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ARTIGO

Alimentação emocional: associações entre impulsividade, depressão, sexo e peso corporal em jovens adultos

Emotional eating: associations among impulsivity, depression, sex, and weight status in young adults

Alimentación emocional: asociaciones entre impulsividad, depresión, sexo y peso corporal en jóvenes adultos

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Resumo: Alimentação Emocional (AE) é definida como comer sob influência de emoções negativas e está associada a transtornos alimentares, impulsividade, depressão e ganho de peso. Entretanto, a literatura não é clara sobre como essas variáveis explicam AE. Este estudo buscou identificar preditores da AE e sua relação com impulsividade, depressão, estilo alimentar e peso corporal em jovens adultos. Foram examinadas diferenças entre sexo no estilo alimentar e diferenças na AE entre indivíduos obesos/com sobrepeso e normais/abaixo do peso. Duzentos estudantes universitários preencheram questionários *online* avaliando todas variáveis. Baixo controle inibitório, sintomas de depressão, sexo feminino e maior índice de massa corporal predisseram AE. Indivíduos obesos/com excesso de peso e do sexo feminino apresentaram aumento da AE. Foram evidenciadas correlações positivas entre Descontrole Alimentar, peso corporal e baixo controle inibitório. Os resultados indicam que a AE está relacionada a fatores psicológicos, como impulsividade e depressão, e biológicos, como sexo e massa corporal.

Palavras-chave: alimentação emocional, impulsividade, controle inibitório, transtorno alimentar, estilo alimentar

Abstract: Emotional Eating (EE) is defined as eating under the influence of negative emotions, and is associated with Eating Disorders, impulsivity, depression and weight gain. However, previous literature is not clear regarding how these variables explain EE. The present study aimed to identify predictors of EE and its relationship to impulsivity, depression, eating style, and weight status in young adults. Sex differences in eating style were examined, and differences in EE between obese/overweight and normal/underweight individuals were tested. Two-hundred college students completed online questionnaires assessing all variables. Low inhibitory control, depression symptoms, female sex, and higher body mass index significantly predicted scores on EE. Obese/overweight and female participants presented increased EE. Correlation analysis evidenced positive associations between EE, Uncontrolled Eating, body mass, and low inhibitory control. Results indicate that EE is related to psychological factors such as impulsivity and depression, and biological factors, such as sex and body mass.

Keywords: emotional eating, impulsivity, inhibitory control, disordered eating, eating style

Resumen: Alimentación emocional (AE) se define como comer bajo la influencia de emociones negativas y se asocia con trastornos alimentarios, impulsividad, depresión y aumento de peso. Sin embargo, la literatura no es clara acerca de cómo estas variables explican AE. Este estudio buscó identificar predictores de AE y su relación con impulsividad, depresión, estilo de alimentación y peso corporal en jóvenes adultos. Se examinaron diferencias entre sexo en el estilo de alimentación y diferencias en AE entre sujetos obesos/con sobrepeso y normales/



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con bajo peso. Doscientos estudiantes universitarios completaron cuestionarios en línea evaluando todas variables. Bajo control inhibitorio, síntomas de depresión, género femenino y índice de masa corporal más alto predijeron AE. Personas obesas/con sobrepeso y mujeres mostraron aumento de AE. Se evidenciaron correlaciones positivas entre comida no controlada, peso corporal y bajo control inhibitorio. AE está relacionada con factores psicológicos, como impulsividad y depresión, y biológicos, como género y masa corporal. **Palabras clave:** alimentación emocional, impulsividad, control inhibitorio, trastorno alimentario, estilo de alimentación

Emotional Eating (EE) is a tendency to overeat under influence of negative emotions (Van Strien, Frijters, Bergers, & Defares, 1986). EE is a problematic behavior that has been associated with Eating Disorders, obesity and lesser effectiveness of weight loss programs (Braden et al., 2016; Koenders & Van Strien, 2011). Particularly regarding Eating Disorders, EE underlies debilitating conditions such as Binge Eating and Bulimia (Nicholls, Devonport, & Blake, 2016). Eating "emotionally" could be either a prodrome of these disorders, or some form of consistent pattern of disordered eating that might never aggravate enough to be considered a disorder (Vanik et al., 2015).

EE is recognized as a source of weight gain and is more frequently reported by obese people (Frayn & Knäuper, 2017). As a result, weight loss programs tend to be less effective to participants who report EE (Koenders & Van Strien, 2011). Emotional eaters are half as likely as non-emotional eaters to reach the 10% weight loss goal of standard behavioral weight loss treatment (López-Guimerà et al. 2014). Despite this statistic, so far very few interventions have incorporated the treatment of emotional nutrition into weight-loss interventions. Eating in the presence of negative emotions has also been considered a mediator in the relationship between depression symptoms and weight gain (Lazarevich et al., 2016; Van Strien et al., 2016). In this sense, in an attempt to regulate their emotions people who incur in EE behavior may use food to avoid or escape the experience of negative emotions and cognitions related to depression symptoms (Konttinen, Männistö, Sarlio-Lähteenkorva, Silventoinen, & Haukkala, 2010; Litwin, Goldbacher, Cardaciotto, & Gambrel, 2016). Clinically, it has been

suggested that EE is a characteristic of atypical major depression, a condition that often leads to overeating, weight gain, and increased risk of obesity (Lasserre et al., 2014).

In addition to depression, another psychological variable strongly related to emotional eating is impulsivity. In a study by Van Blyderveen and colleagues (2016), highly impulsive participants ate more calories in an induced stress condition than in the control condition. Impulsivity was considered a moderating variable in the relationship between nutritional intake and negative affect. One of the factors of impulsivity that is impaired in the ability to interrupt dysfunctional eating behaviors is inhibitory control (Jasinska et al., 2012). Individuals must exert inhibitory control to deal with urges and resist automatic behaviors (e.g. compulsive eating). A meta-analysis investigating self-reported and behavioral measures of inhibitory control demonstrated that obese individuals show difficulties in the effortful control necessary for inhibition (Lavagnino et al., 2016). Impulsiveness may thus contribute to weight gain by reducing one's capacity to resist food temptations, especially in the presence of negative emotions. Indeed, individuals with low inhibitory control tend to eat based on taste preference (despite nutritional value), food-related stimulation (e.g. watching someone eat), and negative emotional state (Jasinska et al., 2012). Besides inhibition, impulsiveness manifests in other forms, such as a lack of planning abilities that can lead to reckless actions. Enhanced effortful planning is a characteristic of Eating Disorders related to increased diet control and restriction (i.e. anorexia), whereas decreased planning skills are more common in bulimic disorders (Rosval et al., 2006).

Apart from psychological characteristics, biological and cultural components associated with sex also influence eating styles. Compared to men, women report an increased frequency of binge eating, EE, loss of control over eating, and compensatory behaviors distinctively associated with bulimia (e.g. vomiting, fasting) (Löffler et al., 2015; Striegel-Moore et al., 2009). In weight loss programs based on dieting, men tend to lose more

weight (both kg and kg/m²) than women, even when these programs are effective for both sexes (Williams et al., 2015). Exposition to male hormones (e.g. testosterone) has been suggested as protective for eating disorders, whilst female hormones (e.g. estradiol) interact with regulatory metabolism and can lead to food cravings and disordered eating (Klump et al. 2017; Krishnan et al., 2016). It is worth mentioning that these sex differences may also reflect cultural norms that affect men and women differently, notably concerning body shape and body image (Nasser, 2009).

Psychological factors such as impulsivity and depression, as well as sex-related biological and cultural factors, seem relevant to eating style. Therefore, a better understanding of the relationship of EE with associated factors could help health professionals to plan tailor-made interventions on eating behavior, especially on the prevention of unhealthy weight gain. Thus, the present study aimed at identifying significant predictors of EE in young adults. Emotional Eating was compared between males and females, between obese/overweight and normal-weight individuals and between highly impulsive individuals and the remaining sample. We further tested relationships among EE, impulsiveness, depression symptoms, eating style, and weight status. Men and women were also compared in other eating styles, impulsivity and depression symptoms.

Method

Participants and procedures

Two-hundred college students (127 females) between 18 and 29 years of age ($M = 22.0$, $SD = 2.73$) participated in this study. They were recruited by personal invitation in the University environment, such as cafeterias and hallways. After signing a consent form, they were brought to the laboratory, where they responded to an online questionnaire, available through the Sosci Survey ([socisurvey.de](https://www.socisurvey.de)) platform. The questionnaire was secured by a password so that only invited participants could access the website and any questions regarding the instruments could be readily answered by researchers and trained assistants. Participants

spent about ten to fifteen minutes to answer the entire questionnaire. They informed age, sex, race/ethnicity, height, and current weight. Participants had the guarantee in the written consent form that their data would be handled only by the researchers of this study. Inclusion criteria were as follows: age between 18-29 years; and enrollment in a University. There was no exclusion criterion. In agreement with national regulations, procedures were approved by the Ethics Committee of the Institute of Psychology (protocol number 67411317.0.0000.5334).

Measures

Three-Factor Eating Questionnaire (TFEQ-R21). The TFEQ-R21 (Natacci and Junior, 2011) was developed by Stunkard and Messick (1985); three dimensions evaluate eating styles in TFEQ-R21 (reliability for the current sample is displayed): Emotional Eating (EE; Cronbach $\alpha = .917$), Uncontrolled Eating (UE; $\alpha = .812$) and Cognitive Restraint (CR; $\alpha = .782$). Its factorial structure was confirmed in a Brazilian sample, with nine UE items, six EE items, and six CR items (Medeiros, Yamamoto, Pedrosa, & Hutz, 2016). Items are displayed on a four-point scale, except for the last item of CR, which requires a response on an eight-point scale. Uncontrolled Eating refers to overeating or to a disposition to eat in the presence of food-related stimuli. Cognitive Restraint is usually considered as dieting attempts and strategies employed to control food intake or weight gain.

Barratt Impulsiveness Scale (BIS-11). BIS-11 is a 30-item instrument, with responses on a four-point Likert scale. It was adapted and translated to Brazilian Portuguese with good psychometric properties, though its original factorial structure has not been confirmed (Malloy-Diniz et al., 2010, 2015; Vasconcelos, Malloy-Diniz, & Correa, 2012). A structure with two factors - Difficulties in Inhibitory Control (BIS-IC, $\alpha = .819$) and Non-Planning (BIS-NP, $\alpha = .666$) was chosen for this study, since it has been reported as more reliable for the version in Brazilian Portuguese (Malloy-Diniz et al., 2015). BIS-IC is thought to reflect both attentional and motor dimensions of impulsiveness, referring

to a general restlessness or a propensity to act without deliberation. BIS-NP encompasses lack of scrutiny towards future actions and events.

Depression, Anxiety, and Stress Scale (DASS-21). The DASS-21 evaluates three dimensions of negative affect with responses in a four-point Likert scale (Lovibond & Lovibond, 1995). This 21-item version has been widely used and its three-factor structure has been confirmed (Henry & Crawford, 2005). DASS-21 was translated and adapted to Brazilian Portuguese (Vignola & Tucci, 2014). In the present study, we tested the effect of depression ($\alpha = .889$), anxiety ($\alpha = .846$) and stress ($\alpha = .855$) symptoms.

Statistical Analyses

Descriptive statistics and Pearson's correlations were performed using all scale measures. Multivariate ANOVA was used to compare males and females in the variables BMI, EE, Uncontrolled Eating, Cognitive Restraint, Depression, BIS-11, BIS-IC, and BIS-NP. Differences in EE between obese/overweight ($n = 56$, $BMI \geq 25.0$) and normal weight/underweight participants ($n = 144$, $BMI < 25.0$) were assessed using a *t* test. EE was also compared between highly impulsive individuals (with a BIS-11 score of 72 or higher) and the remaining sample using a *t*-test. The cutoff point of 72 in the BIS-11 has been suggested by the literature to distinguish individuals with high impulsiveness (Reid et al., 2014; Stanford et al., 2009).

Variables significantly correlated to EE that would not violate the colinearity assumption were considered for the hierarchical regression model to predict EE. Previous literature was also examined for promising variables for the model. First, we tested a model with a single variable (BMI), rendering a significant prediction (R^2) of 6.6% in the variance of EE. Then, sex was added to the model, increasing its prediction to 12.1%. BIS-IC increased R^2 to 18.3%. Lastly, depression, anxiety, and stress symptoms were included, increasing explained variance to 23.8%. However, anxiety and stress were non-significant predictors ($p > .05$), and showed increased VIF (> 2.00), suggesting

collinearity problems. We excluded both variables and restarted the model as before, with only depression symptoms in the last step. The final model showed a total significant prediction of 23.5% of EE variance, with VIF values between 1.01 - 1.14. Autocorrelation of residuals was adequate, as revealed by inspection of the Durbin-Watson statistic (2.134). All models and all variables in the final model were statistically significant ($p < .01$). All analyses were performed using SPSS 22 (IBM Corporation), and in all cases a significance threshold of .05 was adopted.

Results

Demographics

Mean Body Mass Index (BMI) and Standard Deviation are shown on Table 1. According to the World Health Organization charts (De Onis & Habicht, 1996), 20 participants (10%) were below the threshold for normal weight ($BMI < 18.5$); 46 individuals (23%) presented overweight ($BMI \geq 25$) and 10 participants (5.0%) were considered obese ($BMI \geq 30$). Over three quarters of participants (76.5%, $n = 153$) reported being white, whereas 23% ($n = 46$) were black. One participant (0.5%) self-declared as native/indigenous.

Female participants reported significantly more EE than their male counterparts [$F(1, 198) = 9.84, p = .002, \eta^2 = .046$]. Males, on the other hand, showed greater scores for BIS-NP [$F(1, 198) = 4.77, p = .030, \eta^2 = .024$]. Men and women had no significant difference on BMI, Uncontrolled Eating, Cognitive Restraint, depression symptoms, inhibitory control and general impulsiveness. Mean scores for males and females are displayed on Table 1. Obese/overweight participants showed higher scores on EE than other participants [$t(198) = 2.74, p = .007, d = 0.431$]. We found 51 participants who would be categorized as "high impulsiveness" and compared their EE scores with the remaining participants. Impulsive individuals (with a BIS-11 score of 72 or higher) showed increased EE ($n = 51$; $M = 16.2$) in comparison to the remaining participants ($n = 149$; $M = 13.9$), $t(198) = 2.06, p = .003, d = 0.471$.

Correlations

Total BIS-11 impulsivity score correlated positively with Depression ($r = .230, p < 0.01$), Emotional Eating ($r = .184, p < 0.01$) and Uncontrolled Eating ($r = .159, p = .024$). Regarding the two factors of the BIS-11, EE presented a positive correlation with the BIS-IC dimension only ($r = .279,$

$p < 0.01$). Non-Planning impulsivity presented a negative and significant correlation with Cognitive Restriction ($r = -.235, p < 0.01$). Difficulties in Inhibitory Control also had a positive correlation with BMI ($r = .146, p = .039$). EE correlated positively with BMI ($r = .256, p < 0.01$). Table 1 shows all the correlations of the study.

Table 1 - Correlations and Sex Differences for Scores on BMI, Eating Style, Depression Symptoms, and Impulsivity

Variable	Total M (SD)	Females M (SD)	Males M (SD)	1	2	3	4	5	6	7
1. BMI	23.2 (4.14)	22.9 (4.30)	23.6 (3.85)							
2. EE	14.6 (4.76)	15.3* (4.67)	13.2 (4.66)	.256**						
3. UE	19.7 (4.64)	20.12 (4.63)	19.0 (4.61)	.133	.583**					
4. CR	14.2 (4.49)	14.6 (4.76)	13.7 (3.94)	.126	.172*	.112				
5. Depression	12.2 (10.3)	11.9 (10.2)	12.8 (10.5)	.095	.309*	.168*	.001			
6. BIS-11	63.9 (11.0)	63.6 (11.3)	64.4 (10.4)	.120	.184**	.159*	-.032	.230**		
7. BIS-IC	42.3 (8.27)	42.1 (8.77)	42.6 (7.38)	.146*	.279**	.273*	.064	.326**	.917**	
8. BIS-NP	17.3 (4.27)	16.8 (3.96)	18.2* (4.67)	.063	-.049	-.103	-.235**	.016	.727**	.429**

Note. M and SD represent mean and standard deviation. * indicates $p < .05$. ** indicates $p < .01$. * indicates significantly higher score (sex comparison: MANOVA, $p < .05$). BMI: Body Mass Index (kg/m^2); UE: Uncontrolled Eating; CR: Cognitive Restraint; BIS-11 total Barrat-11 score. BIS-IC: BIS-11 Inhibitory Control; BIS-NP: BIS-11 Non-Planning.

Predictive model for Emotional Eating

Hierarchical linear regression models were tested to predict EE with the independent variables BIS-IC, depression, sex, and BMI. The first model included only BMI and presented $r = .256, F(1, 198) = 13.94$; the second model added sex, resulting in $r = .349, F(2, 197) = 13.62$. The third model included BIS-IC, resulting in $r = .428, F(3,$

$196) = 14.64$. Finally, the fourth model included depression symptoms (after excluding anxiety and stress symptoms due to multicollinearity problems), with $r = .484, F(4, 195) = 14.94$, predicting 23.5% of the variance of EE.

BMI ($\beta = .229$) solely predicted 6.6% of the variance of the dependent variable. Female sex ($\beta = .247$) increased 5.6%, BIS-IC ($\beta = .174$) increased 6.2%,

and depression symptoms ($\beta = .240$) added 5.1% to the prediction. Betas are standardized and refer to the final model. All models were significant in a $p < .05$ level (Table 2). By including variables as single predictors in the model, we could observe that depression was the best sole predictor ($r = .10, p < .05$), and sex had the lowest predictive ability ($r =$

$.05, p < .05$). However, the variable sex contributes very similarly when included first or last in the predictive model (in the final model shown in Table 2, it is second to last). This indicates a significant part of the contribution of depression is shared with other variables, while the female sex has a low but rather exclusive contribution to predicting EE.

Table 2 - Hierarchical Regression

		B	SE	Beta	t	p	95% CI	
							Lower Bound	Upper Bound
1	BMI	.29	.08	.25	3.73	.000	.139	.450
2	BMI	.32	.08	.28	4.12	.000	.166	.469
	Sex	2.3	.66	.24	3.53	.001	1.033	3.641
3	BMI	.28	.08	.24	3.66	.000	.127	.424
	Sex	2.3	.64	.24	3.72	.000	1.118	3.639
	BIS-IC	.14	.04	.25	3.84	.000	.070	.219
4	BMI	.26	.07	.23	3.60	.000	.119	.407
	Sex	2.4	.62	.25	3.93	.000	1.217	3.665
	BIS-IC	.10	.04	.17	2.61	.010	.025	.176
	Depression	.11	.03	.24	3.62	.000	.050	.171

Discussion

This work might aid researchers interested on eating styles and clinicians who carry out interventions on eating habits. In a sample consisting of young college students, we were able to identify theoretically and clinically relevant predictors of EE. We also investigated relationships between EE, psychological and demographics variables, eating style and BMI.

As expected, women reported increased EE; it has been previously reported that women are more prone to eat under influence of negative emotions, and that result had already been observed on the Brazilian version of the TFEQ-R21 (Löffler et al., 2015; Medeiros et al., 2016). Biological and cultural aspects that differentiate men and women have been shown to interfere with eating behavior, such as hormonal profile, distinct brain activation for food images, incentive for sports,

and psychological pressure for thinness (Klump, Culbert, and Sisk, 2017; Nasser, 2009; Vari et al., 2016; Wang et al., 2009). Regarding impulsivity, men reported greater difficulties planning behavior, which is in accordance to previous findings of a meta-analysis by Cross, Copping, and Campbell (2011) in which men displayed unplanned imprudent behavior more frequently. Besides, highly impulsive individuals had higher EE scores, which corroborates with data in the literature that relate impulsivity to nutritional intake in emotionally negative situations (Van Blyderveen et al., 2016).

Obese and overweight individuals reported increased EE, in consonance with previous literature (Bénard et al., 2017). Moreover, BMI was significantly correlated to difficulties in inhibitory control, suggesting that impulsive individuals can be at risk of weight gain. It has been shown that individuals with obesity display increased

impulsivity on self-reported measures and behavioral tasks, such as the Go/NoGo, which challenges inhibition capacities (Lavagnino et al., 2016). The BIS-IC dimension analyzed in this study comprises attentional and motor impulsivity. These factors are critical to maintain or regain control over eating habits by avoiding food-related stimuli (Smith et al., 2018) or refraining to respond in customary patterns (e.g. overeating, binge eating) (Kakoschke et al., 2017).

A study with the Brazilian version of the TFEQ-R21 provides data-derived, theoretically oriented clusters for the distribution of eating styles in both sexes (Medeiros et al., 2016). One of these clusters is prominently feminine and displays emotional and uncontrolled eating styles, along with increased BMI. We also found a significant association between Uncontrolled Eating and EE scores. Some authors argue that EE is a stage of uncontrolled eating, in a continuum between healthy eating and severely disordered eating, such as bulimic behavior (Vainik et al., 2015). Future investigations could help clarify this controversy by applying a rationale to discriminate impulsive and compulsive characteristics evaluated by the TFEQ-R21 (Robbins, Gilan, Smith, de Wit, & Ersche, 2012). The Uncontrolled Eating dimension assesses both susceptibility to food stimulation (i.e. desire to eat elicited by food odor, watching someone eating etc.) and difficulty to stop eating (i.e. eating in the absence of hunger, overeating, loss of control etc.) – which may be differentiated based on impulsive and compulsive aspects, respectively.

Theoretical models developed to describe and interpret the relationship between negative affect and overeating are not fully supported by empirical research, possibly due to lack of suitable methods and adequate understanding of the variables involved, including EE itself (Bongers & Jansen, 2016). An approach based on neurocognitive systems of impulsivity and compulsivity is suggested to differentiate automatic actions towards food-related stimuli (impulsivity) from unadaptive recurrent stereotypical behavior (compulsivity) (Robbins et al., 2012).

This study should be interpreted considering its limitations: the sample might not be representative of individuals with different socioeconomic and educational status. There were no inclusion or exclusion criteria other than age, resulting in a sample that is not generalizable to people with Eating Disorders. Lastly, self-reported measures of EE are considered problematic due to their low predictive value, in addition to the difficulty in assessing eating behavior, emotional experience, and the relationship among these (Evers et al., 2009). Further studies may investigate the relationship between clinical and control groups, and include different assessment measures such as neuropsychological instruments and behavioral measures, in addition to psychometric scales.

Conclusion

Results from the current study can help health professionals tailor interventions for individuals struggling to regulate the interaction between negative emotions and eating behavior. The predictive model for EE in this sample involved female sex, increased BMI, depression symptoms and low inhibitory control. Impulsive individuals reported increased food intake during distress, especially if they were female. This eating style can lead to weight gain in the long term (Koenders & van Strien, 2011). Thus, interventions aiming to prevent or treat unhealthy weight gain and disordered eating should address self-control, negative affect, emotion regulation, and healthy habits, in consonance with sex-related innate and cultural differences. Capacity to plan is an important ability to project favorable behavior, and was significantly hindered in men, whereas women seemed more susceptible to eating under emotional distress. This study is relevant to understand the phenomenon of EE in young individuals, considering there are people who use food to regulate and escape emotions, or make hasty food-related decisions, possibly increasing the risk of Eating Disorders and unhealthy weight gain, besides having greater difficulty in the treatment of weight control.

References

- Bénard, M., Camilleri, G., Etilé, F., Méjean, C., Bellisle, F., Reach, G., Hercberg, S., & Péneau, S. (2017). Association between impulsivity and weight status in a general population. *Nutrients*, *9*(3), 217-230. <https://doi.org/10.3390/nu9030217>
- Bongers, P., & Jansen, A. (2016). Emotional Eating Is Not What You Think It Is and Emotional Eating Scales Do Not Measure What You Think They Measure. *Frontiers in Psychology*, *7*, 1-11. <https://doi.org/10.3389/fpsyg.2016.01932>
- Braden, A., Flatt, S., Boutelle, K., Strong, D., Sherwood, N., & Rock, C. (2016). Emotional eating is associated with weight loss success among adults enrolled in a weight loss program. *Journal of Behavioral Medicine*, *39*(4), 727-732. <https://doi.org/10.1007/s10865-016-9728-8>
- Cross, C. P., Copping, L. T., & Campbell, A. (2011). Sex differences in impulsivity: a meta-analysis. *Psychological Bulletin*, *137*(1), 97-130. <https://psycnet.apa.org/doi/10.1037/a0021591>
- Delinsky, S. S., & Wilson, G. T. (2008). Weight gain, dietary restraint, and disordered eating in the freshman year of college. *Eating Behaviors*, *9*(1), 82-90. <https://doi.org/10.1016/j.eatbeh.2007.06.001>
- De Onis, M., & Habicht, J. P. (1996). Anthropometric reference data for international use: recommendations from a World Health Organization Expert Committee. *The American journal of clinical nutrition*, *64*(4), 650-658. <http://doi.org/10.1093/ajcn/64.4.650>
- Evers, C., de Ridder, D. T., & Adriaanse, M. A. (2009). Assessing yourself as an emotional eater: Mission impossible?. *Health Psychology*, *28*(6), 717-725. <https://psycnet.apa.org/doi/10.1037/a0016700>
- Frayn, M., & Knäuper, B. (2017). Emotional Eating and Weight in Adults: a Review. *Current Psychology*, *37*(4), 924-933. <https://doi.org/10.1007/s12144-017-9577-9>
- Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, *44*(2), 227-239. <https://doi.org/10.1348/014466505X29657>
- Jasinska, A. J., Yasuda, M., Burant, C. F., Gregor, N., Khatri, S., Sweet, M., & Falk, E. B. (2012). Impulsivity and inhibitory control deficits are associated with unhealthy eating in young adults. *Appetite*, *59*, 738-747. <https://doi.org/10.1016/j.appet.2012.08.001>
- Kakoschke, N., Kemps, E., & Tiggemann, M. (2017). The effect of combined avoidance and control training on implicit food evaluation and choice. *Journal of Behavior Therapy and Experimental Psychiatry*, *55*, 99-105. <https://doi.org/10.1016/j.jbtep.2017.01.002>
- Clump, K. L., Culbert, K. M., & Sisk, C. L. (2017). Sex differences in binge eating: Gonadal hormone effects across development. *Annual Review of Clinical Psychology*, *13*, 183-207. <https://doi.org/10.1146/annurev-clinpsy-032816-045309>
- Koenders, P. G., & van Strien, T. (2011). Emotional eating, rather than lifestyle behavior, drives weight gain in a prospective study in 1562 employees. *Journal of Occupational and Environmental Medicine*, *53*(11), 1287-1293. <https://doi.org/10.1016/j.jappet.2012.08.009>
- Kontinen, H., Männistö, S., Sarlio-Lähteenkorva, S., Silventoinen, K., & Haukkala, A. (2010). Emotional eating, depressive symptoms and self-reported food consumption. A population-based study. *Appetite*, *54*(3), 473-479. <https://doi.org/10.1016/j.jappet.2010.01.014>
- Krishnan, S., Tryon, R. R., Horn, W. F., Welch, L., & Keim, N. L. (2016). Estradiol, SHBG and leptin interplay with food craving and intake across the menstrual cycle. *Physiology & Behavior*, *165*, 304-312. <https://doi.org/10.1016/j.physbeh.2016.08.010>
- Lasserre, A. M., Glaus, J., Vandeleur, C. L., Marques-Vidal, P., Vaucher, J., Bastardot, F., Waeber, G., Vollenweider, P., & Preisig, M. (2014). Depression with atypical features and increase in obesity, body mass index, waist circumference, and fat mass: a prospective, population-based study. *JAMA Psychiatry*, *71*(8), 880-888. <http://doi.org/10.1001/jamapsychiatry.2014.411>
- Lazarevich, I., Camacho, M. E. I., del Consuelo Velázquez-Alva, M., & Zepeda, M. Z. (2016). Relationship among obesity, depression, and emotional eating in young adults. *Appetite*, *107*, 639-644. <https://doi.org/10.1016/j.appet.2016.09.011>
- Lavagnino, L., Arnone, D., Cao, B., Soares, J. C., & Selvaraj, S. (2016). Inhibitory control in obesity and binge eating disorder: A systematic review and meta-analysis of neurocognitive and neuroimaging studies. *Neuroscience & Biobehavioral Reviews*, *68*, 714-726. <https://doi.org/10.1016/j.neubiorev.2016.06.041>
- Litwin, R., Goldbacher, E. M., Cardaciotto, L., & Gambrel, L. E. (2016). Negative emotions and emotional eating: the mediating role of experiential avoidance. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *22*, 97-104. <https://doi.org/10.1007/s40519-016-0301-9>
- Löffler, A., Luck, T., Then, F. S., Sikorski, C., Kovacs, P., Bötcher, Y., Breitfeld, J., Yönces, A., Horstmann, A., Löffler, M., Engel, C., Thiery, J., Villringer, A., Stumvoll, M., & Riedel-Heller, S. G. (2015). Eating behaviour in the general population: An analysis of the factor structure of the German version of the three-factor-eating-questionnaire (TFEQ) and its association with the body mass index. *PLoS One*, *10*(7), 1-11. <https://doi.org/10.1371/journal.pone.0133977>
- López-Guimerà, G., Dashti, H. S., Smith, C. E., Sánchez-Carcedo, D., Ordovas, J. M., & Garaulet, M. (2014). CLOCK 3111 T/C SNP interacts with emotional eating behavior for weight-loss in a Mediterranean population. *PLoS One*, *9*(6), e99152. <https://doi.org/10.1371/journal.pone.0099152>
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*(3), 335-343. [https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U)

- Malloy-Diniz, L. F., Mattos, P., Leite, W. B., Abreu, N., Coutinho, G., Paula, J. J. D., Tavares, H., Vasconcelos, A. G., & Fuentes, D. (2010). Tradução e adaptação cultural da Barratt Impulsiveness Scale (BIS-11) para aplicação em adultos brasileiros. *Jornal Brasileiro de Psiquiatria*, 59(2), 99-105. <http://dx.doi.org/10.1590/S0047-20852010000200004>
- Malloy-Diniz, L. F., De Paula, J. J., Vasconcelos, A. G., De Almondes, K. M., Pessoa, R., Faria, L., Coutinho, G., Costa, D. S., Duran, V., Coutinho, T. V., Corrêa, H., Fuentes, D., Abreu, N., & Mattos, P. (2015). Normative data of the barratt impulsiveness scale 11 (BIS-11) for Brazilian adults. *Revista Brasileira de Psiquiatria*, 37(3), 245-248. <http://dx.doi.org/10.1590/1516-4446-2014-1599>
- Medeiros, A. C. Q. de, Yamamoto, M. E., Pedrosa, L. F. C., & Hutz, C. S. (2017). The Brazilian version of the three-factor eating questionnaire-R21: psychometric evaluation and scoring pattern. *Eating and Weight Disorders*, 22(1), 169-175. <https://doi.org/10.1007/s40519-016-0256-x>
- Nasser, M. (2009). Eating disorders across cultures. *Psychiatry*, 8(9), 347-350. <https://doi.org/10.1016/j.mppsy.2009.06.009>
- Natacci, L. C., & Junior, M. F. (2011). The three factor eating questionnaire - R21: Tradução para o português e aplicação em mulheres brasileiras. *Revista de Nutrição*, 24(3), 383-394. <http://dx.doi.org/10.1590/S1415-52732011000300002>
- Nicholls, W., Devonport, T. J., & Blake, M. (2016). The association between emotions and eating behaviour in an obese population with binge eating disorder. *Obesity Reviews*, 17(1), 30-42. <https://doi.org/10.1111/obr.12329>
- Reid, R. C., Cyders, M. A., Moghaddam, J. F., & Fong, T. W. (2014). Psychometric properties of the Barratt Impulsiveness Scale in patients with gambling disorders, hypersexuality, and methamphetamine dependence. *Addictive behaviors*, 39(11), 1640-1645. <http://dx.doi.org/10.1016/j.addbeh.2013.11.008>
- Robbins, T. W., Gillan, C. M., Smith, D. G., de Wit, S., & Ersche, K. D. (2012). Neurocognitive endophenotypes of impulsivity and compulsivity: towards dimensional psychiatry. *Trends in Cognitive Sciences*, 16(1), 81-91. <https://doi.org/10.1016/j.tics.2011.11.009>
- Rosval, L., Steiger, H., Bruce, K., Israël, M., Richardson, J., & Aubut, M. (2006). Impulsivity in women with eating disorders: problem of response inhibition, planning, or attention?. *International Journal of Eating Disorders*, 39(7), 590-593. <https://doi.org/10.1002/eat.20296>
- Smith, E., Treffletti, A., Bailey, P. E., & Moustafa, A. A. (2018). The effect of attentional bias modification training on food intake in overweight and obese women. *Journal of Health Psychology*, 1-11. <https://doi.org/10.1177/02781359105318758856>
- Stanford, M. S., Mathias, C. W., Dougherty, D. M., Lake, S. L., Anderson, N. E., & Patton, J. H. (2009). Fifty years of the Barratt Impulsiveness Scale: An update and review. *Personality and Individual Differences*, 47(5), 385-395. <https://doi.org/10.1016/j.paid.2009.04.008>
- Striegel-Moore, R. H., Rosselli, F., Perrin, N., DeBar, L., Wilson, G. T., May, A., & Kraemer, H. C. (2009). Gender difference in the prevalence of eating disorder symptoms. *International Journal of Eating Disorders*, 42(5), 471-474. <https://doi.org/10.1002/eat.20625>
- Urbanek, J. K., Metzgar, C. J., Hsiao, P. Y., Piehowski, K. E., & Nickols-Richardson, S. M. (2015). Increase in cognitive eating restraint predicts weight loss and change in other anthropometric measurements in overweight/obese premenopausal women. *Appetite*, 87, 244-250. <https://doi.org/10.1016/j.appet.2014.12.230>
- Vainik, U., Neseliler, S., Konstabel, K., Fellows, L. K., & Dagher, A. (2015). Eating traits questionnaires as a continuum of a single concept. Uncontrolled eating. *Appetite*, 90, 229-239. <https://doi.org/10.1016/j.appet.2015.03.004>
- Vari, R., Scaccocchio, B., D'Amore, A., Giovannini, C., Gessani, S., & Masella, R. (2016). Gender-related differences in lifestyle may affect health status. *Annali dell'Istituto Superiore di Sanita*, 52(2), 158-166. <http://doi.org/10.4415/ANN.16.02.06>
- Van Blyderveen, S., Lafrance, A., Emond, M., Kosmerly, S., O'Connor, M., & Chang, F. (2016). Personality differences in the susceptibility to stress-eating: The influence of emotional control and impulsivity. *Eating Behaviors*, 23, 76-81. <https://doi.org/10.1016/j.eatbeh.2016.07.009>
- Van Strien, T. (2018). Causes of emotional eating and matched treatment of obesity. *Current diabetes reports*, 18, 1-8. <https://doi.org/10.1007/s11892-018-1000-x>
- Van Strien, T., Frijters, J. E., Bergers, G. P., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International journal of eating disorders*, 5(2), 295-315. [https://doi.org/10.1002/1098-108X\(198602\)5:2<295::AID-EAT2260050209>3.0.CO;2-T](https://doi.org/10.1002/1098-108X(198602)5:2<295::AID-EAT2260050209>3.0.CO;2-T)
- Van Strien, T., Konttinen, H., Homberg, J. R., Engels, R. C., & Winkens, L. H. (2016). Emotional eating as a mediator between depression and weight gain. *Appetite*, 100, 216-224. <https://doi.org/10.1016/j.appet.2016.02.034>
- Vignola, R. C. B., & Tucci, A. M. (2014). Adaptation and validation of the depression, anxiety and stress scale (DASS) to Brazilian Portuguese. *Journal of Affective Disorders*, 155(1), 104-109. <https://doi.org/10.1016/j.jad.2013.10.031>
- Wang, G. J., Volkow, N. D., Telang, F., Jayne, M., Ma, Y., Pradhan, K., Zhu, W., Wong, C. T., Panayotis, K. T., Geliebter, A., Biegan, A., & Fowler, J. S. (2009). Evidence of gender differences in the ability to inhibit brain activation elicited by food stimulation. *Proceedings of the National Academy of Sciences*, 106, 1249-1254. <https://doi.org/10.1073/pnas.0807423106>
- Williams, R. L., Wood, L. G., Collins, C. E., & Callister, R. (2015). Effectiveness of weight loss interventions—is there a difference between men and women: a systematic review. *Obesity Reviews*, 16(2), 171-186. <https://doi.org/10.1111/obr.12241>

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