,21]	-0.01 95% C.I [-0.04; 0,01]
Csns→BMI	- 0.11 95% C.I [-0.18; -0.05]	- 0.11 95% C.I [-0.20; -0.04]	0.01 95% C.I [-0.09; 0.004]
Nrc→BMI	0.08 95% C.I [0.03; 0.14]	0.08 95% C.I [0.02; 0.15]	0.00 95% C.I [-0.02; 0.02]

Note: LSE-Low self-esteem, Csns - Conscientiousness, Nrc - Neuroticism, Ext -Extraversion, Agr - Agreeableness, OE- Openness to experience

We may notice that in this analysis emotional eating mediates the relationship between the 3 personality traits and BMI. Interestingly, in this analysis uncontrolled eating also mediated all 3 relationships. Thus, the results differ in the 2 analyses. This indicates that the 2 mediating mechanisms are redundant (which is to be expected given the very high correlation between uncontrolled eating and emotional eating). Thus, we can conclude that our results fully support the hypothesis that emotional eating mediates the relationship between self-esteem, conscientiousness and neuroticism, on the one hand, and BMI, on the other. People with low self-esteem, high neuroticism, and low conscientiousness tend to eat more emotionally, which leads to an increase in BMI.

Regarding uncontrolled eating, our results partially support the hypothesis that it mediates the relationships between personality traits and BMI. Cognitive restriction does not mediate these relationships.

As for the relationships between the other personality traits (openness to experience, agreeableness, and extraversion) and BMI, although we did not propose hypotheses in this regard, we performed the same analyses and did not obtain any statistically significant mediation.

**Discussion**

The results of the study show that the 5 personality traits of the Big Five model and self-esteem are not significantly associated with BMI, partially confirming the results of previous studies.

However, our mediation hypothesis is partially supported by the results. Thus, emotional eating mediates the relationship between self-esteem, neuroticism, and conscientiousness, on the one hand, and BMI, on the other hand. Emotional eating is a behavioral mechanism through which personality traits influence BMI. As for uncontrolled eating, it mediates the relationships between the 3 traits and BMI only when tested separately from emotional eating. A very likely explanation for this result is that the two constructs correlate very strongly (Hayes, 2017).

The fact that we obtained partially different results for the two constructs (emotional eating and uncontrolled eating) is not surprising. First, it should be noted that the two dimensions are distinct, and our results support this. The confirmatory factor analysis shows that the 3-factor model fits the data better than a 2-factor model (emotional and uncontrolled eating forming a single factor). Also,

even though the two dimensions correlate similarly with personality traits, there is a difference in their correlation with BMI, with emotional eating correlating better (0.449 vs. 0.351 for uncontrolled eating). Mediation analyses support the hypothesis that emotional eating represents a better explanation for the relationship between personality traits and BMI. This result is consistent with several studies that have shown that emotional eating mediates the relationship between depression and BMI/weight (Van Strien et al., 2016; Van Strien, 2018). One possible explanation for this mediating relationship is that emotional eating serves as an emotion regulation mechanism. Thus, people with high neuroticism and low self-esteem tend to experience a higher level of negative emotions, and emotional eating can help them regulate these emotions, which ultimately leads to an increase in body weight. It should also be noted that uncontrolled eating has a stronger evolutionary basis, being considered an adaptive evolutionary response (Rodin, 1981), while emotional eating is a strategy learned throughout life to cope with stress (Van Strien et al., 2016).

Regarding cognitive restriction, our results show that it is not a mediator between personality traits and BMI.

*Limits and future research directions*

The present study has a number of limitations. First, the sample used is one of convenience. Thus, the extrapolation of results to the general population is difficult to achieve. Also, the size of the sample is not very large, which affects the statistical power of the research. A study on a larger and more representative sample of the general population could reveal other relationships between the investigated variables. It should also be noted that the investigated sample is part of a non-clinical population, which means that the extrapolation of results to a clinical population is not possible. Future research could investigate the mediating mechanisms in the present study in such a clinical context.

Also, in the future, for greater accuracy regarding the results of this research, longitudinal studies are needed to provide conclusive evidence regarding the investigated causal relationships. Although it is reasonable to presume that personality traits influence eating behaviours (the 3 factors), which in turn lead to higher BMI, longitudinal studies could increase our confidence in the direction of these relationships. They could also contribute to a better understanding of the role played by uncontrolled eating in these relationships.

## Conclusions

1. Both correlational and hierarchical regression analyses show that the 6 personality traits are not directly associated with BMI.

2. Emotional eating is a mediator in the relationship between low self-esteem, conscientiousness and emotional stability, on the one hand, and BMI, on the other hand.

3. Uncontrolled eating is a mediator in the relationship between low self-esteem, conscientiousness and emotional stability, on the one hand, and BMI, on the other hand, only when each mediator is tested separately. Thus, we cannot draw a definitive conclusion about this mediation relationship.

4. Cognitive restriction does not mediate relationships between personality traits and BMI.

5. Thus, our study supports the idea that emotional eating is an important mechanism in the relationship between personality traits and BMI, and psychological interventions should target these behaviors.

6. For example, individuals with higher levels of neuroticism and lower levels of conscientiousness and self-esteem could be taught emotional regulation strategies, and these could reduce emotional eating, ultimately influencing BMI.

7. Understanding the mechanisms by which personality influences eating behaviors and weight is important because it can help develop more effective obesity interventions.

## Conflict of interests

There are no conflicts of interests.

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