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Research Article

Validation of a Scale for Measuring Responsible Food Consumption in High School Adolescents

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ABSTRACT

Responsible consumption is defined in environmental, cultural, economic, ethical and social terms. The subject has been studied for at least 50 years. Currently, the description of the responsible consumer is relevant, given the climate complications humankind is facing. Having an instrument to identify responsible food consumption in the adolescent population will be a significant contribution to both the scientific field and to group interventions. The objective of this research was to design and validate a scale to measure responsible food consumption in adolescents (Responsible Food Consumption Scale in Adolescents ECRAA) using a sample of 286 high school students. The scale consists of 9 items distributed in two dimensions - attitudes and emotions. It was designed and validated through a cross-sectional study. Aiken's V coefficient and a confirmatory factor analysis was used to validate the scale's content; to approve the construct validity, convergent validity and discriminant validity was used, and reliability was measured by calculating the composite reliability, Cronbach's alpha, omega coefficient, Guttman coefficient (Lambda-6), and Spearman-Brown correction. The ECRAA proved to have adequate properties. All 9 items received a positive evaluation by the experts. The Confirmatory factor analysis supported the structure with favorable goodness-of-fit indices, and the reliability of the data was acceptable. Thus, the ECRAA is valid and reliable for measuring responsible food consumption in adolescents.

Keywords:- Theory of reasoned action, design of a scale, eating habits, health and environment.

El consumo responsable se define en términos medioambientales, culturales, económicos, éticos y sociales. El tema se estudia desde hace al menos 50 años. Actualmente, la descripción del consumidor responsable es relevante, dadas las complicaciones climáticas que enfrenta la humanidad. Contar con un instrumento para identificar el consumo responsablede alimentos en la población adolescente será una contribución significativa, tanto para el campo científico como para las intervenciones grupales. El objetivo de esta investigación fue diseñar y validar una escala para medir el consumo responsable de alimentos en adolescentes (Escala de Consumo Responsable de Alimentos en Adolescentes, ECRAA) utilizando una muestra de 286 estudiantes de secundaria. La escala consta de 9 ítems distribuidos en dos dimensiones -actitudes y emociones. Fue diseñada y validada mediante un estudio transversal. Se utilizó el coeficiente V de Aiken para validar el contenido de la escala y un análisis factorial confirmatorio; para aprobar la validez de constructo se usó validez convergente y validez discriminante, y la fiabilidad se midió calculando la fiabilidad compuesta, el alfa de Cronbach, coeficiente de omega, Coeficiente de Guttman (Lambda-6), y corrección de Spearman-Brown. La ECRAA resultó tener propiedades adecuadas. Los 9 ítems recibieron una evaluación positiva por parte de los expertos. El análisis factorial confirmatorio apoyó la estructura con índices favorables de bondad de ajuste, y la fiabilidad de los datos resultó aceptable. Así pues, el ECRAA es válida y fiable para medir el consumo responsable de alimentos en adolescentes.

Palabras clave: Teoría de acción razonada, diseño de una escala, hábitos alimentarios, salud y medio ambiente.

Introduction

When acquiring products or services, responsible consumption implies that individuals think beyond their immediate needs and consider the ethical, social, environmental, economic, and cultural consequences of their purchases [1]. The study, definition, and measurement of responsible consumption have been developing since the 1970s, with roots in concepts such as green consumers, environmental movements, and ecological research [2]. Carrillo [3] mentions that responsible consumption is defined from social, ethical, ecological, and cultural perspectives and is concerned with meeting the needs of society. The responsible consumer cares about social change, environmental dimensions, corporate responsibility, and their behavior. They also show concern for others, justice, and solidarity, positioning the consumer as a community member capable of improving relationships with people and the planet [4].

Mendoza and García López [5] state that responsible consumption requires the analysis demanded by the consumer's logic to perform and exercise their consumption actions, deciding through observation and prior knowledge about the consumption object, which goes beyond the personal satisfaction of desires and includes economic, social, and ecological aspects. The authors also emphasize the importance of consumer information, whether to facilitate purchasing decisions or extend the useful life of the inputs representing the product or service. This contributes to improving quality of life, valuing time, simplifying consumption channels for purchase, and ensuring availability, among other aspects.

The concept of responsible consumption aims to sensitize and raise awareness among the population about their consumption habits, prioritizing the satisfaction of their basic needs and promoting sustainability by avoiding excessive resource use [6]. Basic needs include clothing, food, health, education, culture and recreation, transportation, housing, and minimal necessary energy resources. Since food is a basic need and is consumed at least twice a day, consumers must be conscious and responsible, not only about their choices but also about the public implications of their private decisions in daily life [7].

Regarding the measurement of responsible consumption, various authors have developed scales from different dimensions. Jain et al. [8] designed a measurement instrument in India based on sustainable consumption, ethical consumption, rationality, minimalism, and local consumption, highlighting minimalism as a key dimension in responsible consumption. In another measurement scale aimed at Spanish-speaking consumers, consumer literacy and company reputation were identified as the most influential factors in responsible consumption [9]. On the other hand, Bianchi et al. [10] proposed a scale for South America considering three dimensions of responsible consumption: ethical, ecological, and social or solidarity-based. Their study concluded that more items should be incorporated into the ecological dimension and the dimension of appropriate resource use should be considered.

The evaluation of responsible food consumption has been approached from different perspectives. For instance, a survey conducted in European countries [11] focused on investigating the place of food purchase, factors influencing food choice decisions, and the frequency of food waste in households. In Spain, Chinea et al. [12] identified the psychosocial variables underlying responsible consumption behavior concerning the environment. Another study in Turkey analyzed tourists' behavior regarding local food consumption, finding that local consumption supports the development of community businesses and promotes the conservation of natural resources in travel destinations [13].

This evidence shows that the measurement of responsible food consumption is conducted from different points in the food supply chain, considering psychosocial dimensions generally aimed at adults. The present study considers the ethical, environmental, and social dimensions of consumers, targeting the adolescent age group.

Previous works have identified factors influencing the consumption of ultra-processed foods by adolescents, from individual, interpersonal, and contextual aspects to public policies [14]. However, they do not consider the environmental impact and focus solely on public health impact.

Theoretical Foundation of the Measurement Scale

Nutrition goes beyond a simple concept as it encompasses a set of social, biological, and psychological processes related to food intake [15]. For this reason, to develop an evaluation scale, the fundamental principles of the Theory of Reasoned Action (TRA) and the Health Belief Model (HBM) were employed. These complex models consider multiple factors that other theories address in isolation, providing greater confidence in the responses.

The TRA, proposed by Fishbein and Ajzen in 1980 [16], has been used in public health studies to identify the attitudes, perceptions, and beliefs that influence people's health-related behaviors [17]. This theory is considered interpersonal with a cognitive orientation, as it posits that people are influenced by their environment and vice versa [18]. Through the TRA, the aim is to explain how and at what frequency positive health-related behaviors and practices are generated [19].

According to the TRA model, behavior results from the interplay between critical attitudes, prior knowledge, and emotions. Based on the expected outcomes of their behavior, individuals commit to each of these dimensions, manifesting them in their behavior, in this case, food consumption [20]. Regarding the practical dimension, behaviors or actions are intentionally performed to care for the environment or minimize harm [21].

Some studies based on the TRA have been implemented with young people. One such study identified attitudes related to sexual behavior [22], finding that decisions about sexual activity are influenced by the context. Authors like Carrillo-Sierra et al. [23] mention that actions taken in primary health care promote healthy habits from an early age. Similarly, studies related to conditions like overweight have identified that the attitudes described as part of this theory favor adherence to treatment in affected individuals [24].

The HBM is a model based on cognitive theory initially proposed by Rosentock in 1974 [25] and defined by Maiman and Becker in 1974 [26]. The model's components derive from the hypothesis related to health and are attributed to two variables: a) the desire to avoid illness or recover if already ill, and b) the belief that a healthy behavior can prevent illness or that such behavior can restore health if already ill (Maiman and Becker, 1974) [26]. In other words, perceptions of illness are determined by beliefs about susceptibility and severity, as well as beliefs about the benefits of action, self-efficacy, and the cost of barriers to health-promoting or detrimental behavior. Therefore, the course of specific actions an individual takes will depend on their beliefs, which are also assumed to be influenced by the norms and pressures of the social group they belong to.

From these perspectives, the questionnaire designed for this study is presented, focusing on the attitudes and emotions of adolescents, as well as the beliefs and contextual circumstances that lead to certain behaviors regarding food consumption. Having a validated instrument to determine the index of responsible food consumption in adolescents is crucial for decision-making and activities related to this age group, whether from institutions, educational centers, organizations, or associations. Therefore, the objective of this work is to design and validate a scale to measure responsible food consumption in adolescents (Responsible Food Consumption Scale for Adolescents, RFCSA) in a sample of high school students.

Methodology:

Study Subjects

The data for this study were obtained from 286 high school students. The sample selection process was two-stage. In the first stage, schools were selected to ensure the representativeness of different socioeconomic contexts related to three factors: local adolescent population density, population typology (urban, rural, or semi-urban), and poverty levels. The selected schools were: Escuela Secundaria Técnica 130 in Heroica Ciudad de Ejutla de Crespo, Oaxaca, with medium population density, rural classification, and a poverty level above 70%; two schools in Santa Cruz Xoxocotlán, Oaxaca, located in areas with high population density and poverty levels below 60%, these were Escuela Secundaria No. 193 in San Isidro Monjas, classified as semi-urban, and Escuela Secundaria Técnica 130 in the municipal agency of Esquipulas, classified as urban [27]. In the second stage, the population that answered the questionnaire was selected using simple random sampling from a universe of 1,640 students. It is worth mentioning that the study was approved by the school administrations and coordinated with the academic coordination area of each school.

The inclusion criteria were a) being enrolled in high school, b) being older than 10 years and younger than 18 years, and c) agreeing to answer the online survey. The exclusion criteria were a) not having a device to respond to the survey, b) not belonging to the target student population, and c) unwillingness to complete the online survey.

Procedure

The development of the instrument occurred in four stages:

First Stage: InstrumentDesign - A scale to assess responsible food consumption was created based on the theoretical assumptions of TRA and HBM [20], considering the sub-variables: emotions and attitudes. The questionnaire was constructed with three sections: I) Identification: which includes the objective and instructions for filling out the RFCSA and sociodemographic data of the respondent, II) Attitudes towards food at home and school, and III) Emotions regarding access to different types of food. Additionally, a Food Consumption Frequency (FCF) questionnaire was incorporated to identify data on the actual practices of adolescents. The analyzed categories included: fruits, vegetables, cereals, legumes, meat and eggs, flavored milk and yogurt, ice cream and popsicles, industrial pastries, industrial snacks, sweets, soft drinks, industrial juices, other sugary beverages, and energy drinks.To construct the sections of each dimension, a literature review of various responsible consumption measurement scales [28], [29], [30], [31], [9], [8], [32], [33], questionnaires directed at adolescents [34], [35], [36], [37], [38], [39], was conducted. The authors' experience in food and adolescence topics was also considered in item construction.The RFCSA items were measured using a Likert

scale, as it allows for identifying the predisposition towards a situation, object, activity, or concept favorably or unfavorably [40]. Five categories were used: strongly agree, agree, neither agree nor disagree, disagree, strongly disagree. The numerical value for each was assigned based on the positive or negative reaction to the statement, as shown in Table 3.

Second Stage: Instrument Validation - This stage evaluates the relevance of the questionnaire for adolescents. Ten experts in community nutrition and adolescent-focused psychology, each with at least 15 years of professional practice and selected using the snowball technique [40], were invited. They were given a questionnaire comprising evaluation scales for clarity, objectivity, organization, sufficiency, and coherence, coded using a 5-point Likert scale: poor=1, fair=2, good=3, very good=4, and excellent=5. The questionnaires were administered at the experts' workplaces. Following their evaluations, two questions were revised for clarity based on their recommendations. The results were processed and analyzed in Excel using Aiken's V technique to measure the degree to which the proposed items had content validity.

Third Stage: Instrument Application - The survey, comprising a total of 9 items and taking approximately 8 to 10 minutes to complete, was administered via Google Forms. The questionnaire included the following thematic axes: identification data, sociodemographic information, and the evaluation of responsible consumption in the sub-variables: attitudes and emotions.

Fourth Stage: Data Analysis - The results were subjected to Confirmatory Factor Analysis (CFA) using Amos (Analysis of Moment Structure) V. 23 software. The internal consistency of the proposed scale was measured by calculating composite reliability, Cronbach's alpha, Omega coefficient, Guttman's Lambda-6 coefficient, and Spearman-Brown correction. These tests were chosen due to their usage in various studies, allowing for comparison. Goodness-of-fit measures included Hu and Bentler's indices, using chi-square adjustment. Since this test is sample-size dependent, additional fit indices such as RMR (Root Mean Square Residual), CFI (Comparative Fit Index), TLI (Tucker Lewis Index), RMSEA (Root Mean Square Error of Approximation), and PCLOSE (Probability of Close Fit) were also considered. Construct validity was measured through convergent and discriminant validity.

Finally, data from the total sample were analyzed using SPSS v.26. The RFCSA index results were obtained by summing the values based on adolescents' responses (see Table 3). The ideal index of responsible food consumption (IRFC) was 45 points, equivalent to 100%. The cohort determination for acceptable levels of responsible food consumption was set at 60%, i.e., from 0 to 26 points was considered an unacceptable level, while from 27 to 45 points was considered acceptable. This cutoff point was justified by aiming for an acceptable behavior level above 60% in terms of the sample's characteristics.

Results

To evaluate the content validity and relevance of the questionnaire, clarity, objectivity, organization, sufficiency, and coherence were considered. According to the experts, the 9 items of the Responsible Food Consumption Scale for Adolescents (RFCSA) are adequate (V > .70). Table 1 shows the results for each of the analyzed dimensions.

Table 1 Content Validity Results According to Experts, across five dimensions and Aiken's V values (n=10)

Dimension	Item	Clarity	Objectivity	Organization	Sufficiency	Coherence	Average Aiken's V
Attitude	1	0.90	0.88	0.93	0.90	0.88	0.90
	2	0.95	0.93	0.95	0.93	0.93	0.94
	3	0.93	0.88	0.93	0.93	0.93	0.92
	4	0.85	0.90	0.90	0.90	0.88	0.89
	5	0.88	0.88	0.88	0.88	0.88	0.88
	6	0.83	0.85	0.85	0.85	0.85	0.85
Emotions	7	0.78	0.93	0.90	0.90	0.90	0.88

	8	0.93	0.93	0.93	0.93	0.85	0.91
	9	0.88	0.93	0.85	0.93	0.90	0.90
Average		0.88	0.90	0.90	0.90	0.89	0.89

The average obtained from the five content validity categories was 0.89, with a minimum of 0.85 and a maximum of 0.94. Regarding the dimensions, the best results were for objectivity, organization, and sufficiency; however, clarity and coherence also present adequate averages.

For the confirmatory factor analysis, the structure of the RFCSA was analyzed using goodness-of-fit indices ($\chi 2$= 45.929, $p < 0.05$; CMID/DF= 1.837; RMR = 0.037; CFI= 0.983; TLI= 0.975; RMSEA= 0.054; PCLOSE = 0.366). The factor loadings are adequate; the average variance extracted (AVE) and composite reliability are acceptable (see Table 2). In summary, the 9-item model is satisfactory.

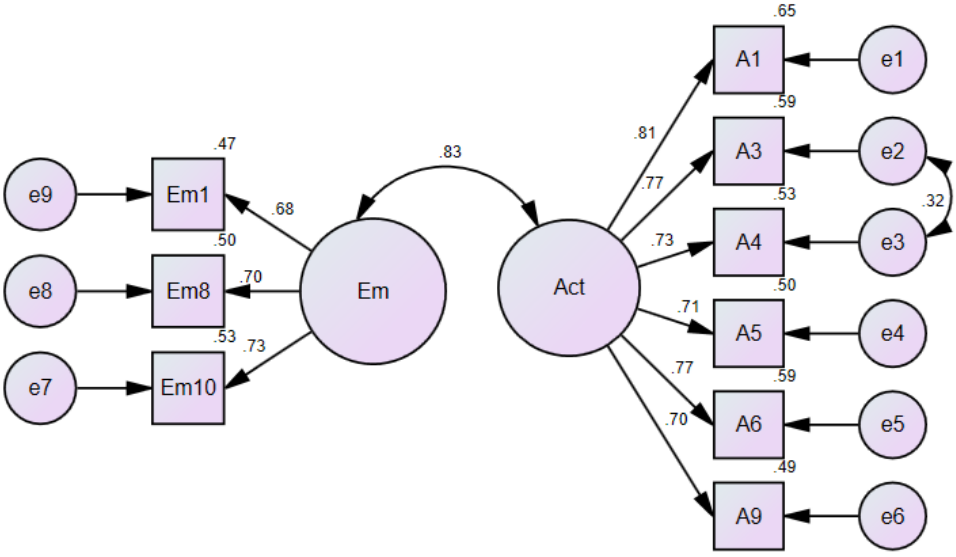

Figure 1 Model of the internal structure of the questionnaire for identifying responsible food consumption in adolescents (RFCSA). The factor loadings by construct are presented in Table 2.

Table 2 Factor Loadings of the Confirmatory Factor Analysis (CFA)

Item	Attitude	Emotion
1	0.81	
2	0.77	
3	0.73	
4	0.71	
5	0.77	
6	0.70	
1		0.68
2		0.70
3		0.73
AVE	0.56	0.50
CR	0.88	0.75
Ω Coefficient	0.88	0.75
Cronbach's Alpha	0.88	0.75
Guttman's Coefficient	0.87	0.76
Spearman-Brown Correction	0.87	0.71

Note: Own elaboration. AVE: Average Variance Extracted, CR: Composite Reliability.

Finally, Table 3 shows the final version of the RFCSA.

Table 3 Final Version of the Responsible Food Consumption Scale for Adolescents (RFCSA) and Assigned Values Based on Expected Responses.

No.	Dimension	Question	Strongly Agree	Agree	Neither	Disagree	Strongly
1	Attitude	At school, during recess, I prefer to eat a packet of cookies, salty chips, or instant soup rather than a piece of fruit.	1	2	3	4	5
2		At school, I prefer to drink soda rather than plain water.	1	2	3	4	5
3		At home, during meals, I prefer to drink soda rather than plain water.	1	2	3	4	5
4		With my friends, I prefer to buy snacks from the store rather than prepare them.	1	2	3	4	5
5		I prefer packaged products from the store rather than home-cooked food.	1	2	3	4	5
6		If I buy a taco and have the option of wrapping it only in paper or using a styrofoam plate, I prefer the styrofoam.	1	2	3	4	5
7	Emotions	I prefer not to know if the food I consume is of natural origin.	1	2	3	4	5
8		I feel the need to buy packaged foods.	1	2	3	4	5
9		When I am in the store, if a food item catches my attention, I buy it even if I do not need it.	1	2	3	4	5

The questionnaire was administered to a population of 286 high school adolescents, aged between 12 and 14 years, of which 56.9% were female and 43.1% were male. The grade level that showed the highest willingness to respond to the questionnaire was 1st grade (43.8%). The descriptive sociodemographic characteristics of the adolescent population and their healthy habits are shown in Table 4. Meanwhile, the frequency consumption results by food group are presented in Table 5.

Table 4. Social and economic characteristics of the studied adolescents (n=286)

Characteristic	Subvariables	% (286)
Sex	Man	43.4
	Woman	56.6
Age	12	36.4
	13	24.1
	14	36.0
	15	2.4
	16	1.0
Type of Locality	Urban	26.9
	Rural	19.6
	Semi-urban	53.5
Second Occupation After School	Household activities	60.5
	Arts	2.1
	Farmer	3.5
	Merchant	3.5
	None	21.3
	Trades (electrician, masonry, mechanics, baking, sewing)	4.5
	Counter work	1.0
	Sports-related work	3.5
School	Escuela Secundaria General 21 de noviembre	26.9
	Escuela Secundaria Técnica No. 193	53.5
	Escuela Secundaria Técnica No. 30	19.6
Grade	1 st	43.4
	2 nd	25.2
	3 rd	315
	No	26.2

Engages in sports	Yes	73.8
Physical Activity	Mixed Martial Arts	3.0
	Athletics	4.2
	Basketball	22.0
	Baseball	1.0
	Boxing	1.0
	Walking	8.8
	Cycling	3.1
	Dance	2.4
	Exercise	3.5
	Soccer	36.7
	Swimming	1.4
	None	10.5
	Skating	2.1
	Spinning	0.3

Table 5. Food Consumption Frequency (n=286)

Food groups	1 to 3 times a day (%)	1 to 3 times a week (%)	4 to 6 times a day (%)	4 to 7 times a week (%)	Never (%)
Fruits	27.6	18.9	17.1	35.7	0.7
Vegetables	24.5	22	16.8	35.3	14
Cereals	24.5	22.7	14.3	36.7	1.7
Legumes	16.1	33.6	10.8	37.1	2.4
Meat and Eggs	13.3	41.6	10.1	33.2	1.7
Flavored Milk and Yogurt	6.3	55.9	4.9	14.3	18.5
Ice Cream and Popsicles	2.4	63.6	2.4	12.9	18.5
Industrial Pastries	1.4	62.6	1.7	8.7	25.5
Industrial Snacks	1	62.9	2.1	10.1	23.8
Sweets	2.8	51	1.4	11.2	33.6
Soft Drinks	2.1	51	1.7	11.5	33.6
Industrial Juices	1.4	57.3	1.7	9.8	29.7
Other Sugary Beverages	4.9	57	5.9	16.8	15.4
Energy Drinks	2.4	21.7	0.7	4.9	70.3

Note: Developed by the authors based on field data.

The descriptive results of the ICRA measurement showed a mean of 33.66 ± 7.11, with a minimum of 12 and a maximum of 45 for females, while for males, the mean was 33.92 ± 7.18, with a minimum of 13 and a maximum of 45. Overall, the mean for the adolescents was 33.77 ± 7.13, ranging from 12 to 45. The significance of the CRAA index was verified through a chi-square test.

A total of 83.6% of the adolescents had an acceptable ICRA level, while 16.4% had unacceptable levels. To determine the association and independence between the acceptability level and sociodemographic variables and food consumption frequency, the chi-square test was applied. The test confirmed with 95% confidence that the variables of gender, age, second occupation after school, physical activity, and the frequency of consumption of fruits, vegetables, cereals, legumes, meat and eggs, flavored milk and yogurt, ice cream and popsicles, industrial pastries, industrial snacks, sweets, soft drinks, industrial juices, other sugary beverages, and energy drinks are independent of the acceptable CRA level, with expected frequencies below 5 and an asymmetrical significance greater than 0.05.

However, the variables of locality type and school of origin were found to be associated with acceptable levels. The results revealed a significant relationship ($X2 = 6.5$, $p < 0.05$ and $X2 = 6.6$, $p < 0.05$, respectively) (Table

6). Specifically, it was observed that the semi-urban population and the population of the technical secondary school 193 demonstrated an acceptable ICRA.

Table 6. Contingency Table of Categorical Variables: Type of Locality, School of Origin, and ICRA Level with Chi-Square Test Resulting in Statistical Significance (n=286)

Variable	Categories of the Variable	Acceptable ICRA Values	Unacceptable ICRA Values	Total
Type of Locality	Rural	45	11	56
		15.70%	3.80%	19.60%
	Semi-urban	132	21	153
		46.20%	7.30%	53.50%
	Urban	73	4	77
		25.50%	1.40%	26.90%
	Total	250	36	286
		87.40%	12.60%	100.00 %
School of Origin	Escuela Secundaria General 21 de noviembre	73	4	77
		25.50%	1.40%	26.90%
	Escuela Secundaria Técnica Núm. 193	132	21	153
		46.20%	7.30%	53.50%
	Escuela Secundaria Técnica Núm. 30	45	11	56
		15.70%	3.80%	19.60%
	Total	250	36	286
		87.40%	12.60%	100.00 %

Note: * Significant values $p \leq 0.05$

Discussion

The purpose of this study was to demonstrate the validity of the Responsible Food Consumption Scale for Adolescents (RFCSA) based on its content, structure, and reliability in a sample of high school students. The scale evaluates two key aspects of responsible food consumption: attitudes and emotions. The value of the RFCSA lies in identifying the level of responsible food consumption among adolescents, who are a vulnerable group, and focusing on issues that could represent risk factors for their future life and health from various fields of knowledge [41]. Other responsible consumption measurement scales have been validated through confirmatory factor analysis [8]; [10]; [33]. The difference with the RFCSA is that it focuses on responsible food consumption. Additionally, the RFCSA incorporates the analysis of experts in nutrition and food topics, and the development of a model of factors affecting consumption and data reliability. Therefore, the RFCSA is an appropriate tool for determining the index of responsible food consumption among adolescents in urban and semi-urban areas in the Mexican context.

The Theory of Reasoned Action (TRA) and the Health Belief Model (HBM) are fundamental for understanding the behaviors and emotions related to adolescents' food choices, according to the proposed scale. The results show that attitudes and emotions are influenced by social standards regarding food, for example, when adolescents strongly agreed that they felt the need for processed foods. Other studies have demonstrated similar assertions, showing that the environment can influence eating behaviors that may pose risks [42], body self-perception [43], or predisposition to mental health issues such as anxiety or depression [44], [45].

It was observed that other responsible consumption measurement scales, such as Gupta & Agrawal's [46], cover various aspects: social, ethical, sustainability, environmental, fair trade, and ecological [12], [47], [48]. However, no scales like the RFCSA presented in this study consider these topics specifically related to food, with questions directed at adolescents based on the food products they have greater access to. In the study by Costa et al. [14], the type and quantity of ultra-processed foods that adolescents have access to in their locality were also identified, but unlike the present research, this study was based on data from the National School Health Survey (PeNSE).

The current global context, where the consequences of environmental pollution and the prevalence of non-communicable diseases compromise the security and quality of life of future generations [49], underscores the scientific value of the RFCSA. It provides a baseline for working with this age group to prevent future problems, both from an ecosystem care perspective and in terms of addressing individual health.

The RFCSA offers several advantages: it is easy to administer, holds adolescents' attention, and provides specific, quantifiable criteria. Its reproducibility allows for comparative studies across different contexts, making it fundamental for cross-study comparisons. Additionally, it can inform the creation of public policies aimed at promoting healthy habits.

Despite these advantages, this study identified several limitations. Firstly, the scale was administered online, which does not allow for real control over the context and situation in which the scale is answered. Secondly, as a self-reported scale, there may be a risk of response bias, driven by the desire to provide socially desirable and expected answers, especially given adolescents' need for acceptance and belonging [50]. In future studies, it would be advisable to administer the scale in person, which would also allow for the clarification of any doubts that may arise while answering it. Additionally, to mitigate the limitation of obtaining socially accepted or desired responses, the scale could be administered by a trained individual [51].

Given the nature of the study and the findings obtained, it is necessary to continue testing the scale's functionality in other groups of adolescents. This will allow for broader and more robust validation and greater generalization of the studies, facilitating comparisons. An example of this need is that this study did not consider the indigenous population, due to their special conditions, language, and socioeconomic and cultural context, as well as access to food, making the scale incompatible for adolescents in this group.

Regarding the initial results obtained from applying the RFCSA to the sample, it was found that most adolescents are at an acceptable level of responsible food consumption, with those in technical secondary school 193 being more responsible in their food consumption, as well as those living in semi-urban areas. This suggests that a semi-urban environment could provide more favorable conditions for adopting responsible food consumption practices among adolescents.

On the other hand, although most of the population presented acceptable ICRA values, the results do not reflect this trend in observed practices. This observation is attributed to the high frequency of consumption of non-recommended ultra-processed foods, highlighting the need for nutritional guidance that generates cultural and environmental changes. These changes should be reflected in practice by reducing the frequency of ultra-processed food consumption and increasing the consumption of natural foods. This suggests that intervention projects aimed at improving responsible food consumption indices in this or other age groups could be implemented.

Conclusion

The study concludes that it provides a valid and reliable tool for measuring responsible food consumption among school adolescents in urban, semi-urban, and rural contexts, with a multidimensional structure. This instrument highlights the multifactorial nature of food consumption by including social, ethical, environmental, and health elements. It also holds practical relevance for researchers, educators, and health professionals interested in food consumption patterns, whether for establishing a baseline or evaluating interventions aimed at improving responsible food consumption behavior in adolescent populations.

The scale has the potential to inform various levels of government through situational diagnoses of population-level responsible food consumption, thereby supporting the design of public policies through plans, programs, or projects that promote healthy and sustainable eating habits. It can also be utilized in school, institutional, business, or social settings for academic and scientific research purposes. Furthermore, studies of this type promote interdisciplinarity by intersecting health, nutrition, environment, and sustainability.

Future studies can conduct additional reliability tests and analyses, including convergent and discriminant validity, known-group validity, nomological validity, and/or social desirability bias testing. Moreover, other research can apply the scale in different contexts according to countries, cultures, or environments to test reliability, validity, and invariance in those settings.

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Author Contributions

Gloria Irene Ponce Quezada: conceptualization, analysis, survey administration, and writing of the first draft. María Eufemia Pérez Flores: conceptualization, methodology, survey administration follow-up, analysis, project management, and funding acquisition.

Conflict of Interest

The authors declare no conflict of interest.

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