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The Sustainability Consciousness Questionnaire: Validation Among Portuguese Population

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Abstract: The primary objective of this study is to validate the Sustainability Consciousness Questionnaire (SCQ) for the Portuguese population, ensuring its reliability and applicability across the dimensions of knowledge, attitudes, and behaviours related to sustainability. This validation is crucial for ensuring the SCQ captures local cultural nuances and provides reliable data to inform educational and policy strategies for promoting sustainability. To achieve this goal, a quantitative methodology was adopted, involving the translation and cultural adaptation of the SCQ into Portuguese. Data were collected from a convenience sample of 630 participants, aged 17 to 83, using an online platform. Ethical procedures were rigorously followed, including obtaining informed consent from all participants and ensuring data confidentiality. The factor structure of the SCQ was analysed using structural equation modelling (SEM). The analysis confirmed a three-dimensional factor structure aligned with the environmental, social, and economic pillars of sustainability, as well as significant correlations between these dimensions and real-world sustainable practices such as recycling and energy conservation. The results confirmed the construct validity of the SCQ, demonstrating robust reliability indicators across its scales and acceptable model fit indices (CFI = 0.860; TLI = 0.851; RMSEA = 0.045). These findings highlight the questionnaire's utility as a measurement tool for sustainable consciousness in the Portuguese context. The SCQ provides a valuable resource for educators, policymakers, and researchers. For instance, educators can use the SCQ to identify gaps in students' sustainability knowledge, policymakers can prioritise areas for intervention based on public attitudes, and researchers can explore relationships between awareness and sustainable behaviours to design effective programs. Furthermore, this study contributes to Sustainable Development Goal 4 (Quality Education) by enabling data-driven strategies to integrate sustainability education into curricula, fostering a deeper understanding of sustainable practices and behaviours essential for achieving global education goals.

Keywords: sustainable awareness; sustainable development; sustainable development goals; 2030 agenda; structural equation modelling

Academic Editors: Colin Michael Hall and Dexter Hunt

Received: 8 November 2024
Revised: 29 November 2024
Accepted: 17 December 2024
Published: 3 January 2025

Citation: Arantes, L.; Sousa, B.B. The Sustainability Consciousness Questionnaire: Validation Among Portuguese Population. *Sustainability* **2025**, *17*, 305. https://doi.org/10.3390/su17010305

1. Introduction

Growing concern about environmental issues has driven the need to develop effective methods for assessing and promoting sustainable awareness among global populations. In

response to this demand, this study contributes to the emerging field of sustainability by validating the SCQ for use in the Portuguese population, addressing the need for culturally adapted and linguistically relevant tools to assess sustainable consciousness.

Sustainability awareness is fundamental to fostering behavioural changes that align with the principles of sustainable development. By assessing knowledge, attitudes, and behaviours, the SCQ provides a multidimensional perspective on how individuals understand and act upon sustainability challenges. In the Portuguese context, this is particularly significant given the country's unique challenges in water resource management and urban planning, as well as its growing commitment to achieving the Sustainable Development Goals. This study not only addresses a critical gap by adapting the SCQ for Portugal but also highlights its potential to support targeted educational and policy initiatives that promote sustainable practices.

Beyond cultural adaptation, this study offers a significant contribution by exploring the relationship between sustainable consciousness and actionable sustainable practices, such as recycling and energy conservation. It provides insights that are critical for designing targeted educational programs, influencing policy decisions, and fostering sustainable behaviours tailored to the Portuguese context. This dual focus on measurement validation and practical application positions this study as a valuable resource for advancing sustainability initiatives in Southern Europe.

This study has three primary objectives: first, to adapt and validate the SCQ for the Portuguese population, ensuring its cultural and linguistic relevance; second, to investigate the associations between sustainable consciousness and actionable behaviours, such as recycling and energy conservation, within the Portuguese context; and third, to provide a robust tool that supports educators, policymakers, and researchers in fostering sustainability awareness and practices. These objectives address gaps in sustainability research and offer practical implications for advancing the field.

Portugal, like many other European nations, has made progress in implementing sustainable practices and policies. However, the Portuguese context presents unique characteristics—such as challenges in water resource management and urban planning—which underscore the importance of using culturally validated tools like the SCQ to capture local sustainability dynamics [1,2]. The SCQ offers an opportunity to assess public awareness and behaviours related to these specific challenges, such as conserving water resources and adopting sustainable urban planning practices. These data can guide tailored interventions to address gaps in sustainable practices within these critical areas. Furthermore, although there is a growing awareness around sustainability, there is still a gap in research on how the Portuguese perceive and act on sustainability in their daily practices [3,4]. By measuring the knowledge, attitudes, and behaviours of the Portuguese population, the SCQ can inform the development of public campaigns and policies aimed at promoting water conservation and sustainable urban initiatives, bridging the gap between awareness and action in daily practices. This study contributes directly to SDG 4 (Quality Education) by providing a validated tool that educators can use to assess sustainability awareness and design targeted educational curricula. Additionally, the SCQ supports SDG 12 (Responsible Consumption and Production) by identifying gaps in public attitudes and behaviours towards sustainable practices, guiding policymakers in implementing effective interventions. By bridging the gap between awareness and action, this research facilitates a practical pathway towards achieving these goals.

Originally developed by [3], the Sustainability Consciousness Questionnaire (SCQ) is grounded in UNESCO's definition of sustainable development, which emphasises the integration of environmental, social, and economic dimensions. The SCQ has been applied in other cultural contexts, including Spain [5], Belgium and Sweden [6], Japan [7], Qatar [8],

Ukraine [9], and Saudi Arabia and Egypt [10], to evaluate sustainability-related knowledge, attitudes, and behaviours. These studies underscore its utility in measuring sustainability awareness and guiding interventions aimed at fostering sustainable practices. However, its adaptation to non-Anglophone populations remains limited, leaving an important gap in global sustainability research.

To verify the reliability and validity of the SCQ in a new cultural and linguistic context, a robust quantitative methodology was adopted. After carefully translating the questionnaire into Portuguese, it was applied to a representative sample of 630 participants via an online platform. Validation of the questionnaire's internal consistency and factor structure was carried out using advanced structural equation modelling (SEM) techniques, including confirmatory factor analysis, which provided a rigorous assessment of model fit indices and factor loadings.

The application of this questionnaire in Portugal aims to verify its reliability and validity in a new cultural and linguistic context. This is crucial, as cultural adaptation and linguistic validation are essential to ensure that the measures are both universally relevant and locally pertinent. By answering the main question, "What is the validity of the SCQ when applied to the Portuguese population?", this study seeks to establish a solid basis for using this instrument in future research and in practical initiatives to promote sustainability.

In addition, this work investigates the relationship between sustainable awareness and effective sustainable practices, such as recycling, energy conservation, and support for environmentally friendly products and companies. We seek to answer the following question: "To what extent is the sustainable awareness of the Portuguese population associated with effective sustainable practices?". Through this analysis, we aim to understand the extent to which sustainable awareness influences effective sustainable behaviour in this specific cultural context. This analysis is vital for identifying the factors that promote or hinder sustainable behaviour, thus facilitating the development of more effective strategies to engage the population in environmentally responsible practices.

This study aims to fill a significant gap in the existing literature, as few studies have explored the validity of sustainable awareness instruments in non-Anglophone contexts, and specifically in Southern Europe. Against this backdrop, the present study aims to validate the Sustainability Consciousness Questionnaire (SCQ) for the Portuguese population, contributing to the accurate measurement of sustainable consciousness and providing a culturally adapted tool for future local research and interventions. This effort not only fills an important gap in the literature on sustainability in non-Anglophone contexts, but also supports the development of educational strategies and public policies based on local data, thus promoting a society that is more aware of and committed to sustainability.

The implications of this study are vast. While the SCQ primarily targets educators and policymakers—who play key roles in designing educational curricula and implementing sustainability policies—it also serves as a valuable tool for researchers seeking to deepen theoretical and empirical understanding of sustainability awareness. By providing insights into public knowledge, attitudes, and behaviours, the SCQ supports the development of targeted interventions and policies that promote sustainable practices, aligning with the United Nations Sustainable Development Goals, particularly SDG 4 (Quality Education) and SDG 12 (Responsible Consumption and Production).

Beyond academic applications, the SCQ provides actionable insights for designing public awareness campaigns, community-based sustainability programs, and targeted policy interventions. For instance, it can guide municipalities in promoting recycling and energy conservation initiatives or support businesses in aligning their practices with sustainable development goals.

The current study follows a structured approach to validate the Sustainability Consciousness Questionnaire (SCQ) for the Portuguese population. First, a comprehensive translation and cultural adaptation process was conducted to ensure linguistic and contextual relevance. This was followed by a quantitative validation using structural equation modelling (SEM) techniques to evaluate the reliability and construct validity of the SCQ. Details on the sampling process, data collection methods, and statistical analyses are provided in the subsequent sections. This structure allows for a robust evaluation of the SCQ and its implications for educational and policy-making applications.

2. Theoretical Background

This section explores the theoretical underpinnings of sustainable consciousness, its relationship with the Sustainable Development Goals (SDGs), and the role of the Sustainability Consciousness Questionnaire (SCQ) in assessing and promoting sustainability in specific contexts like Portugal. By addressing conceptual foundations, global frameworks, and localised applications, we aim to establish a coherent framework for the present study.

2.1. Conceptions of Sustainable Consciousness

Consciousness is a multifaceted phenomenon that encompasses subjective experience, self-awareness, and the ability to process sensory and emotional stimuli [11]. It has long been a subject of interest across disciplines, with philosophers, scientists, and psychologists striving to define its elusive nature [12,13]. Consciousness is often conceptualised as a dynamic and continuous state, integrating perceptions of time, emotional responses, and predictive capacities that allow individuals to align their actions with internal values [14,15].

Building on this foundation, sustainable consciousness refers to an individual's awareness of the interconnectedness of environmental, social, and economic domains and their commitment to adopting sustainable behaviours [3,16]. This concept emphasises not only understanding the impacts of individual actions but also fostering a sense of responsibility to mitigate negative effects and support long-term sustainability goals [17]. Sustainable consciousness encompasses both cognitive awareness and practical application, bridging knowledge and action in meaningful ways.

Research indicates that individuals with sustainable consciousness actively engage in behaviours that reduce their environmental impact, such as recycling, conserving energy and water, reducing waste, and choosing eco-friendly products and services [18]. For instance, green consumer values and environmental concern significantly shape buying behaviours and lifestyle choices [19]. Moreover, practices like mindfulness have been shown to positively influence sustainable consumption by increasing awareness of the broader consequences of individual actions [20,21].

Sustainable consciousness extends beyond individual actions to collective engagement, enabling individuals to participate in community-driven sustainability initiatives. Examples include joining environmental organisations, advocating for policy changes, and supporting sustainable development projects [22,23]. These activities highlight the potential for individuals to act as agents of change, fostering sustainability at both local and societal levels. This dual focus on personal and collective action underscores the transformative potential of sustainable consciousness in addressing global sustainability challenges.

The Sustainable Development Goals (SDGs), as outlined in the 2030 Agenda, provide a comprehensive framework for promoting sustainability. Among these, SDG 4 (Quality Education) and SDG 12 (Responsible Consumption and Production) are particularly relevant to fostering sustainable consciousness. By equipping individuals with the knowledge and skills necessary to adopt sustainable practices, this study contributes to the broader goal of harmonising human activities with the natural environment. The integration

of sustainability into education and community-based programs is critical to achieving these objectives.

International studies further underscore the importance of cultural and social values in shaping sustainability practices. Ref. [24] highlight the role of personal and social norms, while [25] identifies cultural and psychological barriers that often hinder the adoption of pro-environmental behaviours. These findings suggest that fostering sustainable consciousness requires a nuanced, context-specific approach. For instance, in Portugal, challenges such as water resource management and urban planning necessitate tailored interventions that align with local cultural and environmental contexts [26].

By advancing sustainable consciousness through tailored strategies, individuals can transcend awareness to become active participants in achieving sustainability goals. This dynamic interplay between individual responsibility and collective impact forms the foundation of this study, which seeks to validate tools like the Sustainability Consciousness Questionnaire (SCQ) to measure and promote sustainability awareness in culturally diverse settings.

Building on this conceptual framework, the next section situates sustainable consciousness within the global agenda for sustainable development, emphasising its alignment with the 2030 Agenda and the SDGs.

2.2. 2030 Agenda and the Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by the United Nations General Assembly, represents an ambitious global framework, with 17 SDGs designed to harmonise the economic, social, and environmental [27,28] dimensions of human well-being. Central to this agenda is the promotion of inclusive and sustainable economic growth, fostering social inclusion, and protecting natural resources for the benefit of present and future generations [28,29].

In the economic sphere, the SDGs emphasise the integration of sustainable business practices and innovations that combat poverty and promote equitable prosperity. Engaging the private sector and emerging markets in developing solutions that benefit all stakeholders is essential to achieving these goals [30,31]. Socially, SDG 4 (Quality Education) highlights the role of education in fostering sustainability awareness by equipping individuals with the knowledge and skills to adopt sustainable practices [32,33]. By integrating sustainability into curricula, educational institutions can empower individuals to make informed decisions and drive sustainable development. SDG 12 (Responsible Consumption and Production) emphasises reducing environmental impacts through sustainable behaviours, such as minimising waste and conserving resources. Promoting awareness under SDG 12 bridges the gap between knowledge and action, encouraging responsible practices that contribute to long-term sustainability.

Environmentally, the agenda underscores the imperative of preserving natural resources through sustainable consumption and production patterns. These practices require collective efforts across sectors to address environmental challenges, emphasising the interconnected nature of economic, social, and environmental goals [34,35].

Achieving the SDGs necessitates strategic partnerships at national and international levels to mobilise resources, share knowledge, and implement effective strategies. Collaboration among governments, organisations, and civil society is critical to addressing complex sustainability challenges, highlighting the importance of integrated and context-specific approaches [36–38]. Localisation strategies, which adapt the SDGs to subnational contexts, are instrumental in addressing cultural and regional nuances, ensuring policies resonate with local needs and capacities [39].

Technical innovations, particularly in sectors such as engineering and construction, play a vital role in achieving sustainable infrastructure that aligns with SDG 11 (Sustainable Cities and Communities). The circular economy, which minimises waste and keeps resources in use, represents a promising model for achieving these goals [36,40,41].

Furthermore, social marketing emerges as a powerful tool to influence consumer behaviour toward sustainable practices. Effective communication strategies are essential for raising awareness of environmental issues and promoting behavioural changes [37]. This aligns with the need to measure and understand sustainability awareness across diverse populations to develop tailored interventions [26,42].

Localisation strategies that consider subnational contexts in the achievement of the SDGs have been used to promote a rights agenda and, in addition, there has been a strong focus on local narratives as central aspects of the communication of scientific data. These strategies are just one vehicle in the fight against statistical invisibility and political exclusion, arguing for a politics of care that can change the way we make global public policy [39,43].

In this context, sustainable consciousness plays a crucial role in bridging global goals and local implementation. By fostering a deep understanding of sustainability principles and encouraging behavioural change, the 2030 Agenda emphasises the interconnectedness of its objectives. This study contributes to this effort by validating tools that measure sustainability consciousness, ensuring they are culturally adaptable and globally relevant.

Having established the relevance of sustainable consciousness within the 2030 Agenda, we now turn to the SCQ as a methodological tool for evaluating this construct in diverse cultural contexts.

2.3. The Sustainability Consciousness Questionnaire

The Sustainability Consciousness Questionnaire (SCQ) is a robust assessment tool developed to measure individuals' consciousness, attitudes, and behaviours related to sustainable development. Structured around UNESCO's framework for sustainable development [28], the SCQ integrates the environmental, social, and economic dimensions of sustainability into a single instrument. This comprehensive approach provides a multidimensional understanding of sustainability, making it particularly valuable for research and educational contexts [3].

The SCQ is available in two versions: the long version (SCQ-L) and the short version (SCQ-S). Both versions measure sustainability through three core dimensions—knowledge, attitudes, and behaviours (Figure 1)—within each of the three pillars of sustainability (environmental, social, and economic). This structure enables a holistic assessment of sustainability consciousness, distinguishing the SCQ from other tools that often focus exclusively on environmental aspects [44]. By capturing interconnections across sustainability domains, the SCQ offers a versatile framework for both cross-cultural studies and localised interventions.

Numerous studies have validated the SCQ's reliability and applicability in diverse cultural contexts. For instance, its utility has been demonstrated in Spain [5], Belgium and Sweden [6], Japan [7], Qatar [8], Ukraine [9], and Saudi Arabia and Egypt [10]. These studies highlight the SCQ's role in assessing sustainability awareness and promoting education for sustainable development. Furthermore, the SCQ has been instrumental in cross-national comparative studies, providing insights into how cultural differences shape attitudes and behaviours toward sustainability.

Despite its global applicability, there is a significant gap in Portuguese-speaking contexts, where no validated version of the SCQ exists. This limitation restricts its potential to assess and promote sustainable consciousness in these regions. Studies suggest that

environmental attitudes and sustainable behaviours can vary significantly between cultural contexts, underscoring the need for culturally adapted tools to ensure validity and reliability [45]. Validating the SCQ for the Portuguese population addresses this gap, enabling its use in educational, research, and policy-making contexts within Portugal and other Portuguese-speaking regions.

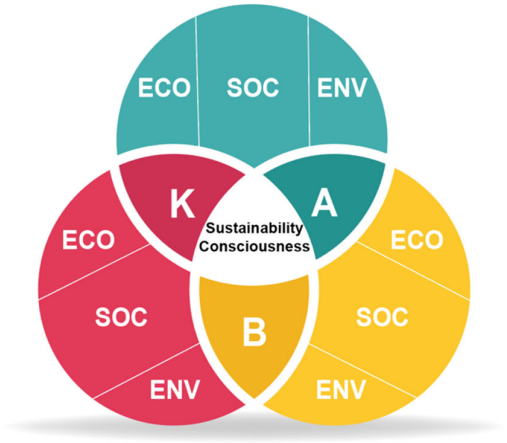

Figure 1. Sustainability consciousness. K = knowingness; A = attitudes; B = behaviour; ECO = economic; SOC = social; ENV = environmental. Source: adaptation from [3].

The SCQ's comprehensive design also allows for direct comparisons with other tools for assessing environmental awareness. For example, while instruments like those developed by [46] focus primarily on environmental attitudes, the SCQ offers a broader perspective by integrating the social and economic dimensions of sustainability. This multidimensionality positions the SCQ as a unique and essential tool for advancing sustainability research and practice.

The adaptation of the SCQ for Portuguese-speaking populations strengthens its role in transnational studies and localised sustainability initiatives. By ensuring that the SCQ accurately reflects cultural nuances, this study supports the development of effective educational programs, community engagement strategies, and policy measures tailored to the realities of Portuguese-speaking countries. These contributions highlight the SCQ's capacity to bridge global goals with local actions, advancing the shared mission of sustainable development.

With a clear understanding of the SCQ's framework and applications, the final subsection focuses on Portugal's unique sustainability challenges and how the SCQ can address these specific needs.

2.4. The Portuguese Context

Portugal has shown a growing commitment to sustainability, addressing both global challenges and issues specific to its national context. One of the most prominent areas of focus is the valuation of ecosystem services in urban and peri-urban areas. Studies have explored how nature's contributions can be integrated into urban management to enhance quality of life and environmental resilience, with Lisbon serving as a leading example through its emphasis on sustainable urban planning [2]. These initiatives highlight the role of sustainable consciousness in promoting balanced and healthy urban environments, fostering a deeper connection between citizens and their local ecosystems.

The sustainability of water resources is another critical concern, particularly considering climate change. Strategic studies have examined future scenarios and proposed adaptations to water management policies, aiming to ensure water security and long-term sustainability [1]. These efforts underscore the importance of fostering public aware-

ness and engagement with water conservation practices, linking individual behaviours to broader sustainability goals.

In the educational and community domains, sustainability is increasingly integrated into student perceptions and engagement. Academic events are leveraged as opportunities to promote sustainable practices and environmental awareness among young people, emphasising the need for education to play a central role in training future leaders and professionals equipped to address sustainability challenges [47]. By cultivating sustainable consciousness at an early stage, these initiatives help bridge the gap between awareness and action, driving long-term societal change.

Despite these advancements, there remains a significant gap in understanding sustainable consciousness among Portuguese citizens. This concept encompasses individuals' knowledge, attitudes, and behaviours regarding sustainability and its environmental, social, and economic dimensions [3,4,48]. The lack of detailed research on this topic limits the effectiveness of public policies and business strategies aimed at fostering sustainable behaviours. Understanding how different communities perceive and engage with sustainability issues is essential for designing policies that resonate culturally and effectively mobilise the population toward sustainable practices.

Given this context, the Sustainability Consciousness Questionnaire (SCQ) emerges as a robust and adaptable tool to address these gaps. Grounded in previous research that highlights the importance of cultural adaptation [3,7], the SCQ enables the systematic evaluation of sustainability perceptions and practices. This study's methodology—including the translation, cultural adaptation, and validation of the SCQ for Portugal—seeks to provide a validated instrument tailored to the Portuguese context. By doing so, it lays the groundwork for future research and informed interventions that address the unique sustainability challenges faced by Portugal.

This theoretical background establishes a robust foundation for the present study by linking conceptual, global, and local perspectives on sustainable consciousness. The following sections detail the methodology employed to adapt and validate the SCQ for the Portuguese context, addressing the gaps identified in the literature.

3. Method

This study employed a quantitative research design aligned with a positivist research philosophy to validate the Sustainability Consciousness Questionnaire (SCQ) for the Portuguese population. Statistical analyses were conducted using IBM SPSS Amos software (version 27), which was chosen for its ability to perform structural equation modelling (SEM) and confirmatory factor analysis (CFA). These techniques were selected to validate the factor structure of the SCQ and assess the relationships between the economic, social, and environmental dimensions (Figure 2).

SEM allowed for a simultaneous analysis of multiple variables, providing a comprehensive understanding of the interactions between the questionnaire's constructs, while CFA confirmed whether the data fit the hypothesised model derived from the original instrument. Fit indices were calculated to evaluate the adequacy of the model, including the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). Thresholds of CFI and TLI values ≥ 0.90 and RMSEA ≤ 0.08 were considered acceptable, following recommendations from the literature [49,50].

The SCQ was translated into Portuguese and culturally adapted following a rigorous translation and back-translation process. A pre-test of the translated instrument was conducted with a sample of 20 participants to ensure clarity, cultural appropriateness, and comprehensibility of the items. Based on participant feedback, minor adjustments were made before deploying the final version of the questionnaire.

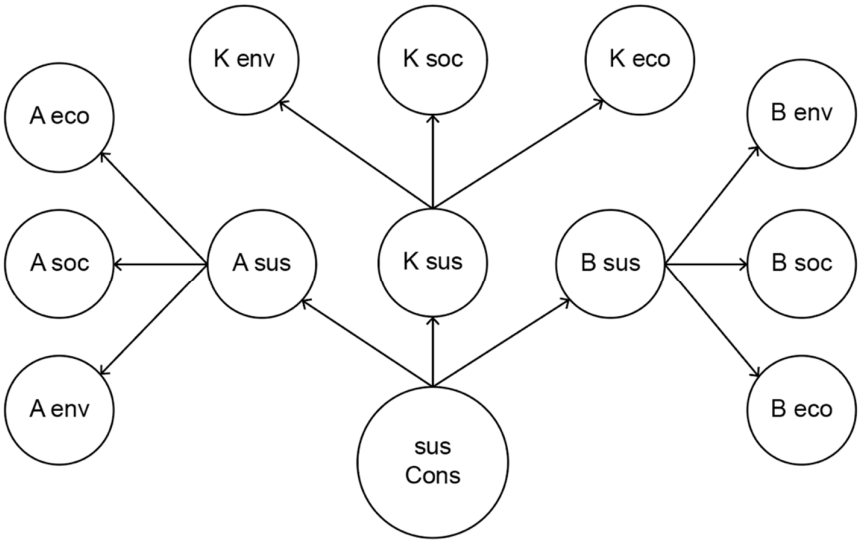

Figure 2. Relationships between the constructs (three-order model). K = knowingness; A = attitudes; B = behaviour; ECO = economic; SOC = social; ENV = environmental; SUS CONS = sustainability consciousness. Source: adapted from [3].

Participants were recruited through convenience sampling using social networks and email lists to disseminate a Microsoft Forms link. While convenience sampling offered accessibility and efficiency, its limitations were acknowledged, particularly the potential bias and reduced generalisability of findings [51]. To mitigate these limitations, efforts were made to ensure a geographically diverse sample. Recruitment targeted individuals of Portuguese origin, and the final sample consisted of 630 participants after data cleaning. The study group included volunteers aged 18 to 70 years, with a notable bias toward highly educated individuals, a factor that may limit the generalisability of the findings to the broader Portuguese population. Future studies are encouraged to employ probabilistic sampling methods to enhance representativeness.

Ethical considerations were carefully addressed. This study was approved by the data protection officer of the Polytechnic University of Cávado and Ave, ensuring compliance with the ethical principles for research involving human participants. Participants were informed about the purpose of this study, the voluntary nature of their participation, and the anonymity of their responses. Data collection adhered to the General Data Protection Regulation (GDPR), and all information was stored securely. Data were collected between 20 February and 22 March 2023, using an online survey format. Participants were assured of the confidentiality of their responses and encouraged to answer honestly. The wide geographical distribution achieved through online recruitment contributed to a diverse sample; however, limitations inherent to the convenience sampling approach were acknowledged.

Demographic Profile

The demographic profile of the participants is summarised in Table 1 below, providing information on gender, education, and marital status. Most of the participants are male (55.6%), with females comprising 43.7% of the sample. The skewed gender distribution highlights the need for caution when generalising the findings, as it may influence certain dimensions of sustainable consciousness, such as attitudes and behaviours traditionally associated with gender roles.

In terms of educational qualifications, the sample is heavily skewed towards highly educated individuals. A significant proportion of participants hold a doctorate (60.5%), followed by a master's degree (15.6%) and a post-doctorate (15.2%) degree. This educational bias suggests that participants may have higher levels of awareness and understanding of

sustainability issues compared to the general population, which could influence the results. Future studies should aim to include a more diverse educational background to enhance the generalisability of findings.

Table 1. Demographic features.

Demographic Breakdown	Frequency	(%)	Valid	Cumulative (%)
Gender				
Male	350	55.6	55.6	55.6
Female	275	43.7	43.7	99.2
Non-binary	2	0.3	0.3	99.5
I'd rather not say	3	0.5	0.5	100.0
Education				
High school	6	1.0	1.0	1.0
Technical courses	1	0.2	0.2	1.1
Undergraduate	48	7.6	7.6	8.7
Master	98	15.6	15.6	24.3
Doctorate	381	60.5	60.5	84.8
Post-doctoral	96	15.2	15.2	100.0
Marriage status				
Single	127	20.2	20.2	20.2
Married	401	63.7	63.7	83.8
Separated	15	2.4	2.4	86.2
Divorced	74	11.7	11.7	97.9
Widowed	11	1.7	1.7	99.7
Common law marriage	2	0.3	0.3	100.0
Total	630		100.0	100.0

As far as marriage status is concerned, most participants are married (63.7%), followed by separated (2.4%), and finally single (20.2%).

The participants' ages ranged from 17 to 83 years, with an average age of 52 (SD = 10.05). While this range provides a broad spectrum of perspectives, the average age indicates that the sample predominantly represents older adults, which may limit the applicability of the findings to younger populations. Future research could address this by ensuring a more balanced age distribution.

4. Results and Discussion

4.1. The Portuguese Long Version

4.1.1. Results

To test the model proposed in Figure 2, various confirmatory factor analyses (CFAs) were conducted. The reliability of the structural model variables for the total sample (n = 654) was assessed through internal consistency indices, factor loadings, means, and standard deviations (Appendix A). Internal consistency indices (α) ranged from an unacceptable sample adequacy index for the social dimension of attitudes ($\alpha < 0.50$) to a good sample adequacy index for the social dimension of knowledge ($0.80 < \alpha < 0.90$), following [52] guidelines.

First- and second-order factors were examined to gain a comprehensive understanding of the data structure. Subsequently, the third-order model depicted in Figure 3 was tested. This hierarchical model follows the structure proposed by [3], where the third-order latent construct, "Sustainability Consciousness", comprises three second-order constructs: sustainability knowledge, sustainability attitudes, and sustainability behaviour. Each second-order construct is further composed of three first-order constructs corresponding

to the three pillars of sustainable development: environmental, social, and economic. The correlations between the errors suggested by the software were included.

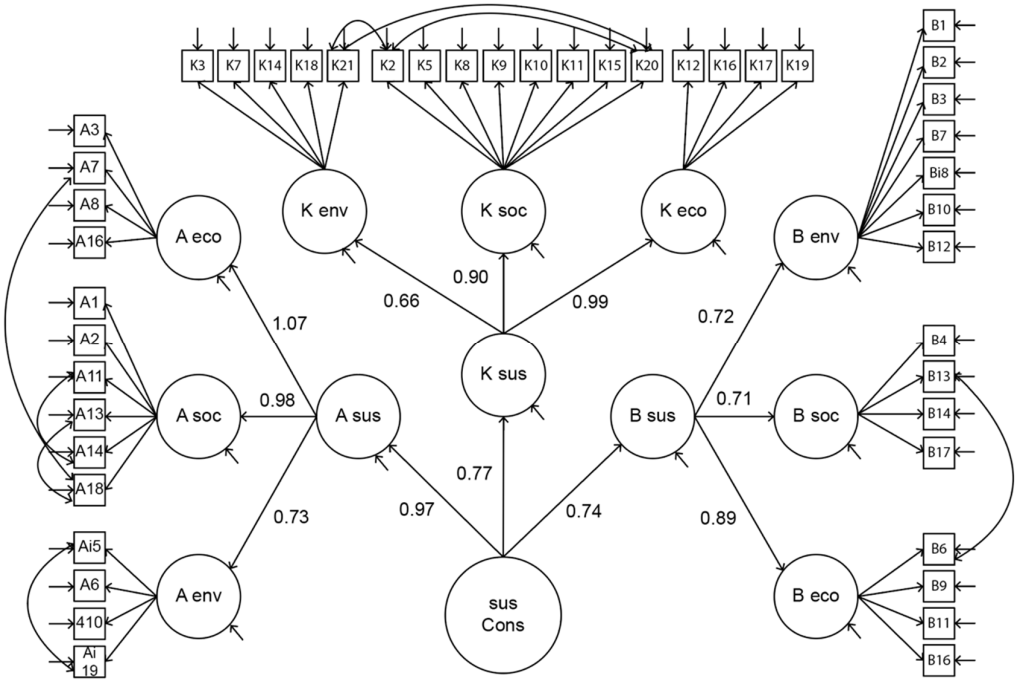

Figure 3. The factor structure of the SCQ-L. K = knowingness; A = attitudes; B = behaviour; ECO = economic; SOC = social; ENV = environmental; SUS CONS = sustainability consciousness.

Three items (K4i: "Preserving nature is not necessary for sustainable development"; B5i: "I often make lifestyle choices that are not good for my health"; B15: "I support an aid organisation or environmental group") were identified as problematic due to non-significant factor loadings and were excluded from subsequent analyses. After their exclusion, the model was re-estimated with the remaining 46 items.

The model fit indices, including RMSEA = 0.045, CFI = 0.860, and TLI = 0.851, indicated a good fit of the model to the data, following thresholds for acceptable fit as outlined by [50,53]. Although the CFI and TLI values were slightly below the ideal threshold of 0.90, these indices are considered acceptable for complex models with large parameter counts [54]. Figure 3 illustrates the factor composition of the SCQ-L, highlighting its hierarchical structure and connections between the constructs.

4.1.2. Discussion

The results validate the factor structure of the SCQ-L in the Portuguese context, supporting its applicability across environmental, social, and economic dimensions. The hierarchical model structure aligns with previous studies, such as [3], which confirmed the multidimensional nature of sustainability consciousness. The exclusion of three problematic items improved the model fit, enhancing its reliability and simplifying its structure without compromising its comprehensiveness. This process underscores the importance of iterative refinement in validating survey instruments.

The relationship between sustainability attitudes and economic attitudes (A sus-A eco) demonstrates the integration of responsible economic behaviour into broader sustainability constructs. Similarly, the links between economic knowledge and sustainability knowledge (K sus-K eco) highlight the critical role of economic literacy in fostering sustainable consciousness. These findings corroborate earlier studies, such as [6], which emphasise the interconnectedness of sustainability dimensions.

Although the CFI and TLI values presented are slightly below the ideal of 0.90, they are still considered acceptable in studies with complex models and large samples [50,54]. Regarding model fit indices (CFI, TLI, and RMSEA), our values fall slightly below traditional thresholds recommended for simpler models (e.g., CFI > 0.95). However, according to [53,54], models with greater complexity and large parameter counts can exhibit lower fit indices without necessarily invalidating their usefulness. This study explicitly recognises these limitations, treating the results as an initial step towards further refinement and validation. Previous studies in similar contexts, such as [6], have also reported comparable fits in survey instrument validation models. Future research could explore additional modifications or alternative model structures to achieve improved fit.

These findings suggest that the SCQ-L is a reliable and valid instrument for assessing sustainability consciousness in the Portuguese population. Its alignment with results from other cultural contexts, such as Ukraine [9] and Sweden [6], reinforces its potential for cross-cultural applications. Moreover, the robust fit indices demonstrate that the SCQ-L can effectively capture the complex interplay between knowledge, attitudes, and behaviours across the three pillars of sustainability.

4.2. The Portuguese Short Version

4.2.1. Results

To understand the reliability index of the short version of the SCQ, internal consistency indices of the structural model variables for the total sample (n = 654) were analysed, along with factor loadings, mean values, and standard deviations (Appendix B). The internal consistency indices (α) ranged from an unacceptable index for the social dimension of behaviour ($\alpha < 0.50$) to a good sample adequacy index for the social dimension of knowledge ($0.80 < \alpha < 0.90$), following [52].

Reliability components and factor loadings were assessed to verify the internal consistency and convergent validity of the constructs of knowledge, attitudes, and sustainable behaviour. Items with factor loadings below 0.40 were excluded to optimise the model [55]. The excluded items included the following: K2 ("For sustainable development, people need to be educated about how to protect themselves against natural disasters"), K21 ("For sustainable development, people need to be educated about how to protect themselves against natural disasters"), A5i ("I think that using more natural resources than we need doesn't threaten people's health and well-being in the future"), A19i ("I think it's OK for each of us to use as much water as we want"), A11 ("I think the government should provide financial support to encourage more people to opt for eco-friendly cars"), A16 ("I think that people who pollute the land, air or water should pay for the damage they cause to the environment"), B7 ("I pick up rubbish when I find it in the countryside or in public places"), B8i ("I don't often reflect on how my actions can harm the natural environment"), B13 ("I work with committees (e.g., student council, labour committee) of my educational institution/employer/voluntarily"), and B9 ("I often buy second-hand products online or in a shop"), among others. After their exclusion, the model was re-estimated with 37 items remaining.

The fit indices for the short version indicated a good model fit: RMSEA = 0.047, CFI = 0.887, and TLI = 0.878. Although the CFI and TLI values were slightly below the ideal threshold of 0.90, they are still considered acceptable for simplified models [55]. Figure 4 illustrates the factor structure of the SCQ-S, maintaining the hierarchical third-order construct of sustainability consciousness, which comprises second-order constructs of knowledge, attitudes, and behaviours, divided into environmental, social, and economic pillars.

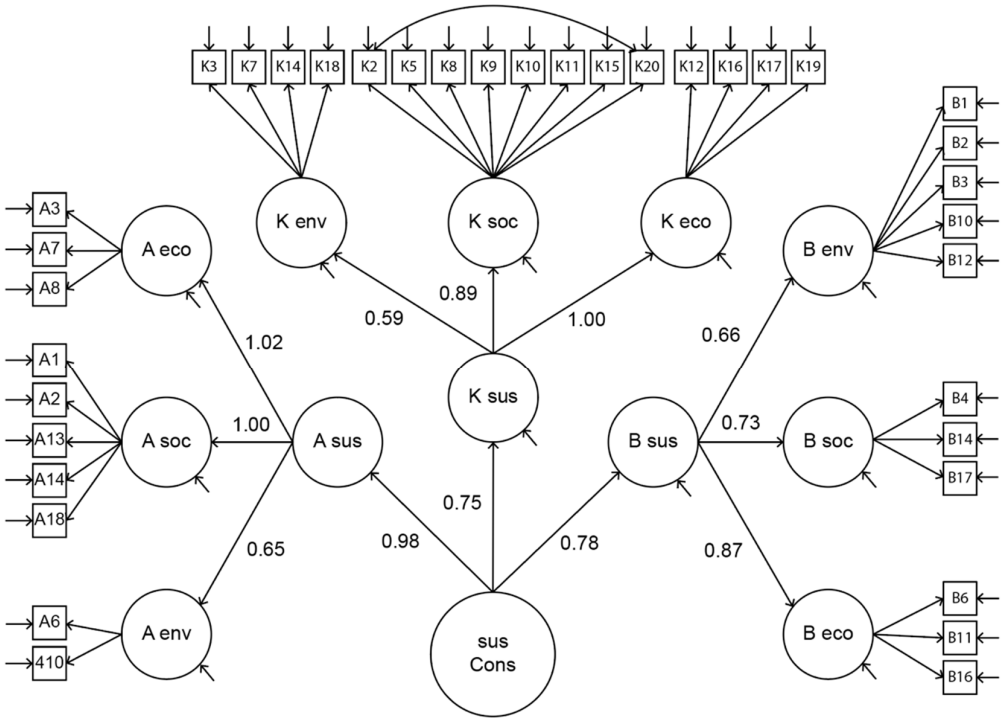

Figure 4. The factor structure of the SCQ-S. K = knowingness; A = attitudes; B = behaviour; ECO = economic; SOC = social; ENV = environmental; SUS CONS = sustainability consciousness.

4.2.2. Discussion

The results demonstrate that the short version of the SCQ retains its robustness as a psychometric tool for measuring sustainability consciousness. The exclusion of problematic items improved model fit and ensured the integrity of the constructs being measured. This refinement process reflects the iterative nature of instrument validation and supports the theoretical framework of sustainability consciousness [3].

Although the fit indices for the short version are slightly below the ideal thresholds (e.g., CFI > 0.90), studies on similar short versions of psychometric tools, such as [5], have shown that minor reductions in fit indices are common but do not compromise practical applicability. This suggests that the SCQ-S is well-suited for research contexts that require shorter response times or greater accessibility.

The findings align with prior research, such as [3,7], which validated the SCQ in other cultural contexts. The Portuguese version also highlights the importance of cultural adaptation in ensuring the relevance and accuracy of psychometric tools. For instance, the exclusion of items related to second-hand purchasing or natural disaster awareness reflects cultural differences that might not resonate with the Portuguese population.

Furthermore, the correlations observed between sustainable knowledge, attitudes, and behaviours indicate that sustainability consciousness is a multifaceted construct, deeply intertwined with practical actions such as recycling and energy conservation. These results corroborate previous findings, including [56], which emphasise the role of awareness in fostering pro-environmental behaviours.

The findings show significant correlations between sustainable awareness and actual sustainable practices, such as recycling and energy conservation, demonstrating that individuals with greater awareness are more likely to engage in environmentally responsible behaviours [56]. This supports previous research on the impact of awareness on pro-environmental behaviour, reinforcing the idea that public engagement strategies are crucial for enhancing sustainable practices [57,58]. This relationship suggests that increasing sustainable awareness can be an effective strategy for promoting sustainable practices among the population [1,3].

The robust psychometric properties of the long and short versions of the SCQ indicate that the tool can be used effectively in various educational and policy-making contexts to promote and assess sustainability awareness. This is particularly relevant for initiatives aimed at increasing public understanding and commitment to the Sustainable Development Goals (SDGs), including quality education and climate action [59].

This study also highlights the importance of cultural adaptation in the validation of psychometric instruments. The adaptation process not only ensures the linguistic appropriateness of the questionnaire, but also its relevance to local cultural norms and practices [3]. The successful adaptation and validation of the SCQ in Portugal provides a model for similar efforts in other non-Anglophone contexts.

Detailed analysis of the results revealed that individuals with a higher level of sustainable consciousness exhibit behaviours that are more in line with ecological practices, such as recycling, energy conservation, and support for environmentally responsible products. These findings reinforce the conclusions of [3], who also identified a significant relationship between awareness and the adoption of sustainable behaviours in populations from different cultural backgrounds. The consistency of the results obtained in the present study demonstrates that the adapted version of the SCQ can accurately capture sustainable consciousness in the Portuguese context. Furthermore, the robustness of the internal consistency indices, reflected in α values greater than 0.70 for most of the constructs, confirms the effectiveness of the instrument in measuring the dimensions of knowledge, attitudes, and behaviours related to sustainability.

The findings of this study not only corroborate the existing literature, but also broaden the understanding of the application of the SCQ in new linguistic and cultural contexts. Previous studies, such as [6], have highlighted the importance of validating measurement instruments in different contexts to ensure their relevance and accuracy. The adaptation of the SCQ for the Portuguese population fills a significant gap in the literature, allowing future research to use this instrument to investigate sustainable consciousness in Portuguese-speaking regions. In addition, this study reflects the relevance of considering contextual and cultural variables when assessing sustainable consciousness and behaviours, aligning with the recommendations of [9,10] on adapting research instruments to maximise their applicability and effectiveness. These results support the idea that increasing sustainable consciousness in the population can have a direct impact on the adoption of pro-environmental practices, which is key to developing more effective educational policies and strategies.

5. Conclusions and Implications

This study validates the SCQ for the Portuguese population, confirming its reliability and construct validity as a culturally adapted tool for measuring sustainable consciousness. The SCQ demonstrated robust psychometric properties in both its long and short versions, with fit indices (RMSEA = 0.045–0.047; CFI = 0.860–0.887; TLI = 0.851–0.878) indicating its effectiveness in capturing the dimensions of sustainable awareness—knowledge, attitudes, and behaviours—within the Portuguese context. This validation fills a significant gap in the literature by providing a reliable tool for future research and practice in Portugal and other Portuguese-speaking populations.

The findings also reveal significant correlations between sustainable consciousness and sustainable practices, such as recycling and energy conservation, supporting the theoretical linkage between awareness and pro-environmental behaviours. These results align with prior studies (e.g., [3,56] and reinforce the potential of targeted interventions to promote sustainable behaviours.

This study makes significant theoretical and practical contributions. On a theoretical level, the work advances understanding of sustainable consciousness by validating the SCQ

in a non-Anglophone context, offering insights into how sustainability can be measured in different cultural and linguistic contexts. This research highlights the importance of cultural adaptation in psychometric studies, addressing linguistic and cultural nuances specific to Portugal, such as issues related to water conservation and the consumption of second-hand products. Furthermore, by examining sustainable consciousness within the environmental, social, and economic dimensions, this study enriches the existing theoretical literature on sustainability and consciousness.

On a practical level, this study offers direct implications for public policy formulation, educational development, and organisational initiatives. Policymakers can use the SCQ to identify gaps in knowledge and attitudes about sustainability, informing public awareness campaigns and targeted educational policies. For example, SCQ results can guide campaigns to promote recycling or the responsible use of water in urban areas. For the education sector, SCQ results can be integrated into curricula, allowing for the development of personalised educational programmes that foster sustainable behaviours among students. In the organisational context, the SCQ offers a practical tool for assessing and promoting sustainability practices, contributing to the creation of a more environmentally responsible organisational culture.

In addition, this study directly supports the implementation of the Sustainable Development Goals (SDGs), especially SDG 4 (Quality Education) and SDG 12 (Responsible Consumption and Production). The validation of the SCQ as a reliable and culturally adapted tool allows for more targeted interventions that promote progress on these goals.

Limitations and Future

This study has some limitations that should be considered when interpreting the results. Firstly, the use of self-reported measures may introduce bias into the responses, as participants may have provided socially desirable answers rather than reflecting their actual behaviours or attitudes. In addition, the sample, made up predominantly of individuals with high levels of education, may limit the generalisability of the findings to the Portuguese population. The fact that the data were collected exclusively online also presents limitations, favouring the participation of individuals with greater access to the internet and greater familiarity with technology, possibly excluding population groups with fewer resources or different educational levels. While the fit indices of our model do not reach traditional cutoffs, the results still provide valuable insights into the cultural adaptation of the SCQ. These findings should be interpreted as a foundational step, with future studies encouraged to refine the model further and explore additional modifications to enhance its fit. Leveraging insights from tailored-fit evaluation strategies, such as those outlined by [53,54], can support the development of more robust models in subsequent research.

Based on these limitations, future research could explore various directions to expand on the findings of this study. Firstly, it is recommended to apply the SCQ in different cultural and demographic contexts, both inside and outside Portugal, to check the generalisability of the results and identify possible cultural variations in perceptions of sustainability. Future research could focus on regional and socioeconomic subgroups within Portugal to explore differences in sustainable consciousness. In addition, future research should consider the use of probabilistic or mixed sampling methods to achieve greater population representativeness. Another line of research could develop and test specific interventions based on the results of the SCQ, evaluating their effectiveness in promoting sustainable behavioural changes, such as increasing recycling rates or reducing energy consumption.

Finally, it is essential to refine the SCQ by incorporating adjusted assessment strategies, such as those proposed by [53,54], to further improve the model's fit indices and ensure its robustness in various contexts. These future initiatives will not only strengthen the

theoretical basis of research into sustainable consciousness but will also offer more effective practical applications, contributing to the advancement of public policies and educational programmes aimed at sustainability.

Author Contributions: Conceptualization, L.A.; Methodology, L.A.; Investigation, B.B.S.; Writing—original draft, L.A.; Visualization, B.B.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: This study has been approved by the Data Protection Officer (DPO) at the educational institution.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The datasets generated and/or analysed during the current study are not publicly available due to privacy and ethical restrictions but are available from the corresponding author upon reasonable request.

Acknowledgments: We would like to thank the participants in this study and the reviewers for their valuable contributions.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. The Portuguese long version of the sustainability awareness questionnaire (SCQ-L).

			Factor Weight	M	SD
Sustainability knowingness (α = 0.88)					
Env. (α = 0.53)	K3	Reducing water consumption is necessary for sustainable development.	0.55	4.73	0.579
	K7	Sustainable development demands that we humans reduce all sorts of waste.	0.71	4.68	0.650
	K14	Preserving the variety of living creatures is necessary for sustainable development (preserving biological diversity).	0.59	4.74	0.660
	K18	Sustainable development requires a shift to renewable natural resources.	0.62	4.54	0.670
	K21	For sustainable development, people need to be educated in how to protect themselves against natural disasters.	0.47	3.87	1.069
Soc. (α = 0.86)	K2	Improving people's chances for a long and healthy life contributes to sustainable development.	0.45	3.91	0.993
	K5	A culture where conflicts are resolved peacefully through discussion is necessary for sustainable development.	0.66	4.24	0.947
	K8	People who exercise their democratic rights are necessary for sustainable development (for example, they vote in elections, involve themselves in social issues, express their opinions).	0.67	4.28	0.849
	K9	Reinforcing girls' and women's rights and increasing equality around the world is necessary for sustainable development.	0.81	4.30	0.901
	K10	Respecting human rights is necessary for sustainable development.	0.77	4.53	0.734
	K11	To achieve sustainable development, all the people in the world must have access to good education.	0.68	4.64	0.632
	K15	Having respect for other cultures is necessary for sustainable development.	0.71	4.47	0.802
	K20	For sustainable development, major infectious diseases such as HIV/AIDS and malaria must be stopped.	0.51	3.64	1.120

Table A1. *Cont.*

			Factor Weight	M	SD
Eco. (α = 0.74)	K12	Sustainable development requires that companies act responsibly towards their employees, customers and suppliers.	0.67	4.53	0.717
	K16	Sustainable development requires a fair distribution of goods and services among people in the world.	0.75	4.39	0.819
	K17	Wiping out poverty in the world is necessary for sustainable development.	0.76	4.41	0.829
	K19	Sustainable development demands that people understand how the economy functions.	0.47	4.08	0.876
Sustainability attitudes (α = 0.80)					
Env. (α = 0.50)	A5i	I think that using more natural resources than we need does not threaten the health and well-being of people in the future.	0.25	4.57	0.918
	A6	I think that we need stricter laws and regulations to protect the environment.	0.54	4.18	0.913
	A10	I think that it is important to take measures against problems which have to do with climate change.	0.66	4.64	0.653
	A19i	I think it is OK that each one of us uses as much water as we want.	0.27	4.72	0.653
Soc. (α = 0.67)	A1	I think that everyone ought to be given the opportunity to acquire the knowledge, values and skills that are necessary to live sustainably.	0.65	4.65	0.571
	A2	I think that we who are living now should make sure that people in the future enjoy the same quality of life as we do today.	0.53	4.60	0.682
	A11	I think that the government should provide financial aid to encourage more people to make the shift to green cars.	0.40	3.76	1.100
	A13	I think that the government should make all its decisions on the basis of sustainable development.	0.54	4.12	0.870
	A14	I think that it is important that people in society exercise their democratic rights and become involved in important issues.	0.63	4.52	0.606
	A18	I think that women and men throughout the world must be given the same opportunities for education and employment.	0.60	4.81	0.444
Eco. (α = 58)	A3	I think that companies have a responsibility to reduce the use of packaging and disposable articles.	0.63	4.68	0.589
	A7	I think it is important to reduce poverty.	0.63	4.76	0.523
	A8	I think that companies in rich countries should give employees in poor nations the same conditions as in rich countries.	0.57	4.18	0.906
	A16	I think that people who pollute land, air or water should pay for the damage they cause to the environment.	0.37	4.39	0.804
Sustainability behaviour (α = 0.72)					
Env. (α = 0.54)	B1	Where possible, I choose to cycle or walk when I'm going somewhere, instead of travelling by motor vehicle.	0.43	3.61	1.116
	B2	I never waste water.	0.47	3.34	1.047
	B3	I recycle as much as I can.	0.70	4.29	0.834
	B7	I pick up rubbish when I see it out in the countryside or in public places.	0.40	3.45	1.059
	B8i	don't think about how my actions may damage the natural environment.	0.36	1.74	0.995
	B10	I always separate food waste before putting out the rubbish when I have the chance.	0.60	4.19	0.979
	B12	I have changed my personal lifestyle in order to reduce waste (e.g., throwing away less food or not wasting materials).	0.55	4.03	0.923

Table A1. *Cont.*

			Factor Weight	M	SD
Soc. (α = 0.41)	B4	When I use a computer or mobile to chat, to text, to play games and so on, I always treat others as respectfully as I would in real life.	0.64	4.69	0.568
	B13	I work with committees (e.g., student council, labour committee) at my educational institution/employer/voluntarily.	0.14	3.04	1.272
	B14	I treat everyone with the same respect, even if they have another cultural background than mine.	0.72	4.64	0.599
	B17	I show the same respect to men and women, boys and girls.	0.72	4.83	0.408
Eco. (α = 0.51)	B6	I do things which help poor people.	0.46	3.87	0.880
	B9	I often purchase second-hand goods over the internet or in a shop.	0.35	2.98	1.271
	B11	I avoid buying goods from companies with a bad reputation for looking after their employees and the environment.	0.54	3.75	0.977
	B16	I watch news programs or read newspaper articles to do with the economy.	0.41	4.07	0.900

Item codes including an "i" in the second column are inverted.

Appendix B

Table A2. The Portuguese short version of the sustainability awareness questionnaire (SCQ-S).

			Factor Weight	M	SD
Sustainability knowingness (α = 0.89)					
Env. (α = 0.72)	K3	Reducing water consumption is necessary for sustainable development.	0.58	4.73	0.579
	K7	Sustainable development demands that we humans reduce all sorts of waste.	0.74	4.68	0.650
	K14	Preserving the variety of living creatures is necessary for sustainable development (preserving biological diversity).	0.60	4.74	0.660
	K18	Sustainable development requires a shift to renewable natural resources.	0.61	4.54	0.670
Soc. (α = 0.86)	K2	Improving people's chances for a long and healthy life contributes to sustainable development.	0.50	3.91	0.993
	K5	A culture where conflicts are resolved peacefully through discussion is necessary for sustainable development.	0.66	4.24	0.947
	K8	People who exercise their democratic rights are necessary for sustainable development (for example, they vote in elections, involve themselves in social issues, express their opinions).	0.67	4.28	0.849
	K9	Reinforcing girls' and women's rights and increasing equality around the world is necessary for sustainable development.	0.82	4.30	0.901
	K10	Respecting human rights is necessary for sustainable development.	0.77	4.53	0.734
	K11	To achieve sustainable development, all the people in the world must have access to good education.	0.69	4.64	0.632
	K15	Having respect for other cultures is necessary for sustainable development.	0.71	4.47	0.802
	K20	For sustainable development, major infectious diseases such as HIV/AIDS and malaria must be stopped.	0.55	3.64	1.120

Table A2. *Cont.*

			Factor Weight	M	SD
Eco. (α = 0.74)	K12	Sustainable development requires that companies act responsibly towards their employees, customers and suppliers.	0.67	4.53	0.717
	K16	Sustainable development requires a fair distribution of goods and services among people in the world.	0.76	4.39	0.819
	K17	Wiping out poverty in the world is necessary for sustainable development.	0.76	4.41	0.829
	K19	Sustainable development demands that people understand how the economy functions.	0.47	4.08	0.876
Sustainability attitudes (α = 0.81)					
Env. (α = 0.54)	A6	I think that we need stricter laws and regulations to protect the environment.	0.57	4.18	0.913
	A10	I think that it is important to take measures against problems which have to do with climate change.	0.69	4.64	0.653
Soc. (α = 0.69)	A1	I think that everyone ought to be given the opportunity to acquire the knowledge, values and skills that are necessary to live sustainably.	0.64	4.65	0.571
	A2	I think that we who are living now should make sure that people in the future enjoy the same quality of life as we do today.	0.52	4.60	0.682
	A13	I think that the government should make all its decisions on the basis of sustainable development.	0.49	4.12	0.870
	A14	I think that it is important that people in society exercise their democratic rights and become involved in important issues.	0.63	4.52	0.606
	A18	I think that women and men throughout the world must be given the same opportunities for education and employment.	0.62	4.81	0.444
Eco. (α = 0.60)	A3	I think that companies have a responsibility to reduce the use of packaging and disposable articles.	0.62	4.68	0.589
	A7	I think it is important to reduce poverty.	0.65	4.76	0.523
	A8	I think that companies in rich countries should give employees in poor nations the same conditions as in rich countries.	0.57	4.18	0.906
Sustainability behaviour (α = 0.74)					
Env. (α = 0.67)	B1	Where possible, I choose to cycle or walk when I'm going somewhere, instead of travelling by motor vehicle.	0.41	3.61	1.116
	B2	I never waste water.	0.45	3.34	1.047
	B3	I recycle as much as I can.	0.70	4.29	0.834
	B10	I always separate food waste before putting out the rubbish when I have the chance.	0.61	4.19	0.979
	B12	I have changed my personal lifestyle in order to reduce waste (e.g., throwing away less food or not wasting materials).	0.55	4.03	0.923
Soc. (α = 0.72)	B4	When I use a computer or mobile to chat, to text, to play games and so on, I always treat others as respectfully as I would in real life.	0.65	4.69	0.568
	B14	I treat everyone with the same respect, even if they have another cultural background than mine.	0.72	4.64	0.599
	B17	I show the same respect to men and women, boys and girls.	0.73	4.83	0.408
Eco. (α = 0.45)	B6	I do things which help poor people.	0.46	3.87	0.880
	B11	I avoid buying goods from companies with a bad reputation for looking after their employees and the environment.	0.52	3.75	0.977
	B16	I watch news programs or read newspaper articles to do with the economy.	0.41	4.07	0.900

References

1. Oliveira, M.C.; Matos, H.A.; Kong, F.; Oliveira, M.C.; Matos, H.A. Sustainability and Strategic Assessment of Water and Energy Integration Systems: Case Studies of the Process Industry in Portugal. *Energies* **2024**, *17*, 195. [CrossRef]
2. Pinto, T.; Machado, T.; Nicolau, D.; Oliveira, N.G.; Vaz, A.S. Accounting for nature contributions to people in corporate sustainability: The case of a waste management company in Portugal. *Corp. Soc. Responsib. Environ. Manag.* **2024**, *31*, 2619–2628. [CrossRef]
3. Gericke, N.; Boeve-de Pauw, J.; Berglund, T.; Olsson, D. The Sustainability Consciousness Questionnaire: The theoretical development and empirical validation of an evaluation instrument for stakeholders working with sustainable development. *Sustain. Dev.* **2019**, *27*, 35–49. [CrossRef]
4. Gulzar, Y.; Eksili, N.; Caylak, P.C.; Mir, M.S. Sustainability Consciousness Research Trends: A Bibliometric Analysis. *Sustainability* **2023**, *15*, 16773. [CrossRef]
5. Marcos-Merino, J.M.; Corbacho-Cuello, I.; Hernández-Barco, M. Analysis of Sustainability Knowingness, Attitudes and Behavior of a Spanish Pre-Service Primary Teachers Sample. *Sustainability* **2020**, *12*, 7445. [CrossRef]
6. Ariza, M.R.; Boeve-De Pauw, J.; Olsson, D.; Van Petegem, P.; Parra, G.; Gericke, N. Promoting Environmental Citizenship in Education: The Potential of the Sustainability Consciousness Questionnaire to Measure Impact of Interventions. *Sustainability* **2021**, *13*, 11420. [CrossRef]
7. Ogishima, H.; Ito, A.; Kajimura, S.; Himichi, T. Validity and reliability of the Japanese version of the sustainability consciousness questionnaire. *Front. Psychol.* **2023**, *14*, 1130550. [CrossRef]
8. Al-Nuaimi, S.R.; Al-Ghamdi, S.G. Assessment of Knowledge, Attitude and Practice towards Sustainability Aspects among Higher Education Students in Qatar. *Sustainability* **2022**, *14*, 13149. [CrossRef]
9. Lytovchenko, I.; Yamshynska, N.; Kutsenok, N.; Filatova, V. Teaching sustainability online to university students with the use of interactive presentation tools: A case study. *Adv. Educ.* **2021**, *8*, 11–18. [CrossRef]
10. Moustafa Saleh, M.S.; Elsabahy, H.E.S. Integrating sustainability development education program in nursing to challenge practice among nursing interns in health care. *J. Nurs. Manag.* **2022**, *30*, 4419–4429. [CrossRef]
11. Kent, L.; Wittmann, M. Time consciousness: The missing link in theories of consciousness. *Neurosci. Conscious.* **2021**, *2021*, niab011. [CrossRef] [PubMed]
12. Klein, C.; Hohwy, J.; Bayne, T. Explanation in the science of consciousness: From the neural correlates of consciousness (NCCs) to the difference makers of consciousness (DMCs). *Philos. Mind Sci.* **2020**, *1*, 1–20. [CrossRef]
13. Otto, S.; Evans, G.W.; Moon, M.J.; Kaiser, F.G. The development of children's environmental attitudes and behavior. *Glob. Environ. Chang.* **2019**, *58*, 101947. [CrossRef]
14. Ceruti, M.; Damiano, L. Plural embodiment(s) of mind. Genealogy and guidelines for a radically embodied approach to mind and consciousness. *Front. Psychol.* **2018**, *9*, 413623. [CrossRef]
15. Pepperell, R. Consciousness as a Physical Process Caused by the Organization of Energy in the Brain. *Front. Psychol.* **2018**, *9*, 11. [CrossRef]
16. Ahn, J.; Shamim, A. The role of consciousness in sustainable food consumption: A cultural comparison. *Soc. Responsib. J.* **2023**, *19*, 1263–1275. [CrossRef]
17. Abuzaid, H.; Almashhour, R.; Mohammed, A.; Beheiry, S. Assessment of the Perception of Sustainability for Occupants of Residential Buildings: A Case Study in the UAE. *Buildings* **2022**, *12*, 994. [CrossRef]
18. Korsager, M.; Scheie, E. Students and education for sustainable development—What matters? A case study on students' sustainability consciousness derived from participating in an ESD project. *Acta Didact. Nor.* **2019**, *13*, 6–26. [CrossRef]
19. Jan, I.U.; Ji, S.; Yeo, C. Values and Green Product Purchase Behavior: The Moderating Effects of the Role of Government and Media Exposure. *Sustainability* **2019**, *11*, 6642. [CrossRef]
20. Fischer, D.; Stanszus, L.; Geiger, S.; Grossman, P.; Schrader, U. Mindfulness and sustainable consumption: A systematic literature review of research approaches and findings. *J. Clean. Prod.* **2017**, *162*, 544–558. [CrossRef]
21. Wamsler, C.; Brossmann, J.; Hendersson, H.; Kristjansdottir, R.; McDonald, C.; Scarampi, P. Mindfulness in sustainability science, practice, and teaching. *Sustain. Sci.* **2018**, *13*, 143–162. [CrossRef] [PubMed]
22. Krsnik, S.; Erjavec, K.; Klopčič, M. Impact of Citizens' Personal Values, Knowledge, Awareness, Informing, Advertising, and Truth of Environmental and Climate Challenges in Support of the Sustainable Development Goals. *Sustainability* **2022**, *14*, 7333. [CrossRef]
23. Yoo, S.S.; Jeon, M. New Wine Needs to Be Put into New Bottles: Legitimating Education for Sustainability in South Korea's Higher Education Institutions. *J. Teach. Educ. Sustain.* **2022**, *24*, 129–146. [CrossRef]
24. Steg, L.; Vlek, C. Encouraging pro-environmental behaviour: An integrative review and research agenda. *J. Environ. Psychol.* **2009**, *29*, 309–317. [CrossRef]
25. Gifford, R. The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. *Am. Psychol.* **2011**, *66*, 290–302. [CrossRef]

26. Nielsen, K.S.; Clayton, S.; Stern, P.C.; Dietz, T.; Capstick, S.; Whitmarsh, L. How psychology can help limit climate change. *Am. Psychol.* **2021**, *76*, 130–144. [CrossRef]
27. Heinrichs, H.; Martens, P.; Michelsen, G.; Wiek, A. *Sustainability Science: An Introduction*; Springer Nature: Berlin/Heidelberg, Germany, 2016. [CrossRef]
28. United Nations. *Transforming Our World: The 2030 Agenda for Sustainable Development*; United Nations: New York, NY, USA, 2015.
29. Hickel, J.; Kallis, G. Is green growth possible? *New Political Econ.* **2020**, *25*, 469–486. [CrossRef]
30. Montero Caro, M.D. Educación, Gobierno Abierto y progreso: Los Objetivos de Desarrollo Sostenible (ODS) en el ámbito educativo. Una visión crítica de la LOMLOE. *Revista de Educación y Derecho* **2021**, *23*, 1–26. [CrossRef]
31. Ridho, T.K.; Vinichenko, M.; Makushkin, S. Participationofcompaniesinemergingmarketstothesustainabledevelopmentgoals (SDGS)-Web of Science Core Collection. In *International Scientific Conference on Economic and Social Development*; Maloletko, A., Rupcic, N., Baracskai, Z., Eds.; Varazdin Development and Entrepreneurship Agency: Varazdin, Croatia, 2018; pp. 741–752.
32. ElAlfy, A.; Palaschuk, N.; El-Bassiouny, D.; Wilson, J.; Weber, O. Scoping the Evolution of Corporate Social Responsibility (CSR) Research in the Sustainable Development Goals (SDGs) Era. *Sustainability* **2020**, *12*, 5544. [CrossRef]
33. Lozano, R.; Barreiro-Gen, B.; Lozano, F.J.; Sammalisto, K. Teaching Sustainability in European Higher Education Institutions: Assessing the Connections between Competences and Pedagogical Approaches. *Sustainability* **2019**, *11*, 1602. [CrossRef]
34. Ferrari, C.A.; Jönsson, M.; Gebrehiwot, S.G.; Chiwona-Karltun, L.; Mark-Herbert, C.; Manuschevich, D.; Powell, N.; Do, T.; Bishop, K.; Hilding-Rydevik, T. Citizen Science as Democratic Innovation That Renews Environmental Monitoring and Assessment for the Sustainable Development Goals in Rural Areas. *Sustainability* **2021**, *13*, 2762. [CrossRef]
35. Shulla, K.; Leal Filho, W.; Sommer, J.H.; Lange Salvia, A.; Borgemeister, C. Channels of collaboration for citizen science and the sustainable development goals. *J. Clean. Prod.* **2020**, *264*, 121735. [CrossRef]
36. Llopis-Albert, C.; Rubio, F.; Zeng, S.; Grima-Olmedo, J.; Grima-Olmedo, C. The Sustainable Development Goals (SDGs) applied to Mechanical Engineering. *Multidiscip. J. Educ. Soc. Technol. Sci.* **2022**, *9*, 59–70. [CrossRef]
37. Rodriguez-Sanchez, C. The role of social marketing in achieving the planet sustainable development goals (SDGs). *Int. Rev. Public Nonprofit Mark.* **2023**, *20*, 559–571. [CrossRef]
38. Sperkova, K.; Anderson, P.; Llopis, E.J. Alcohol policy measures are an ignored catalyst for achievement of the sustainable development goals. *PLoS ONE* **2022**, *17*, e0267010. [CrossRef]
39. De Siqueira, I.R.; Ramalho, L. Participatory methodologies and caring about numbers in the 2030 Sustainable Development Goals Agenda. *Policy Soc.* **2022**, *41*, 486–497. [CrossRef]
40. Fei, W.; Opoku, A.; Agyekum, K.; Oppon, J.A.; Ahmed, V.; Chen, C.; Lok, K.L. The Critical Role of the Construction Industry in Achieving the Sustainable Development Goals (SDGs): Delivering Projects for the Common Good. *Sustainability* **2021**, *13*, 9112. [CrossRef]
41. Ogunmakinde, O.E.; Egbelakin, T.; Sher, W. Contributions of the circular economy to the UN sustainable development goals through sustainable construction. *Resour. Conserv. Recycl.* **2022**, *178*, 106023. [CrossRef]
42. Sachs, J.D. *The Age of Sustainable Development*; Columbia University Press: New York, NY, USA, 2015.
43. Galvão, T.G.; Lima MG, B.; Ramiro, R. Bottom-up regionality and the Sustainable Development Goals: Civil society organizations shaping 2030 Agenda implementation in Latin America. *Rev. Bras. De Política Int.* **2023**, *66*, e021. [CrossRef]
44. Geiger, S.M.; Dombois, C.; Funke, J. The role of environmental knowledge and attitude: Predictors for ecological behavior across cultures? An analysis of Argentinean and German students. *Environ. Dev. Sustain.* **2018**, *22*, 69–87.
45. Fransson, N.; Gärling, T. Environmental concern: Conceptual definitions, measurement methods, and research findings. *J. Env. Psychol.* **1999**, *19*, 369–382. [CrossRef]
46. Geiger, S.M.; Fischer, D.; Schrader, U.; Grossman, P. Meditating for the Planet: Effects of a Mindfulness-Based Intervention on Sustainable Consumption Behaviors. *Environ. Behav.* **2019**, *52*, 1012–1042. [CrossRef]
47. Severino, F.S. Perception of events management students in relation to environmental sustainability: Case study in Portugal. *Eur. J. Tour. Hosp. Recreat.* **2023**, *13*, 198–210. [CrossRef]
48. Hsiao HH, M.; Tseng, H. The formation of environmental consciousness in taiwan: Intellectuals, media, and the public mind. *Asian Geogr.* **1999**, *18*, 99–109. [CrossRef]
49. Hu, L.-t.; Bentler, P.M. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Equ. Model. A Multidiscip. J.* **1999**, *6*, 1–55. [CrossRef]
50. Xia, Y.; Yang, Y. RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods. *Behav. Res. Methods* **2018**, *51*, 409–428. [CrossRef]
51. Bornstein, M.H.; Jager, J.; Putnick, D.L. Sampling in developmental science: Situations, shortcomings, solutions, and standards. *Dev. Rev.* **2013**, *33*, 357–370. [CrossRef]
52. Gliem, J.A.; Gliem, R.R. Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales. Midwest Research-to-Practice Conference in Adult Continuing and Community Education. 2003. Available online: https://hdl.handle.net/1805/344 (accessed on 7 November 2024).

53. Shi, D.; Lee, T.; Maydeu-Olivares, A. Understanding the Model Size Effect on SEM Fit Indices. *Educ. Psychol. Meas.* **2019**, *79*, 310–334. [CrossRef]
54. Mai, R.; Niemand, T.; Kraus, S. A tailored-fit model evaluation strategy for better decisions about structural equation models. *Technol. Forecast. Soc. Change* **2021**, *173*, 121142. [CrossRef]
55. Niemand, T.; Mai, R. Flexible cutoff values for fit indices in the evaluation of structural equation models. *J. Acad. Mark. Sci.* **2018**, *46*, 1148–1172. [CrossRef]
56. Whitburn, J.; Linklater, W.; Abrahamse, W. Meta-analysis of human connection to nature and proenvironmental behavior. *Conserv. Biol.* **2020**, *34*, 180–193. [CrossRef] [PubMed]
57. Michalina, D.; Mederly, P.; Diefenbacher, H.; Held, B. Sustainable Urban Development: A Review of Urban Sustainability Indicator Frameworks. *Sustainability* **2021**, *13*, 9348. [CrossRef]
58. Van der Linden, S.; Maibach, E.; Leiserowitz, A. Improving Public Engagement with Climate Change: Five "Best Practice" Insights From Psychological Science. *Prespect. Psychol. Sci.* **2015**, *10*, 758–763. [CrossRef] [PubMed]
59. Seixas, C.S.; Prado, D.S.; Joly, C.A.; May, P.H.; Neves, E.M.S.C.; Teixeira, L.R. Governança ambiental no Brasil: Rumo aos objetivos do desenvolvimento sustentável (ODS)? *Cad. Gestão Pública Cid.* **2020**, *25*, 81. [CrossRef]