ORIGINAL ARTICLE
IN BEHAVIORAL PSYCHOLOGY

Emotion dysregulation and loneliness as predictors of food addiction

Eirini Tatsi[1], Atiya Kamal[2], Alistar Turvill[3], Regina Holler[4]

Affiliations:

[1] Academic Lead, Office of The Vice-Chancellor, Strategic Planning Department, University of West London, London, UK.
[2] Lecturer in Health Psychology, School of Social Sciences, Birmingham City University, Birmingham, UK.
[3] Lecturer in Early Childhood Health, College of Arts, Humanities and Education, University of Derby, Derby, UK.
[4] PG Health Psychology student, School of Life and Health Sciences, Aston University, Aston St, Birmingham, UK.

Corresponding author:

Ms Tatsi Eirini, University of West London, Office of The Vice-Chancellor, Strategic Planning Department, St Mary's Road, Ealing, London W5 5RF, UK. E-mail: eirini.tatsi@uwl.ac.uk

Abstract

Introduction: This study aimed to investigate whether multiple aspects of emotion dysregulation contribute to the etiology of Food Addiction (FA); as well as to provide further evidence and clarity regarding the role of loneliness on the development of addictive behaviour towards food.
Methods: A correlational study was employed to assess associations within 162 participants which were recruited via online forums on FA and student population. The Yale Food Addiction Scale (YFAS), Difficulties in Emotion Regulation Scale (DERS), and UCLA Loneliness Scale, and a demographic and personal information questionnaire were all completed online. A Poisson regression analysis was carried out and statistical significance was set at P <0.05.
Results: 79% of the sample endorsed a persistent desire or repeated unsuccessful attempts to cut down or control their use of highly processed foods, while 21% met diagnostic criteria for food addiction. Poisson regression analysis demonstrated that the model predicts food addiction (P <0.001). Specifically, food addiction symptom count was positively predicted by difficulty engaging in goal-directed behaviour, impulse control difficulties, lack of emotional awareness and limited access to emotion regulation strategies (P <0.05); DERS total, nonacceptance of emotional responses and lack of emotional clarity were not significant predictors. Loneliness positively predicted food addiction (P =0.002).
Discussion and Conclusions: The findings of this research provide further evidence on the etiology of food addiction, as multiple aspects of emotion dysregulation, including difficulty in engaging in goal-directed behaviour, impulsiveness, emotional awareness and limited access to emotion regulation strategies, and loneliness were found to influence the development of an addictive behaviour towards certain types of food. Future research will need to understand possible causality between these factors and insights into the potential role addictive behaviour of food has in overeating phenomena, such as binge-eating.

KEY WORDS: Addictive behaviours; food addiction; emotional dysregulation; loneliness; unhealthy eating habits.

Riassunto

Introduzione: Questo studio ha cercato di comprendere se i molteplici aspetti della disregolazione emotiva contribuiscano all'insorgenza della dipendenza alimentare, cosi come di fornire ulteriore evidenza e chiarezza sul ruolo della solitudine nello sviluppo della dipendenza alimentare.
Metodi: Uno studio correlazionale è stato adottato per valutare le associazioni esistenti nei 162 partecipanti che sono stati recrutati attraverso i forum online sulla dipendenza alimentare da una popolazione studentesca. I questionari Yale Food Addiction Scale (YFAS), Difficulties in Emotion Regulation Scale (DERS) ed UCLA Loneliness Scale, oltre ad un questionario informativo sui dati individuali e demografici dei partecipanti sono stati completati online. Un modello di regressione di Poison è stato adottato e la significatività statistica è stata fissata pari a P <0.05.
Risultati: Il 79% del campione ha confermato un persistente desiderio o ripetuti tentativi infruttuosi di ridurre o di controllare l'uso di prodotti alimentari molto elaborati, mentre il 21% ha soddisfatto i criteri diagnostici della dipendenza alimentare. La regressione di Poisson ha dimostrato che il modello è in grado di predire la dipendenza alimentare (P <0.001). Specificamente, il numero di sintomi di dipendenza alimentare è stato positivamente predetto dalla difficiltà ad impegnarsi in una condotta finalizzata, dalla difficoltà a controllare l'impulso, dalla mancanza di consapevolezza emozionale e dal limitato accesso alle strategie di regolazione emotiva (P <0.05); il totale del punteggio della scala DERS, la non accettazione delle risposte emozionali e la mancanza di serenità emotiva non sono stati predittori significativi. La solitudine ha predetto positivamente la dipendenza alimentare (P =0.002).
Discussione e Conclusioni: I risultati di questa ricerca forniscono ulteriore evidenza sull'eziologia della dipendenza alimentare, dal momento che è stato scoperto che i molteplici aspetti della disregolazione emotiva, inclusa la difficoltà ad impegnarsi in condotte finalizzate, l'impulsività, la consapevolezza emozionale ed il limitato accesso alle strategie di regolazione emotive, così come la solitudine influenzano lo sviluppo di un comportamento additivo verso certi tipi di alimenti. In futuro la ricerca avrà il bisogno di capire il possible rapporto causale tra questi fattori e di intuire il potenziale ruolo rispetto al comportamento additivo che ha il cibo nei fenomeni di eccesso alimentare come l'impulso incontrollato ad alimentarsi.

TAKE-HOME MESSAGE

The risk of developing addictive tendencies towards food can be influenced and predicted by the cognitive artefacts including emotional regulation and loneliness. Greater insight provided by this research concerning these contributory factors, is essential for developing evidence-based approaches to supporting people living with these challenges.

Competing interests - none declared.

Cite this article as: Tatsi E, Kamal A, Turvill A, Holler R. Emotion dysregulation and loneliness as predictors of food addiction. J Health Soc Sci. 2019;4(1):43-58

DOI 10.19204/2019/mtnd5

Received: 23/10/18 Accepted: 12/11/2018 Published: 10/01/2019

INTRODUCTION

Food addiction (FA) is described as an excessive consumption of hyperpalatable foods [1, 2]; however, the conceptualization of food addiction as a behavioural or substance addiction is still debatable [3–6]. Proposed assessment criteria for FA were developed in parallel with the criteria for substance disorders, including: tolerance, withdrawal, consuming larger amounts or over a longer period than intended, persistent desire or unsuccessful efforts to reduce consumption, much time spent obtaining, using, or recovering from the effects of consumption, giving up or reducing important activities because of consumption, and clinically significant impairment or distress [7]. Additionally, the FA hypothesis suggests that some forms or aspects of problematic and/or compulsive eating behaviour are the result of an addiction to highly processed foods that are typically high in added sugar, fat and salt [8–10]. Furthermore, the 'addictive appetite' model of binge-eating behaviour highlights that the desire and craving for hyperpalatable food is due to the increased incentive salience of food cues and habitual response patterns to them [11, 12].

The concept of FA has striking bio-behavioural parallels to drug abuse, and highly palatable foods rich in sugar, fat and salt have an abuse potential similar to addictive drugs [13–18]. Both food and drug cues activate similar brain regions, such as the amygdala and orbitofrontal cortex [19, 20], increase dopamine metabolism [16, 21–23], and alter the activity of reward circuits in the central nervous system [24–26]. Given the similarities between FA and drug addictions, it is reasonable to assume that they may share salient etiological variables, including difficulties in emotion regulation, commonly known as an emotion dysregulation, that is, the extent to which individuals do not possess the skills necessary to regulate and control negative affect or emotional distress [27]. Empirical research indicates that emotion dysregulation plays a key role in the development of FA, as people who have difficulties in controlling and/or managing their eating habits during stressful events are more likely to show addictive behaviour towards food [28–30].

Innamorati and colleagues [29] examined the relationship between FA, emotion dysregulation and mentalization deficits in a non-clinical cohort. A sample of Italian adults were assessed by the Yale Food Addiction Scale (YFAS) [31] for FA symptoms, the Difficulties in Emotion Regulation scale (DERS) [32] for emotion dysregulation and by the Mentalization Questionnaire (MZQ) [33] for mentalization – i.e., the ability to represent and understand inner mental states in oneself and others. They found that high food-addiction symptoms were associated with mentalization deficits and with all DERS subscales except for the lack of emotional awareness and goals subscales. Multivariate analysis, however, revealed that high food-addiction symptoms were independently associated with mentalization deficits, but not with difficulties in emotion regulation, suggesting that FA and difficulties in emotion regulation could be mediated by other variables, such as body mass index (BMI) and binge-eating severity.

Pivarunas and Conner [30] provide further support on the positive association between emotion dysregulation and FA. They investigated the associations between impulsivity, emotion dysregulation and FA in a large cohort of undergraduate students. FA was assessed by YFAS [31], impulsivity was assessed via the UPPS-P Impulsive Behaviour scale [34, 35] and the DERS [32] was used to assess emotion dysregulation. Findings provide evidence on the role impulsive behaviour and emotion dysregulation has on the development and/or maintenance of FA. Although the finding on emotion dysregulation provides empirical support in the area of FA, the authors did not explore multiple aspects of emotion dysregulation, as the finding was gathered via the overall scale.

Considering the similarities between FA and eating psychopathology, additional support on the relationship between emotion regulation and self-reported occurrence of FA traits is provided by eating-related literature,

which suggests that people change their eating habits as a response to negative emotions [36–39]. Research has shown that people who are under stressful situations are more likely to eat more snack-type food [40–42], chocolate [43–45] and sweet foods [46]. Moreover, food intake and/or feeding behaviour can be either increased or reduced during stress or negative affect [36, 42] depending on the types of external and/or psychological stressors [42, 47]. Empirical studies using DERS to examine any possible associations between emotion dysregulation and eating psychopathology indicated that individuals, especially women, with eating disorders symptomatology demonstrate higher DERS scores [48–50]. Therefore, levels of emotion regulation are suggested to play a crucial role on the etiology of an addictive behaviour towards food.

Another factor that might have a connection with an addictive behaviour is loneliness, as it has been identified as a contributor to the development of substance use [51–53] and behavioural addictions, such as internet addiction [54–57] and FA [58, 59]. A recent study by Dincyurek et al. [58] investigated the relationship between impulsivity, loneliness and FA within University students. 216 male and 160 female students were examined using the Turkish versions of YFAS to assess FA characteristics, the UCLA Loneliness Scale [60] to measure loneliness and the Barratt Impulsiveness Scale to examine impulsivity. Researchers found strong positive associations between FA and loneliness, and FA and impulsivity, where high levels of loneliness (and impulsivity) were related with addiction-like eating habits. This finding provides fruitful implications for the negative affect loneliness has on developing an addictive behaviour towards certain types of food. In addition, Tatsi et al. [59] explored whether loneliness is associated with FA and the mediating effect impulsivity and emotion dysregulation might has on this relationship. Findings provided important implications of the relationship between loneliness and FA, which was unrelated when controlling by the overall effect of impulsivity and emotion dysregulation.

Additionally,the consequences of negative life events can cause loneliness, which can result in isolating oneself from social groups. The potential long-term consequences of withdrawal from social contact (e.g., losing a relationship) are stressors that cause dysphoria [61]. Moreover, eating-related literature suggests that loneliness and/or social isolation predict unhealthy eating behaviours, compulsive eating and eating pathology [62–64], which are characteristics that can be found in individuals with FA [1, 2, 8, 38]. A study by Southward et al. [63] investigated the mediating effect loneliness might have on the relationship between emotion dysregulation and bulimia nervosa/binge eating. A sample of 107 women with bulimia nervosa or binge-eating disorder were assessed via the UCLA Loneliness Scale [60] and DERS [32]. Findings indicated that loneliness is directly associated with bulimia nervosa/ and binge-eating, as well as having a mediating role on the relationship between emotional dysregulation and unhealthy eating behaviours. Therefore, loneliness is considered as another contributor to the development of an addictive behaviour on hyperpalatable foods.

Although evidence for the concept of FA has been steadily growing [65], there is limited empirical research to provide insights into this phenomenon and the factors that predict increased risk of FA. The parallels between FA and substance and/or behavioural addictions, and the similarities between FA and unhealthy eating behaviours [66], suggest empirical research is required to provide further insights into the development of FA including the factors that predict increased risk of FA. In addition, loneliness has long been known to increase vulnerability to an addiction [52, 55, 67]; however, it has been neglected in FA research. To address the shortcomings apparent within the existing literature, the present study seeks to examine whether multiple aspects of emotion dysregulation contribute to the etiology of FA; as well as to provide further evidence and clarity regarding the role of loneliness on the development of addictive behaviour towards food.

METHODS

Partecipant recruitment and study design

From a total of 262 recruited individuals, 162 (61.8%) met the inclusion criteria of being over the age of 18 years, suffering no medical condition and/or currently taking medication, and fluency in English language. To capture a diverse sample, participants were recruited via online forums on FA (e.g., Food Addicts in Recovery Anonymous) and student population, by a probabilistic sampling. Table 1 presents sample characteristics.

After giving informed consent, participants were instructed to complete a series of self-report measures. The study adhered to the British Psychological Society's ethics guidelines [69–71], complied with the World Medical Association Declaration of Helsinki [72] and was approved by an ethics committee of the University of Derby.

This study followed a correlational design, where traits of emotion dysregulation and loneliness were used as predictors, and a count of the number of symptoms endorsed on FA was used as an outcome variable.

Data Collection

Demographic and Personal Information Questionnaire

Participants' characteristics were gathered via a 'Demographic and Personal Information' questionnaire. Questions referring to participants' age, sex and ethnic background together with questions asking about current medical condition and/or the use of a medication were included. Height and weight measures were subsequently used to calculate participants´ body mass index (BMI = kg/m^2).

Yale Food Addiction Scale (YFAS) [31]

FA was assessed via the YFAS, a measure assessing addictive eating behaviour and/or symptoms for substance dependence as stated in the DSM-IV [73] towards certain foods high in sugar, salt, fat, or starches in the past year. This 25-item self-report measure includes a mixture of response categories. On 16 items, a Likert-type format is ranked from 0 (Never) to 4 (4 or more times or daily); 8 items are dichotomous (0 = no, 1 = yes) and the final item is answered from 1 (or fewer times) to 5 (or more times). Following the scoring instructions by Meule and Gearhardt [74], all items were dichotomised to indicate whether the diagnostic criterion corresponding to a given item was positively endorsed. Then, a continuous symptom count (score should range from 0 symptoms to 7 symptoms) was calculated by summing the number of endorsed criteria. The YFAS showed good internal reliability in the current sample (α = .92).

Difficulties in Emotion Regulation Scale (DERS) [32]

Multiple aspects of emotion dysregulation were assessed by the DERS. This is a 36-item scale with five response options ranging from 1 (Almost never) to 5 (Almost always). The scale consists of six subscales:

- Nonacceptance of emotional responses (NONACCEPT, α = .92): Someone's tendency toward negative secondary responses to negative emotions, and/or denial of distress (e.g., *When I'm upset, I become angry with myself for feeling that way*).
- Difficulty engaging in goal-directed behaviour (GOALS, α = .92): Identifies problems in concentrating and accomplishing tasks while experiencing negative emotions (e.g., *When I'm upset, I have difficulty getting work done*).
- Impulse control difficulties (IMPULSE, α = .93): Identifies behaviours when someone struggles to control behaviour when upset (e.g., *I experience my emotions as overwhelming and out of control*).
- Lack of emotional awareness (AWARENESS, α = .86): Captures someone's inattention to emotional responses (e.g., *I pay attention to how I feel*- Reversed Item).
- Limited access to emotion regulation strategies (STRATEGIES, α = .93): Captures someone's beliefs that there is little a person can do to regulate one's emotions effectively after becoming upset (e.g., *When*

Table 1. Demographic sample characteristics of age, sex, BMI, and ethnicity.

Age						
N	Minimum		Maximum	*M*		*SD*
162	18		85	34.80		12.78
Sex						
	Female		Male	Other		Total
N (Percent)	136 (84.0)		25 (15.4)	1 (0.6)		162 (100.0)
BMI class						
	Under- weight	Normal range	Overweight	Obese	Missing	Total
N (Percent)	6 (3.8)	77 (47.5)	35 (21.6)	42 (25.9)	2 (1.2)	162 (100.0)
BMI (160, *M* = 27.78, *SD* = 9.76)						
Ethnicity						
	White		Other	Missing		Total
N(Percent)	123 (75.9)		34 (21.0)	5 (3.1)		162 (100.0)

Note: BMI classes according to World Health Organization classification [68].

I'm upset, I believe that I will remain that way for a long time).

- Lack of emotional clarity (CLARITY, α = .88): Identifies the extent to which individuals are unclear about which emotions they are experiencing. (e.g., *I have no idea how I am feeling*).

These subscales combine to indicate the overall emotional dysregulation scale (α = .96), with higher scores signifying greater emotional dysregulation.

UCLA Loneliness Scale [60]

Loneliness and feelings of social isolation were assessed by the UCLA Loneliness scale, which showed good internal reliability (α = .96). This is a 20-item scale (e.g., *How often do you feel alone?*) in which participants respond from 1 (Never) to 4 (Always). Higher scores indicate higher loneliness and greater perceived social isolation.

Statistical analysis

Preliminary analyses were performed to ensure no violation of the assumptions of normality and/or any indication of univariate/multivariate outliers. Following preliminary analyses, regression was used to test the data. The outcome variable in this study was a count of the number of symptoms endorsed on YFAS, while traits of emotion dysregulation and loneliness were used as the predictors. Due to the nature of the outcome variable (count data; less than its mean), a Poisson regression analysis was performed. Statistical significance was set at $P < 0.05$.

RESULTS

Preliminary analyses

Data (n = 162) were analysed for outliers and normality. There was no evidence of outliers and results indicated that data were normally distributed. Descriptive statistics for all variables are presented in Table 2 and correlations in Table 3.

Per Table 3, all factors were positively correlated at 0.01 and 0.05 significance level.

A majority of the sample, 79% (n = 128), endorsed a persistent desire or repeated, unsuccessful attempts to cut down or control their use of highly processed foods that are typically high in added sugar, fat and/or salt; while 21% of the sample (n = 34) met diagnostic criteria for FA, endorsing at least three symptoms. Multicollinearity was not an issue, as all the VIFs are less than 3 [75].

Screening the data for any possible associations between FA and BMI, analysis indicates a positive association rs (160) =.350, $P < 0.01$ supporting previous studies [76, 77].

Table 2. Descriptive statistics of predictor and outcome variables (n = 162).

	Minimum	Maximum	*M*	*SD*	VIF
YFAS Symptom count	0.00	5.00	1.2	1.57	
DERS_Total	42.00	162.00	87.10	28.18	2.72
DERS_NONACCEPT	5.00	30.00	14.17	6.41	2.64
DERS_GOALS	5.00	25.00	14.93	5.19	2.52
DERS_IMPULSE	6.00	30.00	13.10	5.88	2.74
DERS_AWARENESS	6.00	30.00	14.77	5.08	1.79
DERS_STRATEGIES	8.00	39.00	19.22	8.25	2.02
DERS_CLARITY	5.00	23.00	10.91	4.25	2.91
UCLA_Total	23.00	75.00	47.70	12.26	1.97

Table 3. Descriptive statistics of predictor and outcome variables (n = 162).

	YFAS Symptom count	DERS_ Total	DERS_ NONACCEPT	DERS_ GOALS	DERS_ IMPULSE	DERS_ AWARENESS	DERS_ STRATEGIES	DERS_ CLARITY	UCLA_Total
YFAS Symptom count	-								
DERS_ Total	.496**	-							
DERS_ NONACCEPT	.411**	.842**	-						
DERS_ GOALS	. 416**	.794**	.652**	-					
DERS_IMPULSE	.434**	.841**	.633**	.675**	-				
DERS_ AWARENESS	.276**	.552**	.328**	.202*	.304**	-			
DERS_ STRATEGIES	.467**	.914**	.757**	.720**	.740**	.351**	-		
DERS_ CLARITY	.327**	.793**	.537**	.489**	.610**	.617**	.654**	-	
UCLA_ Total	.436**	.687**	.567**	.519**	.534**	.404**	.638**	.592**	-

Note: *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed)

Table 4. Poisson regression results – YFAS Symptoms count, DERS & UCLA.

Variable	B	SE	95% Wald CI	Wald χ^2	p
DERS_Total	.049	.0249	-.097-.000	3.816	.051
DERS_NONACCEPT	.046	.0283	-.010-.101	2.620	.106
DERS_GOALS	.088	.0328	.023-.152	7.165	.007
DERS_IMPULSE	.071	.0326	.007-.135	4.684	.030
DERS_AWARENESS	.088	.0348	.019-.156	6.336	.012
DERS_STRATEGIES	.076	.0338	.010-.142	5.074	.024
DERS_CLARITY	.031	.0293	-.078-.016	1.717	.190
UCLA_Total	.026	.0084	.009-.042	9.301	.002

Poisson Regression

Poisson regression was run to explore whether emotion dysregulation (DERS_Total) and its six subscales (NONACCEPT, GOALS, IMPULSE, AWARENESS, STRATEGIES, CLARITY), and loneliness (UCLA) predict food addition (YFAS symptoms count). Direct effects were significant, omnibus $\chi 2 = 91.102$, df = 7, $P = 0.001$. The following emotion dysregulation traits: difficulties in engaging in goal directed behaviour (DERS_GOALS), impulsive control difficulties (DERS_IMPULSE), lack of emotional awareness (DERS_AWARENESS) and limited access to emotion regulation strategies (DERS_STRATEGIES) significantly positively predicted YFAS symptom count. Overall emotion dysregulation (DERS_Total), non-acceptance of emotional responses (DERS_NONACCEPT) and lack of emotional clarity (DERS_CLARITY) did not predict YFAS symptom count. Loneliness (UCLA) was a significant positive predictor of YFAS symptom count. Please refer to Table 4 for details.

DISCUSSION

The aim of this study was to explore the relationship between emotion dysregulation, loneliness and food addiction. The majority of this sample (79%) reported having difficulties managing their eating behaviours to foods that are typically high in added sugar, fat and/or salt; while 21% of the sample met diagnostic criteria for FA, endorsing at least three symptoms. BMI levels were positively associated with FA. The majority of the sample were within normal BMI rates (47.5%); overweight (21.6%) and obese (25.9%) rates were also present within this cohort. Overall, the model suggests that emotion dysregulation and loneliness have an important role in the development of an addictive behaviour towards hyperpalatable foods. Emotion dysregulation occurs when an individual lacks the skills required to manage emotions in adaptive ways. The positive association between emotion dysregulation and FA suggests that FA may be driven by unsuccessful attempts to regulate emotions, particularly negative affect. Thus, FA may manifest as a maladaptive attempt at emotion regulation [29, 30]. Our findings suggest that difficulty in engaging in goal-directed behaviour, impulsive control difficulties, lack of emotional awareness and limited access to emotion regulation strategies positively predict FA. The overall score of emotion dysregulation, nonacceptance of emotional responses and lack of emotional clarity had no influence on FA. The association between loneliness and food addiction [58, 59], and other addictions [52–53, 55] and unhealthy eating [63, 64] is well-documented. This study indicates loneliness to be positively associated with food addiction, as higher levels of loneliness and/or social isolation are related to higher levels of FA symptom count. Therefore, the findings of this research provide further evidence on the etiology of FA which should be taken into serious consideration.

The effect emotion dysregulation has on FA is documented by previous investigations [29, 30]. In contrast to Innamorati et al.'s [29] finding, our sample indicated that they are more likely to present more food addictive behaviour when they identify problems in concentrating and accomplishing tasks while experiencing negative emotions (GOALS). As FA is characterised by problematic and/or compulsive eating behaviour [8, 9], this finding can be understood by research in the area of compulsivity. Specifically, compulsive behaviours including addictions and binge eating disorder (BED) are characterised by deficits in goal- directed behaviour and increased regression to habitual behaviour [78]. For instance, the experience of negative emotions may impact upon the desirability of outcomes (e.g., consumption of highly palatable foods is more motivated by retrospective experienced reward than by the prospective outcome of anticipated risk of weight gain). In addition, negative emotions may involve changes to the contingency between actions and outcomes (e.g., '*When I´m upset, I have difficulty concentrating*'; Item 26 from DERS). Both these alterations in the ´goal-directed´ behavioural system by emotional dysregula-

tion may favour the development of the ´bad habit´ to engage in consumption of highly palatable food over anticipatory goal-directed behaviour. Compulsive eating can also be understood as a conflict between an internal, biologically derived drive for food which has its basis in survival and an external culturally derived drive for thinness [79] which may contribute to the conflict experienced. Individuals that are unable to regulate negative emotions and have problems concentrating and accomplishing tasks may be at increased risk of FA due to the competing biological preoccupation with food and difficulties with emotional regulation.

The effect impulsiveness has on FA is well documented [30, 58]. The current sample demonstrated a higher FA symptom count when struggling to control their behaviours when upset, which provides further support for the predictive role impulsiveness has on FA under negative affect. Lack of emotional awareness was another factor that may contribute to the development of FA. These data demonstrated that increased inattention to emotional responses resulted in a higher FA symptom count. A systematic review by Kun and Demetrovics [80] indicated that lower levels of emotional intelligence (i.e., lack of emotional awareness) were related to intense smoking, alcohol use and illicit drugs. Moreover, a recent study by Yildiz [81] indicated that limited access to emotion regulation strategies contributes to the development of internet and smartphone addiction. Our sample demonstrated a similar finding with higher FA symptom count to be associated with struggling to regulate emotions after becoming upset. Considering the similarities within the behavioural addiction literature, the findings of our study suggest impulsiveness, lack of emotional awareness and negative affect have similar relationships across different types of behavioural addictions.

Surprisingly, the overall measure of emotion dysregulation did not predict FA, suggesting that the relationship between emotion dysregulation (overall) and FA could be mediated by other variables, such as binge-eating severity and BMI. This is interesting, as inspection on the relationship between FA and BMI in the current cohort demonstrated a positive association between these variables. Furthermore, nonacceptance of emotional responses (i.e., someone's tendency toward negative secondary responses to negative emotions, and/or denial of distress) did not predict FA. A possible explanation could be the way nonacceptance of emotional responses is measured by the DERS. Most of the items in the subscale indicate feelings of embarrassment (e.g., '*When I'm upset, I become embarrassed for feeling that way*'; Item 12) and guilt (e.g., '*When I'm upset, I feel guilty for feeling that way*'; Item 25) and not an actual negative affect that may link to the intention to binge for foods high in added sugar, fat and salt. The predictive role of lack of emotional clarity (i.e., identifies the extent to which individuals are unclear about which emotions they are experiencing) on FA was not significant. Considering some of the similarities between FA and problematic and/or compulsive eating behaviour [8, 9], this is in line with previous findings that suggest that binge eaters, for instance, appraised a stressful situation more than healthy controls [82]. Thus, those who engage in overeating might be able to identify a negative emotional state clearly and tend to act accordingly with their coping strategy of eating.

The effect loneliness has on addictive behaviours [51–59] and unhealthy eating [62–64] is well-documented. This study provides further support for the role of loneliness in the development of FA. Our finding is in line with previous research which has found a positive association between high levels of loneliness and high levels of food addiction [58, 59]. The positive predictive role of loneliness on FA indicates that FA symptoms are more likely to be present when experiencing loneliness and/or social isolation. Thus, the euphoria experienced when eating highly processed foods that are typically high in added sugar, fat and salt could be a potential cause of FA. The expectation of euphoria that develops over time could function as a reinforcement for continuing and excessive consumption

of hyperpalatable foods, which could provide further support to the 'addictive appetite' model of binge-eating behaviour [11, 48] and the proposed assessment criteria of FA which are in parallel with the criteria for substance disorders [7].

Study limitations

This research is not without limitations. As per YFAS, 21% of the sample met diagnostic criteria for FA, endorsing at least three symptoms, while the majority of the sample (79%) endorsed a persistent desire or repeated, unsuccessful attempts to cut down or control their use of highly processed foods that are typically high in added sugar, fat and/or salt. Therefore, future research should explore individual differences within the YFAS scale (i.e., individuals who meet the diagnostic criteria for FA vs. individuals who demonstrate addictive overeating to foods that are typically high in added sugar, fat and/or salt) in order to provide more detailed information. Data collection relied solely on self-report measures. Although the questionnaires used in the current research have high ecological validity and reliability, Shiffman, Stone and Hufford [10] suggest that global generalisation cannot be assumed, as questionnaires limit the ability to characterise and understand behaviour as it occurs in a natural environment. Thus, future investigations should also consider assessing participants in natural settings. The sampling method was exclusively online. This is common in studies of health and health services, as it can increase the sample of potential participants and reach of a diverse cohort [83, 84]. However, a fundamental issue with online survey research has to do with lack of sampling frame [85–87]. Although a sampling frame was established to minimize any errors and to ensure significant representation of population of interest, Wright [87] highlights self-selection bias as a major limitation of online survey research. Specifically, he reports that there is a tendency for some individuals to respond to a survey invitation, while others ignore it, leading to a systematic bias. For instance, females are more likely to participate in eating-related research than males, which is demonstrated in the current research as the majority of the participants were females. Therefore, it is important future investigations adopt a mixed on- and off-line sampling method to ensure a representative sample is in place.

Considering that FA may overlap with common eating psychopathology, such as binge-eating [66, 88], it is important for future investigations to provide further evidence on the clinical implications of the relationship between binge-eating and FA. BMI was positively correlated with FA levels in the current study highlighting the relationship between addictive overeating and obesity. Further longitudinal research is needed to clarify the pathways between addictive overeating and obesity.

CONCLUSION

This research provides evidence on the effect emotion dysregulation and loneliness have in the development of FA. Multiple traits of emotion dysregulation, including difficulty in engaging in goal-directed behaviour, impulsiveness, emotional awareness and limited access to emotion regulation strategies, and loneliness were positive predictors of FA. Although findings are fruitful, these must be treated with caution and further empirical research is needed to provide insights into the potential role addictive behaviour of food has in overeating phenomena, such as binge-eating. Understanding the relationship between FA and BED would help clarify the extent to which patterns of abnormal eating reflect addictive engagement in these conditions; and provide further support on the critical reflection of the suitability of the term 'food addiction' or 'eating addiction' [4–6, 8]. Considering the crucial role loneliness plays in the etiology of addictive behaviours, it is important for further research to explore the psychological underpinnings of loneliness on FA. Conceptualising unhealthy eating behaviours and addressing the psychological underpinnings of loneliness within an addiction framework may contribute to the improve-

ment of prevention strategies and the development of effective treatments that would improve people's quality of life and provide substantial public health benefit [66].

Acknowledgements

We would like to thank all participants for their time and effort to complete the survey. We are grateful to the platforms Food Addicts in Recovery Anonymous, FA Forum, the Dailystrength FA Support Group, and The Web of Loneliness for hosting our survey. We would also like to thank the University of Derby Undergraduate Research Studentship Scheme (URSS; URSS16-007) for providing financial support to launch this project. URSS had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

References

1. Davis C. From Passive Overeating to "Food Addiction": A Spectrum of Compulsion and Severity. ISRN Obesity. 2013; vol 2013(Article ID 435027):1–20. doi: 10.1155/2013/435027.
2. Davis C. Compulsive Overeating as an Addictive Behavior: Overlap Between Food Addiction and Binge Eating Disorder. Curr Obes Rep. 2013;2:171–178. doi: 10.1007/s13679-013-0049-8.
3. Ruddock HK, Christiansen P, Halford JCG, Hardman CA. The Development and Validation of the Addiction-like Eating Behaviour Scale. Int J Obes. 2017;41:1710–1717. doi: 10.1038/ijo.2017.158.
4. Schulte EM, Potenza MN, Gearhardt AN. A commentary on the "eating addiction" versus "food addiction" perspectives on addictive-like food consumption. Appetite. 2017a;115:9-15. doi: 10.1016/j.appet.2016.10.033.
5. Lacroix E, Tavares H, von Ranson KM. Moving beyond the 'eating addiction' versus 'food addiction' debate: Comment on Schulte et al. (2017). Appetite. 2018;130:286–292. doi: 10.1016/j.appet.2018.06.025.
6. Schulte EM, Potenza MN, Gearhardt AN. Specific theoretical considerations and future research directions for evaluating addictive-like eating as a substance-based, food addiction: Comment on Lacroix et al. (2018). Appetite. 2018;130:293–295. doi: 10.1016/j.appet.2018.06.026.
7. Gearhardt AN, Corbin WR, Brownell KD. Food addiction: an examination of the diagnostic criteria for dependence. J Addict Med. 2009;3:1–7. doi: 10.1097/ADM.0b013e318193c993.
8. Hebebrand J, Albayrak Ö, Adan R, Antel J, Dieguez C, de Jong J, et al. "Eating addiction", rather than "food addiction", better captures addictive-like eating behaviour. Neurosc Biobehav Rev. 2014;47:295–306. doi: 10.1016/j.neubiorev.2014.08.016.
9. Hudson JI, Hiripi E, Pope HG, Kessler RC. The prevalence and correlates of eating disorders in the NCS Replication. Biol Psychiatry. 2007;61:348–358. doi: 10.1016/j.biopsych.2006.03.040.
10. Shiffman S, Stone AA, Hufford MR. Ecological momentary assessment. Ann Rev Clin Psychol. 2008;4:1-32.
11. Berridge KC. The debate over dopamine's role in reward: The case for incentive salience. Psychopharm. 2007;191:391–431. doi: 10.1007/s00213-006-0578-x.
12. Leslie M, Turton R, Burgess E, Nazar BP, Treasure J. Testing the addictive appetite model of binge eating: The importance of craving, coping, and reward enhancement. Europ Eat Disorder Rev. 2018;26:541–550. doi: 10.1002/erv.2621.
13. Gearhardt AN, Davis C, Kuschner R, Brownell KD. The addiction potential of hyperpalatable foods. Curr Drug Abuse Rev. 2011;4:140–145. doi: 10.2174/1874473711104030140.
14. Kenny PJ. Reward mechanisms in obesity: New insights and future directions. Neuron. 2011;69:664–679. doi: 10.1016/j.neuron.2011.02.016.
15. Spring B, Schneider K, Smith M, Kendzor D, Appelhans B, Hedeker D, et al. Abuse potential of carbohy-

drates for overweight carbohydrate cravers. Psychopharmacoly (Berl). 2008;197:637–647. doi: 10.1007/s00213-008-1085-z.

16. Davis C, Carter JC. Compulsive overeating as an addiction disorder. A review of theory and evidence. Appetite. 2009;53:1–8. doi: 10.1016/j.appet.2009.05.018.
17. Albayrak O, Wolfle SM, Hebebrand J. Does food addiction exist? A phenomenological discussion based on the psychiatric classification of substance- related disorders and addiction. Obesity Facts. 2012;5:165–179. doi: 10.1159/000338310.
18. Avena NM. The study of food addiction using animal models of binge eating. Appetite. 2010;55:734–737. doi: 10.1016/j.appet.2010.09.010.
19. Dagher A. The neurobiology of appetite: Hunger as addiction. Int J Obes. 2009;33:30–33. doi: 10.1038/ijo.2009.69.
20. Gearhardt AN, Yokum S, Orr PT, Stice E, Corbin WR, Brownell KD. Neural correlates of food addiction. Arch Gen Psychiatr. 2011;68: 808–816. doi: 10.1001/archgenpsychiatry.2011.32.
21. Rada P, Avena NM, Hoebel BG. Daily bingeing on sugar repeatedly releases dopamine in the accumbens shell. Neuroscience. 2005;134:737–474. doi: 10.1016/j.neuroscience.2005.04.043.
22. Blumenthal DM, Gold MS. Neurobiology of food addiction. Curr Opin Clin Nutr Metab Care. 2010;13:359–365. doi: 10.1097/MCO.0b013e32833ad4d4.
23. Smith DG, Robbins TW. The neurobiological underpinnings of obesity and binge eating: A rationale for adopting the food addiction model. Biol Psychiatry. 2013;73:804–810. doi: 10.1016/j.biopsych.2012.08.026.
24. Hyman SE, Malenka RC, Nestler EJ. Neural mechanisms of addiction: The role of reward-related learning and memory. Ann Rev Neurosc. 2006;29: 565–598. doi: 10.1146/annurev.neuro.29.051605.113009.
25. Volkow ND, Wang GJ, Fowler JS, Telang F. Overlapping neuronal circuits in addiction and obesity: Evidence of systems pathology. Philos Transact Royal Soc Biol Sci. 2008;363:3191–3200. doi: 10.1098/rstb.2008.0107.
26. Volkow ND, Wang GJ, Baler RD. Reward, dopamine and the control of food intake: Implications for obesity. Trends Cogn Sci. 2011;15:37–46. doi: 10.1016/j.tics.2010.11.001.
27. Stepp SD, Scott LN, Morse JQ, Nolf KA, Hallquist MN, Pilkonis PA. Emotion dysregulation as a maintenance factor of borderline personality disorder features. Compr Psychiat. 2013;55:657–666. doi: 10.1016/j.comppsych.2013.11.006.
28. Gearhardt AN, White MA, Masheb RM, Morgan PT, Crosby RD, Grilo CM. An examination of the food addiction construct in obese patients with binge eating disorder. Int J Eat Disord. 2012;45:657–663. doi: 10.1002/eat.20957.
29. Innamorati M, Imperatori C, Harnic D, Erbuto D, Patitucci E, Janiri L, et al. Emotion Regulation and Mentalization in People at Risk for Food Addiction. Behav Med. 2015;43:21–30. doi: 10.1080/08964289.2015.1036831.
30. Pivarunas B, Conner BT. Impulsivity and emotion dysregulation as predictors of food addiction. Eating Behaviors. 2015;19:9–14. doi: 10.1016/j.eatbeh.2015.06.007.
31. Gearhardt AN, Corbin WR, Brownell KD. Preliminary validation of the Yale Food Addiction Scale. Appetite. 2009;52:430–436. doi: 10.1016/j.appet.2008.12.003.
32. Gratz KL, Roemer L. Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. Psychopathol Behav Assessm. 2004;26:41–54. doi: 10.1023/B:JOBA.0000007455.08539.94.
33. Hausberg MC, Schulz H, Piegler T, Happach CG, Klöpper M, Brütt AL, et al. Is a self-rated instrument appropriate to assess mentalization in patients with mental disorders? Development and first validation of the mentalization questionnaire (MZQ). Psychother Res. 2012;22:699–709. doi: 10.1080/10503307.2012.709325.

34. Lynam DR, Smith GT, Whiteside SP, Cyders MA. The UPPS-P: Assessing five personality pathways to impulsive behavior. West Lafayette: Purdue University; 2006 (Unpublished Report).

35. Whiteside SP, Lynam DR, Miller JD, Reynolds SK. Validation of the UPPS impulsive behaviour scale: A four-factor model of impulsivity. Eur J Personality. 2005;19:559–574. doi: 10.1002/per.556.

36. Greeno CG, Wing RR. Stress-induced eating. Psychol Bull. 1994;115:444–464. doi: 10.1037/0033-2909.115.3.444.

37. Gianini LM, White MA, Masheb RM. Eating Pathology, Emotion Regulation, and Emotional Overeating in Obese Adults with Binge Eating Disorder. Eat Behav. 2013;14:309–313. doi: 10.1016/j.eatbeh.2013.05.008.

38. Singh M. Mood, food and obesity. Front Psychol. 2014;5:925. doi: 10.3389/fpsyg.2014.00925.

39. Michopoulos V, Powers A, Moore C, Villarreal S, Ressler KJ, Bradley B. The mediating role of emotion dysregulation and depression on the relationship between childhood trauma exposure and emotional eating. Appetite. 2015;91:129–136. doi: 10.1016/j.appet.2015.03.036.

40. Oliver G, Wardle J. Perceived effects of stress on food choice. Physiol Behav. 1999;66:511–515. doi: 10.1016/S0031-9384(98)00322-9.

41. Oliver G, Wardle J, Gibson EL. Stress and food choice: a laboratory study. Psychosom Med. 2000;62:853–865.

42. Yau YH, Potenza MN. Stress and eating behaviors. Minerva Endocrinol. 2013:38:255–267.

43. Willner P, Benton D, Brown E, Cheeta S, Davies G, Morgan J, et al. "Depression" increases "craving" for sweet rewards in animal and human models of depression and craving. Psychopharmacology. 1998;136:272–283. doi: 10.1007/s002130050566.

44. Zellner DA, Loaiza S, Gonzalez Z, Pita J, Morales J, Pecora D, et al. Food selection changes under stress. Physiol Behav. 2006;87:789–793. doi: 10.1016/j.physbeh.2006.01.014.

45. Fletcher BC, Pine KJ, Woodbridge Z, Nash A. How visual images of chocolate affect the craving and guilt of female dieters. Appetite. 2007;48:211–217. doi: 10.1016/j.appet.2006.09.002.

46. Lowe MR, Maycock, B. Restraint, disinhibition, hunger and negative affect eating. Addict Behav. 1988;13:369–377. doi: 10.1016/0306-4603(88)90043-3.

47. Gibson EL. Emotional influences on food choice: sensory, physiological and psychological pathways. Physiol Behav. 2006;89:53–61. doi: 10.1016/j.physbeh.2006.01.024.

48. Monell E, Hogdahl L, Mantilla EF, Birgegard A. Emotion dysregulation, self-image and eating disorder symptoms in University Women. J Eat Disord. 2015;3:44. doi: 10.1186/s40337-015-0083-x .

49. Cooper JL, O'Shea AE, Atkinson MJ, Wade TD. Examination of the difficulties in emotion regulation scale and its relation to disordered eating in a young female sample. Int J Eat Disord. 2014;47:630–639. doi: 10.1002/eat.22278.

50. Svaldi, J, Griepenstroh J, Tuschen-Caffier B, Ehring T. Emotion regulation deficits in eating disorders: a marker of eating pathology or general psychopathology? Psychiatr Res. 2012;197:103–111. doi: 10.1016/j.psychres.2011.11.009.

51. Henriksen RE, Torsheim T, Thuen F. Loneliness, Social Integration and Consumption of Sugar-Containing Beverages: Testing the Social Baseline Theory. PLoS ONE. 2014;9:e104421. doi: 10.1371/journal.pone.0104421.

52. Nikmanesh Z, Kazemi Y, Khosravi M. Role of Feeling of Loneliness and Emotion Regulation Difficulty on Drug Abuse. Int J Med Toxicol Forens Med. 2015;5:185–191.

53. Hosseinbor M, Yassini Ardekani SM, Bakhshani S, Bakhshani S. Emotional and Social Loneliness in Individuals With and Without Substance Dependence Disorder. Int J High Risk Behav Addict. 2014;3:e22688. doi: 10.5812/ijhrba.22688.

54. Özdemir Y, Kuzucu Y, Ak S. Depression, loneliness and internet addiction: how important is low self-control? Comput Hum Behav. 2014;34:284-290. doi: 10.1016/j.chb.2014.02.009.

55. Pontes HM, Griffiths MD, Patrão IM. Internet Addiction and Loneliness Among Children and Adolescents in the Education Setting: An Empirical Pilot Study. Aloma. 2014;32:91–98.

56. Karapetsas AV, Zygouris NC, Fotis A. I. Internet addiction and loneliness. Encephalos. 2015;52:4–9.

57. Sharifpoor E, Khademi MJ, Mohammadzadeh A. Relationship of Internet Addiction with Loneliness and Depression among High School Students. Int J Psychol Behav Sci. 2017;7:99–102. doi: 10.5923/j.ijpbs.20170704.01.

58. Dinçyurek H, Alasya M, Kağan S. Identifying the Relationship of Food Addiction, Impulsiveness and Loneliness with Different Variables in University Students. EURA J Math Sci Tech Ed. 2018;14:1931–1944. doi: 10.29333/ejmste/85637.

59. Tatsi ET, Kamal A, Turvill A. Holler R. Loneliness and food addiction: How important is emotion dysregulation and impulsivity? Poster presented at: SSA Annual Symposium; 2016 Nov 10; York, UK.

60. Russell DW. UCLA Loneliness Scale (Version 3): Reliability, Validity, and Factor Structure. J Pers Assess. 1996;6:20–40. doi: 10.1207/s15327752jpa6601_2.

61. Caplan SE. Relations among loneliness, social anxiety, and problematic Internet use. Cyberpsychol Behav. 2007;10:234. doi: 10.1089/cpb.2006.9963.

62. Rotenberg KJ, Flood D. Loneliness, dysphoria, dietary restraint, and eating behaviour. Int J Eat Disord. 1999;25:55–64.

63. Southward MW, Christensen KA, Fettich KC, Weissman J, Berona J, Chen EY. Loneliness mediates the relationship between emotion dysregulation and bulimia nervosa/binge eating disorder psychopathology in a clinical sample. Eat Weight Disord. 2014;19:509–513. doi: 10.1007/s40519-013-0083-2.

64. Mason TB. Heron KE, Braitman AL, Lewis RJ. A daily diary study of perceived social isolation, dietary restraint, and negative affect in binge eating. Appetite. 2016;97:94e100. doi: 10.1016/j.appet.2015.11.027.

65. Alonso-Alonso M, Woods SC, Pelchat M, Grigson PS, Stice E, Farooqi S, et al. Food reward system: current perspectives and future research needs. Nutr Rev. 2015;73:296–307. doi: 10.1093/nutrit/nuv002.

66. Gearhardt AN, White MA, Potenza MN. Binge Eating Disorder and Food Addiction. Curr Drug Abuse Rev. 2011;4:201–207.

67. Bozoglan B, Demirer V, Sahin I. Loneliness, self-esteem, and life satisfaction as predictors of Internet addiction: a cross-sectional study among Turkish university students. Scand J Psychol. 2013;54:313–319. doi: 10.1111/sjop.12049.

68. World Health Organisation. BMI Classification. Global Database on Body Mass Index. 2006. [cited 2016 Jul 2] Available from: http://www.who.int/en/bmi/index.jsp.

69. British Psychological Society. Code of Ethics and Conduct. 2009. [cited 2016 Sep 10]. Available from: http://www.bps.org.uk/what-we-do/bps/ethics-standards/ethics-standards.

70. British Psychological Society. Ethics Guidelines for Internet-mediated Research. 2013. [cited 2016 Sep 10] Available from:: http://www.bps.org.uk/publications/policy-and-guidelines/research- guidelines-policy-documents/research-guidelines-poli.

71. British Psychological Society. Code of Human Research Ethics. 2014. [cited 2016 Sep 10] Available from: http://www.bps.org.uk/what-we-do/bps/ethics-standards/ethics-standards.

72. World Medical Association Declaration of Helsinki. Ethical Principles for Medical Research Involving Human Subjects. World Medical Journal. 2013;59:199–202.

73. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (4th edition). Washington, D.C.: American Psychiatric Association; 2000.

74. Meule A, Gearhardt AN. Five years of the Yale Food Addiction Scale: Taking stock and moving forward. Curr Addict Rep. 2014;1:193–205. doi: 10.1007/s40429-014-0021-z.

75. O'Brien RM. A caution regarding rules of thumb for variance inflation factors. Qual Quant. 2007;41:673–690. doi: 10.1007/s11135-006-9018-6.

76. Pedram P, Wadden D, Amini P, Gulliver W, Randell E, Cahill F, et al. Food Addiction: Its Prevalence and Significant Association with Obesity in the General Population. PLoS ONE. 2013;8:e72832. doi: 10.1371/journal.pone.0074832.

77. Gearhardt AN, Boswell RG, White MA. The association of "food addiction" with disordered eating and body mass index. Eat Behav. 2014;15:427–433. doi: 10.1016/j.eatbeh.2014.05.001.

78. Voon V, Derbyshire K, Rück C, Irvine MA, Worbe Y, Enander J, et al. Disorders of compulsivity: a common bias towards learning habits. Mol Psychiatr. 2015;20:345–352. doi: 10.1038/mp.2014.44.

79. Wardle J. Compulsive eating and dietary restraint. Brit J Clin Psychol. 1987;26:47–55. doi : 10.1111/j.2044-8260.1987.tb00722.x.

80. Kun B, Demetrovics Z. Emotional intelligence and addictions: a systematic review. Subst Use Misuse. 2010;45:1131–1160. doi: 10.3109/10826080903567855.

81. Yildiz MA. Emotion regulation strategies as predictors of internet addiction and smartphone addiction in adolescents. J Educ Sci Psychol. 2017;7:66–78.

82. Hansel SL, Wittrock DA. Appraisal and coping strategies in stressful situations: A comparison of individuals who binge eat and controls. Int J Eat Disord. 1997;21:89–93.

83. Eysenbach G, Wyatt J. Using the Internet for Surveys and Health Research. J Med Internet Res. 2002;4:e13. doi: doi:10.2196/jmir.4.2.e13.

84. Safdar N, Abbo LM, Knobloch MJ, Seo SK. Research Methods in Healthcare Epidemiology: Survey and Qualitative Research. Infect Control Hosp Epidemiol. 2016;37:1272–1277. doi: 10.1017/ice.2016.171.

85. Harlow A. Online Surveys – Possibilities, pitfalls and practicalities: The experience of the TELA evaluation. Waikato J Educ. 2010;15:95–108.

86. Ponto J. Understanding and Evaluating Survey Research. J Adv Pract Oncol. 2015;6:168–171.

87. Wright KB. Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services. J Comp Mediated Comm. 2005;10. https://doi.org/10.1111/j.1083-6101.2005.tb00259.x.

88. Wolz I, Hilker I, Granero R, Jiménez-Murcia S, Gearhardt AN, Dieguez C, et al. "Food Addiction" in Patients with Eating Disorders is Associated with Negative Urgency and Difficulties to Focus on Long-Term Goals. Front Psychol. 2016;7:61. doi: 10.3389/fpsyg.2016.00061.