



# Shades of Foods: Prevalence and correlates of food addiction

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## Shades of Foods: Prevalence and correlates of food addiction

**Summary.** *Background:* Growing evidence suggests that certain foods have addictive properties. Food addiction has sparked interest within the scientific community. The purpose of this study was to estimate the prevalence of food addiction to examine their differential characteristics, and the association between food addiction symptoms and physical and psychological variables, such as eating-related behaviours, body mass index (BMI), and personality traits (e.g., types of narcissism). *Method:* The sample consisted of 208 participants (mean age = 26.82 ± 7.89 years; BMI = 27.53 ± 12.21 kg/m<sup>2</sup>; 80.3% female; 79.3% White). Participants completed a web-based self-report survey of food addiction containing the questionnaires to measure these constructs. The main scale used as an outcome variable was the Yale Food Addiction Scale (YFAS). *Results:* 14.4% of participants met the YFAS diagnostic criteria for potential food addiction. Individuals who met the criteria displayed greater food craving, more frequent consumption of sugary foods, the tendency to develop eating disorders, and more negative attitudes toward and thoughts of physical appearance. Those categorised as food addicts also exhibited a lower level of self-esteem and grandiose narcissism, and a high level of hypersensitive narcissism. Food craving and body image issues were associated with the severity of food addiction. *Conclusions:* The findings of this investigation supported the construct of food addiction as both, addictive behaviour similar to the one observed in substance use and as behavioural addiction. Furthermore, it was suggested that this potential addiction is related to overweight and obese individual young females.

**Keywords:** Food addiction; eating behaviour; addictive behaviour, behavioural addiction; prevalence

## Les ombres dels aliments: Prevalença i correlacions de l'addicció al menjar

**Resum.** *Antecedents:* el nombre creixent d'evidències suggereixen que certs aliments tenen propietats addictives. L'addicció als aliments (o addicció al menjar) ha suscitat interès a la comunitat científica. El propòsit d'aquest estudi ha estat estimar la prevalença d'addicció al menjar per examinar les seves característiques diferencials i l'associació entre els símptomes d'aquesta addicció i les variables físiques i psicològiques, com ara els comportaments relacionats amb el menjar, l'índex de massa corporal (IMC) i els trets de personalitat (per exemple, tipus de narcisisme). *Mètode:* La mostra es va compondre de 208 participants (edat mitjana = 26,82 ± 7,89 anys; IMC = 27,53 ± 12,21 kg/m<sup>2</sup>; 80,3% gènere femení; 79,3% raça blanca). Els participants van completar una enquesta en línia d'autoavaluació de l'addicció al menjar que contenia els qüestionaris per mesurar aquests constructes. L'escala principal que es va utilitzar com a variable dependent va ser l'escala d'addicció als aliments (o al menjar) de Yale (YFAS). *Resultats:* el 14,4% dels participants van complir els criteris diagnòstics del YFAS per a la seva possible addicció al menjar. Els individus que compliren els criteris mostraren un major anhel o desig pel menjar, un consum més freqüent de menjar amb sucre, la tendència a desenvolupar trastorns alimentaris i una actitud i pensaments més negatius sobre la pròpia aparença física. Els classificats com a addictes al menjar també van

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*mostrar un nivell més baix d'autoestima i de narcisisme de tipus grandios, així com un alt nivell de narcisisme hipersensible. Els problemes relacionats amb l'anhel o el desig de menjar i de l'auto-imatge corporal van ser associats amb la severitat de l'addicció al menjar. Conclusions: Les troballes d'aquesta investigació han recolzat el constructe de l'addicció al menjar com a comportament addictiu similar a l'ús de substàncies i l'addicció al comportament. A més a més, els resultats suggereixen que aquesta potencial addicció esta relacionada amb dones joves amb sobrepès o obesitat.*

**Paraules clau:** addicció alimentària (o al menjar); comportament alimentari; comportament addictiu; addicció conductual; prevalença

## Introduction

Obesity is one of the most prevalent health issues worldwide. The “obesity epidemic” receives the attention of the public, policymakers, and scientists. The term “food addiction” (FA) has been used in public media and scientific literature for decades, but despite the broad acceptance of the term in popular culture, its definition, aetiology, and validity remain debatable, as addictive behaviour is under continued research (Lemeshow, Gearhardt, Genkinger, & Corbin, 2016; Ruddock et al., 2016).

From an evolutionary perspective, humans have a predisposition to overeating and a preference for high-fat and high-sugar food, as it helps ensure survival in times of shortage. The plausibility of the existence of FA is strongly supported by the similarities between the behavioural symptoms (e.g., tolerance and withdrawal) induced by food and those associated with drugs, as well as the effects of both kinds of substances on the neurotransmitters (e.g., dopamine and opioid) (Avena, Rada, & Hoebel, 2008; Avena, 2010; Avena Wang, & Gold, 2011; Cocores & Gold, 2009; Corsica & Pelchat, 2010; Pelchat, 2009; Umberg, Shader, Hsu, & Greenblatt, 2012). In other words, obesity and drug addiction may induce similar deficits in the responsiveness of the brain’s reward system (Kenny, 2011). Over-consuming palatable foods causes an elevated reinforcing value of food and an impairment of the control circuits (Volkow, Wang, & Baler, 2011). Addiction-like symptoms such as strong food cravings and loss of control in overeating have been reported in some people and may result in intake regulation difficulties and contribute to obesity. There is growing evidence to show that certain foods and some ingredients in food have similar functions to drugs, which may lead to addictive processes (Gearhardt, Corbin, & Brownell, 2009).

However, it is unclear whether FA is a distinct disorder (Long, Blundell, & Finlayson, 2015), a compulsive and severe form of binge eating disorder (BED; Davis, 2013), or phenomenon affecting a subgroup of the overweight and obese population (usually females) who engage in more extreme overeating (Bégin et al., 2012). The overlap between FA and BED has provoked much debate. Loss of control over food consumption is a characteristic of both phenomena. FA has some mechanisms in common with BED, including reward dysfunction, craving, emotion dysregulation, and impulsivity (Schulte, Grilo, & Gearhardt, 2016). However, 24% of the obese adults who met the criteria for FA did not meet the criteria for BED (Davis et al., 2011), and only 41.5% of obese patients with BED reached the diagnostic threshold for FA (Gearhardt, White, Masheb, & Grilo, 2013). Impairment and distress are present in food addicts in a way that differs significantly from individuals suffering from BED (Schulte, Grilo, & Gearhardt, 2016). Furthermore, the overlap between BED and substance use disorders (SUDs) has been explored (Schreiber, Odlaug & Grant, 2013), and the two phe-

nomena have been found to share similar phenomenology (e.g., urges to engage in bingeing episodes resulting in distress and impairment).

Binge eaters and those who engage in consumption behaviours associated with certain processed foods were found to meet the criteria of substance use disorders in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association [APA], 2000) (Gold, Frost-Pineda, & Jacobs, 2003; Ifland et al., 2009). The Yale Food Addiction Scale (YFAS; Gearhardt et al., 2009) is the first instrument designed to classify individuals’ addictive-like eating behaviour. The criteria of the YFAS are based on the extrapolation of the substance dependence listing in the DSM-IV to eating behaviours. Research has revealed that YFAS scores significantly predict the frequency of binge eating, and individuals diagnosed with FA are more likely than others to exhibit depression, negative emotions, emotion dysregulation, eating disorders (EDs), and lower self-esteem (Gearhardt et al., 2012). Indeed, BED has been classified as a public health problem along with other EDs (e.g., bulimia nervosa [BN]), with an estimated prevalence of 1.4% in 14 countries worldwide (Kessler et al., 2013), most often affecting early adults, usually women.

It is essential that researchers work to develop an understanding of the prevalence and correlates of FA. There is a lack of scientific evidence to shed light on whether it really represents an addictive behaviour (i.e., an addiction based on a substance; Drummond, Tiffany, Glautier, & Remington, 1995) or a behavioural addiction (i.e., an addiction based on a behaviour; Marks, 1991). To date, individuals reaching the threshold for FA have been found to consume sugary foods more frequently than those who did not meet the criteria (Davis et al., 2011). FA is related to problematic eating and plays a role in eating pathology (Gearhardt et al., 2012; Gearhardt, Boswell, & White, 2014). Food craving is a combination of a strong desire and attraction to a particular food, and it provides a positive mood change in individuals without psychopathological issues (Hill, 2007). Chocolate was the most frequently craved food in Western societies (Massey & Hill, 2012), but those who self-report as addicted to chocolate exhibit greater depression, guilt, and craving before eating chocolate. However, consuming chocolate does not enhance their mood, but instead leads to more intense feelings of guilt (Macdiarmid & Hetherington, 1995).

Concerning physical characteristics, food addicts displayed greater body shape and weight concerns than healthy controls (Burmeister, Hinman, Koball, Hoffmann, & Carels, 2013; Gearhardt et al., 2014). Distorted body image has a considerable impact on physical and mental health (Derenne & Beresin, 2006). Weight and body shape concerns or dissatisfaction (e.g., negative emotionality, perfectionism, depressive symptoms), which emerge from body image disturbances, seem to significantly predict the onset of EDs (Carlson et al., 2018; Keel & Forney, 2013; Stice, Marti, & Durant,

2011). The more strongly an individual internalises the idealisation of thinness, the more likely he or she is to exhibit bulimic and anorexic attitudes and behaviours (Grabe, Ward, & Hyde, 2008). Body shame occurs when a person fails to meet internalised or cultural ideals. For many women, consuming high-calorie foods means “being bad”, whereas dieting is a symbol of “being good” (Silberstein, Striegel-Moore, & Rodin, 1987). Body shame is a significant predictor of restrained eating, but it has also been found to binge-eating (Fredrickson, Roberts, Noll, Quinn, & Twenge, 1998). The self-perception of failure triggers negative emotions, which may lead to overeating or binge eating.

With regard to psychological characteristics, low self-esteem increases vulnerability to depression and anxiety (Sowislo & Orth, 2013) and predicts disturbances in eating and body image (Courtney et al., 2008). Women suffering from EDs, BN, and chronic dieting exhibited a lower than average level of self-esteem (Heatherton & Baumeister, 1991; Shea & Pritchard, 2007). Binge eating may stem from negative emotions related to low self-esteem or other stressors (Brechan & Kvalem, 2015). Additionally, narcissism has been found to be both a risk and a protective factor connected with healthy behaviour. It predicted high-risk behaviours and alcohol use but was positively linked to physical activity (Hill, 2016). This would seem to be due to two factors, grandiosity-exhibitionism and vulnerability-sensitivity (Cain, Pincus, & Ansell, 2008; Wink, 1991), both of which have been studied in relation to EDs (Gordon & Bombeck, 2010). Maladaptive vulnerable narcissism has also been found to be associated with greater weight preoccupation (Davis, Claridge, & Cerullo, 1997). This subtype of narcissism is usually characterised by vulnerability, exploitativeness, self-sacrificing self-enhancement, defensive self-sufficiency, grandiose fantasy, narcissistic social avoidance, shameful disavowal of needs and narcissistic entitlement rage. In terms of the connection with EDs, vulnerable narcissism seems to produce a tendency to base self-worth on an individual's appearance (Zeigler-Hill, Clark, & Picard, 2008), whereas grandiose narcissism (e.g., having an excessive sense of self, with unlimited power) has not been found to have the same degree of connection with a drive for thinness or bulimic symptoms.

Regardless of how previous researchers have conceptualised food addiction, the studies of the topic have been related to EDs (e.g., binge eating disorder, bulimia nervosa), eating consumption, and physical or psychological characteristics. The field of FA now has a set of a few clinical and psychometric instruments (e.g., YFAS) based on the framework set by the APA to assess the phenomenon of addictive eating behaviour. However, to the best of the authors' knowledge, no study has focused on all of these elements simultaneously, and more evidence is needed in the field related to addiction.

Thus, the aim of the current study was twofold. The first aim was to explore the prevalence of FA in the general population of adults to detect the differences

in terms of demographic characteristics, body mass index (BMI), and measures of predictors of to eating-related behaviours, body image, and personality between those potentially diagnosed as food addicts and those diagnosed as non-food addicts in a community sample. The secondary aim was to assess the participants' symptom severity and examine the association between these health variables and the YFAS symptom count. Consistent with previous research findings, it was hypothesised that individuals who are likely to meet the criteria for FA will also be likely to exhibit higher levels of food craving, higher frequencies of consuming palatable food, higher risk of EDs, and more negative thoughts concerning physical appearance than those who do not meet the criteria. We also expected that food-addicted individuals would display a lower level of self-esteem and an increased level of vulnerable narcissism.

## Methods

### Participants

A cross-sectional web-based survey was conducted in 2017 and hosted by Qualtrics at Nottingham Trent University. The 208 participants were recruited from multiple sources, including the psychology department's online participant pool, informal requests, and advertising on social media. The sample consisted of 167 females and 41 males, aged 18 to 57 years. The mean (*M*) age was 26.82 years (standard deviation [*SD*] = 7.89). The body mass index (BMI) was calculating from the participants' self-reported heights and weights. The average BMI was 27.53 (*SD* = 12.21). Of the participants, 79.3% self-identified as white, 40.9% were overweight or obese, 38% self-reported having mental and/or physical issues, and approximately half of the respondents stated that they had family members who had psychological or physical illnesses (see Table 1). The majority of participants were women under the age of 30 (77.2%).

### Measures

#### Food addiction

*Yale Food Addiction Scale* (YFAS, Gerhardt et al., 2009). The YFAS is a 25-item self-report instrument designed to identify individuals' addictive eating behaviours and to measure the presence of seven symptoms of FA. The YFAS combines two types of response categories presented in a dichotomous and Likert-type format and provides two scoring options, a symptom count indicating the number of FA symptoms and a clinical diagnosis. In order to meet the diagnostic threshold, respondents must have experienced three or more symptoms over the past 12 months and must have displayed clinically significant impairment or distress. The symptom count score ranges from zero to seven, which reflects the number of criteria met. The YFAS

**Table 1.** Participant Characteristics (N = 208)

|  | N   | %    | M     | SD    | Range        |
|--|-----|------|-------|-------|--------------|
| Gender   |     |      |       |       |              |
| Female   | 167 | 80.3 |       |       |              |
| Male   | 41  | 19.7 |       |       |              |
| Age (years)  |     |      | 26.82 | 7.89  | 18-57        |
| Race   |     |      |       |       |              |
| White  | 165 | 79.3 |       |       |              |
| Black  | 10  | 4.8  |       |       |              |
| Asian  | 18  | 8.7  |       |       |              |
| Mixed  | 10  | 4.8  |       |       |              |
| Other  | 5   | 2.4  |       |       |              |
| Body Mass Index (N = 203)<br>(BMI, kg/m <sup>2</sup> ) |     |      | 27.53 | 12.21 | 15.63-106.79 |
| Weight status  |     |      |       |       |              |
| Underweight<br>(BMI < 18.5)                            | 14  | 6.7  |       |       |              |
| Normal weight<br>(BMI 18.5 - 24.9)                     | 104 | 50   |       |       |              |
| Overweight<br>(BMI 25.0 - 29.9)                        | 39  | 18.8 |       |       |              |
| Obese<br>(BMI ≥ 30)                                    | 46  | 22.1 |       |       |              |
| Missing Data   | 5   | 2.4  |       |       |              |
| Regular Smoker   | 22  | 10.6 |       |       |              |
| Non-Smoker   | 186 | 89.4 |       |       |              |
| Personal physical<br>and mental issues                 |     |      |       |       |              |
| Yes <sup>1</sup>                                       | 79  | 38   |       |       |              |
| No   | 129 | 62   |       |       |              |
| Family members with<br>physical and mental issues      |     |      |       |       |              |
| Yes <sup>1</sup>                                       | 107 | 51.4 |       |       |              |
| No   | 101 | 48.6 |       |       |              |

Note. M = Mean; SD = Standard Deviations.

<sup>1</sup> Self-reported physical and mental health issues involve:

Eating disorders: anorexia nervosa (AN), bulimia nervosa (BN), binge eating (BED), and eating disorder not otherwise specified (EDNOS)

Mood disorders: anxiety, social anxiety, depression, and bipolar disorder

Obesity, and obesity-related disease (type II diabetes)

Attention deficit hyperactivity disorder (ADHD)

Personality disorder: Obsessive-compulsive disorder (OCD) and borderline personality disorder (BD)

Post-traumatic stress disorder (PTSD)

Substance dependence (e.g., alcohol, and drug)

showed adequate internal reliability ( $\alpha = .81-.86$ ) and good convergent and discriminant validity in the original study. The Cronbach's alpha for this scale in the current sample was .82.

#### Eating-related behaviours

*Eating Attitude Test* (EAT-26, Garner, Olmsted, Bohr, & Garfinkel, 1982). The EAT-26 is a shortened version of the 40-item EAT (Garner & Garfinkel, 1979). It was shown to have a high correlation with the EAT-40 ( $r = .98$ ). Items are rated on a six-point Likert scale ranging from zero (never) to three (always), with higher scores revealing greater eating pathology. A total score of over 20 functions as a cut-off indicating a high ED risk. The EAT-26 had good internal consistency reliability ( $\alpha = .91$ ), three-week test-retest reliability ( $r = .86$ ), and convergent validity ( $r = .66$ ) in the non-clinical sample (Augustus-Horvath & Tylka, 2009). The Cronbach's alpha coefficient for the EAT-26 in the current investigation was .85.

*Food Cravings Questionnaire-Trait-Revised* (FCQ-T-R; Meule, Hermann, & Kübler, 2014)). The FCQ-T-R is a reduced version of the Food Cravings Questionnaire-Trait (FCQ-T; 39 items). This 15-item measure is answered on a six-point Likert scale ranging from one (never) to six (always). The scores range from six to 90. Higher scores indicate a higher level of food cravings. The Cronbach's alpha in the present study was .96, which is consistent with the original study.

*Eating Behaviour Patterns Questionnaire: Snacking on Sweets Subscale* (EBPQ-SS, Schlundt, Hargreaves, & Buchowski, 2003). The snacking on sweets subscale is a six-item subscale of the EBPQ, which is used to measure the frequency and quantity of sugary food consumption between regular meals. The response choices range from one to five. The alpha coefficient ranged from .55 to .78 in the original study. Cronbach's  $\alpha$  for the present study was .76.

*Body Mass Index* (BMI). Participants were asked to provide their demographic information. Self-reported height and weight were used to compute participants' BMI (kg/m<sup>2</sup>).

#### Body weight and body shame

*Body Appreciation Scale* (BAS, Avalos, Tylka, & Wood-Barcalow, 2005). The BAS is a 13-item unidimensional instrument measuring multiple aspects of positive body image. Responses to each statement are given on a five-point Likert-type scale ranging from one (never) to five (always). Scores can range from 13 to 65, representing the lowest and highest level of body appreciation, respectively. The BAS had good discriminant and construct validity, in addition to internal reliability ( $\alpha = .94$ ) (Avalos et al., 2005). Cronbach's alpha for this scale in the present study was .95.

*Objectified Body Consciousness Scale: Body Shame Subscale* (OBC-BS, McKinley & Hyde, 1996). The eight-item self-report subscale of the OBC is applied to measure a negative body experience. The original study showed that the body shame subscale was significantly related to public body consciousness ( $r = .25, p < .05$ ), and it displayed good internal consistency ( $\alpha = .75$ ) and test-retest reliability ( $\alpha = .79$ ). Cronbach's alpha in the current study was .86.

#### Personality traits

*Narcissistic Personality Inventory-13* (NPI-13, Gentile et al., 2013). The NPI-13 is a brief multidimensional measure of grandiose narcissism with 13 dichotomous questions (Yes = 1; No = 0). The NPI-13 showed good reliability in the original study ( $\alpha = .75$ ). However, in the present study, the Kuder-Richardson Formula 20 for this scale was .63. However, the NPI-13 was included in the subsequent analysis. Although the short length of the instrument may reduce its reliability, this value could be considered sufficient. Moreover, for multidimensional measures, relatively low reliability (e.g.,  $\alpha = .50$ ) does not decrease validity coefficients (Schmitt, 1996).

*Hypersensitive Narcissism Scale* (HSNS, Hendin & Cheek, 1997). The HSNS contains ten statements measuring the characteristics of vulnerable narcissism. The response options range from one (strongly disagree) to five (strongly agree). A maximum score of 50 reflects the highest level of non-pathological vulnerable narcissism. The original study reported that the HSNS had adequate internal consistency ( $\alpha = .72$ ) and good convergent and discriminant validity. Cronbach's  $\alpha$  for this scale in the current study was .73.

*Rosenberg Self-Esteem Scale* (RSES, Rosenberg, 1965). The RSES is the most widely used self-report instrument for assessing global self-worth through ten items. The RSES has high reliability ( $\alpha = .72 - .88$ ) and internal consistency (Gray-Little, Williams, & Hancock, 1997). The response choices range from one (very inaccurate) to five (very accurate). The scores range from five to 50. Higher scores indicate a higher level of self-esteem. Cronbach's alpha for this scale in this study was .94.

### Procedure

After obtaining ethical approval, an online data collection method was carried out to survey individuals' addictive eating-related behaviours. The survey was pretested with a small group of volunteers and modified before its launch. The first part of the survey consisted of demographic questions including age, gender, ethnicity, height, weight, and the physical and mental status of the participants and their family members. Height and weight measurements were designed as forced responses. However, the participants were able to type a response, such as "I do not know". A few participants did so. The items on the health history of the participants and their family members also allowed respondents to answer with a text to specify their physical and mental state and indicate whether they or their family members had issues regarding substance dependence, EDs, obesity or obesity-related diseases, or mood disorders.

### Statistical analysis

The symptom count version of YFAS scoring was used to detect the endorsement of FA symptoms, and the dichotomous format determined the YFAS-diagnosed food addiction. To examine group differences between participants who met (or did not meet) the criteria for FA, *t*-tests were used to investigate age and BMI, and chi-squared tests were carried out to explore differences in terms of gender, ethnicity, weight status, EAT-26 cut-off, smoking status, and personal and family member physical status. Given that white was the majority race among participants in the study, ethnicity was dichotomised into white and other for the  $\chi^2$ -test analysis. Furthermore, more food addicts were observed in the obese population than the healthy weight group. Thus, to conduct the  $\chi^2$ -test on weight status, a BMI value of 25 acted as a cut-off to divide the sample into normal weight (BMI < 25) and overweight-obese (BMI  $\geq$  25) groups. Multivariate analysis of variance (MANOVA) was used to compare potential food addicts and non-food addicts for each of the predictors. To explore the association between the symptom scores, demographic characteristics, BMI, and the predictors, descriptive statistics for all scales were first calculated. The Pearson correlation coefficient was applied to evaluate the bivariate association between total scores. Stepwise regression analysis was used to determine the predictors that best explained the vari-

ance in the food addiction symptom score as an outcome. All data were analysed using IBM SPSS version 23 for Windows.

### Ethics

The study procedures were carried out following the principles of the Declaration of Helsinki. The Social Sciences Research Ethics Committee at Nottingham Trent University approved the study. All subjects were informed about the study, and all provided informed consent.

### Results

#### Prevalence of food addiction and group differences

Overall, 30 (14.4%) of the 208 participants met the YFAS criteria for FA. No significant differences in age, ethnicity, smoking status, or family members' health status emerged between food addicts and non-food addicts. Females dominated the proportion of the sample with FA. Only one male met the criteria for the YFAS diagnosis. The average BMI of participants meeting the YFAS criteria was 31.62, which fell within the obese range (BMI  $\geq$  30). More than half of food addicts (56.7%) were overweight and obese (BMI  $\geq$  25). Of 30 food addicts, 17 were more likely to develop EDs. Unlike the individuals who did not meet the criteria for FA, a relatively high percentage (63.3%) of food addicts self-reported suffering from mental issues including mood disorders, EDs, etc. Table 2 describes the characteristics of participants who met and those that did not meet the criteria for FA.

MANOVA was used to compare the two groups in terms of the predictors. The multivariate *F* ratio generated from Pillai's statistic was statistically significant ( $F_{8, 199} = 18.1, p < .001$ ), and all the univariate *F* values were statistically significant (see Table 3). Food addicts reported greater food craving and more frequent consumption of sugary foods. The higher EAT-26 scores presented among food addicts indicated a high level of concern about dieting, body weight or problematic eating behaviours. Food addicts exhibited a less positive body image and an increased degree of body shame. In addition, food addicts showed a lower level of self-esteem and grandiose narcissism but a greater level hypersensitive narcissism than non-food addicts.

#### Food addiction symptoms

The average number of FA symptoms was 2.17 (*SD* = 1.8). Of 208 participants, 58 (27.9%; 52 females and six males) endorsed at least three symptoms. 30 of them reported clinically significant impairment or distress, and 28 participants that displayed three or more symptoms did not receive the YFAS FA diagnosis. The three most commonly endorsed symptoms were persistent desire or reported unsuccessful attempts to quit (88.9%), use continues despite knowledge of adverse consequences (34.1%), and tolerance (25%). The symp-

**Table 2.** Participants characteristics listed separately for food addicts (*N* = 30) and non-food addicts (*N* = 178)

|  | Food addicts<br><i>N</i> = 30 (14.4%)<br><i>N</i> (%) / <i>M</i> ( <i>SD</i> ); Range | Non-food addicts<br><i>N</i> = 178 (85.6%)<br><i>N</i> (%) / <i>M</i> ( <i>SD</i> ); Range | <i>p</i>        |
|--|---|--|-----------------|
| Gender   |   |  |                 |
| Female   | 29 (96.7%)  | 138 (77.5%)  | <i>p</i> = .015 |
| Male   | 1 (3.3%)  | 40 (22.5%)   |                 |
| Age (years)                                    | 26.87 (± 8.62); 18-53   | 26.81 (± 7.78); 17-57  | <i>p</i> = .887 |
| Race   |   |  |                 |
| White  | 27 (90%)  | 138 (77.5%)  | <i>p</i> = .119 |
| Black  | 2 (6.7%)  | 8 (4.5%)   |                 |
| Asian  | 1 (3.3%)  | 17 (9.6%)  |                 |
| Mixed  | 0   | 10 (5.6%)  |                 |
| Other  | 0   | 5 (2.8%)   |                 |
| BMI (kg/m <sup>2</sup> )                       | <i>N</i> =29<br>31.62 (± 13.46);<br>16.65-79.04                                       | <i>N</i> = 174<br>26.85 (± 11.90);<br>15.63-106.79   | <i>p</i> = .051 |
| Weight status                                  |   |  |                 |
| Underweight (BMI < 18.5)                       | 2 (6.7%)  | 12 (6.7%)  | <i>p</i> = .048 |
| Normal weight (BMI 18.5 - 24.9)                | 10 (33.3%)  | 94 (52.8%)   |                 |
| Overweight (BMI 25.0 – 29.9)                   | 3 (10%)   | 36 (20.2%)   |                 |
| Obese (BMI ≥ 30)                               | 14 (46.7 %)   | 32 (18 %)  |                 |
| Missing data                                   | 1 (3.3%)  | 4 (2.3%)   |                 |
| Met EAT-26 cut-off<br>( <i>N</i> = 39)         | 17 (56.7%)  | 22 (12.36%)  | <i>p</i> < .001 |
| Regular Smoker                                 | 6 (20%)   | 16 (9%)  | <i>p</i> = .07  |
| Non-Smoker                                     | 24 (80%)  | 162 (91%)  |                 |
| Personal physical and mental issues            |   |  | <i>p</i> = .002 |
| YES <sup>1</sup>                               | 19 (63.3%)  | 60 (33.7%)   |                 |
| NO   | 11 (36.7%)  | 118 (66.3%)  |                 |
| Family members with physical and mental issues |   |  | <i>p</i> = .823 |
| YES <sup>1</sup>                               | 16 (53.3%)  | 91 (51.1%)   |                 |
| NO   | 14 (46.7%)  | 87 (48.9%)   |                 |

<sup>1</sup> Physical and mental health issues involve:  
 Eating disorders: anorexia nervosa (AN), bulimia nervosa (BN), binge eating (BED), and eating disorder not otherwise specified (EDNOS)  
 Mood disorders: anxiety, social anxiety, depression, and bipolar disorder  
 Obesity, and obesity-related disease (type II diabetes)  
 Attention deficit hyperactivity disorder (ADHD)  
 Personality disorder: obsessive-compulsive disorder (OCD), and borderline personality disorder (BD)  
 Post-traumatic stress disorder (PTSD)  
 Substance dependence (e.g., alcohol, and drug)  
<sup>2</sup> Please see Appendix A

**Table 3.** Means, standard deviations, *p*-values, and effect sizes for the differences between food addicts and non-food addicts on the variables (*N* = 208)

| Variables | Food addict<br>( <i>N</i> = 30)<br><i>M</i> ( <i>SD</i> ) | Non-food addict<br>( <i>N</i> = 178)<br><i>M</i> ( <i>SD</i> ) | <i>F</i> ( <i>p</i> -value) | Effect size <i>f</i> <sub><i>p</i></sub> <sup>2</sup> |
|-----------|---|--|-----------------------------|---|
| FCQ-T-R   | 65.17 (15.93)   | 37.30 (13.06)  | 109.45 ( <i>p</i> < .001)   | .347  |
| BAS       | 29.03 (7.50)  | 44.62 (11.08)  | 55.01 ( <i>p</i> < .001)    | .211  |
| EAT-26    | 21.2 (12.56)  | 9.89 (8.23)  | 40.86 ( <i>p</i> < .001)    | .166  |
| OBC-BS    | 39.80 (9.67)  | 28.49 (9.94)   | 33.45 ( <i>p</i> < .001)    | .140  |
| RSES      | 25.13 (8.94)  | 33.92 (9.32)   | 23.06 ( <i>p</i> < .001)    | .101  |
| EBPQ-SS   | 20 (6.231)  | 16.18 (5.109)  | 13.43 ( <i>p</i> < .001)    | .061  |
| HSNS      | 35 (5.80)   | 30.67 (6.32)   | 12.35 ( <i>p</i> = .001)    | .057  |
| NPI-13    | 1.97 (2.01)   | 3.01 (2.30)  | 5.49 ( <i>p</i> = .02)      | .026  |

Note. FCQ-T-R = Trait Food-Cravings Questionnaire-Revised; BAS = Body Appreciation Scale; EAT-26 = Eating Attitudes Test; OBC-BS = Body Shame Subscale; RSES = Rosenberg Self-Esteem Scale; EBPQ-SS = Snacking on Sweets Subscale; HSNS = Hypersensitive Narcissism Scale; NPI-13 = Narcissism Personality Inventory-13items.

tom count was significantly correlated with gender (*r* = .18, *p* = .01), smoking (*r* = -.16, *p* = .02), and BMI (*r* = .20, *p* = .004), suggesting that females, current smokers, and overweight and obese individuals were likely to endorse more symptoms. The symptom count between individuals endorsing three or more symptoms and less than three symptoms differed significantly by gender (*p* = .04) and BMI (*p* = .01). Table 4 presents the number and percentage of the sample meeting the criteria for the seven symptoms.

The inter-correlations between the YFAS symptoms and the independent variables are provided in Table 5. The result of stepwise regression analysis showed that food craving and body appreciation explained 57.1% of the variation in the YFAS symptom scores. Table 6 summarises the findings of this analysis. Tests to in-

**Table 4.** Percent of sample meeting criteria for each of the seven symptoms and the diagnosis criterion of food addiction (*N* = 208)

| Seven Symptoms  | Met Criteria<br><i>N</i> (%) | Did Not Meet<br>Criteria<br><i>N</i> (%) |
|---|------------------------------|--|
| Substances taken in large amount and for longer period than intended            | 29 (13.9%)                   | 179 (86.1%)                              |
| Persistent desire or repeated unsuccessful attempts to quit                     | 185 (88.9%)                  | 23 (11.1%)                               |
| Much time/activity to obtain, use, recover                                      | 44 (21.2%)                   | 164 (78.8%)                              |
| Important social, occupational, or recreational activities given up or reduced  | 31 (14.9%)                   | 177 (85.1%)                              |
| Use continues despite knowledge of adverse consequences                         | 71 (34.1%)                   | 137 (65.9%)                              |
| Tolerance (marked increase in amount; marked decrease in effect)                | 52 (25%)                     | 156 (75%)                                |
| Characteristic withdrawal symptoms; substance taken to relieve withdrawal       | 40 (19.2%)                   | 168 (80.8%)                              |
| Diagnosis Criterion<br>Use causes clinically significant impairment or distress | 44 (21.2%)                   | 164 (78.8%)                              |

**Table 5.** Means, Standard Deviations, Reliability Estimates, and Inter-correlations for Variables ( $N = 208$ )

| Variables               | <i>M</i> | <i>SD</i> | 2     | 3     | 4     | 5     | 6      | 7      | 8      | 9     | 10     |
|-------------------------|----------|-----------|-------|-------|-------|-------|--------|--------|--------|-------|--------|
| 1 YFAS sym              | 2.17     | 1.80      | .41** | .70** | .39** | .50** | -.60** | -.39** | .29**  | -.16* | .20**  |
| 2 EAT-26                | 11.52    | 9.79      |       | .37** | .12   | .63** | -.49** | -.29** | .22**  | .01   | -.004  |
| 3 FCQ-T-R               | 41.32    | 16.66     |       |       | .53** | .45** | -.50** | -.31** | .30**  | -.07  | .17*   |
| 4 EBQ-SS                | 16.73    | 5.44      |       |       |       | .20** | -.26** | -.25** | .20**  | -.04  | .14*   |
| 5 OBC-BS                | 30.13    | 10.65     |       |       |       |       | -.68** | -.43** | .39**  | -.13  | .15*   |
| 6 BAS                   | 42.37    | 11.96     |       |       |       |       |        | .63**  | -.38** | .33** | -.28** |
| 7 RSES                  | 32.65    | 9.75      |       |       |       |       |        |        | -.52** | .39** | .03    |
| 8 HSNS                  | 31.29    | 6.41      |       |       |       |       |        |        |        | -.02  | .003   |
| 9 NPI-13                | 2.86     | 2.28      |       |       |       |       |        |        |        |       | -.13   |
| 10 BMI<br>( $N = 203$ ) | 27.53    | 12.21     |       |       |       |       |        |        |        |       |        |

Note. YFAS = Yale Food Addiction Scale; EAT-26 = Eating Attitudes Test; FCQ-T-R = Trait Food-Cravings Questionnaire-Revised; EBQ-SS = Snacking on Sweets Subscale; OBC-BS = Body Shame Subscale; BAS = Body Appreciation Scale; RSES = Rosenberg Self-Esteem Scale; HSNS = Hypersensitive Narcissism Scale; NPI-13 = Narcissism Personality Inventory-13items; BMI = Body mass index.

\* $p < .05$ ; \*\* $p < .001$

**Table 6.** Summary of regression analysis for the variables predicting symptoms of food addiction ( $N = 208$ )

|         | <i>B</i> | <i>SE B</i> | $\beta$ | <i>t</i> | <i>p</i> | <i>R</i> <sup>2</sup> |
|---------|----------|-------------|---------|----------|----------|-----------------------|
| Stage 1 |          |             |         |          |          |                       |
| FCQ-T-R | .076     | .005        | .701    | 14.102   | < .001   | .491                  |
| Stage 2 |          |             |         |          |          |                       |
| FCQ-T-R | .058     | .006        | .535    | 10.211   | < .001   | .571                  |
| BAS     | -.050    | .008        | -.334   | -6.381   | < .001   |                       |

Note. FCQ-T-R = Trait Food-Cravings Questionnaire-Revised; BAS = Body Appreciation Scale.

investigate whether the data met the assumption of collinearity indicated that multicollinearity was not a concern (FCQ-T-R: *Tolerance* = .754, *VIF* = 1.326; BAS: *Tolerance* = .754, *VIF* = 1.326). The data met the assumption of independent errors (Durbin-Watson value = 1.848). Low body appreciation and high food craving were associated with greater symptom severity.

## Discussion and Conclusions

The aim of the study was twofold: first, to explore the prevalence of FA in a community sample of adults to detect the differences in demographics, BMI, and predictors relating to eating-related behaviours, body perception, and personality traits; second, to assess the participants' symptom severity and examine the association between these psychical and psychological variables and the YFAS symptoms.

Concerning the first aim of the current study, which was to explore the prevalence of FA, 14.4% of participants were identified as food addicts in this sample. This estimated prevalence is consistent with previous studies using samples of women (Carlson et al., 2018; Steward et al., 2018). Thus, our findings are in line with the recent literature on the topic, showing that females and individuals with an elevated BMI are primarily susceptible to FA. The proposed prevalence rates range from 5% to 10% in student and community samples (Meule & Gearhardt, 2014b). However, the prevalence is significantly greater in populations that are obese or have EDs. In such cases, the prevalence rate seems to be approximately 76% (Carlson et al. 2018; Meule, 2011). Compared to the rates in healthy students (i.e., 11.4%; Gearhardt et al., 2009; 8.5%; Meadows, Nolan,

& Higgs, 2017), the prevalence rate for the current study was slightly higher than that the level suggested by prior data because it included participants from both the student pool and social media. Indeed, a recent similar study using the same mixed sample recruitment strategy and the same instrument (YFAS) found exactly the same prevalence of FA (14%, according to Bonder, Davis, Kuk, & Loxton, 2018). Thus, this increment may be explained by the fact that the sample included 40.9% overweight and obese participants and 38% reporting other EDs. However, the prevalence rates found among obese adults in prior studies have varied greatly (6.7%, Chao et al., 2017; 15.2%, Eichen, Lent, Goldbacher, & Foster, 2013; 25%, Davis et al., 2011; 24.2% Steward et al., 2018). Due to low prevalence rates in obese individuals, FA was thought not to have a causal role in obesity (Chao et al., 2017). Some studies found no connection between BMI and YFAS diagnoses or symptoms (Gearhardt et al., 2011; Eichen, Lent, Goldbacher & Foster, 2013; Meule & Kübler, 2012). Based on a non-linear relationship between FA symptoms and BMI (Meule, 2012), individuals in non-obese weight ranges diagnosed with FA may present compensatory behaviours with BN or anorexia nervosa (AN). A positive association between BMI and FA diagnoses and symptoms was found in the present study.

Overall, our findings confirm the conclusions of previous research as to the validity of the FA construct (Gearhardt et al., 2011; Bonder et al., 2018). Food cravings, snacking on sweets, and the severity of EDs were positively related to FA diagnoses and symptoms, which is consistent with previous findings (Gearhardt et al., 2009; Davis et al., 2011). That food craving was a significant predictor of FA symptoms is in accordance with Meule and Kübler's (2012) research. Food craving is associated with binge eating and eating disorder psychopathology (Chao, Grilo & Sinha, 2016). The effects of withdrawal or abstinence provide an acceptable explanation for craving (Massey & Hill, 2012), but emotions may play a crucial role between craving and bingeing. Both hunger and food craving associated with negative emotions lead to bingeing (Waters, Hill, & Waller, 2001). Boredom, anger, and depression are associated with craving for foods (Rog-



ers & Smit, 2000). In this sample, 16 of 30 food addicts self-reported having depression, anxiety, or both. Excessive food intake may be prompted by either the absence of certain foods or by an effort to escape from negative emotions (Heatherton & Baumeister, 1991).

In line with expectations, food addicts scored lower for positive body image and higher for body shame. A lower level of positive body image predicted FA symptom severity (i.e., body uneasiness may be an essential symptom in the development and maintenance of FA; Imperatori et al., 2018). Positive body image is defined as “an overarching love and respect for the body” (Tylka & Wood-Barcalow, 2015, p. 121), which is associated with self-care behaviours and adaptive coping strategies. Individuals with positive body image have reduced EDs and psychopathology, and they are less likely to use food to cope with stress or conflicting emotions (Carlson et al., 2018; Wood-Barcalow, Tylka, & Augustus-Horvath, 2010). Positive body image protects individuals from the negative effects of exposure to the thin-idealised media images (Andrew, Tiggemann, & Clark, 2015). Promoting positive body image was recognised as an effective intervention to reduce body dissatisfaction and disordered eating (Halliwell, 2013), which may relieve FA symptoms. Body shame consists of a negative evaluation of one’s body coupled with powerful emotion. It highlights one’s failure to achieve the ideal body. Individuals suffering from severe bulimic symptoms have been found to display a higher level of body shame (Doran & Lewis, 2012). Greater body shame among food addicts indicates reflections of their self-worth – a bad self. Food addicts may perceive “bad me” as intensely consuming high-calorie foods. As Burmeister et al.’s (2013) findings suggested, FA symptoms might affect body shame.

Lower self-esteem was correlated with the FA diagnoses and symptoms in this study, which was consistent with Gearhardt et al.’s (2012; 2013) research. Low self-esteem may be a trigger or an outcome of addiction. According to Courtney, Gamboz and Johnson (2008), low self-esteem increased the likelihood of developing an ED and depression, and depressive symptoms mediated the relationship between low self-esteem and disordered eating. Little is known about the association between FA and narcissism. Food addicts displayed higher degrees of vulnerable narcissism and lower levels of grandiose narcissism in this sample. Narcissism was positively associated with life satisfaction and well-being (Hill & Roberts, 2012; Zuckerman & O’Loughlin, 2009), but an inflated self-view, defensive self-enhancement, and sensitivity to others’ evaluation of narcissism negatively affected one’s physical and mental health (Cascio, Konrath, & Falk, 2015). There was a rise in narcissism over a period of 25 years (1979-2006) (Twenge, Konrath, Foster, Campbell, & Bushman, 2008). Nowadays, young people may be more narcissistic than previous generations. The stress-response systems among individuals with greater narcissism were found to be sensitive to daily negative affects (Cheng, Tracy, & Miller, 2013). Lemaitre (2016) hypothesised

that the narcissism epidemic might be related to the prevalence of obesity due to an increase in social stress. A maladaptive coping strategy, overeating, may be applied to tackle this stress. An understanding of the relationship between addictive eating behaviours, narcissism and stress would benefit from more research on addressing disordered eating among the younger generation.

For the second aim, compared to individuals that endorsed less than three FA symptoms, those displaying three or more symptoms tended to be females and to have higher BMI. According to reviews by Meule (2011) and Meule and Gearhardt (2014b), “persistent desire or repeated unsuccessful attempts to quit” was the most common symptom, while “use continues despite knowledge of adverse consequences” and “tolerance” were commonly endorsed symptoms in obese samples. The three most common symptoms in this study also appeared in earlier studies of obese samples. Food craving and decreased positive body image were associated with FA symptom severity.

#### **Culture bounds, food preference, and body image**

Cultural variables may influence the YFAS’s sensitivity. Torres and colleagues (2017) suggested that the gastronomic tradition may explain a low prevalence of FA (2.5%) in a Portuguese non-clinical sample. FA may reflect one’s adoption of Western culture, mainly North American culture.

The extent to which FA may be associated with age and ethnicity is unclear. Similar to the majority of studies examining addictive eating behaviours based on white females, the majority of this sample was made up of Caucasian women under the age of 30, defined as young adults (Hamilton, Williams, Bowers, & Calzone, 2009). This developmental stage in the lifespan involves years of increased energy and productivity, which tends to peak during the late 20s and early 30s (after which time metabolism starts to decline). Thus, although it is a period of genuine individual choice when individuals begin to organise their eating habits and exercise regimes The choices and decisions made in this period often form the basis of healthy options for an individual’s life (Lopez-Fernandez, Stack, & Mitra, 2019). One previous investigation indicated that black women of low socioeconomic status had higher FA symptom scores than Hispanic women (Berenson, Laz, Pohlmeier, Rahman, & Cunningham, 2015). A negative correlation between age and FA symptoms was observed in Eichen, Lent, Goldbacher and Foster’s (2013) study. Larger and more diverse samples with a broader spectrum of ages are warranted for future cross-cultural studies (such as the report on prevalence and correlation with BED by the World Health Organization [WHO] undertaken by Kessler et al., 2013) to understand the relationship between FA, age, culture and ethnicity.

Meanwhile, the debate on how to recognise FA continues (Meule, & Gearhardt, 2014b; Pai, Vella, & Richardson, 2014). This study lends support to the

belief that what has been measured as FA seems to be valid for both addictive behaviour and behavioural addiction. In the context of this research, it is worth noting the inclusion of Gambling and Gaming Disorders (the latter only as a condition warranting further study) in the fifth DSM (DSM-5; APA, 2013) and in the International Classification of Diseases eleventh revision (ICD-11; WHO, 2018), highlighting the future potential of this not yet officially recognised addiction problem. Both of these disorders have been included as non-substance related, behavioural or process addictions after a period of debate, which continues (e.g., disordered gaming; Griffiths, Kuss, Lopez-Fernandez, & Pontes, 2017). Because FA is considered by some researchers (e.g., Zhang et al., 2012) to be a behavioural addiction and because it fits with the component model of addiction (Griffiths, 2005), its validity supports this construct, which has started to become a research priority because of the need for scientific evidence. Meanwhile, other researchers (e.g., Zaiuddeen & Fletcher, 2013) question the validity of the FA concept due to the inconsistencies of human studies on this phenomenon. Crucial elements have recently been considered. According to Pai and colleagues (2014), FA is addiction to the substance of food when it is consumed without much control (i.e., with impaired control), which happens with hyperpalatable refined foods usually associated with obesity (a consequence of FA, which may lead to social withdrawal and isolation), and this is converse to an evolutionary perspective. Moreover, Meule and Gearhardt (2014b) reviewed the transferability of the new DSM-5 SUDs and gambling disorder criteria to FA, finding plausible or empirical evidence in almost all of them. Thus, the research domain criteria approach works for FA in both cases and highlights the relevance of identifying mechanisms; indeed, it is necessary to examine whether specific foods (or ingredients) are capable of altering the system in a manner that is akin to addictive substances/behaviours. This study has modestly provided evidence that the consumption of these types of foods (i.e., snacking on sweets) is risky regardless of body (e.g., body appreciation) or psychological (e.g., self-esteem) perceptions.

Nevertheless, this study has some limitations. First, the sample size is small, with predominately female and white individuals, which precludes generalising the findings to a broad population, although recent and similar research papers (Bonder et al., 2018) have had even smaller sample sizes, and female participants were also the dominant gender in these studies (Carlson et al., 2018). Second, the subjects may be homogeneous and biased due to convenience sampling, although this is the usual sampling method in this emerging field (Steward et al., 2018). Third, the validity of self-reporting mechanisms needs to be considered, as according to Gorber, Tremblay, Moher, and Gorber (2007), social desirability has an impact on self-reports; however, this has been the general procedure in similar samples (Bonder et al., 2018). Participants may provide under-

estimated body weight and overestimated height data, which affects the assessment of BMI. To avoid self-report bias, as Meule, Müller, Gearhardt and Blechert (2017) suggested, an interview version of YFAS is needed.

To sum up, this study replicated many of the findings from prior studies on FA, adding simultaneously all health variables related to this potential addiction (i.e., eating-related behaviours, physical and psychological constructs associated with the phenomenon). The YFAS is a valid instrument applied in many investigations to assess individuals' addictive-like eating behaviours, which have been the main psychometric tool to estimate prevalence (14.4%) and potentially diagnose groups of problematic eaters. Recently, the new version of the YFAS was released based on the DSM-5 criteria for substance-related and addictive disorders (Gearhardt, Corbin, & Brownell, 2016). However, this YFAS 2.0 was not available when this study began in 2016. FA has been shown to be associated with higher eating-related behaviours (e.g., food craving, eating attitudes, higher snacking); negative perceptions (e.g., lower body appreciation, higher body shame), and characteristic personality traits (e.g., lower self-esteem, higher vulnerable narcissism, and lower grandiose narcissism). Notably, this latter personality trait is unique in the research on FA. Moreover, it seems a relatively common condition in young adult females, similar to BED (Schreiber et al., 2013), which is characterised by chronic over-consumption of food resulting in embarrassment, distress, and potential health problems, and it has been included as a disorder in DSM-5 as a 'Feeding and eating disorder'. This evidence may support the existence of a potential disorder on the addictive spectrum (e.g., 'Addiction and substance use disorders' DSM-5). This study has described a subgroup of individuals with disordered eating who suffer from more severe overeating predicted by food craving and body appreciation. The findings could also be useful to support the future diagnosis of FA and clinical agreement on the meaning of FA, as well as for the development of personalised treatments.

## References

- American Psychiatric Society (2013). *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*. Arlington, VA: American Psychiatric Association.
- Andrew, R., Tiggemann, M., & Clark, L. (2015). The protective role of body appreciation against media-induced body dissatisfaction. *Body image* 15, 98-104. doi:10.1016/j.bodyim.2015.07.005
- Augustus-Horvath, C. L., & Tylka, T. L. (2009). A Test and Extension of Objectification Theory as It Predicts Disordered Eating: Does women's age matter? *Journal of Counseling Psychology*, 56(2), 253-265. <https://doi.org/10.1037/a0014637>
- Avalos, L., Tylka, T. L., & Wood-Barcalow, N. (2005). The Body Appreciation Scale: Development and

- psychometric evaluation. *Body Image*, 2(3), 285-297. <https://doi.org/10.1016/j.bodyim.2005.06.002>
- Avena, N. M., Rada, P., & Hoebel, B. G. (2008). Evidence for sugar addiction: Behavioral and neurochemical effects of intermittent, excessive sugar intake. *Neuroscience and Biobehavioral Reviews*, 32, 20-39. <https://doi.org/10.1016/j.neubiorev.2007.04.019>
- Avena, N. M. (2010). The study of food addiction using animal models of binge eating. *Appetite*, 55, 734-737. <https://doi.org/10.1016/j.appet.2010.09.010>
- Avena, N. M., Wang, M., & Gold, M. S. (2011). Implications of Food Addiction and Drug Use in Obesity. *Psychiatric Annals*, 41, 478-482. doi:10.3928/00485713-20110921-06
- Bégin, C., St-Louis, M. É., Turmel, S., Tousignant, B., Marion, L. P., Ferland, F., Blanchette-Martin, N., & Gagnon-Girouard, M. P. (2012). Does food addiction distinguish a specific subgroup of overweight/obese overeating women? *Health*, 4(12A), 1492-1499. doi:10.4236/health.2012.412A214
- Berenson, A. B., Laz, T. H., Pohlmeier, A. M., Rahman, M., & Cunningham, K. A. (2015). Prevalence of food addiction among low-income reproductive-aged women. *Journal of Women's Health*, 24(9), 740-744. <https://doi.org/10.1089/jwh.2014.5182>
- Bonder, R., Davis, C., Kuk, J. L., & Loxton, N. J. (2018). Compulsive "grazing" and addictive tendencies towards food. *European Eating Disorders Review*, <http://dx.doi.org/10.1002/erv.2642>
- Brechan, I., & Kvaalem, I. L. (2015). Relationship between body dissatisfaction and disordered eating: Mediating role of self-esteem and depression. *Eating Behaviour*, 17, 49-58. <https://doi.org/10.1016/j.eatbeh.2014.12.008>
- Burmeister, J. M., Hinman, N., Koball, A., Hoffmann, D. A., & Carels, R. A. (2013). Food addiction in adults seeking weight loss treatment. Implications for psychosocial health and weight loss. *Appetite*, 60, 103-110. <https://dx.doi.org/10.1016/j.appet.2012.09.013>
- Chao, A. M., Grilo, C. M., & Sinha, R. (2016). Food cravings, binge eating, and eating disorder psychopathology: Exploring the moderating roles of gender and race. *Eating Behaviors*, 21, 41-47. <http://doi.org/10.1016/j.eatbeh.2015.12.007>
- Chao, A. M., Shaw, J. A., Pearl, R. L., Alamuddin, N., Hopkin, C. M., Bakizada, Z. M., Berkowitz, R. I., & Wadden, T. A. (2017). Prevalence and psychosocial correlates of food addiction in persons with obesity seeking weight reduction. *Comprehensive Psychiatry*, 73, 97-104. <https://doi.org/10.1016/j.comppsy.2016.11.009>
- Cain, N.M., Pincus, A.L., & Ansell, E.B. (2008). Narcissism at the crossroads: Phenotypic description of pathological narcissism across clinical theory, social/personality psychology, and psychiatric diagnosis. *Clinical Psychology Review*, 28(4), 638-656. <http://dx.doi.org/10.1016/j.cpr.2007.09.006>
- Carlson, L., Steward, T., Agüera, Z., Mestre-Bach, G., Magaña, P., Granero, R., . . . Fernández-Aranda, F. (2018). Associations of food addiction and nonsuicidal self-injury among women with an eating disorder: A common strategy for regulating emotions? *European Eating Disorders Review*, <http://dx.doi.org/10.1002/erv.2646>
- Cascio, C. N., Konrath, S. H., & Falk, E. B. (2015). Narcissists' social pain seen only in the brain. *SCAN*, 10, 335-341. <https://doi.org/10.1093/scan/nsu072>
- Cheng, J. T., Tracy, J. L., & Miller, G. E. (2013). Are Narcissists Hardy or Vulnerable? The Role of Narcissism in the Production of Stress-Related Biomarkers in Response to Emotional Distress. *Emotion*, 13(6), 1004-1011. <http://dx.doi.org/10.1037/a0034410>
- Cocores, J. A., & Gold, M. S. (2009). The salted food addiction hypothesis may explain overeating and the obesity epidemic. *Medical Hypotheses*, 73(6), 892-899. <http://doi.org/10.1016/j.mehy.2009.06.049>
- Corsica, J. A., & Pelchat, M. L. (2010). Food addiction: true or false? *Current Opinion in Gastroenterology*, 26(2), 165-169. doi:10.1097/MOG.0b013e328336528d
- Courtney, E. A., Gamboz, J., & Johnson, J. G. (2008). Problematic eating behaviors in adolescents with low self-esteem and elevated depressive symptoms. *Eating Behaviors*, 9(4), 408-414. <https://doi.org/10.1016/j.eatbeh.2008.06.001>
- Davis, C., Claridge, G., & Cerullo, D. (1997). Personality factors and weight preoccupation: A continuum approach to the association between eating disorders and personality disorders. *Journal of Psychiatric Research*, 31(4), 467-480. [https://doi.org/10.1016/S0022-3956\(97\)00006-X](https://doi.org/10.1016/S0022-3956(97)00006-X)
- Davis, C., Curtis, C., Levitan, R. D., Carter, J. C., Kaplan, A. S., & Kennedy, J. L. (2011). Evidence that 'food addiction' is a valid phenotype of obesity. *Appetite*, 57, 711-717. <https://doi.org/10.1016/j.appet.2011.08.017>
- Davis, C. (2013). Compulsive overeating as an addictive behaviour: Overlap between food addiction and binge eating disorder. *Current Obesity Reports*, 2(2), 171-178. <https://doi.org/10.1007/s13679-013-0049-8>
- Derenne, J. L., & Beresin, E. V. (2006). Body image, media, and eating disorders. *Academic Psychiatry*, 30(3), 257-261. <https://doi.org/10.1176/appi.ap.30.3.257>
- Doran, J., & Lewis, C. A. (2012). Components of shame and eating disturbance among clinical and non-clinical populations. *Eur. Eat. Disorders Rev.*, 20, 265-270. doi:10.1002/erv.1142
- Drummond, D. C., Tiffany, S. T., Glautier, S., & Remington, B. (Eds.). (1995). *The Wiley series in clinical psychology. Addictive behaviour: Cue exposure theory and practice*. Oxford, England: John Wiley & Sons.
- Eichen, D. M., Lent, M. R., Goldbacher, E., & Foster, G. D. (2013). Exploration of "food addiction" in overweight and obese treatment-seeking adults. *Appetite*, 67, 22-24. <https://doi.org/10.1016/j.appet.2013.03.008>
- Fredrickson, B. L., Roberts, T., Noll, S. M., Quinn, D. M., & Twenge, J. M. (1998). That swimsuit becomes

- you: Sex differences in self-objectification, restrained eating, and math performance. *Journal of Personality and Social Psychology: Personality Processes and Individual Differences*, 75(1), 269-284. <http://dx.doi.org/10.1037/0022-3514.75.1.269>
- Garner, D. M., & Garfinkel, P. E. (1979). The eating attitudes test: An index of the symptoms of anorexia nervosa. *Psychological Medicine*, 9(2), 273-279. <https://doi.org/10.1017/S0033291700030762>
- Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The Eating Attitudes Test: psychometric features and clinical correlates. *Psychological Medicine*, 12, 871-878. Retrieved from <http://www.drshopp.com/wp-content/uploads/2015/06/eatingattitudes-test.pdf>
- Gearhardt, A. N., Boswell, R. G., & White, M. A. (2014). The Association of "food addiction" with disordered eating and body mass index. *Eating Behaviors*, 15(3), 427-433. <https://doi.org/10.1016/j.eatbeh.2014.05.001>
- Gearhardt, A. N., Corbin, W. R., & Brownell, K. D. (2009). Preliminary validation of the Yale Food Addiction Scale. *Appetite*, 52(2), 430-436. Retrieved from <http://www.midss.org/content/yale-food-addiction-scale-yfas>
- Gearhardt, A. N., Corbin, W. R., & Brownell, K. D. (2016). Development of the Yale Food Addiction Scale version 2.0. *Psychology of Addictive Behaviour*, 30(1), 113-121. <http://dx.doi.org/10.1037/adb0000136>
- Gearhardt, A. N., White, M. A., Masheb, R. M., & Grilo, C. M. (2013). An examination of food addiction in a racially diverse sample of obese patients with binge eating disorder in primary care setting. *Comprehensive Psychiatry*, 54(5), 500-505. <https://doi.org/10.1016/j.compsych.2012.12.009>
- Gearhardt, A. N., White, M. A., Masheb, R. M., Morgan, P. T., Crosby, R. D., & Grilo, C. M. (2012). An examination of the food addiction construct in obese patients with binge eating disorder. *Int. J. Eat. Disord.*, 45, 657-663. doi:10.1002/eat.20957
- Gentile, B., Miller, J. D., Hoffman, B. J., Reidy, D. E., Zeichner, A., & Campbell, W. K. (2013). A Test of Two Brief Measures of Grandiose Narcissism: The Narcissistic Personality Inventory-13 and the Narcissistic Personality Inventory-16. *Psychological Assessment*, 25(4), 1120-1136. <http://dx.doi.org/10.1037/a0033192>
- Gold, M. S., Frost-Pineda, K., & Jacobs, W. S. (2003). Overeating, binge eating, and eating disorders as addictions. *Psychiatric Annals*, 33(2), 117-122. doi:10.3928/0048-5713-20030201-08
- Gorber, S. C., Tremblay, M., Moher, D., & Gorber, B. (2007). A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. *Obesity Reviews*, 8, 307-326. doi:10.1111/j.1467-789X.2007.00347.x
- Gordon, K. H., & Dombek, J. J. (2010). The associations between two faces of narcissism and eating disorder symptoms. *Eating Behaviors*, 11(4), 288-292. <https://doi.org/10.1016/j.eatbeh.2010.08.004>
- Grabe, S., Ward, L. M., & Hyde, J. S. (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychological Bulletin*, 134(3), 460-476. <http://dx.doi.org/10.1037/0033-2909.134.3.460>
- Gray-Little, B., Williams, V. S. L., & Hancock, T. D. (1997). An Item Response Theory Analysis of the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin*, 23(5), 443-451. <https://doi.org/10.1177/0146167297235001>
- Griffiths, M. (2005). A 'components' model of addiction within a biopsychosocial framework. *Journal of Substance Use*, 10(4), 191-197. <http://dx.doi.org/10.1080/14659890500114359>
- Griffiths, M. D., Kuss, D. J., Lopez-Fernandez, O., & Pontes, H. M. (2017). Problematic gaming exists and is an example of disordered gaming: Commentary on: Scholars' open debate paper on the world health organization ICD-11 gaming disorder proposal (Aarseth et al.). *Journal of Behavioral Addictions*, 6(3), 296-301. <http://dx.doi.org/10.1556/2006.6.2017.037>
- Halliwel, E. (2013). The impact of thin idealized media images on body satisfaction: Does body appreciation protect women from negative effects? *Body Image*, 10(4), 509-514. <https://doi.org/10.1016/j.bodyim.2013.07.004>
- Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin*, 110(1), 86-108. <http://dx.doi.org/10.1037/0033-2909.110.1.86>
- Hendin, H., & Cheek, J. (1997). Assessing hypersensitive narcissism: A re-examination of Murray's Narcissism Scale. *Journal of Research in Personality*, 31(4), 588-599. <https://doi.org/10.1006/jrpe.1997.2204>
- Hill, A. J. (2007). The psychology of food craving. *Proceedings of the Nutrition Society*, 66(2), 277-285. <https://doi.org/10.1017/S0029665107005502>
- Hill, M. E. (2016). The role of narcissism in health-risk and health-protective behaviors. *Journal of Health Psychology*, 21(9), 2021-2032. <https://doi.org/10.1177/1359105315569858>
- Hill, P. L., & Roberts, B. W. (2012). Narcissism, Well-being, and Observer-Rated Personality Across the Lifespan. *Social Psychological and Personality Science*, 3(2), 216-223. <https://doi.org/10.1177/1948550611415867>
- Ifland, J. R., Preuss, H. G., Marcus, M. T., Rourke, K. M., Taylor, W.C., Burau, K., Jacobs, W. S., Kadish, W., & Manso, G. (2009). Refined food addiction: A classic substance use disorder. *Medical Hypotheses*, 72(5), 518-526. <https://doi.org/10.1016/j.mehy.2008.11.035>
- Imperatori, C., Innamorati, M., Lamis, D. A., Farina, B., Fabbriatore, M., & Contardi, A. (2018). Body uneasiness is associated with food addiction symptoms: A cross-sectional study. *European Eating Disorders Review*, <http://dx.doi.org/10.1002/erv.2640>
- Keel, P. K., & Forney, K. J. (2013). Psychological Risk Factors for Eating Disorders. *International Journal of Eating Disorders*, 46(5), 433-439. doi:10.1002/eat.22094
- Kenny, P. J. (2011). Reward Mechanism in Obesity: New

- insights and future directions. *Neuron*, 69(4), 664-679. <https://doi.org/10.1016/j.neuron.2011.02.016>
- Kessler, R. C., Berglund, P. A., Chiu, W. T., Deitz, A. C., Hudson, J. I., Shahly, V., . . . Xavier, M. (2013). The prevalence and correlates of binge eating disorder in the world health organization world mental health surveys. *Biological Psychiatry*, 73(9), 904-914. <http://dx.doi.org/10.1016/j.biopsych.2012.11.020>
- Lemaitre, B. (2016). Connecting the obesity and the narcissism epidemics. *Medical Hypotheses*, 95, 10-19. <https://doi.org/10.1016/j.mehy.2016.08.001>
- Lemeshow, A. R., Gearhardt, A. N., Genkinger, J. M., & Corbin, W. R. (2016). Assessing the psychometric properties of two food addiction scales. *Eating Behaviors*, 23, 110-114. doi:<http://dx.doi.org/10.1016/j.eatbeh.2016.08.005>
- Long, C. G., Blundell, J. E., & Finlayson, G. (2015). A systematic review of the application and correlates of YFAS-diagnosed 'food addiction' in humans: Are eating-related 'addictions' a cause for concern or empty concepts? *Obesity Facts*, 8, 386-401. <https://doi.org/10.1159/000442403>
- Lopez-Fernandez, O., Stack, R. & Mitra, S. (2019). Adulthood to ageing. In P. Banyard, G. Dillon, C. Norman, & B. Winder (Eds.). *Essential Psychology* [In Press] (3rd edition). London: Sage Publications Ltd.
- Macdiarmid, J. I., & Hetherington, M. M. (1995). Mood modulation by food: An exploration of affect and cravings in 'chocolate addicts'. *British Journal of Clinical Psychology*, 34(1), 129-138. doi:10.1111/j.2044-8260.1995.tb01445.x
- Marks, I. (1990). Behavioural (non-chemical) addictions. *Addiction*, 85(11), 1389-1394.
- Massey, A., & Hill, A. J. (2012). Dieting and food craving. A descriptive, quasi-prospective study. *Appetite*, 58(3), 781-785. <https://doi.org/10.1016/j.appet.2012.01.020>
- McKinley, N. M., & Hyde, J. S. (1996). The Objectified Body Consciousness Scale: Development and Validation. *Psychology of Women Quarterly*, 20(2), 181-215. doi:10.1111/j.1471-6402.1996.tb00467.x
- Meadows, A., Nolan, L. J., & Higgs, S. (2017). Self-perceived food addiction: Prevalence, predictors, and prognosis. *Appetite*, 114, 282-298. <https://doi.org/10.1016/j.appet.2017.03.051>
- Meule, A. (2011). How prevalent is "food addiction"? *Frontiers in Psychiatry*, 2, 61, 1-4. <http://doi.org/10.3389/fpsy.2011.00061>
- Meule, A. (2012). Food addiction and body-mass-index: A non-linear relationship. *Medical Hypotheses*, 79(4), 508-511. <https://doi.org/10.1016/j.mehy.2012.07.005>
- Meule, A., & Gearhardt, A. N. (2014a). Five years of the Yale Food Addiction Scale: Taking stock and moving forward. *Current Addiction Reports*, 1(3), 193-205. <https://doi.org/10.1007/s40429-014-0021-z>
- Meule, A., & Gearhardt, A. N. (2014b). Food addiction in the light of DSM-5. *Nutrients*, 6(9), 3653-3671. doi:10.3390/nu6093653
- Meule, A., & Kübler, A. (2012). Food cravings in food addiction: The distinct role of positive reinforcement. *Eating Behaviours*, 13(3), 252-255. <https://doi.org/10.1016/j.eatbeh.2012.02.001>
- Meule, A., Hermann, T., & Kuebler, A. (2014). A short version of the Food Cravings Questionnaire-Trait: The FCQ-T-reduced. *Frontiers in Psychology*, 5, 190. <http://doi.org/10.3389/fpsyg.2014.00190>
- Meule, A., Müller, A., Gearhardt, A. N., & Blechert, J. (2017). German version of the Yale Food Addiction Scale 2.0: Prevalence and correlates of 'food addiction' in students and obese individuals. *Appetite*, 115, 54-61. <https://doi.org/10.1016/j.appet.2016.10.003>
- Pai, N., Vella, S., & Richardson, K. (2014). Is food addiction a valid phenomenon through the lens of the DSM-5? *Australian and New Zealand Journal of Psychiatry*, 48(3), 216-218. <http://dx.doi.org/10.1177/0004867413512384>
- Pelchat, M. L. (2009). Food addiction in humans. *The Journal of Nutrition*, 139(3), 620-622. doi:10.3945/jn.108.097816
- Rogers, P. J., & Smit, H. (2000). Food craving and food "addiction": A critical review of the evidence from a biopsychosocial perspective. *Pharmacology Biochemistry and Behavior*, 66(1), 3-14. [https://doi.org/10.1016/S0091-3057\(00\)00197-0](https://doi.org/10.1016/S0091-3057(00)00197-0)
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Ruddock, H. K., Christiansen, P., Jones, A., Robinson, E., Field, M., & Hardman, C. A. (2016). Believing in food addiction: Helpful or counterproductive for eating behaviour? *Obesity*, 24(6), 1238-1243. doi:10.1002/oby.21499
- Schlundt, D. G., Hargreaves, M. K., & Buchowski, M. S. (2003). The Eating Behavior Patterns Questionnaire predicts dietary fat intake in African American women. *Journal of The American Dietetic Association*, 103(3), 338-345. doi:10.1053/jada.2003.50049
- Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment*, 8(4), 350-353. <http://dx.doi.org/10.1037/1040-3590.8.4.350>
- Schulte, E. M., Grilo, C. M., & Gearhardt, A. N. (2016). Shared and unique mechanisms underlying binge eating disorder and addictive disorders. *Clinical Psychology Review*, 44, 125-139. <https://doi.org/10.1016/j.cpr.2016.02.001>
- Shea, M. E., & Pritchard, M. E. (2007). Is self-esteem the primary predictor of disordered eating? *Personality and Individual Differences*, 42(8), 1527-1537. <https://doi.org/10.1016/j.paid.2006.10.026>
- Schreiber, L. R. N., Odlaug, B. L., & Grant, J. E. (2013). The overlap between binge eating disorder and substance use disorders: Diagnosis and neurobiology. *Journal of Behavioral Addictions*, 2(4), 191-198. <http://dx.doi.org/10.1556/JBA.2.2013.015>
- Silberstein, L. R., Striegel-Moore, R. H., & Rodin, J. (1987). Feeling fat: A woman's shame. In H. B. Lewis (Ed.), *The role of shame in symptom formation*, 89-108. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Sowislo, J. F. S., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological Bulletin*, 139(1), 213-240. <http://dx.doi.org/10.1037/a0028931>

- Steward, T., Mestre-Bach, G., Vintró-Alcaraz, C., Lozano-Madrid, M., Agüera, Z., Fernández-Formoso, J. A., . . . Fernández-Aranda, F. (2018). Food addiction and impaired executive functions in women with obesity. *European Eating Disorders Review*, <http://dx.doi.org/10.1002/erv.2636>
- Stice, E., Marti, C. N., & Durant, S. (2011). Risk factors for onset of eating disorders: Evidence of multiple risk pathways from an 8-year prospective study. *Behaviour Research and Therapy*, *49*(10), 622-627. <https://doi.org/10.1016/j.brat.2011.06.009>
- Torres, S., Camacho, M., Costa, P., Ribeiro, G., Santos, O., Viera, F. M., Brandão, I., Sampaio, D., & Oliveira-Maia, A. J. (2017). Psychometric properties of the Portuguese version of the Yale Food Addiction Scale. *Eat Weight Disord*, *22*(2), 259-267. <https://doi.org/10.1007/s40519-016-0349-6>
- Twenge, J. M., Konrath, S., Foster, J. D., Campbell, W. K., & Bushman, B. J. (2008). Egos Inflating Over Time: A cross-temporal meta-analysis of the Narcissistic Personality Inventory. *Journal of Personality*, *76*(4), 875-901. doi:10.1111/j.1467-6494.2008.00507.x
- Tylka, T. L., & Wood-Barcalow, N. L. (2015). What is and what is not positive body image? Conceptual foundations and construct definition. *Body image*, *14*, 118-129. <https://doi.org/10.1016/j.bodyim.2015.04.001>
- Umberg, E. N., Shader, R. I., Hsu, L. K. G., & Greenblatt, D. J. (2012). From disordered eating to addiction: The “food drug” in bulimia nervosa. *Journal of Clinical Psychopharmacology*, *32*(3), 376-389. doi:10.1097/JCP.0b013e318252464f
- Volkow, N. D., Wang, G. J., & Baler, R. D. (2011). Reward, dopamine and the control of food intake: implications for obesity. *Trends in Cognitive Sciences*, *15*(1), 37-46. <https://doi.org/10.1016/j.tics.2010.11.001>
- Waters, A., Hill, A., & Waller, G. (2001). Bulimics' responses to food craving: is binge-eating a product of hunger or emotional state? *Behaviour Research and Therapy*, *39*(8), 877-886. [https://doi.org/10.1016/S0005-7967\(00\)00059-0](https://doi.org/10.1016/S0005-7967(00)00059-0)
- Wink, P. (1991). Two Faces of Narcissism. *Journal of Personality and Social Psychology*, *61*(4), 590-597. <http://dx.doi.org/10.1037/0022-3514.61.4.590>
- Wood-Barcalow, N. L., Tylka, T. L., & Augustus-Horvath, C. L. (2010). “But I like my body”: Positive body image characteristics and a holistic model for young-adult women. *Body image*, *7*(2), 106-116. <https://doi.org/10.1016/j.bodyim.2010.01.001>
- World Health Organization (2018). International Classification of Diseases (ICD 11). Geneva: Author. Retrieved from <https://icd.who.int/en/>
- Zeigler-Hill, V., Clark, B.C., & Pickard, J.D. (2008). Narcissistic subtypes and contingent self-esteem: Do all narcissists base their self-esteem on the same domains? *Journal of Personality*, *76*(4), 753-774. doi:10.1111/j.1467-6494.2008.00503.x
- Ziauddeen, H., & Fletcher, P. C. (2013). Is food addiction a valid and useful concept? *Obesity Reviews* *14*, 19-28. doi:10.1111/j.1467-789X.2012.01046.x
- Zhang, Y, Tian, J., von Deneen, K. M., et al. (2012). Process addictions in 2012: food, internet and gambling. *Neuropsychiatry* *2*, 155-161. doi:10.2217/np.12.14
- Zuckerman, M., & O'Loughlin, R. E. (2009). Narcissism and well-being: A longitudinal perspective. *European Journal of Social Psychology*, *39*(6), 957-972. doi:10.1002/ejsp.594

## APPENDIX A

Summary of food addicts' self-reported mental and physical status ( $N = 19$ )

|    |  |
|----|--|
| 1  | ED; Anxiety  |
| 2  | Obesity; Depression; Anxiety                         |
| 3  | AN; Depression; Anxiety                              |
| 4  | BN; Depression                                       |
| 5  | Borderline Personality disorder; OCD; Anxiety        |
| 6  | AN   |
| 7  | Depression; Anxiety                                  |
| 8  | Obesity; Anxiety                                     |
| 9  | Obesity  |
| 10 | ADHD; BED  |
| 11 | Obesity; OCD; Depression; Anxiety                    |
| 12 | Obesity; PTSD; Depression; Anxiety                   |
| 13 | Anxiety  |
| 14 | AN; Depression                                       |
| 15 | Borderline Personality Disorder; Depression; Anxiety |
| 16 | AN; Depression; Anxiety                              |
| 17 | Obesity; Depression                                  |
| 18 | AN; Purging subtype; PTSD; Depression; Anxiety       |
| 19 | Anxiety  |

Note. ED = Eating Disorder; AN = Anorexia nervosa; BN = Bulimia nervosa; OCD = Obsessive-compulsive disorder; ADHD = Attention deficit hyperactivity disorder; BED = Binge eating disorder; PTSD = Post-traumatic stress disorder.