



Original/*Obesidad*

Psychometric characteristics of the Eating and Appraisal Due to Emotions and Stress Questionnaire and obesity in Mexican university students

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Abstract

Introduction: emotional eating has been defined as eating in a response to negative emotions and it is associated with weight gain. The English version of Eating Appraisal Due to Emotions and Stress Questionnaire (EADES) was developed to assess how individuals use food in order to cope with stress and emotions.

Objective: to analyze psychometric characteristics of Spanish version of EADES and to identify whether the constructs of EADES were associated with obesity in university students.

Methods: the EADES (Spanish version) was administered to 232 Mexican university students from 18 to 29 years old. Body Mass Index (BMI) was calculated. A test-retest evaluation was conducted with 75 participants.

Results: Cronbach's alpha of EADES was 0.92; the interclass correlation coefficient was 0.88. Regarding BMI and EADES results, the subscale Emotion and Stress Related Eating was significantly associated with obesity ($p = 0.026$). Through factor analysis of the instrument, three factors were extracted and items that showed factor loading < 0.40 were eliminated. 40 items remained in the questionnaire. With regard to obesity and the 40-items version of the instrument, a statistically significance association was found for the total score ($OR = 0.973$, $p = 0.020$) and for the factor Self-confidence related to Emotional Eating component ($OR = 0.940$, $p = 0.026$).

Conclusions: a good internal consistency and temporal stability of the Spanish version of the instrument were found; the 40-item EADES version was positively associated with obesity. This instrument could be useful in assessing emotional eating.

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Key words: *Eating behavior. Obesity. EADES questionnaire. Psychometric characteristics. Students.*

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CARACTERÍSTICAS PSICOMÉTRICAS DEL CUESTIONARIO SOBRE CONDUCTA ALIMENTARIA RELACIONADA A EMOCIONES Y ESTRÉS (EADES) Y OBESIDAD EN ESTUDIANTES UNIVERSITARIOS DE LA CIUDAD DE MÉXICO

Resumen

Introducción: la conducta alimentaria emocional se ha definido como el comer como respuesta a las emociones negativas y se ha asociado con el aumento de peso. El cuestionario Eating Appraisal Due to Emotions and Stress Questionnaire (EADES, Conducta Alimentaria Relacionada a Emociones y Estrés), fue desarrollado para la identificación y evaluación de las conductas relacionadas con la ingestión de alimentos como resultado del estrés y las emociones.

Objetivo: analizar las características psicométricas de la versión en español del EADES e identificar la posible asociación entre los constructos que conforman el EADES con la presencia de obesidad en estudiantes universitarios mexicanos.

Métodos: la versión traducida al español del EADES fue administrado a 232 estudiantes de 18 a 29 años. Se calculó el Índice de Masa Corporal (IMC). El análisis de confiabilidad (test-retest) se llevó a cabo con 75 participantes.

Resultados: el alfa de Cronbach de EADES en español fue de 0,92; el coeficiente de correlación intraclass fue de 0,88. Se observó una asociación significativa entre el puntaje del EADES, subescala Conducta Alimentaria Relacionada a Emociones y Estrés, y el IMC ($p = 0.026$). Mediante el análisis de factores del instrumento, tres factores fueron extraídos, y los ítems que mostraron cargas factoriales $< 0,400$ fueron eliminados, lo que dio por resultado una versión reducida del EADES, la cual se conformó por 40 ítems. Con respecto a la obesidad y el instrumento reducido, se encontró una asociación estadísticamente significativa para la puntuación total ($OR = 0,973$, $p = 0,020$) y para el factor de Autoconfianza en la Conducta Alimentaria Emocional ($OR = 0,940$, $p = 0,026$).

Conclusiones: se encontró una buena consistencia interna y estabilidad temporal del instrumento EADES en la versión en español; la versión reducida a 40-ítems se asoció positivamente con obesidad. Este instrumento puede ser útil para la evaluación de la conducta alimentaria emocional.

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Palabras clave: *Conducta alimentaria. Obesidad. Cuestionario EADES. Características psicométricas. Estudiantes.*

Introduction

Emotional eating has been defined as eating in a response to a range of negative emotions, such as anxiety, sadness or loneliness, and has been associated with weight gain¹⁻⁴.

The relationship between eating and negative emotions has been studied widely and it is well established that they tend to increase food consumption⁵⁻⁸. Eating has been recognized as a coping strategy for dealing with stress and anxiety; therefore, it was proposed that obese people might overeat in order to reduce psychological discomfort. This conclusion might also be valid for people with normal weight, but unlike overweight people, they will either increase or decrease their eating when stressed^{5,6,9-11}.

Regarding positive emotions, the information is less conclusive; nevertheless, Macht¹² have shown that positive emotions increase the pleasure related with food and the consumption of healthy food, while negative emotions (anger, fear and sadness) may increase impulsive eating.

Thus, individuals with normal weight, who eat with the intention of coping with stress, are at risk of becoming obese. Eating, as a coping mechanism for dealing with stress and emotions, is considered to be an attempt to diminish negative or fluctuating mood states, in the absence of another adaptive strategy¹¹.

In studies on emotional eating, different self-applied questionnaires have been developed. One of the earliest instruments is the Three Factor Eating Questionnaire (TFEQ) which assesses dietary restraint, disinhibition and hunger, as well as its abridged version TFEQ-R18^{13,14}. Among other questionnaires, that attempt to measure eating behavior in relation to emotions, it is important to mention the Mindful Eating Questionnaire, Dutch Eating Behavior Questionnaire, Emotional Eating Scale, Emotional Eater Questionnaire and also the Emotional Appetite Questionnaire^{2,15,16-18}. Some of them are too long, while others were designed to assess awareness of physical and emotional sensation associated with eating or specifically for obese people.

The Eating and Appraisal Due to Emotions and Stress (EADES) Questionnaire offers an integral evaluative approach and represents an untraditional method for assessing eating behavior along with individual strategies for coping and adaptation¹⁹. The instrument allows identifying individuals who use food in order to cope with emotions and stress, and it is based on the Transactional Model of Stress and Coping, which provides a framework for evaluating the coping process and helps to explain individual differences in coping responses²⁰. The model includes a series of phenomena, such as primary and secondary appraisals, resources, coping effort and adaptation outcomes. After the evaluation of the significance of a stressor or threatening event, the evaluation of the controllability of the stressor and the personal coping resources

follows (what can be done in response to a stressful situation, i.e., through adaptive or maladaptive reactions) and goes on to analyze coping efforts through a cognitive-evaluative process (a decision about specific personal coping strategies). Finally, adaptation outcomes are produced that can be positive or negative in relation to emotional well-being, functional status and health. According to this model, positive adaptation outcomes can produce healthy eating behavior, while unhealthy stress and emotions management can lead to overeating. Eating represents a maladaptive way to cope with emotions and stress, and being overweight represents a negative adaptation outcome^{19,20}.

Taking this into account, EADES is an instrument, which aims to assess eating behavior in relation to emotions and stress. The English version has been validated within a public university population that included only staff and faculty, with ages ranging from 18 to 83 years old; however, a validated Spanish version is not yet available. This self-applied questionnaire consists of 49 items divided into three subscales: a) Emotion and Stress-Related Eating, b) Appraisal of Ability and Resources to Cope and c) Appraisal of Outside Influences and Stressors. In addition, Ozier et al.³ have identified a relationship of the first two subscales with overweight and obesity.

The high prevalence of obesity worldwide has raised important questions about the role of emotions in the etiology of this health condition^{21,22}. Recent studies have shown that obesity represents a health issue accompanied by mental disorders, such as anxiety, depression and addictive behaviors, characterized by difficulties of emotion management²³⁻²⁷. In addition, previous studies have revealed that many people experience changes in eating behavior in response to emotional stress: 11% to 55% eat more, while 32% to 70% eat less¹¹. Epidemiological data indicates that stress-related eating is associated with increased body weight as well^{9,28}.

In Mexico, the National Health and Nutrition Survey reported that 35% of adolescents and 71.2% of adults over 20 years of age were overweight or obese²⁹. Studies have shown that eating habits among university students is a major issue^{28,30}. Young adults, who experience the transition into university life, are frequently exposed to stress and time restraints. Poor eating habits acquired at this age generally persist into adult life and may lead to being overweight or obese.

Given the high and increasing prevalence of overweight and obesity in Mexico, an understanding the role of emotional eating and nutrition education is particularly important in preventing weight gain during university years and the development of obesity in adulthood^{28,30}. As far as it was possible to investigate, there are no studies on the psychometric characteristics or validated questionnaires on emotional eating for Mexican people. Previous studies have focused on risk factors of eating disorders^{27,31-35}. For this reason, the aims of the study were to assess psychometric charac-

teristics of a Spanish version of EADES; as well as to identify if the questionnaire and its constructs were associated with overweight and obesity in Mexican students' population.

Methods

Sample

Application of the questionnaire was conducted from September 2013 to January 2014 in a public university of Mexico City; 232 students from a total population of 1,260 freshmen students (27.8% of the total population) participated in the study. The participants belong to three departments: Biological Science and Health, Social Sciences and Humanities and Science and Art Design. Students who did not attend the appointment for measurement of weight and height or who did not answer all the items of the questionnaire were excluded (17 students). Thus, the total sample was reduced to 215 participants.

A test-retest study was conducted with 75 participants. These students completed the EADES twice, with an interval period of three weeks.

Instrument

The Eating and Appraisal Due to Emotions and Stress Questionnaire (EADES) is a psychometric instrument that has been previously validated using exploratory factor analysis¹⁹. This self-applied instrument consists of 49 items divided into three subscales: Emotion- and Stress-Related Eating (24 questions, Cronbach's alpha=0.95); Appraisal of Ability and Resources to Cope (20 questions, Cronbach's alpha=0.87); and Appraisal of Outside Influences and Stressors (5 question, Cronbach's alpha=0.65). Total Cronbach's alpha reliability coefficient of the original study was 0.949. Individuals respond to the questionnaire in accordance with their level of agreement from strongly agree to strongly disagree, on a scale of 1 to 5. Subscales from the EADES questionnaire were given a score with the following ranges: Emotion- and Stress-Related Eating from 24 to 120; Appraisal of Ability and Resources to Cope from 20 to 100; Appraisal of Outside Influences and Stressors from 5 to 25. Negatively toned questions (1-3,6-8,10,12,16-20,22,23,30,31,33,45-47) were reversed, so that the lower the number the more compromised is the ability to cope with emotions and stress by eating^{3,19}.

Procedures

The linguistic adaptation of the EDAES was obtained by a translation/back-translation method. A team

of experts and translators analyzed the appropriate wording equivalent of each item. Subsequently, the comprehensibility of each item was discussed with a sample of 32 university health science students. Finally, two bilingual teachers evaluated the degree of equivalence between the original English and the final Spanish versions. The Spanish version of the EDAES used in the present study was correctly understood by students^{36,37}.

Students, who participated in the study during school hours, filled out a paper-and pencil questionnaire. The questions were carefully explained by the nutritionists to ensure an understanding of the instrument. After completing the questionnaire, all students attended a workshop entitled "Eating and Emotions". It was decided that this was an opportune time to reflect on the issue of stress and emotion management, as well as to create awareness about the need of professional help in some cases. The average time for completing the questionnaire was 15 minutes. For the test-retest evaluation the questionnaire was applied to the students by the same trained nutritionists during school hours. Response rate to the questionnaire was 97%.

In addition, weight, height and body mass index (BMI weight/height²) were recorded using a scale of Body Composition Analyzer (Tanita, model 418). Based on WHO criteria³⁸, the cutoff point for being overweight was BMI $\geq 25\text{kg/m}^2$, for being obese $\geq 30\text{kg/m}^2$ and for being underweight $< 18.5\text{kg/m}^2$.

Ethics

The study was carried out after project approval by the University Review Board, where the ethical aspects were revised. The protocol for human research of the Mexican Health Ministry was followed. The students participated on a voluntary basis and they signed the informed consent. Educational workshop on "Eating and Emotions" was given to all participants during the data collection.

Statistical analysis

Descriptive statistics were used to summarize the data. Internal consistency of the total questionnaire and of the subscales was estimated using Cronbach Alpha. Two factor analyses were performed: the first one using a varimax rotation and the second, an oblique rotation (promax). Factor loadings and uniqueness of the items, as well as correlation matrix among factors were obtained from the oblique matrix rotation. Pearson correlation coefficients were applied between three subscales of the questionnaire. A multiple logistic regression model was constructed for BMI $\geq 30\text{kg/m}^2$ (as a dependent categorical variable: obese and non-obese) and the total score of the instrument (as an independent variable), adjusted by sex and age; odds

rations (OR) were obtained. The significance level was set at $p < 0.05$. By studying the test-retest reliability, intraclass correlation coefficient (ICC) was calculated. STATA V 12 Statistical Package was used for data analysis (*Stata Statistical Software: Release 12*. College Station, TX: StataCorp LP).

Results

From a total of 215 students, 69 (32%) were men and 146 (68%) were women; 198 (92%) were single, 10 (4.7%) were married and 7 (3.3%) lived together. Mean age was 21.3 (SD=3.0) with a range from 17 to 29 years. The descriptive characteristics (sex, age, marital status, BMI, mean of a total Score of EADES and subscales means) are presented in Table I. No differences were observed in BMI and EADES scores by sex.

Analysis of the original scale (EADES)

By assessing the reliability, the Cronbach's alpha for the total scale was 0.92; for subscale 1: Emotion- and Stress- Related Eating was 0.88; for subscale 2: Appraisal of Resources and Ability to Cope was 0.91; for subscale 3: Appraisal of Outside Stressors and Influences was 0.54.

The Pearson's correlation between first and second subscales was significant ($r=0.496$, $p<0.0001$); the same was observed between the first and the third subscales ($r=0.354$, $p=0.0002$), as well as between the second and the third subscales ($r=0.654$, $p<0.0001$).

Test-retest reliability. To assess test-retest stability, 75 students twice filled out the questionnaire. The analysis showed an adequate intraclass correlation coefficient (ICC= 0.88, $p<0.01$).

Variables	n (%)
<i>Sex</i>	
Men	69 (32%)
Women	146 (68%)
<i>Age mean (SD)</i>	
<i>Marital Status</i>	
Single	198 (92%)
Married	10 (4.7%)
Living together	7 (3.3%)
<i>BMI</i>	
Normal Weight	157 (73.1%)
Overweight	39 (18.1%)
Obese	19 (8.8%)
<i>Total Score EADES (Mean, SD)</i>	189.9 (21.7)
<i>Subscales</i>	
Emotion- and Stress- Related Eating	95.9 (11.8)
Appraisal of Ability and Resources to Cope	76.0 (10.9)
Appraisal of Outside Influences and Stressors	18.3 (3.0)

Factor analysis of EADES

Extracting three factors from varimax rotation of the items, it was shown that they explained 30.1% of the variance of the questionnaire (F1=0.175; F2=0.116; F3=0.10). In order to improve the explained variance, an oblique rotation (promax) was performed: Factor 1 accounted for .206 of the variance; Factor 2 for 0.157; Factor 3 for 0.142. Factor loading and uniqueness are presented in Table II (items that did not provide factor loading >0.400 were excluded).

The factor analysis of our data showed that Factor 1 included items of self-efficacy in emotion and stress related eating, and consisted of 12 questions, while Factor 2 included items of self-confidence in emotion and stress-related eating, and consisted of 9 questions (all of these questions belong to the original subscale Emotion-and Stress-Related Eating which consists of 24 items). Three items were eliminated from the original scale: "I am confident I can control my eating when I am tired", "I am confident I can control my eating when I am relieved", "I overeat when I socialize". In our data, Factor 3 was related to the ability to cope and consisted of 19 questions (the items of this factor were the same of those in the original subscale: Appraisal of Resources and Ability to Cope), only one item was eliminated ("when a problem arises, it is hard for me to make a plan of action and follow it"). The subscale: Appraisal of Outside Stressors and Influences was excluded during the factor extraction process (all items showed low factor loading). Thus, a total of 40 items from the EADES questionnaire (49 original items) were selected from the factor analysis. The correlation matrix of the promax rotation showed the highest value between factor 1 and 2 (0.392), followed by the correlation between factors 2 and 3 (0.355) and factor 1 and 3 (0.314), $p<0.05$.

Assessing internal consistency, the Cronbach's alpha reliability coefficient for the total 40-items instrument was 0.911; for Factor 1: Self-efficacy in Emotion- and Stress-related Eating was 0.867; for Factor 2: Self-confidence in Emotion- and Stress-related Eating was 0.839, and for Factor 3: Appraisal of Resources and Ability to Cope was 0.906.

Association between EADES and BMI

In the multivariate regression analysis (BMI as a dependent variable and total score, subscales scores of the original instrument, sex, and age as independent variables). The regression coefficient was significant for Subscale 1 (Emotion- and Stress-Related Eating, $\beta= -0.610$, $p= 0.026$) and for age ($p=0.028$). However, for Subscale 3 (Appraisal of Outside Stressors and Influences), the regression coefficient (adjusted for age and sex) was positive $\beta=0.270$, $p=0.013$. The association with Subscale 2 and sex were not significant in this model, Table III.

Table II
Factor loadings and Cronbach's alpha for the 40-items version of EADES questionnaire^a

Factor and question number	Factor Loading	Uniqueness
Factor 1: Self-efficacy in Emotion- and Stress-Related Eating		
1. Utilizo los alimentos para manejar mis emociones (<i>I use food to cope with my emotions</i>)	0.715	0.455
2. Cuando estoy molesto conmigo mismo, como (<i>I eat when I am upset with myself</i>)	0.617	0.580
3. Cuando estoy ansioso, como (<i>I eat when I am anxious</i>)	0.655	0.557
6. Me consuelo con la comida (<i>I comfort myself with food</i>)	0.530	0.746
7. Cuando estoy frustrado, como (<i>I eat when I am frustrated</i>)	0.707	0.490
8. Cuando estoy triste, como (<i>I eat when I am sad</i>)	0.708	0.480
10. Cuando estoy enojado, como (<i>I eat when I am angry</i>)	0.572	0.632
12. Cuando estoy estresado, como en exceso (<i>I overeat when I am stressed</i>)	0.724	0.471
16. No me puedo controlar cuando como (<i>I feel out of control when I eat</i>)	0.571	0.649
18. Es difícil para mí dejar de comer aunque me sienta lleno (<i>It is hard to me to stop eating when I am full</i>)	0.520	0.724
19. Para evitar enfrentar los problemas, como (<i>I eat to avoid dealing with problems</i>)	0.563	0.649
20. No tengo control sobre la cantidad que como (<i>I do NOT have control over how much I eat</i>)	0.491	0.723
Factor 2: Self-confidence in Emotion- and Stress-Related Eating		
4. Considero que puedo controlar mi alimentación cuando estoy molesto conmigo mismo (<i>I am confident I can control my eating when I am upset with myself</i>)	0.755	0.429
5. Considero que puedo controlar mi alimentación cuando estoy molesto (<i>I am confident I can control my eating when I feel upset</i>)	0.819	0.318
9. Considero que puedo controlar mi alimentación cuando estoy frustrado (<i>I am confident I can control my eating when I am frustrated</i>)	0.713	0.464
11. Considero que puedo controlar mi alimentación cuando me siento triste (<i>I am confident I can control my eating when I am sad</i>)	0.662	0.447
13. Considero que puedo controlar mi alimentación cuando estoy ansioso (<i>I am confident I can control my eating when I am anxious</i>)	0.591	0.459
14. Considero que puedo controlar mi alimentación cuando estoy enojado (<i>I am confident I can control my eating when I am angry</i>)	0.747	0.360
15. Considero que puedo controlar mi alimentación cuando estoy cansado (<i>I am confident I can control my eating when I am tired</i>)	0.706	0.444
21. Considero que puedo controlar mi alimentación, cuando me libero de preocupaciones (<i>I am confident I can control my eating when I am relieved</i>)	0.428*	0.839
24. Considero que puedo controlar mi alimentación cuando me siento feliz (<i>I am confident I can control my eating when I feel happy</i>)	0.562*	0.695
Factor 3: Appraisal of Resources and Ability to Cope		
25. Soy capaz de satisfacer mis necesidades emocionales (<i>I am able to meet my emotional needs</i>)	0.620	0.476
26. Trato de resolver el problema cuando sé que hay algo mal en mi vida (<i>I try to resolve a problem when I know there is something wrong in my life</i>)	0.732	0.394
27. Generalmente puedo encontrar una solución a mis problemas (<i>I can usually work out a solution to my problems</i>)	0.759	0.379
28. Soy capaz de manejar situaciones estresantes (<i>I am capable of dealing with stressful situations</i>)	0.642	0.560
29. Tengo control sobre mi vida (<i>I have control over my life</i>)	0.648	0.520
30. NO me siento seguro en mi vida (<i>I do NOT feel secure in my life</i>)	0.557	0.612
31. Frecuentemente me siento triste (<i>I feel sad often</i>)	0.603	0.508
32. Soy capaz de manejar mis propios problemas (<i>I am capable of handling my own problems</i>)	0.615	0.547
34. Tengo control sobre mis emociones (<i>I have control over my emotions</i>)	0.542	0.554
35. Trato de pensar positivamente en tiempos difíciles (<i>I try to think positive when times are tough</i>)	0.557	0.706
36. Me ocupo de los problemas lo antes posible (<i>I deal with problems sooner rather than later</i>)	0.641	0.576
37. Considero los pros y contras de las situaciones antes de tomar decisiones sobre qué hacer (<i>I weigh the pros and cons of situations before I make decisions about what to do</i>)	0.665	0.517
38. Soy capaz de satisfacer mis necesidades espirituales (<i>I am able to meet my spiritual needs</i>)	0.619	0.551
39. Mis amigos me apoyan cuando tengo problemas (<i>My friends support me when I have problems</i>)	0.463	0.765
40. Soy capaz de decir "no" cuando tengo que hacerlo (<i>I am able to say no when I need to</i>)	0.473	0.742
41. Trato de analizar el problema para entenderlo mejor (<i>I try to analyze a problema to better understand it</i>)	0.698	0.468
42. Mi familia me apoya cuando tengo problemas (<i>My family support me when I have problems</i>)	0.688	0.560
43. Hablo de mis sentimientos (<i>I talk about my feelings</i>)	0.590	0.691
44. Trato de encontrar soluciones alternativas para mis problemas (<i>I try to find alternative solutions to my problems</i>)	0.715	0.438

Items that did not provide sufficient factor loading (< 0.400) in any of the subscales were eliminated.

Total Cronbach alpha = 0.911. Factor 1 Cronbach alpha = 0.867. Factor 2 Cronbach alpha = 0.839. Factor 3 Cronbach alpha = 0.906

*questions that were added in oblique rotation

Table III
Association between obesity and EADES scores^a

Questionnaire	OR (95% CI)	p value
Original questionnaire (49 items)¹		
Total score	0.98 (0.93 -1.01)	0.056
<i>Subscale 1</i>		
Emotion- and Stress-Related Eating	0.96 (0.92- 0.99)	0.024*
<i>Subscale 2</i>		
Appraisal of Ability and Resources to Cope	0.97 (0.93 - 1.01)	0.113
<i>Subscale 3</i>		
Appraisal of Outside Influences and Stressors	1.04 (0.89 – 1.20)	0.653
Spanish Version of EADES (40 items)²		
Total score	0.97 (0.90-0.99)	0.020*
<i>Factor 1</i>		
Self-Efficacy in Emotion and Stress Related Eating	0.96 (0.92-1.00)	0.081
<i>Factor 2</i>		
Self-Confident in Emotion and Stress Related Eating	0.94 (0.89-0.94)	0.026*
<i>Factor 3</i>		
Appraisal of Ability and Resources to Cope	0.95 (0.90-1.01)	0.120

^aLogistic Regression model for BMI \geq 30, adjusted for age and sex.

*p < 0.05.

¹ adjusted R² was 0.050.

² adjusted R² was 0.038.

In the multivariate regression (BMI as a dependent variable and total score of 40-item instrument, factor scores, sex and age as independent variables), statistical significance was found for factor 2: Self-confidence in Emotion- and Stress-related Eating, $\beta = -0.086$, $p = 0.019$ and for age, $p = 0.028$.

Considering obesity (BMI \geq 30 kg/m²) as a dependent variable and the total score of the 40-item version as an independent (adjusted by sex and age), statistical significance was found for total score (OR=0.973, $p = 0.020$) and for factor 2: Self-confidence in Emotion- and Stress-Related Eating (OR=0.940, $p = 0.026$), Table III.

Discussion

The purpose of the present study was to evaluate psychometric characteristics of the EADES questionnaire and its association with BMI in Mexican university students. This instrument aims to assess eating behavior related to emotions and stress as well as coping strategies for problems and stress.

The results indicated a good internal consistency and temporal stability of the EADES questionnaire. The analysis showed high Cronbach's alpha coefficient for the full instrument that is consistent with prior results. However, similar to the data of Ozier et al.¹⁹, the internal consistency was high for the first subscale Emotion- and Stress-Related Eating and for the second Appraisal of Resources and Ability to Cope, and low

for the third subscale. Due to the recent creation of the questionnaire, there are no other studies to compare these results. In addition, EADES showed high test-retest stability in our study.

Prior results of the questionnaire applied at the University of Alabama, US, among students, staff and faculty¹⁹ revealed a three-factor model that was related to the original Transactional Model of Stress and Coping, from which the instrument was derived. In the analysis performed with our data, also three-factors were extracted, but factor grouping was different: the subscale Appraisal of Outside Stressors and Influences (original factor 3) was excluded in the factor extraction process (all items showed low factor loading). In addition, this subscale showed the lowest percentage of the total variance, both in our study and in the study of Ozier et al.¹⁹. The questions related to subscale Appraisal of Ability and Resources to Cope (original factor 2, which consisted of 20 questions) remained in one factor, except the item "when a problem arises, it is hard for me to make a plan of action and follow it". The original subscale Emotion- and Stress- Related Eating (which consisted of 24 questions) was divided into two factors in our study. It is worth mentioning that questions on Self-efficacy in Emotion- and Stress-Related Eating (12 items) and questions on Self-confidence in Emotion- and Stress-Related Eating (9 items), which formed the original first factor, were grouped into separate factors. In total, nine questions were excluded due to their low factor loading, and 40 items remained from

the original 49 items. Some items showed high uniqueness values indicating that they have a high variance that was not explained by other items of the questionnaire; thus some questions of the instrument may be related to other domains that should be studied more carefully in further research on emotional eating. Furthermore, the 40-item Spanish version had a good internal consistency.

Regarding EADES score and BMI, a significant association was found between original subscale Emotion-and Stress- Related Eating and BMI. Our findings partially corroborate the data of Ozier et al.³ who have identified a relationship between this subscale and obesity, as well as between poor stress management (subscale -Appraisal of Ability and Resources to Cope) and obesity. It is important to point out that subscale 3: Appraisal of Outside Stressors and Influences had an unexpected relationship with obesity in our study, showing that higher scores were associated with higher BMI, which is the opposite of the questionnaire's hypothesis (according to the questionnaire, the lower the score, the more compromised is the individual's ability to cope with emotions and stress by eating). This finding reinforced the advantage of using the version of 40-item. In addition, this subscale was not included in the Spanish version of the questionnaire obtained during the factor analysis.

The multivariate regression model, adjusted for age and sex, showed an association between obesity and the total score of the 40-items version of the instrument. In our study, it was found that body weight was increased with age, and the total score of the questionnaire was decreased with age, in both men and women. This suggests that the older the person the more compromised is his/her ability to cope with stress and emotions.

Regarding the association of our factors with BMI, a significant relationship was found with factor 2 (Self-confidence in Emotion- and Stress-Related Eating). This association suggests that maladaptive behavior in managing stress and emotions may represent a risk for weight gain.

Similarly, Green et al.³⁹ concluded that university students who scored high on an emotional eating had higher BMIs than students with lower emotional eating scores. Laitinen et al.⁹ and Ozier et al.³ also showed that emotion- and stress-related eating, as well as poor stress management were associated with increased body weight. As far as it was possible to investigate, there are no published studies on this problem in Mexican populations.

Some studies have examined the relationship between eating disturbances and coping behavior, which can be adaptive and maladaptive, e.g., using food as positive reinforcement^{9,15}. It is important to measure eating patterns along with coping strategies for problems and stress. Rational coping style (i.e., planning to solve a problem or thinking of an alternative way to solve it) generally is more effective than an emo-

tion-focused one (unless a problem is not changeable), and these skills have to be learned at an early age⁴⁰.

The transition to university life is a stressful experience for many young people. How emotions are managed during these formative years is critical for the development of healthful eating behaviors. Coping with stress through eating represents a significant challenge towards the goal of healthy eating. As young adults progress to adulthood, greater responsibilities and more stress are to be expected. Therefore, time planning and stress management skills should be taught for those who are susceptible to emotional eating¹.

Among the limitations, it should be noted that the study was carried out with a specific non-clinical population (university students) with fairly low prevalence of obesity. Thus, caution needs to be taken in extrapolating the results among other population groups. Further studies with different groups and larger samples are required to identify the external validity of the questionnaire, also the short version of the instrument should be considered.

In Mexico, there is a severe obesity problem, and a validated instrument to detect emotional eating is essential. Periodic follow-up studies are needed to more precisely assess emotional eating.

Conclusions

The results indicated a good internal consistency and a good temporal stability of the EADES questionnaire.

The 40-item version of EADES, obtained from this study, could be used in similar settings to assess emotional eating. More studies with different age groups and BMI scores are required in order to study the validity of this instrument.

A multidisciplinary intervention, focusing on emotion and stress management in addition to dietary behavior changes, should be developed in order to reduce the potential risk for weight gain in young adult populations.

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