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Psychological Inflexibility in Spanish Adults: Characteristics of Emotional Eating and the Healthy Eating Index

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Abstract: The aim is to understand the relationship between psychological inflexibility, emotional eating, and the rate of healthy eating. A total of 705 Spanish adults participated (65.2% women); the mean age was 27.21 years (SD = 10.67). The instruments used were Acceptance and Action Ques-tionnaire, Eating and Appraisal Due to Emotions and Stress Questionnaire and the Healthy Eating Index for the Spanish population. The women showed significantly higher scores in psychological inflexibility than men ($p < .001$). No differences have been described in the Emotional Eating scale ($p = .085$) differences have been reported on the Self-efficacy in Emotion -and Stress-Related Eating subscale, where men do better at managing eating ($p < .001$). Females indicate better diet quality ($p < .001$). Those who show less psychological inflexibility obtain emotional eating scores indicative of less coping with emotions through food ($p < .001$). Groups formed according to psychological inflexibility do not differ in diet quality ($p = .898$). The importance of psychological inflexibility is due to its role and strong association with a variety of problems related to eating behavior, but especially because it is a construct that can be intervened upon and modified.

Keywords: emotional consumption; psychological flexibility; healthy diet; adults

1. Introduction

Eating disorders (EDs) form a group of syndromes characterized by eating behaviors and psychological disturbances, accompanied by changes in weight and/or social alterations. These disturbances significantly influence social functioning and quality of life [1,2]. People with eating disorders are vulnerable to developing severe somatic complications that can cause a high risk of suicide [3] and elevated mortality rates [4]. Specific disorders, such as Anorexia Nervosa (AN) can reach mortality rates between 5-20% [5].

Eating disorders have a high prevalence in the population. It has been reported [6], over the 2000-2018 period, that the lifetime weighted means of EDs were 8.4% (3.3-18.6%) for women and 2.2% (0.8-6.5%) for men. The weighted mean prevalence of DEs at 12 months were 2.2% (0.8-13.1%) for women and 0.7% (0.3-0.9%) for men. More recently, it is shown [5] that the lifetime and 12-month joint prevalence of ED was 0.91% (95% CI, 0.48-1.71) and 0.43% (95% CI, 0.18-0.78), respectively. The pooled lifetime and 12-month prevalence, by subgroups and including all types of ED, was 1.69% and 0.72%, respectively. The lifetime prevalence of Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Binge Eating Disorder (BED) was 0.16% (95% CI, 0.06-0.31), 0.63% (95% CI, 0.33-1.02) and 1.53% (95% CI, 1.00-2.17), respectively. The lifetime prevalence of EDs in Western countries was 1.89% and was high at 2.58% in women.

An aspect little studied but relevant to eating behavior, and related to compulsive forms of eating, is emotional eating. In this regard, two eating behaviors can be distin-guished, one based on emotional (irritability, anxiety, or stress) cues (emotional eating) and the other on external (smell or

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sight of attractive food) cues [7]. Emotional eating is thus regarded as the tendency to overeat in response to negative emotions, such as anxiety, depression, or irritability [8,9]. Has shown to be associated with weight outcomes, both in respect to weight gain over time and difficulties with weight loss and weight loss maintenance.

It has been shown that the stress is related to emotional eating among adolescents, which in turn increases the risk of development and continuation of overweight/obesity [10]. The results of this research indicated that higher cortisol reactivity, but not subjective stress reactivity, predicted subjective emotional eating, over and above the impact of chronic stress. Neither chronic stress nor subjective or objective stress reactivity predicted objective emotional eating after stress induction. The findings point to the role of chronic stress and cortisol reactivity as risks for greater perceived emotional eating among adolescents, while clarifying the differences between perceived and objective emotional eating.

Emotional eating is a common problem among people struggling with weight issues [11]. Emotional eaters are particularly prone to consuming foods high in fat, sugars, and calories in response to negative emotions [12]. These eating habits, combined with higher body weight, place emotional eaters at increased risk for diabetes and heart disease [13,14]. Emotional eaters are half as likely as non-emotional eaters to achieve the 10% weight loss goal of standard behavioral weight loss treatment [15]. It should also be remembered that emotional eating may be the first step toward developing a binge eating disorder and its extreme subtypes, such as food addiction [16]. In addition, emotional eating is manifest differently in men and women. In men, it has been associated with body mass index and uncontrolled eating; however, in women, emotional eating has been linked to uncontrolled eating, anxiety, and poor sleep quality [17].

The literature shows that in stressful situations, out of a group of 638 women (18-39 years) 12.4% had high scores in emotional eating and 40.4% could be considered moderate emotional eaters [18]. Similarly, in Italy, in an equivalent situation, and out of 602 people (18-79 years) about half of the cohort increased their food intake to feel better (55 %) and used food in response to feelings of anxiety (48.7%) [19].

It should be considered that eating behavior does not only refer to the type of relationship established with the food and the quantity ingested. We have already seen the need to consider the quality of the food ingested. Evaluating the quality of the diet, allows obtaining necessary information of great interest to know the health status of people, where healthy eating is crucial to obtain a good quality of life that lasts through the years, and allows preventing overweight, obesity, and chronic non-communicable diseases in adulthood [20,21].

Evaluation instruments have been developed to obtain an index of healthy/unhealthy food intake ([22], and others) also in Spanish population [23]. For its development, a quantitative and qualitative evaluation of the diet was taken as a basis, which is compared with recommended intakes in each of the 10 groups or areas that make up the index and that represent aspects of interest in nutrition. Diet quality indices aim to evaluate diet in a general way and categorize individuals according to whether they are more or less compliant with behaviors considered as healthy. Healthy eating includes sufficient intakes of fruits, vegetables, grains, dairy, proteins, nuts, and oils; while limiting saturated fats, salt, and empty calories [24–27].

Basically, the data related to diet quality show a very similar pattern among different countries (Argentina, Canada, United States, France, Chile, Turkey, Brazil, etc.). It is indicated that more than half of the adult population had a poor quality diet, observing a less healthy diet in men, young adults and those with lower educational level [28–35].

On the other hand, a construct that may help to understand how eating behavior problems develop and are maintained is that of psychological inflexibility. Psychological flexibility refers to the possibility of fully embracing unpleasant private events in the present, without attempting to modify them. Rather, the individual is encouraged to let go of a struggle against discomfort and instead fully feel, engage with, and view these events for what they are as a method of serving one's own values [36,37]. The psychological flexibility model (fundamental to Acceptance and Commitment Therapy; ACT) promotes adaptive coping through six processes of skills-acceptance, cognitive defusion,

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awareness of the present moment, ability to see oneself in context, values, and committed action [36,38,39].

Psychological inflexibility is strongly and positively associated with various psychopathologies, including anxiety, depression, and eating disorders [40–42], while it is negatively associated with quality of life, perceived health, and positive emotional experiences [36]. In addition, evidence in non-clinical samples suggests that psychological inflexibility and experiential avoidance (the unwillingness to stay in touch and consequently avoid internal states such as unpleasant thoughts, feelings, and sensations) play a key role in the relationship between negative emotional states and the onset of emotional eating [9,43,44].

With respect to eating behaviors, the psychological inflexibility is associated with increased binge eating among individuals who meet the criteria for overweight/obesity [45]. Moreover, several studies have indicated that cognitive diffusion techniques (cognitive defusion), as a component of psychological flexibility, reduce cravings and objective eating behaviors [46]. Thus, psychological inflexibility appears to produce barriers that make it difficult to change weight- and eating-related conditions [47]. Note that no research has been found linking healthy eating patterns and psychological inflexibility.

In this context, the aim of the present research is to determine the relationship between the construct of psychological inflexibility and behaviors related to emotional eating and the healthy eating index. It is expected to find, as a first hypothesis, that women, compared to men, will present a greater psychological inflexibility. The second hypothesis predicts that women will show scores indicating a greater association with emotional eating than men. As a third hypothesis, it is proposed that people with high scores in psychological inflexibility will show a greater association with the presence of emotional eating. Similarly, as a fourth hypothesis, psychological inflexibility is predicted to be negatively associated with healthy dieting.

2. Materials and Methods

2.1. Participants

Participants in the study sample were a total of 705 people, of whom 460 (65.2%) were women and 245 (34.8%) men, aged between 18 and 62 years. When grouping participants by age, 438 (62.1%) admit to being between 18 and 24 years old, 186 (26.4%) people say they are between 25 and 44 years old and 81 (11.5%) say they are between 45 and 62 years old. In terms of educational level, 74 (10.5%) had primary education, 198 (28.2%) had secondary education and 431 (61.3%) had university education.

2.2. Instruments

Through an ad hoc interview, information was collected on sociodemographic and educational characteristics (sex, year of birth, weight, height, and level of education). The Healthy Eating Index for the Spanish population (HEIS) [23] was used to assess diet quality. This questionnaire is a version of the North American Healthy Eating Index (HEI) [22], adapted to the Spanish population. First, twelve food categories are established: 1- fresh fruit, 2- meat, 3- eggs, 4- fish, 5- pasta, rice, potatoes, 6- bread and cereals, 7- vegetables, 8- legumes, 9- sausages and cold meats, 10- dairy products, 11- sweets, and 12- soft drinks with sugar. Then, each of these groups is further divided into the following 5 consumption subcategories: 1- daily consumption, 2- three or more times a week but not daily, 3- once or twice a week, 4- less than once a week, 5- never or almost never.

To calculate the HEIS, each variable is scored from 0 to 10, where 10 indicates that the recommendations proposed by the Spanish Society of Community Nutrition [48] are met. The total sore is categorized according to three levels: Healthy (> 80 points), Needs change (50-80 points), and Unhealthy (< 50 points).

The Eating and Appraisal Due to Emotions and Stress Questionnaire (EADES) [49], in its Spanish adaptation by Lazarevich et al. [50] was used to assess emotional eating. In the Spanish version, this self-applied instrument consists of 40 items, with nine items from the original excluded in the

adaptation due to their low factor load. The item responses adopt a Likert format (1.- strongly disagree to 5.- strongly agree), where a higher score is taken to indicate a weaker relationship between eating and a negative emotional state. Therefore, a total score and three subscales are obtained, which in this study have shown very good reliability: F1.- Self-efficacy in Emotion -and Stress-Related Eating (in this study, Cronbach's α = .898). This subscale refers to the extent to which individuals use food to cope with emotions or stressors related to eating behaviors, along with self-efficacy regarding eating behavior. F2.- Self-confidence in Emotion -and Stress-Related Eating (Cronbach's α = .889) refers to the participant's perception, concerning their well-being, of their resources and skills for coping with stress and emotions. Finally, F3.- Appraisal of Resources and Ability to Cope (Cronbach's α = .913) refers to the perception, related to personal well-being, of how an individual can cope with external stressors. The Cronbach's alpha reliability coefficient for the total scale in this study was .924.

The Acceptance and Action Questionnaire (AAQ-II) [51], in its Spanish adaptation by Ruiz et al. [52] was used to assess Psychological Inflexibility. This instrument provides a general measure of psychological flexibility-inflexibility consisting of a 7-item questionnaire concerned with how the individual relates to their private events (e.g., thoughts, feelings, emotions, and memories) and to what extent they perceive these events as an obstacle to leading the life they wish. Participants respond on a Likert-type scale (1: never, to 7: always) to indicate the extent they believe the statements to be true. Low scores on the questionnaire indicate greater psychological flexibility, while high scores indicate greater inflexibility. The test used in this study has shown high internal consistency (Cronbach's α = .930). To determine the relationship between the level of flexibility and the rest of the variables, the participants were categorized according to tercile distributions of the total AAQ-II score [53]. Thus, three levels were established: High Inflexibility ($\geq$ 34 points), Medium Inflexibility (21-33 points), and Low Inflexibility ($\leq$ 20 points).

2.3. Procedure

This study uses a non-probabilistic sampling methodology with a cross-sectional design. Data collection was carried out both on paper and online. On the one hand, the study was attended in person and the links were sent, through social networks and e-mails, to the management of various social centers, clubs, and various adult groups so that they could be distributed among those attending the activities they organized. Likewise, we went in person to various universities to ask for volunteers to fill in the questionnaires. It was also disseminated among students through social networks, Moodle, and other university courses.

2.4. Statistical Analysis

The following was carried out descriptive analyses (frequencies, percentages, means, and standard deviation) were conducted to characterize the main research variables. The reliability of the tests was calculated using Cronbach's alpha (α). The comparison of quantitative variables was carried out using the Student's t-test for independent groups. The effect size was estimated using Cohen's d (d < 0.2- small effect size; d = 0.2 to 0.8- medium effect size and d > 0.8- large effect size). In the case of quantitative variables with more than two categories, an ANOVA test was conducted, with Snedecor's F statistic and Bonferroni's post hoc tests. The effect size was calculated using Eta Squared η^2, where the η^2 effect size coefficients were evaluated as follows: $0.01 \leq \eta^2 < 0.06$ = a small effect size, $0.06 \leq \eta^2 < 0.14$ = a medium effect size, and $\eta^2 \geq 0.14$ = a large effect size. In the case of categorical variables, the Chi-Square test (χ^2) was used. For categorical variables, Cramer's V was used to estimate the effect size (< 0.2- small effect size; between 0.2 and 0.6- moderate effect size and > 0.6- large effect size). Associations between the variables were analyzed by Pearson correlations and Stepwise linear regression analysis was employed to determine the predictors of psychological inflexibility. Analyses were conducted using the SPSS statistical package (IBM version 25.0, SPSS Inc Armonk, NY, USA).

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3. Results

The mean age of the participants was 27.21 years (SD = 10.67). Notably, women were significantly younger than men (t = 2.108, p = .035). Specifically, women tend to fall within the 18–24-year age range, whereas men are predominantly in the 25–44-year age group (Table 1), with an effect size of Cramer's V = 0.138. Differences in educational level were also found, with more women holding university-level qualifications than men, who tend to have medium levels of education (Cramer's V = 0.243). As expected, there are also gender differences in body composition. Men, on average, were heavier and taller than women. Consequently, differences were observed in BMI, with women predominantly falling into the underweight category while a higher number of men were classified as overweight (Cramer's V = 0.70).

Table 1. Social, physical, and educational characteristics of the participants according to gender.

	Total **705**	**Men** **245 (34.8)**	**Women** **460 (65.2)**		***p***
Age	27.21 (10.67)	28.36 (11.19)	26.59 (10.33)	t = 2.108	.035
Age groups				$\chi^2_{(2,705)}$ = 13.39	.001
18-24	438 (62.1)	130 (29.7)	308 (70.3)		
25-44	186 (26.4)	82 (44.1)	104 (55.9)		
45-62	81 (11.5)	33 (40.7)	48 (59.3)		
Educational Level				$\chi^2_{(2,705)}$ = 41.53	< .001
Basic	74 (10.5)	26 (35.1)	48 (64.9)		
Average	198 (28.2)	104 (52.5)	94 (47.5)		
University	431 (61.3)	113 (26.2)	318 (73.8)		
Weight	68.33 (14.93)	78.17 (14.45)	63.09 (12.31)	t = 13.87	< .001
Height	170.96 (12.24)	178.12 (9.22)	167.15 (11.94)	t = 13.54	< .001
BMI	23.48 (4.95)	24.74 (4.74)	22.81 (4.93)	t = 5.01	< .001
Categories BMI				$\chi^2_{(3,705)}$ = 20.41	< .001
Underweight	81 (11.5)	14 (17.3)	67 (82.7)		
Normal weight	403 (57.2)	133 (33.0)	270 (67.0)		
Overweight	144 (20.4)	64 (44.4)	80 (55.6)		
Obese	77 (10.9)	34 (44.2)	43 (55.8)		

Note: - For quantitative variables M(SD) and categorical variables N(%). BMI: Body Mass Index; BMI categories: Underweight (<18.5), Normal weight (18.5-24.9), Overweight (25-29.9), Obese (≥ 30).

Table 2 compares the mean scores for each variable according to the gender of the participants. Regarding emotional eating scores, no significant gender differences were found (*Cohen's d* = 0.14). However, it is worth noting that men scored higher than women, suggesting a lower use of food for emotional management. Significant differences were found for F1.- EADES (Self-efficacy in Emotion- and Stress-Related Eating) scores, with men showing higher levels of self-efficacy or reduced reliance on food as a coping mechanism for dealing with negative emotions (*Cohen's d* = 0.34). However, no differences were found in the F2-EADES (Self-confidence in Emotion -and Stress-Related Eating) or in the F3-EADES (Appraisal of Resources and Ability to Cope).

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Table 2. Descriptive data of the sample according to scores obtained on the Psychological Inflexibility, Emotional Eating, and Healthy Eating Index scales for the Spanish population.

	Total **705**	**Men** **245 (34.8)**	**Women** **460 (65.2)**		*p*
EADES	148.51 (23.51)	150.60 (22.54)	147.40 (23.97)	$t = 1.725$	.085
F1.- EADES	46.63 (9.72)	48.82 (8.88)	45.46 (9.95)	$t = 4.583$	< .001
F2.- EADES	31.81 (8.45)	31.95 (8.91)	31.74 (8.21)	$t = 0.323$	.747
F3.- EADES	70.08 (13.13)	69.83 (13.51)	70.20 (12.93)	$t = 0.358$	.721
AAQ-II	20.75 (9.43)	18.24 (9.18)	22.09 (9.29)	$t = 5.252$	<.001
AAQ-II Categories				$\chi^2_{(2,705)} = 26.340$	< .001
High Inflexibility	80 (11.3)	19 (23.8)	61 (76.2)		
Medium Inflexibility	249 (35.3)	63 (25.3)	186 (74.7)		
Low Inflexibility	376 (53.3)	163 (43.4)	213 (56.6)		
HEIS	63.89 (13.78)	61.61 (14.15)	65.10 (13.44)	$t = 3.219$	.001
HEIS Categories				$\chi^2_{(2,705)} = 4.785$	.091
Healthy	80 (11.3)	21 (26.2)	59 (73.8)		
Needs change	501 (71.1)	173 (34.5)	328 (65.5)		
Unhealthy	124 (17.6)	51 (41.1)	73 (58.9)		

Note. - For quantitative variables M(SD) and for categorical variables N(%). EADES: Total score on the Eating Appraisal Due to Emotions and Stress Questionnaire; F1-EADES: Score on Factor 1.- Self-efficacy in Emotion - and Stress-Related Eating; F2-EADES: Score on Factor 2.- Self-confidence in Emotion -and Stress-Related Eating; F3-EADES: Score on Factor 3.- Appraisal of Resources and Ability to Cope; AAQ-II: Total score on the Acceptance and Action Questionnaire II; AAQ-II Categories: High Inflexibility (≥ 34 points), Medium Inflexibility (21-33 points), and Low Inflexibility (≤ 20 points); HEIS: Score on the Healthy Eating Index for the Spanish population; HEIS Categories: Healthy (>80 points), Needs change (50-80 points), and Unhealthy (< 50 points).

Inspection of the psychological inflexibility scores according to gender revealed that women obtained significantly higher scores, with a medium effect size (*Cohen's d* = 0.42). There was a tendency for women to place themselves in the high and medium inflexibility categories, while men placed themselves in the low inflexibility group (Cramer's $V = 0.193$). In the case of women, 13.3% were found to have high inflexibility scores, 40.4% medium, and 46.3% low. In contrast, 7.8% of men were classified as having high inflexibility, 25.7% as medium, and 66.5% as low inflexibility.

When examining the scores obtained on diet quality according to the healthy eating index for the Spanish population, women tended to report consuming a healthier diet than men, with a medium effect size (*Cohen's d* = 0.25). However, when the participants were grouped according to the categories established for diet quality (healthy, needs changes, unhealthy), we observed that both men and women were grouped similarly, with no significant gender differences (Cramer's $V = 0.082$).

When the participants were categorized according to their psychological inflexibility scores (Table 3), no significant differences were found in the healthy eating index between the three groups. However, group differences were found in the response to emotional eating. As psychological inflexibility decreased, higher scores were obtained in emotional eating, indicating a reduced reliance on food as an emotional regulator. Thus, it was found that for these differences in the emotional eating scale, the effect size was large ($\eta^2 = 0.18$). For Factor 1-EADES, the effect size of self-efficacy in emotion- and stress-related eating was medium ($\eta^2 = 0.12$). For Factor 2-EADES, self-confidence in emotion- and stress-related eating, the effect size was small ($\eta^2 = 0.03$), and for Factor 4-EADES, appraisal of resources and ability to cope, the effect size was large ($\eta^2 = 0.16$).

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Table 3. Scores on the Emotional Eating scales and the Healthy Eating Index for the Spanish population according to Psychological Inflexibility.

	High Inflexibility 80 (11.3) (a)	**Medium Inflexibility 249 (35.3) (b)**	**Low Inflexibility 376 (53.3) (c)**	$F_{(2,704)}$	p
EADES	126.45 (20.70)	143.65 (19.49)	156.43 (22.67)	74.849	< .001
F1.- EADES	39.49 (11.97)	44.75 (9.44)	49.40 (8.21)	46.888	< .001
F2.- EADES	25.10 (7.44)	31.77 (7.35)	32.63 (9.12)	9.703	< .001
F3.- EADES	58.86 (9.63)	67.13 (10.26)	74.41 (13.52)	66.332	< .001
HEIS	63.22 (13.42)	64.01 (14.27)	63.95 (13.56)	0.108	.898
HEIS Categories				$\chi^2_{(4,705)} = 2.025$	.731
Healthy	6 (7.5)	32 (40.0)	42 (52.5)		
Needs change	58 (11.6)	173 (34.5)	270 (53.9)		
Unhealthy	16 (12.9)	44 (35.5)	64 (51.6)		

Note: - For quantitative variables M(SD) and categorical variables N(%). AAQ-II: Total score on the Acceptance and Action Questionnaire II; EADES: Total score on the Eating Appraisal Due to Emotions and Stress Questionnaire; F1-EADES: Score on Factor 1.- Self-efficacy in Emotion -and Stress-Related Eating; F2-EADES: Score on Factor 2.- Self-confidence in Emotion -and Stress-Related Eating; F3-EADES: Score on Factor 3.- Appraisal of Resources and Ability to Cope; HEIS: Score on the Healthy Eating Index for the Spanish population; HEIS Categories: Healthy (>80 points), Needs change (50-80 points), and Unhealthy (< 50 points).

Post hoc comparisons using the Bonferroni test revealed significant differences between the groups in the emotional eating scale, where a < b (p < .001); a < c (p < .001); b < c (p < .001). For the subscale of self-efficacy in emotion- and stress-related eating, differences between all groups were found, with a < b (p < .001); a < c (p < .001); b < c (p < .001). Similarly, the three groups differed significantly on the subscale appraisal of resources and ability to cope, with a < b (p < .001); a < c (p < .001); b < c (p < .001). However, for factor two of the scale, self-confidence in emotion- and stress-related eating, the source of the difference emerges from the low inflexibility, which differs from the other two groups, with a < b (p = .002) a < c (p < .001); b = c (p = .623).

Relationships between the variables were analyzed using Pearson's correlation test to facilitate stepwise linear regression analysis. The resulting correlations indicate that high scores in psychological inflexibility are negatively related to scores on the emotional eating scale. However, no relationship was found with the healthy eating index (Table 4).

Table 4. Pearson's Bivariate Correlations (Emotional Eating, Body Mass Index, Psychological Inflexibility, and Healthy Eating Index for the Spanish population).

r/p	**1**	**2**	**3**	**4**	**5**	**6**	**7**
(1) EADES	1						
(2) F1-EADES	.673/<.001	1					
(3) F2-EADES	.739/<.001	.333/<.001	1				
(4) F3-EADES	.817/<.001	.250/<.001	.434/<.001	1			
(5) BMI	- .083/.027	- .103/.006	- .056/.136	- .037/.326	1		
(6) IP	- .461/<.001	- .372/<.001	- .145/<.001	- .456/<.001	- .002/.949	1	
(7) HEIS	.179/<.001	.062/.099	.141/<.001	.184/<.001	-.013/.725	- .033/.383	1

Note - r/p. EADES: Eating Appraisal Due to Emotions and Stress Questionnaire; F1-EADES: Self-efficacy in Emotion and Stress-Related Eating; F2-EADES: Self-confidence in Emotion and Stress-Related Eating; F3-EADES: Appraisal of Resources and Ability to Cope; BMI.- Body Mass Index; PI.- Psychological Inflexibility; HEIS: Healthy Eating Index for the Spanish population.

The regression analysis (Table 5) was conducted to generate models that can help to explain and predict emotional eating scores. For this purpose, psychological inflexibility, healthy eating index, and BMI were considered as predictor variables. The inclusion of BMI as a predictor variable was

motivated by its low but significant correlation with emotional eating and the fact that the existing literature suggests that emotional eating is associated with body weight.

Table 5. Stepwise regression analysis, taking Emotional Eating as the predicted variable and Psychological Inflexibility, Healthy Eating Index for the Spanish population, and Body Mass Index as predictor variables.

	β	*t*	*p*	R^2	ΔR^2	*p*	*F*	*p*
Model 1				.212	.212	<.001	$F_{(1,704)}$ = 189.465	< .001
PI	-.461	13.765	<.001					
Model 2				.239	.027		$F_{(2,704)}$ = 110.351	< .001
PI	-.455	13.824	<.001					
HEIS	.164	4.982	<.001					
Model 3				.246	.007		$F_{(3,704)}$ = 76.227	< .001
PI	-.456	13.884	<.001					
HEIS	.163	4.967	<.001					
BMI	-.082	2.512	.012					

Note: BMI: Body Mass Index; PI: Psychological Inflexibility; HEIS: Healthy Eating Index for the Spanish population.

Psychological inflexibility alone as a predictor variable accounts for 21.2% of the variance in emotional eating scores, showing a negative predictive relationship (β = - .461). When the healthy eating index is introduced into the model, the explanatory capacity increases slightly to 23.9%. However, the predictive power of psychological inflexibility for emotional eating is reduced (β = - .455) and the healthy eating index contributes to the model with a negative coefficient (β = - .164). Finally, when BMI is added to the model, its overall explanatory power increases to 24.6%. It should be noted that while BMI makes a significant contribution, the increase in the predictive capacity of the model is small (β = - .082).

Finally, we would like to highlight data that might be considered of particular interest. There were no significant differences in psychological inflexibility or emotional eating based on participants' education levels. However, differences were observed in the healthy eating index ($F_{(2,702)}$ = 10.583, p < .001). Specifically, this difference stemmed from the fact that the participants with a university education showed different dietary patterns to those with secondary education (p < .001).

Differences in psychological inflexibility were found according to age ($F_{(2,704)}$ = 9.230, p < .001), where the highest levels of inflexibility were reported among participants aged 18-24 years compared to the 25-44-year age group (p = .009) and the 45-62-year group (p = .001). In contrast, no differences were observed between the two older groups. Similarly, age differences were found in the healthy eating index ($F_{(2,704)}$ = 3.817, p = .022), where the 45-62-year group had a healthier diet than both the 18-24-year (p = .025) and 25-44-year group (p = .033), with no differences between the two younger age groups. Finally, no differences in emotional eating were found according to age group.

No significant differences were found in psychological inflexibility based on BMI categories ($F_{(3,704)}$ = 2.024, p = .109). However, differences are found in emotional eating ($F_{(3,704)}$ = 3.292, p = .020) and its factors F1-EADES ($F_{(3,704)}$ = 4.510, p = .004) and F2-EADES: ($F_{(3,704)}$ = 2.614, p = .050), but not F3--EADES ($F_{(3,704)}$ = 1.086, p = .354). Participants categorized as obese appeared to rely more on food as an emotional regulator than both the underweight group (p = .030) and the normal weight group (p = .029), but not the overweight group (p = .355). No differences were found among the remaining groups. A slight trend was observed regarding the healthy eating index, although with a residual difference ($F_{(3,704)}$ = 2.318, p = .074), with the overweight group tending to have a better-quality diet than the obese group.

Finally, it should be noted that only 11.3% of the participants reported having a healthy diet. In comparison, a significant majority (88.7%) need to make significant changes, and in 17.6% of cases, the diet was characterized as unhealthy and a cause for concern.

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4. Discussion

The present research aimed to explore the relationship between the construct of psychological inflexibility and behaviors related to emotional eating and the healthy eating index. Our first hypothesis proposed that women would show higher levels of psychological inflexibility than men. This prediction was supported by our data, revealing that women tend to fall into the high and medium categories of psychological inflexibility. In contrast, men are predominantly categorized as having low inflexibility. These findings align with those reported in the existing literature [41,43,44,54,55], highlighting gender-based differences in various disorders, with women typically considered more vulnerable [56,57].

The second hypothesis predicted that women would exhibit stronger associations with emotional eating than men. This hypothesis was only partially supported by the data. While the analyses revealed no significant gender differences in the total scale score, there seems to be a tendency for men to obtain higher scores on the emotional eating test. However, gender differences were found in the self-efficacy in emotion- and stress-related eating factor, with men obtaining higher scores than women, indicating that men are less inclined to use food as a coping mechanism for managing emotions.

These results partially support the notion that emotional eating manifests differently in men and women [17]. It is well-established that women show a greater propensity for emotional eating in response to negative emotions, including feelings of anxiety, anger, frustration, and depression [55,58,59]. Moreover, it is worth noting that, in line with these findings, emotional eating appears to be linked more strongly to increased cortisol than subjective stress reactivity. Interestingly, neither chronic stress nor subjective or objective stress reactivity were shown to be predictors of objective emotional eating in response to stress induction [10]. Thus, it has been suggested that cortisol hyperreactivity could serve as a marker of stress, particularly among women who develop depression [60]. Additionally, other potential factors have been proposed to explain why women may be particularly prone to emotional eating, including mood changes related to hormonal variations associated with the menstrual cycle [61,62] and emotional changes linked to a heightened cortisol response.

Our third hypothesis proposed that individuals with high scores in psychological inflexibility would show a greater tendency to exhibit emotional eating. Our analyses supported this hypothesis, demonstrating that as psychological inflexibility scores increase, the scores on the emotional eating test decrease. This decrease in scores indicates an increased reliance on food as an emotional regulator. It is also worth noting that differences were found between the three inflexibility groups on the test, both in the total score and for two of the subscales. Specifically, these differences were observed in the subscale of self-efficacy in emotion and stress-related eating and in the subscale of appraisal of resources and ability to cope. However, for factor two of the scale — self-confidence in emotion- and stress-related eating — the low inflexibility group differed from the other two groups.

These results support other findings in the literature suggesting that psychological inflexibility is positively associated with eating behavior problems [42], showing an inverse relationship with positive emotional experiences [36]. It has been found that psychological inflexibility has a significant negative predictive capacity for emotional eating either as a single variable in the model (β = - .461), when the healthy eating index is introduced into the model (β = - .455) or when BMI is added to these two variables (β = - .456).

Data from the literature have consistently emphasized the significance of psychological inflexibility and experiential avoidance in understanding the relationships between negative emotional states and the onset of emotional eating [9,43,44]. In this regard, research has demonstrated that psychological inflexibility interventions can potentially mitigate eating-related problems [46]. One perspective for understanding this situation involves considering that individuals who struggle with emotional regulation may find it challenging to control their impulses in certain emotional situations and may possess limited strategies for managing their emotions effectively [63]. Consequently, they may resort to coping mechanisms associated with psychological inflexibility in such situations. This can be manifest as attempts to avoid distressing situations or linking a thought

to an experience, leading to a reluctance to engage in positive actions, since similar efforts have not yielded the desired outcome in the past [63]. In essence, individuals who encounter difficulties in managing and regulating emotions tend to exhibit behaviors characteristic of psychological inflexibility [63], leading to increased symptoms of various forms of psychopathology, particularly anxiety and depression [64,65]. Therefore, emotional dysregulation is thought to indirectly impact emotional disorders through its association with psychological inflexibility, given that both emotional dysregulation and psychological inflexibility are related to psychopathology [66].

Finally, our fourth hypothesis predicted a negative association between psychological inflexibility and a healthy diet. However, our data do not support this hypothesis. It was observed that levels of psychological inflexibility are not correlated with diet quality. The data provided indicate that a substantial percentage (88.7%) of the participants need to make significant dietary changes, while 17.6% fell into the category of having a diet that is worryingly unhealthy. These values align with (albeit slightly higher than) those reported in Spain in the general population by Norte-Navarro and Ortiz-Moncada [23]. Their study, which included 29.478 individuals [67], found that 72% of participants required changes in their dietary habits.

The literature has consistently demonstrated a strong relationship between the construct of psychological inflexibility and eating behavior problems [42], including the use of food as a means to regulate negative emotions [43]. Importantly, modifying psychological inflexibility can potentially reduce eating problems [46]. However, no previous studies have explored the relationship between psychological inflexibility and diet quality. The absence of a direct relationship between diet quality and psychological inflexibility may suggest that this construct is more closely linked to the patterns of food consumption and eating behaviors rather than the specific types of food consumed. However, it is important to further investigate this lack of relationship since, as previous research has shown, stress can significantly impact the type and quantity of food people choose [68]. Many individuals report increased energy intake and alterations in their dietary preferences in response to stress, often favoring foods high in fat, sugar, calories, and palatability [68]. In this regard, as observed in the case of emotional eating, cortisol plays a prominent role in mediating stress responses.

While the present research provides valuable insights into eating behavior, it is important to acknowledge certain limitations that should be addressed in future work. First, this study is cross-sectional, which restricts our ability to establish causal relationships between the variables studied. Additionally, it should be noted that the data were collected using self-report measures, an approach that is susceptible to potential inaccuracies stemming from memory bias or participants' subjective perceptions. Furthermore, an uncontrollable factor in this study was the presence of clinical problems among the participants. It would be interesting to consider both a clinical population with eating disorders and a non-clinical population in future research. Despite these limitations, this study contributes valuable information that can help to analyze the relationships between the three constructs presented.

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References

1. Hay, P.; Mitchison, D.; Collado, A.E.L.; González-Chica, D.A.; Stocks, N.; Touyz, S. Burden and health-related quality of life of eating disorders, including Avoidant/Restrictive Food Intake Disorder (ARFID), in the Australian population. *J. Eat. Disord.*, 2017,5(1):1-21. https://doi.org/10.1186/s40337-017-0149-z
2. Pohjolainen, V.; Koponen, S.; Rasanen, P.; Roine, R.P.; Sintonen, H.; Karlsson, H. Long-term health-related quality of life in eating disorders. *Qual. Life Res.,* 2016,25(9):2341-2346. https://doi.org/10.1007/s11136-016-1250-5
3. Keski-Rahkonen, A.; Mustelin, L. Epidemiology of eating disorders in Europe: prevalence, incidence, comorbidity, course, consequences, and risk factors. *Curr. Opin. Psychiatry,* 2016,29(6):340-345. https://doi.org/10.1097/YCO.0000000000000278
4. Smink, F.R.; van Hoeken, D.; Hoek, H.W. Epidemiology of eating disorders: incidence, prevalence, and mortality rates. *Curr. Psychiatry Rep.*, 2012,14(4):406-414. https://doi.org/10.1007/s11920-012-0282-y
5. Qian, J.; Wu, Y.; Liu, F.; Zhu, Y.; Jin, H.; Zhang, H.; Wan, Y.; Li, C.; Yu, D. An update on the prevalence of eating disorders in the general population: a systematic review and meta-analysis. *Eat. Weight Disord.*, 2022,27(2):415-428. https://doi.org/10.1007/s40519-021-01162-z
6. Galmiche, M.; Déchelotte, P.; Lambert, G.; Tavolacci, M.P. Prevalence of eating disorders over the 2000-2018 period: a systematic literature review. *Am. J. Clin. Nutr.*, 2019,1,109(5):1402-1413. https://doi.org/10.1093/ajcn/nqy342
7. van Strien, T. Causes of emotional eating and matched treatment of obesity. *Curr. Diab. Rep.,* 2018,18(6):35. https://doi.org/10.1007/s11892-018-1000-x
8. van Strien, T.; van de Laar, F.A.; van Leeuwe, J.F.J.; Lucassen, P.L.B.J.; van den Hoogen, H.J.M.; Rutten, G.E.H.M., et al. The dieting dilemma in patients with newly diagnosed type 2 diabetes: does dietary restraint predict weight gain 4 years after diagnosis?. *Health Psychol.,* 2007,26(1):105-112. https://doi.org/10.1037/0278-6133.26.1.105
9. Whiteside, U.; Chen, E.; Neighbors, C.; Hunter, D.; Lo, T. Larimer M. Difficulties regulating emotions: do binge eaters have fewer strategies to modulate and tolerate negative affect?. *Eat. Behav.,* 2007,8(2):162-169. https://doi.org/10.1016/j.eatbeh.2006.04.001
10. Sato, A.F.; Darling, K.E.; Ruzicka, E.B.; Fahrenkamp, A.J.; Shields, C.V.; West, C.E.; Schuler, S.M. A biobehavioral examination of emotional eating in adolescents: Evaluating the role of acute cortisol stress reactivity in the context of a multi-method assessment of eating in response to stress. *Appetite,* 2023,184:106486. https://doi.org/10.1016/j.appet.2023.106486
11. Frayn, M.; Knäuper, B. Emotional Eating and Weight in Adults: a Review. *Curr. Psychol.,* 2018,37(4):924-933. https://doi.org/10.1007/s12144-017-9577-9
12. Konttinen, H. Emotional eating and obesity in adults: The role of depression, sleep, and genes. *Proc. Nutr. Soc.,* 2020,79(3):283-289. https://doi.org/10.1017/S0029665120000166
13. Godoy-Izquierdo, D.; González, J; Tadeo-Rodríguez, A; Lara, R; Ogallar, A; Navarrón, E; Ramírez, M.J; Arbinaga, F. Body Satisfaction, Weight Stigma, Positivity and Happiness Among Overweight and Obese Spanish Adults: A Preliminary Analysis. *Int. J. Environ. Res. Public Health.,* 2020,17(12):4186. https://doi.org/10.3390/ijerph17124186
14. Wang, H.; Shara, N.M.; Calhoun, D.; Umans, J.G.; Lee, E.T.; Howard, B.V. Incidence rates and predictors of diabetes in those with prediabetes: the strong heart study. *Diabetes Metab. Res. Rev.*, 2010,26(5):378-385. https://doi.org/10.1002/dmrr.1089
15. López-Guimerà, G.; Dashti, H. S.; Smith, C. E.; Sánchez-Carracedo, D.; Ordovas, J. M.; Garaulet, M. CLOCK 3111 T/C SNP interacts with emotional eating behavior for weight-loss in a Mediterranean population. *PloS One*, 2014,9(6):e99152. https://doi.org/10.1371/journal.pone.0099152
16. Davis, C. From passive overeating to "food addiction": A spectrum of compulsion and severity. *Obes.*, 2013,435027. https://doi.org/10.1155/2013/435027
17. Amoako, M.; Amoah-Agyei, F.; Du, C.; Fenton, J.I.; Tucker, R.M. Emotional Eating among Ghanaian University Students: Associations with Physical and Mental Health Measures. *Nutrients,* 2023,15:1526. https://doi.org/10.3390/nu15061526
18. Al-Musharaf, S. Prevalence and Predictors of Emotional Eating among Healthy Young Saudi Women during the COVID-19 Pandemic. *Nutrients,* 2020,24,12(10):2923. https://doi.org/10.3390/nu12102923
19. Di Renzo, L.; Gualtieri, P.; Cinelli, G.; Bigioni, G.; Soldati, L.; Attina, A.; Bianco, F.F.; Caparello, G.; Camodeca, V.; Carrano, E.; et al. Psychological aspects and eating habits during COVID-19 home

confinement: Results of EHLC-COVID-19 Italian Online Survey. *Nutrients*, 2020,12:2152. https://doi.org/10.3390/nu12072152

20. Godoy-Izquierdo, D.; Ogallar, A.; Lara, R.; Rodríguez-Tadeo, A.; Arbinaga, F. Association of a Mediterranean diet and fruit and vegetable consumption with subjective well-being among adults with overweight and obesity. *Nutrients,* 2021,13(4):1342. https://doi.org/10.3390/nu13041342
21. Wang, J.; Shang, L.; Light, K.; Loughlin, J.O.; Paradis, G.; Gray-Donald, K. Associations between added sugar (solid vs. liquid) intakes, diet quality, and adiposity indicators in Canadian children. *Appl. Physiol. Nutr. Metab.*, 2015,40(8):835-841. https://doi.org/10.1139/apnm-2014-0447
22. Kennedy, E.T.; Ohls, J.; Carlso, S.; Fleming, K. The Healthy Eating Index: design and applications. *J. Am. Diet. Assoc*., 1995,95(10):1103-1108. https://doi.org/10.1016/S0002-8223(95)00300-2
23. Norte-Navarro, A.I.; Ortiz-Moncada R. Spanish diet quality according to the healthy eating index. *Nutr. Hosp.*, 2011,26(2):330-336. https://doi.org/10.3305/nh.2011.26.2.4630
24. Magalhães, B.; Peleteiro, B.; Lunet, N. Dietary patterns and colorectal cancer: Systematic review and meta-analysis. *Eur. J. Cancer Prev.,* 2012,21(1):15-23. https://doi.org/10.1097/CEJ.0b013e3283472241
25. Tucker, K.L. Dietary patterns, approaches, and multicultural perspective. *Appl. Physiol. Nutr. Metab.,* 2010,35(2):211-218. https://doi.org/ 10.1139/H10-010
26. Turati, F.; Damartello, M.; Bravi, F.; Serraino, D.; Augustin, L.; Giacosa, A.; Negri, E.; Levi, F.; La Vecchia, C. Adherence to the World Cancer Research Fund/American Institute for Cancer Research Recommendations and the Risk of Breast Cancer. *Nutrients,* 2020,12(3):607. https://doi.org/10.3390/nu12030607
27. Vieira, A.R.; Abar, L.; Chan, D.S.M.; Vingeliene, S.; Polemiti, E.; Stevens, C.; Greenwood, D.; Norat, T. Foods and beverages and colorectal cancer risk: A systematic review and meta-analysis of cohort studies, an update of the evidence of the WCRF-AICR Continuous Update Project. *Ann. Oncol*., 2017,28(8):1788-1802. https://doi.org/oi: 10.1093/annonc/mdx171
28. Drewnowski, A.; Fiddler, E.C.; Dauchet, L.; Galan, P.; Hercberg, S. Diet quality measures and cardiovascular risk factors in France: applying the Healthy Eating Index to the SU.VI.MAX study. *J. Am. Coll. Nutr*., 2009,28(1):22-29. https://doi.org/10.1080/07315724.2009.10719757
29. Guenther, P.; Casavale, K.; Kirkpatrick, S.; Reedy, J.; Hiza, H.; Kuczynski, K.; et al. *Diet Quality of Americans in 2001-02 and 2007-08 as Measured by the Healthy Eating Index-2010. Nutrition Insight 51.* In: Promotion. USDoACfNPa, editor. 2013.
30. Guenther, P.M.; Kirkpatrick, S.I.; Reedy, J.; Krebs-Smith, S.M.; Buckman, D.W.; Dodd, K.W., et al. The Healthy Eating Index-2010 is a valid and reliable measure of diet quality according to the 2010 Dietary Guidelines for Americans. *J. Nutr*., 2014,144(3):399-407. https://doi.org/10.3945/jn.113.183079
31. Jessri, M.; Ng, A.P.; L'Abbe, M.R. Adapting the Healthy Eating Index 2010 for the Canadian Population: Evidence from the Canadian National Nutrition Survey. *Nutrients*, 2017,9(8):910. https://doi.org/10.3390/nu9080910
32. Koksal, E., Karacil-Ermumcu, M.S., Mortas, H. Description of the healthy eating indices based diet quality in Turkish adults: a cross-sectional study. *Environ. Health Prev. Med*., 2017,22(1):12. https://doi.org/10.1186/s12199-017-0613-z.
33. Moreira, P.R.; Rocha, N.P.; Milagres, L.C.; de Novaes, J.F. Critical analysis of the diet quality of the Brazilian population according to the Healthy Eating Index: a systematic review. *Cien. Saude Colet*., 2015,20(12):3907-3923. https://doi.org/10.1590/1413-812320152012.18352015
34. Pinto, V.; Landaeta-Diaz, L.; Castillo, O.; Villarroel, L.; Rigotti, A.; Echeverria, G., et al. Assessment of Diet Quality in Chilean Urban Population through the Alternate Healthy Eating Index 2010: A Cross-Sectional Study. *Nutrients*, 2019,11(4):891. https://doi.org/10.3390/nu11040891
35. Zapata, M.E.; Moralta-Ibáñez, L.; López-Laura, B. Diet quality according to the Healthy Eating Index. Analysis in the adult population of Rosario City, Argentina. *Diaeta,* 2020,38(170):8-15.
36. Hayes, S.C.; Luoma, J.B.; Bond, F.W.; Masuda, A.; Lillis, J. Acceptance, and commitment therapy: Model, processes, and outcomes. *Behav. Res. Ther.,* 2006,44(1):1-25. https://doi.org/10.1016/j.brat.2005.06.006
37. Hayes, S.C.; Strosahl, K.D.; Wilson, K.G. *Acceptance and Commitment Therapy. Process and practice of mindful change* (Mindfulness). Edit. Desclée De Brouwer, Bilbao, 2014.
38. Cassar, G.E.; Knowles, S.; Youssef, G.J.; Moulding, R.; Uiterwijk, D.; Waters, L.; Austin, D.W. Examining the mediational role of psychological flexibility, pain catastrophizing, and visceral sensitivity in the relationship between psychological distress, irritable bowel symptom frequency, and quality of life. *Psychol. Health Med.,* 2018,23(10):1168-1181. https://doi.org/10.1080/13548506.2018.1476722
39. Ferreira, N.B.; Eugenicos, M.P.; Morris, P.G.; Gillanders, D.T. Measuring acceptance in irritable bowel syndrome: Preliminary validation of an adapted scale and construct utility. *Qual. Life Res*., 2013,22(7):1761-1766. https://doi.org/10.1007/s11136-012-0299-z
40. Arbinaga, F. Pain catastrophizing related to psychological inflexibility, self-reported injuries, and perfectionism in soccer referees. *J. of Sci. in Sport and Exercise*, 2023, https://doi.org/10.1007/s42978-023-00234-z

41. Moreno-Domínguez, R.; Bernal-López, M.; Carrasco-Rodríguez, Y.; Arbinaga, F. Symptoms of psychopathology and psychological inflexibility in recreational athletes. *Rev. Psicol. Apl. Deporte Ejerc. Fis.*, 2023,8(1):e6,1-13. https://doi.org/10.5093/rpadef2023a7
42. Rawal, A.; Park, R.J.; Williams, J.M.G. Rumination, experiential avoidance, and dysfunctional thinking in eating disorders. *Behav. Res. Ther.*, 2010,48(9):851-859. https://doi.org/10.1016/j.brat.2010.05.009
43. Guerrini-Usubini, A.; Varallo, G.; Giusti, E.M.; Cattivelli, R.; Granese, V.; Consoli, S.; Bastoni, I.; Volpi, C.; Castelnuovo, G. The Mediating Role of Psychological Inflexibility in the Relationship Between Anxiety, Depression, and Emotional Eating in Adult Individuals with Obesity. *Front. Psychol.*, 2022,13:861341. https://doi.org/10.3389/fpsyg.2022.861341
44. Litwin, R.; Goldbacher, E.M.; Cardaciotto, L.A.; Gambrel, L.E. Negative emotions, and emotional eating: the mediating role of experiential avoidance. *Eat. Weight Disord.*, 2017,22(1):97-104. https://doi.org/10.1007/s40519-016-0301-9
45. Finger, Id.R.; de Freitas, B.I.; Oliveira, M.dS. Psychological inflexibility in overweight and obese people from the perspective of acceptance and commitment therapy (ACT). *Eat. Weight Disord.*, 2020,25(1):169-175. https://doi.org/10.1007/s40519-018-0541-y
46. Karekla, M.; Georgiou. N.; Panayiotou, G.; Sandoz, E.K.; Kurz, A.S.; Constantinou, M. Cognitive Restructuring vs. Defusion: Impact on craving, healthy and unhealthy food intake. *Eat. Behav.*, 2020,37:Article 101385. https://doi.org/10.1016/j.eatbeh.2020.101385
47. Kauffman, B.Y.; Garey, L.; Zvolensky, M.J. Psychological inflexibility in terms of eating behaviors among individuals seeking treatment for comorbid affective vulnerabilities and weight-related behaviors. *J. Contextual Behav. Sci.*, 2022,26:168-172. https://doi.org/10.1016/j.jcbs.2022.09.006
48. Sociedad Española de Nutrición Comunitaria (SENC). *Healthy Eating Guide* [Spanish]. 2004. [http://www.nutricioncomunitaria.org/generica.jsp?tipo=docu&id=3].
49. Ozier, A.D.; Kendrick, O.W.; Knol, L.L.; Leeper, J.D.; Perko, M.; Burnham, J. The eating and Appraisal Due to Emotions and Stress (EADES) Questionnaire: Development and Validation. *J. Am. Diet. Assoc.*, 2007,107(4):619-628. https://doi.org/10.1016/j.jada.2007.01.004
50. Lazarevich, I.; Irigoyen-Camacho, M.E.; Velázquez-Alva, M.C.; Salinas-Ávila, J. Psychometric characteristics of the Eating and Appraisal Due to Emotions and Stress Questionnaire and obesity in Mexican university students. *Nutr. Hosp.*, 2015,31(6):2437-2444. https://doi.org/10.3305/nh.2015.31.6.8960
51. Bond, F.W.; Hayes, S.C.; Baer, R.A.; Carpenter, K.M.; Orcutt, H.K.; Waltz, T.; Zettle, R.D. Preliminary psychometric properties of the Acceptance and Action Questionnaire - II: A revised measure of psychological inflexibility and experiential avoidance. *Behav. Ther.*, 2011,42(4):676-688. https://doi.org/10.1016/j.beth.2011.03.007
52. Ruiz, F.J.; Langer, A.; Luciano, C.; Cangas, A.J.; Beltrán, I. Measuring experiential avoidance and psychological inflexibility: The Spanish version of the Acceptance and Action Questionnaire-II. *Psicothema*. 2013,25(1):123-129.
53. Roales-Nieto, J.G.; Moreno-San Pedro, E.; Córdoba-García, R.; Marín-Romero, B.; Jiménez-López, F.R.; Gil-Luciano, A.; Silvano-Arranz, A.; Fernández-Lao, I.R.; Granados-Gámez, G.; Hernández-López, M. Smoking self-quitting and psychological flexibility. *Rev. Int. Psicol. Ter. Psicol.*, 2016,16(2):111-130.
54. Ouwens, M.A.; van Strien, T.; van Leeuwe, J.F.J. Possible pathways between depression, emotional and external eating. A structural equation model. *Appetite*, 2009,53:245-248. https://doi.org/10.1016/j.appet.2009.06.001
55. Ruisoto, P.; López-Guerra, V.; López-Núñez, C.; Sánchez-Puertas, R.; Paladines-Costa, M.B.; Pineda-Cabrera, N.J. Transdiagnostic model of psychological factors and sex differences in depression in a large sample of Ecuador. *Int. J. Clin. Health Psychol.*, 22(3):100322. https://doi.org/10.1016/j.ijchp.2022.100322
56. Heidari, S., Babor, T.F., De Castro, P. et al. Sex and Gender Equity in Research: rationale for the SAGER guidelines and recommended use. *Res. Integr. Peer Rev.*, 2016,1,2. https://doi.org/10.1186/s41073-016-0007-6
57. Kneavel, M. (2021). Relationship Between Gender, Stress, and Quality of Social Support. *Psychol. Rep.* 2021,124(4):1481-1501. https://doi.org/10.1177/0033294120939844
58. Davis, E.; Greenberger, E.; Charles, S.; Chen, Ch.; Zhao, L.; Dong, Q. Emotion experience and regulation in China and the United States: how do culture and gender shape emotion responding?. *Int. J. Psychol.*, 2012,47(3):230-239. https://doi.org/10.1080/00207594.2011.626043
59. Thompson, S.; Romeo, S. Gender and racial differences in emotional eating, food addiction symptoms, and body weight satisfaction among undergraduates. *J. Diabetes Obes.*, 2015,2(2):1-6 https://doi.org/10.15436/2376-0494.15.035
60. Cerda-Molina, A.L.; Borráz-León, J.I.; Mayagoitia-Novales, L.; Gaspar-Del-Río, A.T. Cortisol reactivity and mental health in adults exposed to early violence: systematic review. *Pan. Amer. J. Publ. Health*, 2017,41:e171 https://doi.org/10.26633/RPSP.2017.171
61. Eddy, K.T.; Tanofsky-Kraff, M.; Thompson-Brenner, H.; Herzog, B.B.; Brown, T.A.; Ludwing, D.S. Eating disorder pathology among overweight treatment-seeking youth: clinical correlates and cross-sectional risk modeling. *Behav. Res. Ther.*, 2007,45(10):2360-2371. https://doi.org/10.1016/j.brat.2007.03.017

62. World Health Organization. The world health report 2002-reducing risks, promoting healthy life. *Educ. Heal. Chang. Learn. Pract.*, 2003,16(2):230. https://doi.org/10.1080/1357628031000116808
63. Cobos-Sánchez, L.; Flujas-Contreras, J.M.; Becerra, I.G. Relation between psychological flexibility, emotional intelligence, and emotion regulation in adolescence. *Curr. Psychol.,* 2022,41(8):5434-5443. https://doi.org/10.1007/s12144-020-01067-7
64. Aldao, A.; Nolen-Hoeksema, S.; Schweizer, S. Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clin. Psychol. Rev.*, 2010,30(2):217-237. https://doi.org/10.1016/j.cpr.2009.11.004
65. Kashdan, T.B.; Rottenberg, J. Psychological flexibility as a fundamental aspect of health. *Clin. Psychol. Rev.*, 2010,30(7):865-878. https://doi.org/10.1016/j.cpr.2010.03.001
66. Aldao, A.; Gee, D.G.; De Los Reyes, A.; Seager, I. Emotion regulation as a transdiagnostic factor in the development of internalizing and externalizing psychopathology: Current and future directions. *Dev. Psychopathol*., 2016,28(4pt1):927-946. https://doi.org/10.1017/S0954579416000638.
67. Ministerio de Sanidad y Consumo. *Encuesta Nacional de Salud 2006. Metodología detallada*. 2008,[http://www.msc.es/estadEstudios/estadisticas/encuestaNacional/encuestaNac2006/metodENS2006.pdf]
68. Ulrich-Lai, Y.M.; Fulton, S.; Wilson, M.; Petrovich, G.; Rinaman, L. Stress exposure, food intake and emotional state. *Stress.* 2015,18(4):381-399. https://doi.org/10.3109/10253890.2015.1062981