

University students involved in a sustainable world: assessing sustainable consumption in Spain

Assessing
sustainable
consumption

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Abstract

Purpose – To achieve sustainable development to protect the environment and society, an increasing number of scholars have conducted in-depth research on sustainable and responsible consumption behaviors. The outputs demonstrate that consumers are increasingly concerned and aware of the issues associated with the excessive use of resources. The purpose of this paper is to analyze the validity and reliability of the Sustainable Consumption Scale (SC-S) in the Spanish context.

Design/methodology/approach – The adaptation of SC-S to Spanish was carried out in accordance with international methodological standards. The Spanish version of this scale was applied empirically to the research sample was composed of 962 university students (49.1% male and 50.9% female) from 54 Universities in 15 regions of Spain that participated in the study.

Findings – The analyses carried out to verify the psychometric properties retained 16 items from the original proposal, grouped equally in three factors: Cognitive – six items; Affective – seven items; and Conative – four items. The scale presented adequate adjustment indexes, as well as optimal values of the different measures of reliability, recommended by the literature.

Originality/value – This instrument can be used by the Spanish academic community, which will contribute to the assessment and prediction regarding a sustainable consumption attitude. From these screenings, it will be also possible to understand the impact and development of the objectives outlined by Agenda 2030.

Keywords Sustainable behavior, Cognitive, Affective, Conative, SDG12, Higher education

Paper type Research paper

1. Introduction

1.1 Sustainability in a consumer society

Sustainable development can be defined as the development capable of encountering the needs of the current generation, without compromising the ability to meet the needs of next generations, in order not to exhaust resources for the future (United Nations, 1987). In creating this definition, the World Commission on Environment and Development aims to harmonize two objectives: economic development and environmental conservation (OECD, 2015). The 2030 Agenda was created in 2015 and comprises 17 Sustainable Development Goals – successors to the Millennium



Goals – whose main target is to create a new global model of sustainability. It addresses several dimensions (social, economic, environmental), with the aim of eradicating poverty and covering interrelated topics, promoting peace, justice and effective institutions, as well as promoting partnerships for sustainable development (United Nations, 2015).

In recent years, there has been increasing attention to the environmental impact of consumer behavior, in particular, sustainable behaviors. Several studies show that the consumers are aware of green subjects, and consider these issues when making green products purchase decision (Young *et al.*, 2010; Zhang and Dong, 2020). The concept of sustainable consumption emerged as a new proposal that involves a procedural perspective associated with broader changes in the configurations related to consumption practices. According to Lorek and Fuchs (2013), it is possible to consider that strategies to promote sustainable consumption are focused on attempts to increase human well-being through social structures. The change and concern for sustainable behavior requires that consumers develop more positive pro-environmental attitudes (Steg and Vlek, 2009). According to Ajzen (1991), the relationship between attitudes and behavior comes from expectation value models. Assessing the consumption patterns of university students will improve knowledge about social and environmental impacts, their attitudes toward sustainable consumption and behavioral intention. This perspective, combined with psychological capital, and the cognitive, affective and conative dimensions, allows the formation of attitudes through active cognition. Universities have a crucial role in ensuring that this vital Agenda be fulfilled, as generators of knowledge and innovation. According to Elmassah *et al.* (2021), these institutions are one of the main actors in education for a responsible consumption, through sustainable activities, which can have a substantial impact on social, environmental and economic development. Building a sustainable future is rooted with Universities because it requires a multilevel coordination: integration of pedagogy, academic research, student involvement and social impact assessments (Miller *et al.*, 2021). Hence, it becomes extremely important to study the individual's knowledge, skills and mentalities that compel him/her to commit to more sustainable consumption attitudes and, consequently, a more sustainable future.

Global crisis triggered by the Covid-19 pandemic, since early 2020, has created many social, health and economic challenges, which require a strategy recalibration. However, this also means that there is a need for a more fruitful commitment to acceleration policies that will facilitate the achievement of the goals that compose the Agenda to ensure a global recovery (Shulla *et al.*, 2021). For instance, the Goal 12 aims to ensure sustainable consumption and production modalities, promoting resource and energy efficiency, sustainable infrastructure and providing access to basic services, green and decent jobs and a better quality of life for all. Responsible or sustainable consumption implies the use of material products, energy and immaterial services in such a way that their use minimizes the impacts on the environment, and that way ensure the future of the next generations (Rana and Paul, 2017). There is no doubt that the pandemic is marking a before and an after across the globe, which means that the value of responsible consumption is brought an urgent issue more than ever (Perkins *et al.*, 2021). According to the World Economic Forum (2020), COVID-19 can be seen as a catalyst, which accelerates the progress of achieving the SDGs. Hence, it is clear the need to focusing on tangible examples of what can be achieved from a perspective of sustainable consumption, through the changes that the pandemic brought about in all countries.

Changes in the earth and man-made pollution have a negative global impact (Rosenzweig *et al.*, 2008), due to individual is primarily responsible for climate change with its activities related to cultural, economic, political and social processes (Swim *et al.*, 2009). Increased consumption of non-functional products or purposes leads to a growth in the carbon footprint given the need for greater production of goods (Peters, 2010). Currently, the planet faces huge economic, social and environmental challenges, which need solutions determined between the several world

governments. To encountering the needs of future generations, sustainable consumption is what simultaneously optimizes the use and disposal of resources and their environmental, social and economic consequences (Luchs *et al.*, 2011). In Western countries, predominates a consumerist culture, where the social value of the products and the status that the product gives to those who buy it are prioritized (Rodríguez-Díaz, 2013). On the other hand, responsible and sustainable consumption appears in this same context, where consumers are aware of the problems associated with the excessive use of resources (Carmona, 2018). Today, the young people were born at the time of modern globalization and the domination of the capitalism, and they have all a greater propensity for consumerism (Hume, 2010; Álvarez-Suárez *et al.*, 2014). Hence, it becomes especially relevant to analyze the perception and action of this particular population in relation to sustainable consumption, because they represent the future society (Hume, 2010). There are several studies on entrepreneurship conducted with young university students, highlighting the role that Universities play in promoting entrepreneurial attitudes (Margaça *et al.*, 2021; Ward *et al.*, 2019). In recent years, academics have also been interested in studying the decision-making antecedents to create sustainable enterprises (Butkouskaya *et al.*, 2020; Eller *et al.*, 2020; Strachan, 2018; Vuorio *et al.*, 2018). The results highlight that intentions oriented toward sustainability are driven by attitudes toward sustainability and the perception of entrepreneurial desirability. Through sustainable entrepreneurship, it is possible to capture and explore business ideas, focusing especially on the economic, social and environmental consequences, achieving innovations that translate into a sustainable lifestyle (Cohen and Wimm, 2007), as well products and goods that consider economic, social and environmental goals (Parrish, 2010).

The Sustainable Development Report 2020 finds that the pandemic caused by the SARS-CoV-2 is causing serious disruptions to reaching the SDGs (Sachs *et al.*, 2020). However, these objectives are closely linked to the prevention and control of a crisis, such as the coronavirus and, therefore, its logic is doubly reinforced: on the one hand, by its ability to reduce the risk of this type of pandemic and, on the other, by its value in an effective, equitable and sustainable response to the evident consequences. Regarding the progress made until the beginning of the pandemic by Spain, the report notes that the country is ranked 20th out of a total of 165 countries, with an overall score in terms of achieving the SDGs of 79.46% (Sachs *et al.*, 2020).

Looking at trends, many high-income countries are not making significant progress on sustainable consumption and production (SGD 12). It is also clear that COVID-19 crisis can be a catalyst for social change. Hence, the relationships of SDG 12 with most of the other SDGs confirm that the advancement in sustainable changing consumption and production patterns could contribute to attaining the rest of the targets (Guevara and Julián, 2019). Therefore, it is extremely important to study *a priori* the intentionality of carrying out sustainable consumption behaviors.

Therefore, the main objective of this study is to analyze the validity and reliability of a scale that assesses the propensity for a more sustainable consumption, in the Spanish context.

1.2 Sustainable behavior – Theory of Mind and Positive Psychological Capital

The Theory of Mind (ToM) (Premack and Woodruff, 1978; Leslie, 2000) assumes that the individuals are aware of their self, the surrounding environment, and others; that is, they attribute their mental states to their self and to others (Barry and Howard, 1990; Castelli, 2015). According to Barry and Howard (1990), when considering the cognitive process, this theory aims to understand the behavior pattern, through different mental states: cognition (thoughts), affectivity (feelings) and conation (conviction). Consumers have different levels of awareness, ideas and beliefs about sustainable consumption (Quoquab and Mohammad, 2020), and make interpretations about it (Phipps *et al.*, 2013). These cognitive processes will

influence consumers in performing behaviors related to sustainability, as attitudes toward a behavior significantly explain the real behavior (Ajzen, 1991; Panzone *et al.*, 2016). Sustainable consumption is also influenced by the – positive or negative – feelings, which produce in the consumer. These feelings are related to the commitment to develop (or not) sustainable consumption behaviors (Tung *et al.*, 2017). This affective component comprises the emotional interpretations of the knowledge that people have (Huitt and Cain, 2005). Finally, the conation, the behavior, the consumer's commitment to carry out sustainable consumption actions (Quoquab and Mohammad, 2020), the mental process where action is directed toward an objective, it is the behavior that occurs as a result of cognition or affection toward; in this case, sustainable consumption (Huitt and Cain, 2005).

The SDGs approach placed the individual at the center of the issue and the wellbeing also came to be seen as a crucial goal of sustainable development (Hubscher-Davidson, 2020). According to the World Health Organization (2007), health is not only about complete physical well-being or the absence of disease but also about mental, spiritual and social fulfillment. Subjects related to sustainability and its development are of interest not only to ecology or economics, but, recently, also to psychology. According to Chiesa *et al.* (2018), psychology is concerned about how to optimize people's resources and their capacity for regeneration. The psychological processes, also addressed by ToM, are directly involved in decision-making (environmental), as well as in behaviors (which promote sustainability) (Di Fabio and Rosen, 2018). Hence, Positive Psychological Capital (PsyCap) is presented, by Luthans and Youssef (2004), as dynamic topic and primary quality and a sustainability strategy in the organizational environment. PsyCap is defined:

[...] as individual's positive psychological state of development that is characterized by 1) having confidence (efficacy) to take on and put in the necessary effort to succeed at challenging tasks; 2) making a positive attribution (optimism) about succeeding now and in the future; 3) persevering toward goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and 4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resilience) to attain success (Luthans *et al.*, 2015, p. 2).

These four psychological capacities of hope, efficacy, resilience and optimism (HERO) are measurable, open to development and can be managed for more sustainable consumption. For several authors, PsyCap is manifested through motivation, enhancement of cognitive capabilities and capability to pursue goals (Peterson *et al.*, 2011; Salanova and Ortega-Maldonado, 2019). Tang (2020) states that PsyCap has been understood as a facilitator of creativity and associate a greater degree of sustainable success. Alongside PsyCap, it is also important to note that the psychology of sustainability and sustainable development emphasizes a prevention approach and promotes well-being in individuals and organizations for sustainable development and global growth (López-Núñez *et al.*, 2020). An important construction of PsyCap concerns the ability of an individual to positively evaluate the result (of a behavior, for instance) (Tang, 2020). It is possible to affirm that PsyCap directs people to sustainable practices. Hence, this fact highlights that PsyCap promotes innovation and makes the individual concerned with maintaining a sustainable world.

1.3 Sustainable consumption scale (SC-S)

To assessing the sustainable behaviors of Malaysian consumers based on the three dimensions of the theory of mind, Quoquab and Mohammad (2020) recently developed a pioneer assessment instrument aimed at studying sustainability in a very particular way, in parallel with the 2030 Agenda. It is relevant also highlight the contributions of Balderjahn *et al.* (2013),

who developed and applied a Consciousness scale for sustainable consumption, with an emphasis on the ecological, social and economic dimensions of sustainability.

This scale is based on the “theory of mind” and the concept of “mindfulness”. Regarding this last construct, there is empirical evidence (Frank *et al.*, 2019) of its relation to sustainable behaviors, as well as its training can influence the adoption of these behaviors. Its construction had two samples and two distinct moments: Study 1 – extraction of the factorial structure; and Study 2 – validation of the purified scale. According to the authors, the construction and validation of this instrument contributes to knowledge about sustainable consumption measures, suggests a new taxonomy, generates indicators for each of the three categories and empirically tests the reliability and validity of the subscales. This study allowed to confirm the nomological validity of the model, demonstrating a strong and positive effect of sustainable consumption with environmental activism. The original instrument, Sustainable Consumption-Scale (Quoquab and Mohammad, 2020), contains 21 items, which are grouped into three dimensions, namely, Cognitive (six items), Affective (seven items) and Conative (eight items), and were presented on five-response choices. The SC-S, which it will be validated for the Spanish context in this paper, is a pioneering work that conceptualizes, develops and validates a multidimensional scale to measure the propensity of consumers for sustainable consumption.

2. Materials and methods

This research is descriptive, quantitative and transversal. A set of 1,500 questionnaires were sent, among which 1,003 questionnaires were returned answered and 962 cases were considered usable. Forty-one cases were deleted due to missing values (22 cases), random answers (15) and outliers (4). This method of data collection has become increasingly common, as it has low implementation costs, combined with autonomy and flexibility (de Vaus, 2014). According to Ramsey *et al.* (2016), this method also maintains the statistical equivalence of the more traditional methods. The form used contained information about the objectives of the investigation, as well as the informed consent form, which the respondent voluntarily accepted. It is also important to mention that the ethical principles of research involving human beings proposed by the American Psychological Association (APA) were also scrupulously followed.

2.1 Participants

Figure 1 presents a group of 962 University students (49.1% male, 50.9% female) from 15 autonomous Spanish communities and from fifty-four Universities that participated in the

Autonomous Community	No.	%
Castile and Leon	388	40%
Extremadura	139	14%
Community of Madrid	66	7%
Canary Islands	58	6%
Andalusia	51	5%
La Rioja	49	5%
Castilla La Mancha	35	4%
Galicia	35	4%
Cantabria	27	3%
Aragon	26	3%
Basque Country	25	3%
Valencian Community	24	2%
Asturias	15	2%
Navarra	13	1%
Catalonia	11	1%

Figure 1.
Description of the sample by autonomous community

study. The age of the participants ranged from 18 to 26 years old ($M = 21.47$, $SD = 4.65$), engaged in law and social sciences-related area (29.8%), health-related area (27.3%) and technologies-related area (13.2%). It is important to mention that 52% are attending a graduation degree, 37.8% are studying for a master's degree and 10.2% are attending a doctorate.

2.2 Translation, adaptation and validation procedure of the SC-S to the Spanish context

For a correct adaptation of a scale from one culture to another, the methodological standards, defined by the International Test Commission, must be followed (Muñiz, 2000) and was here considered. The guidelines of the adaptation of the Sustainable Consumption Scale to the Spanish language was carefully followed.

Direct and reverse translation designs were combined to avoid inaccuracies (Brislin, 1986). The translations were made by two independent bilingual translators and, later, compared and analyzed to obtain a final version for each item. Based on the first version, two different native and bilingual translators and without knowledge of the instrument performed the reverse translation. This step allowed to evaluate the quality of the translation, through the degree of coincidence with the original version of the scale (Hambleton *et al.*, 2004), and allowed to make the necessary adjustments.

The content validity was conducted by two experts in the construction of the scale and two specialists related to the construction to be evaluated. They provided information with the specifications of the items (Spaan, 2006). It was assessed the wording of each element and its comprehensibility, using a five-level rating scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

This was followed by the pre-test, which was applied to 30 university students from University of Salamanca, following the dictates of Beaton *et al.* (2007). To clearly define the wording of the items, the individuals answered the questionnaire and, afterwards, were interviewed to verify if they understood the meaning of the questions and if they answered properly. Their comments on Spanish version Scale resulted in minor changes. The last version obtained was empirically applied to 962 university students. Psychometric analysis and a final revision by the Spanish version for the Spanish context of the SC-S is presented. The internal consistency for all dimensions in original scale was assured: for the affection dimension: $\alpha = 0.92$; for the cognitive dimension: $\alpha = 0.91$; and for the conative dimension: $\alpha = 0.92$. The validated scale to measure the SC construct is shown in Appendix.

2.3 Procedures

The database of this study is consisted of Spanish University students, from most autonomous communities, to whom it was sent an e-mail, in the last quarter of 2020, through the Public Relations offices of the Universities, with an invitation to participate in the research and also followed an informed consent form. The data was collected between October 2020 and December 2020 by means of a sampling for convenience. Finally, the inclusion criteria were be Spanish and legal age.

2.4 Statistical analysis

To analyze the psychometric properties of the Sustainable Consumption Scale, a validity and reliability analysis was carried out. First, the Statistical Program SPSS version 26.0 was used to check the psychometric properties of the items. Analysis of the descriptive statistics referred to the mean, deviation, asymmetry, kurtosis and correlation. To analyze the internal validity, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used. Although it is not consensual, VA Prooijen and van der Kloot (2001) concluded that it

is possible to use EFA and CFA in the same sample, when the structure of an instrument is composed of more than one factor. In other words, CFA can be used to test slightly more restricted versions of an unrestricted model derived via EFA, in the same database. For these two analyses, the statistical program Factor, and AMOS 26 were used. To check the good fit of the EFA-derived model, the root mean square of the residuals (RMSR) and goodness-of-fit index (GFI) indicators proposed by Tanaka and Huba (1989) were found to have values below 0.05 Harman (1980) and above 0.95 (Ruiz *et al.*, 2010), respectively. The value of the generalized G-H index proposed by Ferrando and Lorenzo-Seva (2018) was also checked, which allows the replicability of the factors extracted by the EFA to be ensured if it presents values higher than 0.80. It was performed CFA using the robust maximum likelihood estimation method. To analyze the model fit were used: significant chi-square of the robust correction (Satorra and Bentler, 1994), the ratio of χ^2/df (Wheaton *et al.*, 1977) the goodness of fit (GFI > 0.95), the comparative fit index (CFI > 0.90), the incremental fit index (IFI > 0.90), the Tucker–Lewis index (TLI > 0.90), as well as the root mean square error of approximation (RMSEA). The scale reliability was verified using the Cronbach's alpha, the average variance extracted and the composite reliability (Hair *et al.*, 2013).

3. Results

3.1 Psychometric properties of the items

First, the psychometric properties of the SC-S indicators were analyzed from the examination of the values of item-total correlation, mean, standard deviations, asymmetry, and kurtosis. This information is presented in Table 1, in which it is possible to see the all indicators present item-total correlation coefficients above the value recommended on the literature, that is >0.30 (Nunnally, 1995). Regarding to the values of kurtosis, the values above 3.0 in several indicators are observed, meaning that this may not guarantee a normal distribution data (Chou and Bentler, 1995).

3.2 Exploratory factor analysis

For the verification and determination of the number of factors, statistical criteria were assumed to carry out an exploratory analysis (Ledesma and Valero-Mora, 2007). According to the Kaiser criterion, factors with eigenvalues greater than 1 and a percentage of explained variance greater than 5% are retained and interpreted. The first step during the implementation of EFA was to observe if the data matrix was subject to factoring, that is, to analyze whether the data can be submitted to the factor analysis process (Pasquali, 1999). For this, the Kaiser–Meyer–Olkin (KMO) criterion was used. Its value can vary from zero to one and, as a rule for interpreting, values less than 0.5 are considered unacceptable, between 0.5 and 0.7 are considered mediocre; between 0.7 and 0.8 are considered good; values greater than 0.8 and 0.9 are considered excellent and excellent, respectively (Hutcheson and Sofroniou, 1999). In this study, the KMO index was 0.93. These results are presented in Table 2.

After that, an EFA was carried out for the 21 items of the SC original scale, using the Parallel Analysis method. Following the criteria for excluding indicators recommended by the literature (factor loads below 0.40 or cross loads in two or more factors), in the case of the two-factor solution, it was necessary to eliminate five items, getting arranged six items in one factor and eleven in the other. In the three-factor solution, five items were eliminated: getting grouped in one factor with five items, other with seven items and the last with four items. The results of this analysis are presented in Table 3.

The fit of the model derived from the EFA was analyzed using the RMSR (=0.05) and gamma index or GFI (=0.99) coefficients, with scores within the intervals recommended by the literature. Additionally, the possible replicability of the factors in other studies was

Items	Mean	SD	R IT-c	α (without item)	Sk	Kur
SC1 Cog1. I believe wasting food and other consumables is unethical	4.521	0.7469	0.410	0.919	-2.012	5.261
SC2 Cog2. I am aware that excess consumption can cause a shortage of natural resources	4.526	0.7212	0.510	0.917	-1.691	3.211
SC3 Cog3. I believe that it is important to use eco-friendly products and services	4.251	0.8465	0.638	0.914	-1.130	1.299
SC4 Cog4. I believe that individuals should care for the future generation	4.602	0.6342	0.496	0.917	-1.661	3.134
SC5 Cog5. I believe that it is our responsibility to care for the natural environment	4.635	0.6230	0.601	0.916	-1.958	4.917
SC6 Cog6. I know that natural resources decreasing at an alarming rate	4.523	0.6978	0.509	0.917	-1.517	2.390
SC7 Affec1. I feel good when I can control my whims for buying unnecessary things	4.180	0.9580	0.441	0.919	-1.169	1.040
SC8 Affec2. I don't like to waste food or beverage	4.612	0.6390	0.472	0.918	-1.888	4.534
SC9 Affec3. I prefer to buy organic food, as it is environmentally friendly	3.551	1.0242	0.633	0.914	-0.373	-0.217
SC10 Affec4. I prefer to pay more to purchase environmentally friendly products	3.155	1.1423	0.557	0.917	-0.083	-0.659
SC11 Affec5. I prefer to use paper bags, since they are biodegradable	4.121	1.0088	0.622	0.915	-1.157	0.931
SC12 Affec6. I like to purchase only what I need	3.879	1.0036	0.489	0.918	-0.660	-0.225
SC13 Affec7. I feel happy to give priority to environmental welfare	3.832	0.9453	0.721	0.912	-0.607	0.166
SC14 Con1. I intend to reduce the misuse of goods and services (e.g. I switch off the lights and the fan when I am not in the room)	4.379	0.8048	0.608	0.915	-1.476	2.466
SC15 Con2. I will continue to purchase environmentally friendly products even though they are slightly expensive	3.492	1.0305	0.663	0.914	-0.355	-0.309
SC16 Con3. I will avoid consumption activities that can lead to environmental pollution	3.854	0.9269	0.678	0.913	-0.658	0.227
SC17 Con4. I will continue to purchase biodegradable packages (e.g., use of paper bag instead of plastic bag).	4.008	0.9837	0.697	0.913	-0.910	0.418
SC18 Con5. I will keep trying not to waste my food and beverage	4.573	0.6463	0.522	0.917	-1.697	3.970
SC19 Con6. I will spend my money wisely to avoid wastage and excessive purchases	4.221	0.8096	0.502	0.917	-0.990	0.961
SC20 Con7. I will keep contributing to environmental welfare in all respects	4.055	0.8250	0.753	0.912	-0.671	0.279
SC21 Con8. I will not engage in any purchase that can have a negative effect on the environment	3.352	1.0520	0.532	0.917	-0.187	-0.518

Table 1. Mean, standard deviation, corrected item-total correlation, alpha if the item is removed, asymmetry and kurtosis values

Source: Adapted from [Quoquab and Mohammad \(2020\)](#)

checked by using the Generalized G–H Index, which reached values above 0.80, indicating a possible good replicability of these in other samples. Finally, the 16 items retained by the EFA explained 55.5% of the variance.

3.3 Confirmatory factor analysis

After the EFA, several CFAs were performed to check the fit of the factorial solutions derived from the EFA and the proposed three-factor solution of the original Sustainable Consumption Scale (Quoquab and Mohammad, 2020). Regarding the adjustment values between different indices, Hair *et al.* (2013) relativize the cutoff values according to the number of subjects and the number of variables observed. For a number of subjects greater than 250 and a number of variables observed between 12 and 30 significant chi-square values are expected, the CFI or TLI must be greater than, 0.92 and the RMSEA must present values less than, 0.07, in conjunction with CFI greater than 0.92.

Table 2. Kaiser–Meyer–Olkin criterion and Bartlett’s test

Measures	Sample
KMO measure of sampling adequacy	0.929
Bartlett’s test of sphericity	$\chi^2(210) = 9773.86 p < 0.001$

Table 3. Rotated factorial structure of the SC scale

Item	CogSC	AffectSC	ConatSC	Com.
SC1	0.60			0.60
SC2	0.77			0.70
SC4	0.70			0.62
SC5	0.75			0.73
SC6	0.73			0.58
SC9		0.77		0.57
SC10		0.80		0.65
SC13		0.76		0.79
SC15		0.85		0.61
SC16		0.73		0.50
SC17		0.71		0.56
SC20		0.79		0.55
SC8			0.69	0.53
SC12			0.68	0.55
SC18			0.75	0.63
SC19			0.75	0.57
Eigenvalue	8.33	2.01	1.31	
Variance	39.68	9.55	6.24	
G-H Index	0.90	0.97	0.96	
Items	5	7	4	

Table 4. Goodness-of-fit indices of the several SC-Scale factorial solutions

Factorial solution	χ^2	df	χ^2/df	RMSEA (CI)	GFI	TLI	CFI	IFI
Original SC-Scale (3 factors – 21 items)	2341.54	186	12.59	0.11 (0.106 – 0.114)	0.78	0.75	0.78	0.78
SC-Scale - EFA (3 factors – 16 items)	355.60	83	4.28	0.058 (0.052 – 0.065)	0.95	0.94	0.96	0.96
SC-Scale – EFA (2 factors – 16 items)	367.78	85	4.33	0.059 (0.053 – 0.065)	0.95	0.94	0.96	0.96

Table 4 presents the adjustment rates of each of the factorial solutions. It can be seen that all of them present good adjustment indexes with values within the intervals recommended by the literature, except the one proposed in the original Quoquab and Mohammad Scale in which the CFI and IFI indexes presented values lower than 0.90. For this argument, it was assumed to select the three-factor solution derived from the EFA (16 items), because it presented a good theoretical interpretation of the factors and met the requirements of validity and reliability.

To analyze the reliability of the elected solution, the values of the Cronbach's alpha, the CR and the AVE were analyzed and are represented in the Table 5. Cronbach's alpha showed values above 0.70, obeying the dictated by the literature (Hair *et al.*, 2013). The values also met in the case of CR values, with 0.82 for the Factor 1 (Cognitive SC), 0.80 for the Factor 2 (Affective SC) and 0.82 for the Factor 3 (Conative SC). Although the AVE indicator was less than 0.50 in two factors, when the reliability of the construct is acceptable, a low value of the AVE can be accepted (Hatcher, 1994).

As pointed out by Kline (2005), regarding the discriminant validity, it was verified that the correlation between the three factors was lower than 0.85. Additionally, as presented in it was found that the square root of the AVE was higher than the correlation between factors.

To analyze the adequacy of the model in relation to gender, configurational invariance, metric invariance and scalar invariance were tested. The first type concerns the assessment of the adequacy of the structure of latent constructs; the second type tests the invariance of factorial weights between groups, comparing the model with the free factor weights and the model with factorial weights when restricted to equality between groups; and, finally, the

Items	λ	α	CR	AVE
Factor 1 – Cognitive-SC		0.79	0.80	0.58
SC1	0.79			
SC2	0.84			
SC4	0.64			
SC5	0.61			
SC6	0.63			
Factor 2 – Affective-SC		0.81	0.82	0.43
SC9	0.66			
SC10	0.59			
SC13	0.79			
SC15	0.52			
SC16	0.64			
SC17	0.65			
SC20	0.72			
Factor 3 – Conative-SC		0.91	0.82	0.40
SC8	0.66			
SC12	0.72			
SC18	0.60			
SC19	0.62			

Table 5.
Factorial loads,
composite reliability,
average variance
extracted and
Cronbach's alpha

Factor	F1	F2	F3
F1	0.66		
F2	0.49	0.76	
F3	0.51	0.54	0.63

Table 6.
Correlations between
SC-Scale factor pairs
and AVE square root
in the diagonal

scalar invariance evaluates the invariance of the means between the groups, comparing with the model in which both the factorial weights and the factorial means are constrained to be between groups (Ciecuch and Davidov, 2015).

First, the factorial adjustment of the model obtained above was tested for both genders. The female model obtained the following values $\chi^2/df = 2.07$; CFI = 0.95; RMSEA = 0.07; P [rmsea] = 0.005; SRMR = 0.05; AIC = 215.27; MECVI = 1.39}. In turn, the male model $\{\chi^2/df = 2.11$; CFI = 0.93; RMSEA = 0.08; P[rmsea] = 0.005; SRMR = 0.06; AIC = 223.69; MECVI= 1.13}.

Table 7 presents the results regarding the multigroup analysis, and the different types of invariance. Considering the values obtained, the configurational invariance of the model can be admitted, meaning that the implicit constructs are suitable for both male and female. Regarding the results of metric and scalar invariance, it is possible to state that the model can be considered equivalent between the two genders, considering the reference values indicated by Chen (2007).

4. Discussion

Considering the importance of the validation of the Sustainable Consumption Scale in the Spanish context, the principal aim of this study was to obtain a first version of this measurement instrument translated and adapted. To achieve this objective, all statistical procedures have been complied with, namely, the verification of the psychometric properties and the validity and reliability of the scale, through by exploratory and confirmatory factor analyses.

EFA suggested grouping the items into three factors, and this solution coincided with the dimensions obtained by the Quoquab and Mohammad (2020) Scale, with the indication of eliminating five items, which suggests an abbreviated version of the SC-S. This can be explained by the fact that it is a sample from a similar context (that is, the university environment) to that used for the construction and validation of the original Sustainable Consumption scale. The final model consisted of 16 items grouped into three factors: Factor 1 – Cognitive Dimension (seven items) – the ability to think about mental states in oneself and others and to use this information to understand what other people know and predict how they will act. Factor 2 – Affective Dimension (five items) – the ability to infer the emotions or feelings of another agent. Factor 3: Conative Dimension (four items) – the proactive part of motivation that connects knowledge, affect, drives, desires and instincts to behavior. The items grouped in the three factors are largely coincident with the original scale, namely, the Cognitive-SC factor. The Affective-SC factor was generated by grouping three items from the affective and four from the conative domains. Finally, the Conative-SC grouped two items from the second factor and two from the third. Knowledge and awareness (Frank, 2021) of their individual behaviors (and their impact) play an important role in the intention to change. Therefore, measuring a construct such as sustainable behavior allows to assess how variables such as the belief system, motivation and emotions can be decisive in adopting a sustainable mindset.

Based on Mcgregor's (2005) paradigm of informed and reflective consumer behavior, it is possible to determine that individuals can make conscious decisions, guided by their morality and values. Therefore, a cognitive approach to behavior allows to understand the implementation of an action, which is influenced by several internal and external factors. The cause of sustainability requires proficiencies related to internal processes that contribute to engaging in sustainable consumption, namely, self-awareness, resilience and ethics (Frank, 2021). Literature (Frank, 2021; Reimers, 2021) reveals that, despite advances in research, Environmental Education for Sustainability has been devaluing intrapersonal

Table 7.
Analysis of the adequacy of the model in relation to gender – invariance methods

Method	χ^2/df	CFI	RMSEA	P[rmsea]	SRMR	AIC	MECVI	$\Delta\chi^2$	ΔCFI	$\Delta RMSEA$	$\Delta SRMS$
Configurational	2.15	0.93	0.08	0.005	0.06	223.69	1.13				
Metric	2.15	0.94	0.06	0.013	0.05	438.08	1.25				
Scalar								(12) = 38.28 $p < 0.001$	0.013	0.003	0.0004

skills. Underlying sustainable behavior is a set of skills that enable the individual to make conscious decisions rooted in their values and beliefs. Hence, based on the Theory of Mind, this scale brings a new paradigm for evaluating behavior that is expected to be sustainable, as well as the associated personal structures.

5. Limitations and future research

The current study presents certain limitations that could be overcome in future studies, for a correct interpretation of the results. This is an adaptation to the Spanish context, thus, to be able to verify the replicability of the dimensions of the scale, it is necessary that its validity and reliability be verified in other Spanish-speaking countries. It is worth noting that the data collection method used can lead to bias, as there are elements that are not controlled (e.g.: social desirability). Finally, regarding the sample, it should also be noted that it is a non-probabilistic sample, which makes it impossible to generalize the results. However, based on these, it is extremely important to carry out further research, with the aim of confirming the factorial solution found in this study. The validation of an assessment instrument is an ongoing process. In future research, it will be pertinent to carry out more solid analyses with a view to validating the factorial structure of the scale. After this process, it will be possible to confirm the distribution of items, as well as the reliability of the scale as a measure of sustainable consumption.

6. Conclusions

The validation of the Sustainable Consumption Scale supports the verification of the psychometric criteria, validity and reliability, resulting in a new instrument relevant to the Spanish context. This generated instrument is composed of three factors and sixteen items. The validation process of the several items, allowed to recognize the necessary adjustments regarding the terminology appropriate to the scale application context. This action enabled the validation of the criteria of sufficiency, clarity, consistency and relevance, subsequently with the support of the validation indexes. The EFA and CFA allowed the instrument validation. Through these two analyses, it was possible to verify and obtain a reduction in the number of items and a new grouping, as well as the verification of the fit of the model.

It is important to mention the cultural differences between the contexts of the two scales. The original scale was applied in Malaysia, which reveals a break in the trend, as this is a subject little studied in eastern countries (Tian *et al.*, 2011). This country, according to the Sustainable Development Report (Sachs *et al.*, 2020), is ranked 65th out of a total of 165 countries, with an overall score in terms of compliance with the SDGs of 70.88%. Despite the differences (e.g. cultural background, consumption patterns, etc.) between Western and Eastern countries, it is possible to conclude that sustainable criteria are recognized as an important common requirement for all countries; especially at a time when everyone works together to achieve the SDGs.

Bearing in mind the importance and compliance with a more sustainable agenda, it is also necessary to universities to implement education programs for sustainability. Thus, and as a contribution to the field of study, implementing a HERO culture can be particularly promising to promote more sustainable consumption behaviors. PsyCap can positively influence the cognitive processes and perceptions of the individuals, helping them to understand the importance of having a sustainable attitude. That is, from the information collected about a certain attribute (e.g. organic food, carbon footprint), individuals ponder it based on previous beliefs (Godfrey and Feng, 2017; Panzone *et al.*, 2016) and experiences,

which will later influence their final assessment for the common good and for the sustainability.

There are several studies on sustainability carried out within Universities (Barros *et al.*, 2020; Thongplew *et al.*, 2021), because the Higher Education Institutions have shown a greater concern for increasing the range of sustainable strategies and initiatives, both in curricula and in the improvement and transformation of infrastructures, to instill sustainable consumption. Therefore, the main relevance of validating the scale of sustainable consumption in the university environment reveals that the emphasis should be placed on participative and inclusive methodologies, on building public awareness about sustainability, and promoting civic knowledge and competence in (responsible) consumption issues. Considered “small cities” and in view of the impact that these institutions have on societies and the environment, it is extremely important to build and use measuring instruments that assess sustainability. In addition to bringing new impulses to research, the data support and emphasize the goals of the United Nations. Finally, the application of the Sustainable Consumption Scale in the Spanish university context will contribute to screen for sustainable consumption of the population, as well as the role of universities. From these screenings, it will be also possible to understand the impact and development of the objectives outlined by Agenda 2030.

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Consumo Sostenible

Consumo Cognitivo Sostenible	<p>Cog.1 – Creo que desperdiciar comida y otros productos de consumo no es ético</p> <p>Cog.2 – Soy consciente de que el consumo excesivo puede provocar una escasez de recursos naturales</p> <p>Cog.3 – Creo que las personas deberían preocuparse por la generación futura</p> <p>Cog.4 – Creo que es nuestra responsabilidad cuidar el medio ambiente natural</p> <p>Cog.5 – Sé que los recursos naturales están disminuyendo a un ritmo alarmante</p>
Consumo Sostenible Afectivo	<p>Affec.1 – Prefiero comprar alimentos orgánicos, ya que respetan el medio ambiente</p> <p>Affec.2 – Prefiero pagar más para comprar productos ecológicos</p> <p>Affec.3 – Me siento feliz de dar prioridad al bienestar ambiental</p> <p>Affec.4 – Seguiré comprando productos respetuosos con el medio ambiente aunque sean un poco caros</p> <p>Affec.5 – Evitaré actividades de consumo que puedan conducir a la contaminación ambiental</p> <p>Affec.6 – Continuaré comprando productos biodegradables (por ejemplo, uso de bolsas de papel en lugar de bolsas de plástico)</p> <p>Affec.7 – Seguiré contribuyendo al bienestar medioambiental en todos los aspectos</p>
Consumo Sostenible Conativo	<p>Con1. – No me gusta desperdiciar comida o bebida</p> <p>Con2. – Me gusta comprar solo lo que necesito</p> <p>Con3. – Seguiré intentando no desperdiciar mi comida y bebida</p> <p>Con.4 – Gastaré mi dinero sabiamente para evitar desperdicios y excesos de compras</p>

Table A1.
Finalized sustainable
consumption scale
for the Spanish
context

Source: Adapted from [Quoquab and Mohammad \(2020\)](#)

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