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Research Article

Structural Model of Impulsivity and Food Addiction with the Mediating Role of Food Craving and Emotional Processing

Manijeh Mohebbi Rad[1], Amin Rafiepoor[2*], Mojgan sepahmansour[3], Sadegh Taghiloo[4]

1.PhD Student, Department of Health Psychology, Central Tehran Branch, Islamic Azad University, Tehran, Iran.
2.Department of Psychology, Payame Noor University, Tehran, Iran
3.Professor, Department of Psychology, Central Tehran Branch, Islamic Azad University, Tehran, Iran
4.Department of Psychology, Astara Branch, Islamic Azad University, Guilan, Iran

Correspondence:

Amin Rafiepoor

Email:

rafiepoor@pnu.ac.ir

Abstract

Objective: The present study was conducted to investigate the potential role of food craving and emotional processing in explaining and predicting the relationship between impulsivity and food addiction.

Method: This study was descriptive and correlational research. The statistical population included all people with obesity who were referred to the health centers and nutrition clinics in Tehran in the spring and summer of 2023. In this research, 357 participants were selected through the convenience sampling method. Body mass index, the Barratt Impulsiveness Scale (Fossati et al., 2001), the Yale food addiction scale (Gerhard et al., 2009), the food craving questionnaire - trait (Sepda Benito et al., 2000), and the Emotional processing scale (Baker et al., 2007) were used to collect data. Data were analyzed using structural equation modeling through Amos24 software.

Results: The results showed that the model fits appropriately with the observed data. The coefficient of the direct path of impulsivity and food addiction was positive and significant. The indirect relationship between impulsivity and food addiction through food craving and emotional processing was also positive and significant. This finding indicates that both emotional processing and food craving mediate the relationship between impulsivity and food addiction positively and meaningfully.

Conclusion: It seems that emotional processing problems and impulsivity play a significant role in the etiology and continuation of pathological eating, and focusing on the interaction of these factors can be beneficial in the prevention and treatment of eating problems in overweight and obese people.

Keywords: Impulsivity, Food addiction, Food craving, Emotional processing, Health.

How to Cite

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Extended Abstract

Background and Objectives

Obesity and related health issues impact millions worldwide, including Iran (Esdalahi et al., 2023). Pathological eating behaviors and obesity are linked to psychological issues like depression and anxiety (MaltaisLévesque et al., 2025). In Iran, 2016 data showed 60.9% of adults were overweight and 25.8% obese (Esdalahi et al., 2023).

Research links certain eating behaviors, especially towards palatable foods, to addiction. Randolph (1956) coined “food addiction” to describe compulsive overeating, suggesting that it affects brain functions related to reward and decision-making, leading to compulsive behavior (RevanCortiz et al., 2024; Ravichandran et al., 2024).

A core aspect of food addiction is craving: a powerful, persistent urge to consume specific foods (Meule & Blechert, 2017). Research links heightened stress and feelings of loss of control to increased cravings and food intake (Filippon, 2022). Neuroimaging reveals that increased connectivity within brain reward networks correlates with higher food craving scores, supporting the neurobiological basis of cravings (Nolan, 2024).

Impulsivity is strongly implicated in food addiction and craving (GasparPérez, 2025). Individuals with binge eating disorder who also meet criteria for food addiction show higher impulsivity than those without food addiction (Minhas, 2021). Thus, impulsivity may drive uncontrolled eating and addictive food consumption (RevanCortez et al., 2024).

Emotional processing and regulation are important in understanding obesity and food addiction. Many people with these issues use emotional eating as a coping method. Problems with processing emotions are linked to binge eating and strong cravings. Stress and negative feelings can lead to impulsive eating as a way to manage mood, highlighting the relationship between emotions and eating habits (Estévez, 2024). Negative emotions may thus fuel maladaptive eating through interactions between affect, impulsivity, and craving.

Despite evidence for pairwise relationships among impulsivity, craving, emotional regulation, and food addiction, integrated models testing these simultaneously in obese populations are scarce. This study aimed to test a structural model linking impulsivity to food addiction mediated by food craving and emotional processing in obese adults. The research question was whether food craving and emotional processing difficulties mediate the impulsivity–food addiction relationship.

Materials and Methods

This descriptive correlational study used structural equation modeling (SEM). The population included obese adults attending health centers and nutrition clinics in Tehran during spring and summer 2023. Following guidelines (Schumacker & Lomax, 2004), 357 participants were recruited through convenience sampling. Questionnaires were administered in a single session using counterbalancing to mitigate order effects.

Barratt Impulsiveness Scale 11: 30 items assessing inattentive, motor, and non-planning impulsivity. Higher scores indicate greater impulsivity. Previous $\alpha = 0.84$; in this study, $\alpha = 0.76$ (Fossati et al., 2001; McLeish & Oxoby, 2006).

Yale Food Addiction Scale: 27 items covering nine symptom domains, 0–4 Likert scale. Original $\alpha = 0.86$; Persian $\alpha = 0.87$; in this study $\alpha = 0.74$ (Gearhardt etal., 2009; Panahi & Hakhat, 2018).

Food Craving Questionnaire–Trait: 39 items across nine subscales on a 6-point Likert; higher scores indicate greater craving. Original $\alpha = 0.97$; Persian α between 0.79 and 0.96; this study $\alpha = 0.91$ (CepedaBenito et al., 2000; Kechoui & Ashrafi, 2015).

Emotional Processing Scale: 25 items over five dimensions, 5-point Likert scale. Original $\alpha = 0.92$; Iranian $\alpha = 0.95$; current study $\alpha = 0.66$ (Baker et al., 2007; Lotfi et al., 2016).

Model fit was assessed via χ^2/df, RMSEA, GFI, AGFI, and CFI indices. Path coefficients (standardized β), direct, indirect, and total effects were calculated. Multicollinearity was checked through VIF and tolerance. Normality was assessed by skewness and kurtosis.

Results

Among 357 participants, 148 were male (41.5%) and 209 were female (58.5%), with a mean age of 29.40 years (SD = 5.94). BMI distribution: 12.6% <31; 36.3% between (32–34); 24.6% (35–37); and 25.5% >37. Correlations among impulsivity, craving, emotional processing, and food addiction were positive and significant (Table 1). Skewness and

kurtosis were within ±2, supporting normality. Multicollinearity diagnostics showed tolerance >0.10 and VIF <10.
SEM indicated good model fit: $\chi^2/df = 2.38$, RMSEA = 0.062, CFI = 0.933, GFI = 0.916, AGFI = 0.890. The model explained 56% of the variance in food addiction ($R^2 = 0.56$).
Path estimates (Table 3):

- Impulsivity → Food Craving: $\beta = 0.239$, $p < 0.001$
- Impulsivity → Emotional Processing: $\beta = 0.464$, $p < 0.001$
- Food Craving → Food Addiction: $\beta = 0.417$, $p < 0.001$
- Emotional Processing → Food Addiction: $\beta = 0.269$, $p < 0.001$
- Direct Impulsivity → Food Addiction: $\beta = 0.362$, $p < 0.001$
- Indirect Impulsivity → Food Addiction via mediators: $\beta = 0.224$, $p < 0.001$
- Total Impulsivity → Food Addiction: $\beta = 0.586$

Mediation analysis confirmed food craving ($\beta\_indirect = 0.100$, $p < 0.01$) and emotional processing ($\beta\_indirect = 0.124$, $p < 0.01$) significantly mediated the impulsivity–food addiction relationship (Baron & Kenny, 1986).

Discussion and Conclusion

This study confirms that impulsivity influences food addiction directly and indirectly. Food craving and difficulties in emotional processing mediate the indirect effect. The positive direct effect aligns with prior findings that link trait impulsivity to addictive eating (RevanCortiz et al., 2024; Ravichandran et al., 2024; Pursey et al., 2024; GasparPérez, 2023; Minhas, 2021). Impulsive individuals have reduced inhibitory control and a greater sensitivity to immediate rewards, such as palatable foods, favoring instant gratification over long-term goals (Gaspar Pérez et al., 2023; Leehr et al., 2023). Neurologically, dysregulation in dopamine reward pathways and prefrontal control areas may underpin these tendencies (Ravichandran et al., 2024).

The indirect effect via food craving shows that impulsivity increases appetitive urges. These urges then promote addictive eating. This aligns with research showing that impulsivity predicts increased food craving and problematic consumption (Nolan, 2024; Meule & Blechert, 2017). Impulsive traits undermine planning and self-monitoring, enabling craving escalation.

Emotional processing as a mediator highlights that impulsivity may impair affect regulation. This may predispose individuals to food addiction. This concurs with literature linking emotion dysregulation to eating addiction (Estévez, 2024; Ribeiro et al., 2023). Negative emotions may deplete cognitive resources, weaken inhibitory control, and trigger compulsive eating.

The findings suggest that negative affects lead to cravings and compulsive eating. Impulsivity makes this worse. Comfort eating can become compulsive and eventually lead to cravings.

Introduction

Millions of people around the world, including in Iran, suffer from obesity and its physical consequences, such as diabetes and cardiovascular diseases (Esdalahi et al., 2023). Also, pathological eating and obesity are associated with the onset of a range of psychological consequences, such as depression and anxiety (Maltais-Lévesque, Legendre, & Bégin, 2025; Basharpour, Anbari, & Mohajeri, 2019). In 2016, the rate of overweight and obesity in Iranian adults reached 60.9% and 25.8% (Esdalahi et al., 2023). By 2035, the prevalence of overweight and obesity in the world is predicted to be 51% (Percy et al., 2024). Food, especially highly palatable foods, can be addictive (Rossi, 2025). The term food addiction was first coined by Randolph (1956) as "a common pattern of symptoms that are descriptively similar to those of other addictive processes" (Revan-Cortiz et al., 2024). According to the "food addiction" theory, exposure to food and excessive consumption of food cause changes in brain circuits such as brain reward circuits, decision-making, control, habit formation, and emotions that are the focus of drug addiction and lead to behavioral addiction and compulsive overeating (Ravichandran et al., 2024).

Craving for food, as a strong driving force for obesity, is considered the main structure of food addiction (Meule & Blechert, 2017). Food craving is a condition in which people consume food they crave —a potent, persistent desire that can be due to nutritional deficiencies, boredom, or dietary restrictions. Researchers have found that perceived tension (intrapersonal and interpersonal) and a sense of loss of control are associated with increased food cravings and consumption (Filippon et al., 2022). Increased connectivity between regions of the reward network has a positive correlation with food craving questionnaire scores, which indicates higher food cravings in people with food addiction (Nolan, 2024).

There is a high correlation between impulsivity and food addiction (Gaspar-Pérez et al., 2025; 2023) and between food craving and food consumption (Miol & Blichert, 2017). Impulsivity, impulse control problems, and impaired inhibition increase people's vulnerability to developing eating disorders and food addiction (Kidd & Lexton, 2021). Research has shown that overweight individuals with binge eating disorder who also have a food addiction diagnosis act more impulsively than individuals who do not meet the criteria for food addiction (Minhas et al., 2021). Thus, impulsivity may be a key factor associated with binge eating and food addiction in individuals struggling with weight issues (Revan-Cortez et al., 2024).

Another variable that is related to impulsivity, food addiction, and food craving is emotional processing. Many obese people who suffer from cravings and food addiction experience emotional eating both in response to unpleasant emotions and in response to pleasant emotions (Homayounpour, Sirfi, & Qara, 2022), which may be a mechanism to process and regulate their emotions. Research has confirmed the relationship between emotion processing and regulation problems with food addiction (Haque et al., 2017). Also, binge eating and food cravings, as forms of impulsive behavior, can be rooted in problems with emotion processing and regulation (Estévez et al., 2024). During stressful events, individuals may exhibit increased impulsive behaviors, such as binge eating and other unhealthy eating behaviors (Forsen-Mantilla et al., 2022). This is likely due to interactions between affective states, impulsivity, and addictive behaviors, as well as emotional processing and regulation difficulties (Forsen-Mantilla et al., 2022). In such a situation, maladaptive eating behaviors in people with food addiction act as a coping mechanism in response to anxiety and stress (Ribro et al., 2023). In other words, unpleasant emotional states cause people to use maladaptive coping strategies, such as increasing food consumption, to suppress negative emotions (Jacques-Tiora et al., 2021).

In 2016, thIn 2016, 60.9% of Iranian adults were overweight and 25.8% were obese (Ritchie & Roser, 2017). Obesity raises the risk of diseases like high blood pressure and cardiovascular conditions. It also puts mental health at risk; people with obesity face higher rates of depression and anxiety (Chapela et al., 2024). Socially, obesity can promote isolation by lowering self-esteem and increasing discrimination (Nolan, 2024). People with obesity miss more workdays and work less efficiently. Identifying what causes obesity is key to prevention and treatment. Researchers believe that analyzing a food addiction model helps clarify the components involved in weight gain and obesity. This approach also supports the design of effective interventions. Therefore, it is important to examine the direct and indirect effects of psychological variables — such as impulsivity, food cravings, and emotional processing — on food addiction. Literature reviews show that researchers have not yet studied the interactive or causal effects of impulsivity, food craving, and emotional processing together in one conceptual model for obese people. Thus, this study asks whether the food addiction structural model, based on impulsivity and with food craving and emotional processing as mediators, fits experimental data. More specifically, the question is whether food craving and emotional processing mediate the link between food addiction and impulsivity in obese people.

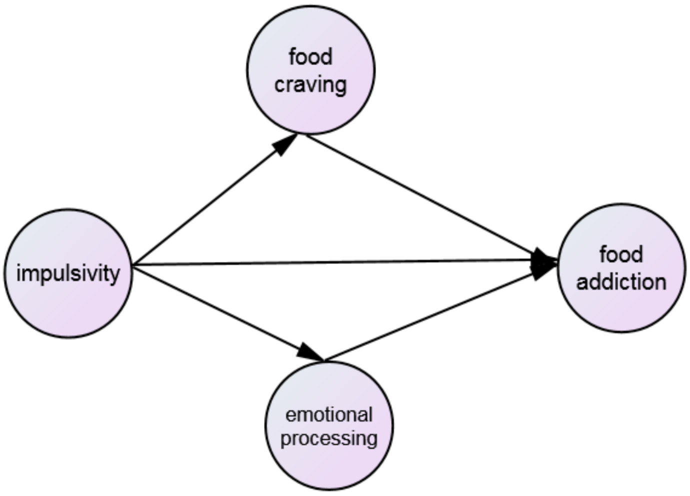

Figure 1- Proposed research model

Method

The research method was descriptive and correlational (using structural equation modeling). The statistical population comprised all obese individuals referred to health centers and nutrition clinics in Tehran during the spring and summer of 2023. In recent years, the ratio of the subject to the estimated parameters has been widely used by researchers. Based on this method, a ratio of 5:1 subjects to the estimated parameters yields a small sample size; 10:1 is a suitable sample size; and 20:1 is an optimal sample size (Schumacker & Lomax, 2004). Among them, 357 people were selected using convenience sampling. After obtaining management approval for the health and nutrition clinics, the topic and purpose of the research were discussed with obese patients, and the questionnaires were distributed to the participants. First, a demographic questionnaire was administered to the subjects, and, if they met the research criteria (body mass index above 30, high school diploma or higher, age 18 to 40), the other research questionnaires were presented to them. If the participants were pregnant, had sleep disorders, or had physical diseases that lead to overeating, such as ulcerative colitis or Crohn's disease, the use of psychoactive drugs, and mental disorders, they were excluded from the study. Participants completed the questionnaires individually during a single session. To avoid potential bias in responses to questionnaire items and to strengthen the validity of the collected results, the counterbalance method was used. That is, the order in which the questionnaires were given to the subjects was not fixed or uniform. By changing the order in which the questionnaires were presented, an effort was made to maintain the validity of the answers. After collecting the data and removing distorted and statistical outliers in the initial evaluation, the questionnaires that were complete and accurate were entered into the analysis.

Ethical Statement

All participants were informed of the research objectives and assured that their names and data would be kept confidential at all stages of the research, and that they had the right to withdraw from the study at any time.

Measures

Barratt Impulsiveness Scale-11: This 30-item measure, developed by Fossati et al. (2001), assesses hasty decision-making and lack of foresight across three subscales: inattentive, motor, and non-planning impulsivity. Higher scores indicate greater impulsivity. Its validity is supported by a Cronbach's alpha of 0.84 and significant correlations between subscales and total score (0.25–0.80) (McLeish & Oxoby, 2006). Ekhtiary et al. (2007) further validated the scale by correlating it with Eysenck's impulsivity questionnaire (r = 0.295), Dickman's impulsivity scale (r = 0.551), and Zuckerman's excitement-seeking questionnaire (r = 0.133). Javed et al. (2013) confirmed convergent validity through subscale correlations. The total impulsivity score correlated with the non-planning factor (0.80), motor factor (0.74), and cognitive factor (0.47). Overall scale validity was 0.81 (Cronbach's alpha) and 0.77 (retest). In the present study, Cronbach's alpha was 0.76.

Yale food addiction scale (YFAS): This scale was designed by Gerhard et al. (2009) to determine the dependence and symptoms of food addiction. This 27-option scale includes nine subscales and is graded on a Likert scale from 0 to 4. Gerhard et al. (2009) reported a Cronbach's alpha coefficient of 0.86 for the scale, indicating sufficient internal validity. Its reliability coefficient has been reported as 0.85 by the test-retest method within a week. By examining the validity and reliability of this scale in Iranian society, Panahi and Hakhat (2018) found that the scale demonstrated acceptable factor loadings for each item in an exploratory factor analysis. In the validity check, using the correlation between items and the total score, all items correlated significantly with the total score, indicating the scale's ability to distinguish items, and the total score's Cronbach's alpha coefficient was 0.87. Also, Cronbach's alpha coefficient on the scale was 0.74.

The Food Craving Questionnaire-Trait (FCQ-T), designed by Cepeda-Benito et al. (2000), consists of 39 questions in nine components. Using a six-point Likert scale, it measures food cravings in adults, with scores ranging from 39 to 234; higher scores indicate greater cravings. Both English and Spanish versions show good validity and reliability (Cronbach's alpha = 0.97). Kechoui and Ashrafi (2015) found strong correlations with external eating, emotional eating, and diet-related worry, and a weak correlation with restrained eating, supporting the questionnaire's convergent and divergent validity. The Persian version shows good internal consistency (Cronbach's alpha = 0.79-0.96) and test-retest reliability (0.76-0.86). In this study, the Cronbach's alpha for the entire questionnaire was 0.91.

Emotional Processing Scale: This 25-item scale, designed by Baker et al. (2007), measures emotional processing styles and includes five components, each scored on a 5-point Likert scale (not at all to extremely). Notably, Baker et al. investigated the scale's factor structure using an exploratory factor analysis and extracted five factors. Moreover, test designers reported Cronbach's alpha and retest coefficients of the scale as 0.92 and 0.79, respectively. In Iran, Lotfi, Abolghasemi, and Narimani (2016) contributed further evidence by reporting a correlation coefficient of 0.54 between this scale and the emotion regulation scale, indicating convergent validity. Additionally, they reported the questionnaire's Cronbach's alpha coefficient as 0.95. In the present study, the Cronbach's alpha coefficient of this scale was 0.66.

The data was analyzed using the structural equation modeling method by using AMOS 24.0 software and Maximum Likelihood (ML) estimation.

Results

In the current study, 148 males (41.5%) and 209 females (58.5%) participated, with an average age of 29.40 and a standard deviation of 5.94, respectively. The body mass index (BMI) of participants is categorized as follows: 48 participants (12.6%) have a BMI less than 31; 130 participants (36.3%) have a BMI from 31 to less than 35; 88 participants (24.6%) have a BMI from 35 to less than 38; and 91 participants (25.5%) have a BMI of 38 or higher. Table 1 presents the means, standard deviations, and correlation coefficients for the research variables.

Variable	1	2	3	4	Mean	SD	skewness	stretching	tolerance coefficient	Variance inflation
food addiction	**1**				8.13	5.18	0.610	-0.410	-	-
impulsiveness	0.401**	1			31.60	6.88	0.942	1.16	0.860	1.163
craving for food	0.540**	0.189**	1		123.76	32.40	-0.428	-1.04	0.840	1.190
Emotional processing	0.536**	0.37**	0.397**	1	63.89	15.92	0.941	1.675	0.751	0.331

Table 1: Mean, correlation, deviation, and correlation coefficients of research variables

Table 1 presents the correlation coefficients between variables, aligning with research expectations and theories. The variables' stretching and skewness values are within ±2, supporting the normality assumption for univariate data. Collinearity was assessed using variance inflation factors (VIFs) and tolerance coefficients. The predictors' tolerance coefficients exceeded 0.1, and VIF values were below 10, confirming that collinearity was not violated. The model was analyzed via structural equation modeling. Table 2 summarizes the model's fit indices.

Table 2- The fit indices of the research model

Fit indices	CFI[5]	AGFI[4]	GFI[3]	RMSEA[2]	$df^{1۲}/\chi$	df	Chi-Squre
model	0.933	0.890	0.916	0.062	2.38	131	311.35
cutting point	0.90>	0.850>	0.90>	0.08<	>3	-	-

Table 2 shows all fit indices support the acceptable fit of the model with the collected data (χ^2/df=2.38, CFI=0.933, GFI=0.916, AGFI=0.890, and RMSEA=0.062). Table 3 shows the path coefficients in the structural model. Table 3 shows the path coefficients in the structural model.

Table 3- Direct, indirect, and total path coefficients between the research variables in the structural model

Path	b	SE	β	p
Path coefficient between impulsivity ⟶ and craving for food	3.380	0.914	0.239	0.001
Path coefficient between impulsivity ⟶ and Emotional processing	0.639	0.143	0.464	0.001
Path coefficient between food craving ⟶ and food addiction	0.006	0.001	0.417	0.001

Path coefficient between emotional processing → and food addiction	0.040	0.008	0.269	0.001
Direct path coefficient between impulsivity → and food addiction	0.073	0.016	0.362	0.001
Indirect path coefficient between impulsivity → and food addiction	0.045	0.011	0.224	0.001
Total path coefficient between impulsivity → and food addiction	0.119	0.021	0.586	0.001

Table 3 shows that the path coefficient between food craving (β=0.417, P<0.01) and emotional processing (β=0.269, P<0.01) is positive, with food addiction at the 0.01 level. The direct path coefficient between impulsivity and food addiction is β = 0.362 (P > 0.01). The indirect path coefficient is β = 0.224 (P > 0.01); both are positive and significant at the 0.01 level. Although this finding shows that food craving and emotional processing mediate the relationship between impulsivity and food addiction in obese people, the significance of each of these mediators was not meaningful. Therefore, Baron and Kenny's formula (1986, cited by Malenkrot et al., 2006) was used. Applying this formula showed that the indirect effect of impulsivity on food addiction via food craving (p<0.01, β=0.100) and via emotional processing (p<0.01, β=0.124) is positive and significant at 0.01. This finding indicates that both emotional processing and food craving mediate the relationship in a positive and meaningful way. Figure 2 shows the research's structural model.

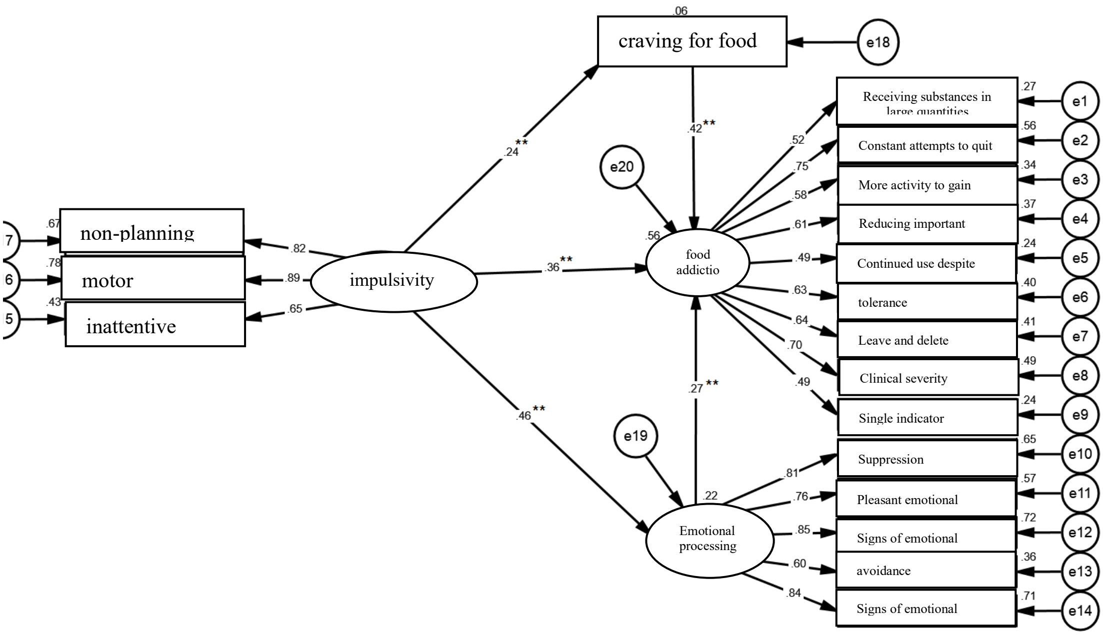

Figure 2: The structural model of the research using standard data

As shown in Figure 2, the sum of the squared multiple correlations (R2) for the food addiction variable in obese people was 0.56. It shows that impulsivity, food craving, and emotional processing explain a total of 56% of the variance of food addiction in obese people.

Discussion and Conclusion

The results showed that the coefficient of the direct path between impulsivity and food addiction is positive and significant. The findings of this study regarding the positive relationship between impulsivity and food addiction are in line with the findings of other researchers (Reivan Ortiz et al., 2024; Ravichandran et al., 2024; Pursey et al., 2024; Gaspar-Pérez et al., 2023; Minhas et al., 2021; Kidd et al., Laxton, 2021). Based on the findings of Rivan Cortez et al. (2024), more problems in emotional regulation, impulsivity, negative mood, and anxiety cause eating disorders and increase the level of food addiction. Ravichandran et al. (2024) found that food addiction was associated with brain symptoms in motivation and reward processing areas, indicating disruption of dopaminergic regulation and inhibition of cognitive control areas.

Gaspar-Pérez et al. (2023) showed that impulsivity is related to food addiction in men. Based on the concept of negative urgency, people are more likely to act impulsively when distressed in an effort to reduce negative affect. People with food addiction tend to act suddenly when experiencing strong positive and negative emotions and are unable to control the amount of food they consume. These people are unable to maintain attention and motivation to perform tasks; as a result, they cannot set rules for food consumption or adhere to the rules. The low inhibition ability in controlling eating behaviors makes them unable to control the consumption of unhealthy foods despite being aware of the physical harm of overeating, such as weight gain and obesity. Therefore, the likelihood of food consumption increases during stress, leading to a short-term improvement in mood after overeating. Also, people with food addiction, especially in situations of inconsistency between their personal needs and the current situation, may act immediately and overeat by choosing immediate gratification with food instead of waiting for a delayed reward. This aspect of impulsivity in people with food addiction could be related to low inhibitory control (Gaspar-Pérez et al., 2023).

In a systematic review, Gaspar-Pérez et al. (2023) found that impulsivity is associated with food addiction in men. Based on the negative urgency concept, people are more likely to act impulsively when they are distressed to reduce negative affect. People with food addiction, when experiencing strong positive and negative emotions, tend to act immediately and are unable to control the amount of food they consume. These people cannot maintain attention and motivation to perform tasks; as a result, they cannot set rules for food consumption or adhere to the regulations. The low inhibition ability in controlling eating behaviors makes them unable to control the consumption of unhealthy foods despite being aware of the physical harm of overeating, such as weight gain and obesity. Therefore, the likelihood of food consumption increases when experiencing stress, leading to a short-term improvement in mood after overeating. Also, people with food addiction, especially in situations of inconsistency between their personal needs and the current situation, may act immediately and overeat by choosing immediate gratification with food instead of waiting for a delayed reward. This aspect of impulsivity in people with food addiction could be related to low inhibitory control (Gaspar-Pérez et al., 2023). Researchers suggest that reward responsiveness and impulsivity are associated with cognitive (e.g., attentional bias towards food) and behavioral (e.g., overeating and food cravings) issues (Leehr et al., 2023). Food-related stimuli can induce attentional bias and exacerbate food addiction by capturing attention and activating reward pathways in the brain, potentially through ascending processes or inhibitory deficits, descending control mechanisms, or a combination of both. Numerous studies have highlighted the role of the mesolimbic dopamine pathway, the brain's reward circuit, in the inability to suppress impulses to consume high-fat and sugary foods in cases of food addiction (Ravichandran et al., 2024). It appears that individuals with food addiction exhibit a diminished capacity to resist the allure of immediate rewards in favor of delayed rewards (delayed value), likely due to dysregulation in brain regions, particularly the prefrontal cortex, with an emphasis on the dorsolateral prefrontal area (Ravichandran et al., 2024).

The results showed that the indirect effect of impulsivity on food addiction, mediated by food craving, is positive and significant. This finding complies with other research (Nolan, 2024; Philippon et al., 2022; Meule and Blechert, 2017). Nolan (2024) showed that the lack of foresight, as one measure of impulsivity, explains the relationship between the extent of drug consumption and energy from selected foods, through the mediation of food cravings. Philippon et al. (2022) also showed that cognitive impulsivity can predict problematic eating behaviors through increased food cravings. Meule and Blechert (2017) found that higher impulsivity predicted more frequent food cravings, regarding lower eating self-regulation success and higher body mass index and weight regulation. It seems that impulsivity is associated with the possibility of increasing food cravings by disrupting the processes of self-appraisal and monitoring, choosing goals and planning, and implementing and monitoring strategies that are related to the possibility of increased appetite, which disrupts the monitoring of eating behaviors and the regulation and implementation of rules for eating and increases food addiction.

In examining the interactive relationship between food craving and impulsivity with overeating, Meule and Blechert (2014) showed that impulsive reactions to food cues occur when both impulsivity and food craving traits are high. Accordingly, people prone to overeating may show impaired inhibitory control when faced with high-calorie, palatable food stimuli, due to low inhibitory control and high reward responsiveness. Filippon et al. (2022) have proposed cognitive limitations as the mechanism underlying impulsivity's effects on food cravings and maladaptive eating behaviors. At the neural level, impulsive food choices are associated with activation in brain regions involved in reward processing. Therefore, people with binge eating disorders have limited resources to control their craving for food and their response to a food stimulus; this phenomenon is more evident in people with high impulsivity.

The findings of this study showed that emotional processing directly and significantly mediates the effect of impulsivity on food addiction in obese people, consistent with those of Estévez et al. (2024), Ribeiro et al. (2023), Forsén Mantilla et al. (2022), and Jacques-Tiura et al. (2021). The findings of Estévez et al. (2024) confirmed the mediating role of emotion regulation in the relationship between executive functions (including impulsivity and metacognition) and eating disorders, such as binge eating. Ribeiro et al. (2023) confirmed the role of emotional processing and regulation disorders in eating addiction, and they added that food addiction was associated with increased negative urgency scores and regulation of emotion disorders. Forsén Mantilla et al. (2022) emphasized the interplay of impulsivity, compulsion, and emotion regulation for understanding food addiction, and they showed how the impulsive and compulsive nature of addictive binge eating symptoms can process and regulate dysregulated emotional states. Jacques-Tiura et al. (2021) confirmed the direct and indirect effects of impulsivity (mediated by emotion dysregulation) on food addiction and loss of control over eating in victims of violence.

Delaying short-term rewards (such as overeating), avoiding responding to immediate environmental stimuli, and focusing on long-term goals are essential to successful impulse control. However, when experiencing unpleasant emotions, people with high impulsivity tend to choose goals that reduce their negative emotions immediately (such as overeating). Also, as it was said earlier, based on the cognitive approach and according to the limited capacity assumption, when people with food addiction experience unpleasant emotions that they are not able to process successfully, their self-regulation resources are used to regulate emotions. Limited capacity and reduced self-regulation capacity lead to disruption in pursuing long-term goals and focusing on short-term objectives, and increase the symptoms of food addiction. Neuropsychological research on the mediating role of emotional processing in the relationship between impulsivity and food addiction has emphasized the activity of different areas of the prefrontal cortex. Neural circuits related to impulsivity, emotion-related impulsivity, and emotional reasoning overlap in the medial prefrontal and orbitofrontal cortex (Elliott et al., 2023). Dysfunction in the medial prefrontal cortex, which separates revision systems from limbic input, reduces inhibition and increases emotional instability (Jobson et al., 2021). Therefore, impulsivity related to emotion through unsuccessful emotional processing can disrupt impulse control and inhibition and increase food addiction.

In general, the correlation of impulsivity, food craving, and emotional processing with eating addiction can be the result of limited access to emotion processing strategies, conflict between different self-regulation goals (such as emotion processing and impulse control), and limited capacity. Just as the transition from occasional drug use to full dependence involves a shift from positive to negative reinforcement, consuming palatable food, at first, has pleasurable and relaxing effects that can modulate the stress response. Nevertheless, intermittent and frequent consumption can lead to negative emotions when not eating, tolerance, seeking pleasurable food despite its negative consequences, and food craving by altering the settings of brain reward pathways. The results support an emotion dysregulation model whereby eating to avoid negative emotions (highly correlated with food addiction) leads to food cravings, compulsive eating, and food addiction. Such negative emotions may also lead to impulsive consumption of palatable food through negative urgency.

The participants in the present study were obese individuals referred to health centers and nutrition clinics in Tehran, which limits the generalizability of the results to other groups. The self-report technique was applied to collect data. It is worth mentioning that this technique could be influenced by social desirability bias. It is suggested to carry out interventions to correct the attention bias of people with food addiction. Since food cravings are influenced by impulsivity and emotions, we recommend considering interventions targeting deficits in impulse control and emotional processing to reduce food cravings. It seems that emotional processing disorders and impulsivity play a significant role in the etiology and continuation of pathological eating, and focusing on the interaction of these factors can be beneficial in the prevention and treatment of eating problems in overweight and obese people.

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References

Asaollahi, T., salehi, M., jomehri, F., & Taghilou, S. (2023). Investigating the Mediating Role of Experiential Avoidance in the Relationship between Stress, Mindfulness, and Binge eating in Obese People. *Iranian Journal of Health Psychology*, *6*(1), 69-80. doi: 10.30473/ijohp.2023.65383.1273

Baker, R., Thomas, S., Thomas, P. W., & Owens, M. (2007). Development of an emotional processing scale. *Journal of Psychosomatic Research*, *62*(2), 167-178.

basharpoor, S., anbari, F., & mohajeri aval, N. (2019). Social Anxiety and Emotion Control Strategies: Can Eating Disorder Symptoms be predicted?. *Iranian Journal of Health Psychology*, *2*(2), 71-80. doi: 10.30473/ijohp.2020.37474.1007

Cepeda-Benito, A., Gleaves, D. H., Fernández, M. C., Vila, J., Williams, T. L., & Reynoso, J. (2000). The development and validation of Spanish versions of the state and trait food cravings questionnaires. *Behaviour Research and Therapy*, *38*(11), 1125-1138.

Chapela, S. P., Simancas-Racines, A., Ceriani, F., Martinuzzi, A. L. N., Russo, M. P., Zambrano, A. K., ... & Barrea, L. (2024). Obesity and Obesity-Related Thyroid Dysfunction: Any Potential Role for the Very Low-Calorie Ketogenic Diet (VLCKD)?. *Current Nutrition Reports*, *13*(2), 194-213.

Elliott, M. V., Esmail, S. A., Weiner, K. S., & Johnson, S. L. (2023). Neuroanatomical correlates of emotion-related impulsivity. *Biological psychiatry*, *93*(6), 566-574.

Estévez, A., Momeñe, J., Macía, L., Iruarrizaga, I., Olave, L., & Aonso-Diego, G. (2024). The Mediating Effect of Coping Strategies and Emotion Regulation in the Relationship between Impulsivity, Metacognition, and Eating Disorders. *Nutrients*, *16*(12), 1884. https://doi.org/10.3390/nu16121884

Filippone, L., Shankland, R., & Hallez, Q. (2022). The relationships between social media exposure, food craving, cognitive impulsivity and cognitive restraint. *Journal of Eating Disorders*, *10*(1), 184. https://doi.org/10.1186/s40337-022-00698-4

Forsén Mantilla, E., Clinton, D., Monell, E., Levallius, J., & Birgegård, A. (2022). Impulsivity and compulsivity as parallel mediators of emotion dysregulation in eating-related addictive-like behaviors, alcohol use, and compulsive exercise. *Brain and Behavior*, *12*(1), e2458. https://doi.org/10.1002/brb3.2458

Fossati, A., Di Ceglie, A., Acquarini, E., & Barratt, E. S. (2001). Psychometric properties of an Italian version of the Barratt Impulsiveness Scale-11 (BIS-11) in nonclinical subjects. *Journal of clinical psychology*, *57*(6), 815-828.

Gaspar-Pérez, A., Granero, R., Fernández-Aranda, F., Rosinska, M., Artero, C., Ruiz-Torras, S., ... & Jiménez-Murcia, S. (2025). Exploring food addiction across several behavioral addictions: Analysis of clinical relevance. *Nutrients*, *17*(7), 1279.

Gaspar-Pérez, A., Paslakis, G., Rosinska, M., Munguía, L., Jiménez-Murcia, S., Szilágyi, A., ... & Fernández-Aranda, F. (2023). Food Addiction and Impulsivity in Clinical Populations by Gender: a Systematic Review. *Current Addiction Reports*, *10*(4), 793-816.

Gaspar-Pérez, A., Paslakis, G., Rosinska, M., Munguía, L., Jiménez-Murcia, S., Szilágyi, A., ... & Fernández-Aranda, F. (2023). Food Addiction and Impulsivity in Clinical Populations by Gender: a Systematic Review. *Current Addiction Reports*, *10*(4), 793-816.

Gearhardt, A. N., Corbin, W. R., & Brownell, K. D. (2009). Preliminary validation of the Yale food addiction scale. *Appetite*, *52*(2), 430-436.

Hauck, C., Weiß, A., Schulte, E. M., Meule, A., & Ellrott, T. (2017). Prevalence of ‘food addiction’as measured with the Yale Food Addiction Scale 2.0 in a representative German sample and its association with sex, age and weight categories. *Obesity facts*, *10*(1), 12-24.

Homayounpour, P., seirafi, M., & Ghareh, S. (2022). Efficacy of Dialectical Behavior Therapy in Reduction of Negative Emotions in Obese Women. *Iranian Journal of Health Psychology*, *5*(1), 57-64. doi: 10.30473/ijohp.2022.56694.1155

Jacques-Tiura, A. J., Lanni, D. J., Anderson, L. A., & Naar, S. (2021). Victimization and food addiction symptoms: direct and indirect effects through emotion dysregulation, impulsivity, and loss-of-control eating. *Psychology of women quarterly*, *45*(2), 243-254.

Javid, M., Mohammadi, N., & Rahimi, Ch. (2012). Psychometric features of the Farsi version of the 11th edition of the Barrett Impulsivity Scale. *Psychological methods and models*. 8: 23-34.

Jobson, D. D., Hase, Y., Clarkson, A. N., & Kalaria, R. N. (2021). The role of the medial prefrontal cortex in cognition, ageing and dementia. *Brain communications*, *3*(3), fcab125. doi: 10.1093/braincomms/fcab125

Kechoui, M. & Ashrafi, E. (2015). Examining the factorial structure, reliability and validity of food craving-trait questionnaire in Iranian adults. *Journal of Kerman University of Medical Sciences*. 23 (5): 631-648.

Kidd, C., & Loxton, N. J. (2021). A narrative review of reward sensitivity, rash impulsivity, and food addiction in adolescents. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *109*, 110265. https://doi.org/10.1016/j.pnpbp.2021.110265

Leehr, E. J., Schag, K., Vogel, J., Dresler, T., Zipfel, S., Fallgatter, A. J., ... & Giel, K. E. (2023). Food-related reward sensitivity across the spectrum of body weight and impulsive eating: Pilot findings from a multi-method approach. *Appetite*, *181*, 106386.

Lotfi, S., Abolghasemi, A., & Narimani, M. (2017). Comparison of emotional processing and fear of positive and negative evaluations in women with social phobia and normal women. *Knowledge and Research in Applied Psychology*, 14(53): 101-111.

Mallinckrodt,B.,Abraham,W.T.,Wei,M.,Russell,D.W.(2006).Advances in Testing the Statistical Significance of Mediation Effects,Journal of Counseling Psychology, 53(3), 372–378.

Maltais-Lévesque, C., Legendre, M., & Bégin, C. (2025). Examining maladaptive eating behaviors and psychological difficulties among women with compulsive eating and obesity: a latent profile analysis. *Journal of Eating Disorders*, *13*(1), 36.

McLeish A, Oxoby R.(2006). Measuring impatience: elicited discount rates and the Barratt impulsiveness scale. *Clin Psychol*; 65(4): 679-692.

Meule, A., & Blechert, J. (2017). Indirect effects of trait impulsivity on body mass. *Eating Behaviors*, *26*, 66-69.

Minhas, M., Murphy, C. M., Balodis, I. M., Samokhvalov, A. V., & MacKillop, J. (2021). Food addiction in a large community sample of Canadian adults: prevalence and relationship with obesity, body composition, quality of life and impulsivity. *Addiction*.

Nolan, L. J. (2024). Food selection in a buffet scenario by persons in recovery from substance use disorder: Testing a parallel mediation model including impulsivity, food craving, and breadth of drug use. *Physiology & Behavior*, *275*, 114458. https://doi.org/10.1016/j.physbeh.2024.114458

Okhti, H., Rizvan Fard, M. & Makrami, A. (2009). Impulsivity and its various evaluation tools: review of the views and studies done. *Iranian Journal of Psychiatry and Clinical Psychology*, 3: 247-257.

Panahi, A. & Haqat, S. A. (2019). Preliminary validation of Yale Food Addiction Questionnaire. *Iranian Journal of Psychiatry and Clinical Psychology*. 25 (4): 454-470.

Pursey, K. M., Yokum, S., Brain, K., & Burrows, T. (2024). Neural Responses in Addictive Eating: a Systematic Review. *Current Addiction Reports*, *11*(2), 173-190.

Ravichandran, S., Sood, R., Das, I., Dong, T., Figueroa, J. D., Yang, J., ... & Gupta, A. (2024). Early life adversity impacts alterations in brain structure and food addiction in individuals with high BMI. *Scientific Reports*, *14*(1), 13141. https://doi.org/10.1038/s41598-024-63414-z

Reivan Ortiz, G. G., Campoverde, X., Vinañzaca, J., Estrada, J., Yanza, R., & Granero, R. (2024). Factors increasing the risk for food addiction in Ecuadorian students. *Frontiers in Psychiatry*, *14*, 1214266. https://doi.org/10.3389/

fpsyt.2023.1214266

Ribeiro, A., Sinval, J., Félix, S., Guimarães, C., Machado, B. C., Gonçalves, S., ... & Conceição, E. M. (2023). Food addiction and grazing—The role of difficulties in emotion regulation and negative urgency in university students. *Nutrients*, *15*(20), 4410. https://doi.org/10.3390/nu15204410

Ritchie, H., & Roser, M. (2017) - "Obesity". *Published online at OurWorldInData.org*. Retrieved from: 'https://ourworldindata.org/obesity' [Online Resource]. Available in 2020/08/09.

Rossi, A. A. (2025). Tying food addiction to uncontrolled eating: The roles of eating-related thoughts and emotional eating. *Nutrients*, *17*(3), 369.

Schumacker,R.E. & Lomax, R.G.(2004). A beginners guide to structural equation modeling, Lawrence Erlbaum association publishers, Mahwah, New Jersey & London.