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Research Article

Impact Factors in the Eco-friendly Food Choices of Portuguese Consumers

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Abstract

Ecologically conscious consumers play a pivotal role in sustaining environmental development for the future, contributing to the preservation of the planet's and society's well-being. Therefore, this research aimed to assess Portuguese consumers' orientation towards environmental issues and how these concerns influence their food purchasing decisions. Consequently, a cross-sectional and quantitative study was conducted based on an online questionnaire applied to a sample of 696 Portuguese consumers aged between 18 and 74 years old. Subsequently, the data was analyzed using the version 28.0 of the IBM SPSS software. Data analysis involved the use of descriptive statistics to characterize the sample, Cronbach's Alpha to analyze the internal consistency of the responses, and Spearman's test to study the correlation between variables. Finally, a multivariate analysis was conducted to estimate three linear regression models. The majority of the respondents (57.6%) lived in the North of Portugal, specifically in Porto (26.1%), Bragança (18.4%), and Braga (13.1%) districts; had completed secondary education or equivalent (51.3%); have a household income between 705 and 2115 euros (62.2%); and live in households with 3 (27.7%) or 4 people (29.6%). The values of Cronbach's Alpha were satisfactory for all dimensions, indicating good consistency of the responses. All correlations found were statistically significant at the 1% significance level and positive. The results suggest that interest in ecological knowledge, knowledge of environmental issues, and age are important factors influencing ecological purchasing habits, conscious purchasing planning, and sustainable behavior. These findings are valuable in guiding public policies that promote sustainability through more effective strategies.

Keywords: Sustainability, Ecological behavior, Ecological knowledge, Food goods.

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Introduction

Food production is an essential activity. The food system of the European Union (EU) aims to guarantee access to fresh and safe food. However, it has been verified that agriculture and food sectors have a negative impact on the environment, which is demonstrated by the report of the Intergovernmental Panel on Climate Change (IPCC). This report blames food systems for around a third of the world's greenhouse gas emissions, consuming large amounts of natural resources, resulting in loss of biodiversity and negative health impacts (European Council, 2022). The IPCC, the United Nations group responsible for assessing scientific knowledge related to climate change, recently stated that climate change has to be challenged through a global approach where sustainability is the main value (IPCC, 2019). On May 20, 2020, the European Commission released the "Farm to Fork" Strategy, present at the core of the European Green Deal, with the aim of making food systems fair, healthy and sustainable. According to Schebesta and Candel (2020), it was the first time in the history of the EU that food sustainability was addressed comprehensively, that is, from primary production to the consumer, which represents a first step towards a solution to the problems of food systems appearing to be timely to address some of the environmental and public health concerns facing European society.

The challenge of sustainable development and consumption is to satisfy current desires without impoverishing future generations and the planet in the long term. Therefore, new standards of sustainable practices are increasingly being promoted (Sesini et al., 2020). Ensuring sustainable consumption is one of the 17 Goals of the 2030 Agenda for Sustainable Development adopted by world leaders in September 2015 (United Nations, 2022). The development of organic production and other forms of sustainable agriculture depends on knowledge and awareness of the need to conserve natural resources and the environment, as well as on economic factors such as market preferences and incentives for production practices that, in the long term, allow meeting people's food needs, improving the quality of the environment and natural resources, the efficient use of non-renewable and renewable resources, the unfolding of natural biological cycles, bearing the economic costs of production and improving farmers and society life quality as a whole (Stojic & Dimitrijevic, 2020).

Quality food is a basic requirement of the modern consumer, but other parameters such as the price of products, as well as their nutritional value, always had a decisive influence on consumer choice. Market preferences play an important role in creating a sustainable food production system. Through demand, consumers send a strong message to producers, sellers and intermediaries in the value chain about what is important to them (Stojic & Dimitrijevic, 2020). Food consumption provides a great insight into consumer behaviors, and it is attracting increasing attention due to its environmental, social and economic effects (Papargyropoulou et al., 2014). Although food residues and food-related behaviors are measures observed in determining consumption behaviors, food, in general, also depends on contextual factors that dictate consumption, such as regional differences, food availability and distribution (Annunziata et al., 2020; Papargyropoulou et al., 2014). Changing behaviors and individual patterns of food consumption might have a significant effect on mitigating greenhouse gas emissions. Consumers can, through their choices, influence food production and management, playing an important role in a more sustainable food system (Grunert, 2011; Lombardi et al., 2017).

Among the factors that determine consumer preferences, ecological awareness must play a key role. Ecological awareness reflects people's concern and knowledge about the impact of their behavior on the environment (Fu et al., 2020).

In this context, the main objective of this research was to verify the impact of interest in ecological knowledge, knowledge of environmental issues and socioeconomic variables in the ecological purchasing habits, in the planning of conscious purchase and in the ecological attitudes of the Portuguese consumers purchasing habits. To achieve this objective, three specific objectives were formulated that will help to better understand the motivations and behaviors of consumers in relation to environmental issues when choosing food, namely: (1) to identify socioeconomic factors that influence the attitudes and behaviors of purchasing food, specifically,

gender, age, marital status, household size, household income level and family financial comfort; (2) to verify if the interest in ecological knowledge is a determinant of the ecological purchasing habits, of the conscious purchase planning and of the ecological attitude; and (3) to verify if the consumer's knowledge of ecological issues is a predictor of ecological purchasing habits, conscious purchase planning and ecological attitude.

The work is structured into five sections. In the first section, the theme is contextualized, highlighting the relevance and current interest of the study, and a review of the literature on ecological awareness, ecological knowledge and ecological interest, purchasing behavior, ecological purchasing habits and diet type is presented, which will support the research. In the second section, the methodology is described, including the type of study and sampling, the data collection procedures and instrument, the statistical treatment of the data and ethical issues. In the third section, the results are presented and analyzed. Subsequently, the results are discussed in the fourth section. Finally, in the fifth and last section, the main conclusions are presented, the limitations of this research are presented, future research is suggested and contributions for the literature are highlighted.

Methods

In this section, the type of study and sampling, the procedures developed and the instrument used to collect the data, the statistical treatment of the data and the ethical issues are presented.

Type of study and sampling

This study is quantitative and cross-sectional. Quantitative studies make it possible to measure opinions, behaviors, habits and attitudes based on a sample. In this type of study, some concepts are used to formulate hypotheses about the phenomenon to be studied. This approach aims to collect numerical data as a way to explain the outlined phenomenon (Ludwig & Johnston, 2016). On the other hand, cross-sectional studies are characterized by analyzing data at a single moment in time as if they were a photograph (Creswell & Creswell, 2021). Participants in this type of study are selected based on certain variables of interest.

In order to respond to the objectives of the study, a non-probabilistic sample was collected, selected for convenience. The data was collected using an online questionnaire that could be shared by family, friends and acquaintances. A sample is non-probabilistic or empirical when the elements of a population do not have a calculable probability greater than zero of being part of the sample, that is, individuals do not have the same probability of participating in the study (McDaniel & Gates, 2013; Sarstedt & Mooi, 2014). This type of sampling allows data collection in a simple way. However, its main disadvantage is that responses can be obtained from individuals who are completely unrelated to the problem being investigated (Etikan, Musa & Alkassim, 2016). To avoid this problem, the sample was restricted taking into account age (minimum 18 years old) and nationality (Portuguese).

Data collection instrument

Data collection was done between September 2022 and the first half of January 2023. The instrument used to collect the data was a questionnaire with two sections. The first section included questions that allowed the socioeconomic characterization of the respondent, namely gender, age, educational level, household size, household income level and family financial comfort. The second section included the model of sustainable food purchasing attitudes and behaviors developed by Kuźniar, Surmacz and Wierzbiński (2021). This model includes 17 statements. For each statement, respondents used a Likert-type scale ranging from 1 (completely disagree) to 7 (completely agree). Subsequently, the statements were aggregated into four dimensions, namely: (1) interest in ecological knowledge, (2) knowledge of ecological issues, (3) ecological purchasing habits, and (4) conscious purchasing planning (Table 1).

Table 1: Dimensions of sustainable food purchasing attitudes and behaviors

Dimension	Items
(1) interest in ecological knowledge	1. I am constantly looking to increase knowledge about green eating and to develop healthy eating habits. 2. In recent years, I have increased the level of knowledge and awareness in terms of developing healthy eating habits. 3. I try to keep up with ongoing social campaigns dedicated to healthy eating and put them into practice. 4. I increase my knowledge of eating habits regularly by consulting information presented by experts.
(2) knowledge of ecological issues	5. Beef production on a global scale leads to climate change to a great extent. 6. Purchasing local products eliminates greenhouse gas emissions related to food supply. 7. Diets rich in fruits and vegetables instead of meat and animal products have a positive impact on the environment. 8. Buying from local producers gives you the possibility to see if growing crops is beneficial to the environment.
(3) ecological purchasing habits	9. I always check the country of origin of the food products I buy. 10. I always check that the food products I buy have a high-quality certificate. 11. I buy food more often at stores dedicated to green products. 12. I prefer regionally/locally grown food products.
(4) conscious purchasing planning	13. When I buy food, I always use my own reusable bags. 14. I plan my meals in advance. 15. I cook with ingredients I have on hand. 16. Before buying, I look at what I have available in the cupboards and fridge. 17. When purchasing, I usually make a shopping list.

Data editing and treatment

IBM SPSS version 28 software was used to edit and analyze the collected data. For nominal and ordinal variables, absolute and relative frequencies were calculated. In addition, measures of central tendency, such as mean, mode and median, and measures of dispersion, such as standard deviation, minimum and maximum, were calculated for ordinal and quantitative variables (Pestana & Gageiro, 2014; Marôco, 2021).

The assessment of the internal consistency of the four dimensions of sustainable food purchasing attitudes and behaviors was performed using the Cronbach's Alpha coefficient. For this coefficient, positive values between 0 and 1 indicate the degree of consistency or reliability of a set of questions. In fact, a value greater than 0.9 is very good, between 0.8 and 0.9 is good, between 0.7 and 0.8 is fair, between 0.6 and 0.7 is weak and below 0.6 is not admissible (Nunnally & Bernstein, 1994).

To study the correlation between interest in the ecological knowledge, knowledge of ecological issues, ecological purchasing habits, conscientious purchasing planning and ecological attitude variables, the Spearman correlation test was used. This test delivers the Rho coefficient that measures the intensity of the correlation. In fact, the correlation coefficient ranges from -1 (inverse perfect correlation) to 1 (direct perfect correlation). The Spearman test allows testing the null hypothesis (H_0) of the variables not being correlated against the alternative hypothesis (H_1) of the variables being correlated (Pestana & Gageiro, 2014).

Finally, three multivariate regression models were estimated allowing the analysis of the association between the dependent or explained metric

variables "Ecological purchasing habits (Y_1)", "Conscientious purchase planning (Y_2)" and "Sustainable attitudes and behaviors (Y_3) " and the independent or explanatory variables (Malhotra, 2019), namely, "Interest in ecological knowledge (X_1)", "Knowledge of ecological issues (X_2)", "Gender (X_3)", "Age (X_4)", "Education level (X_5)", "Household income level (X_6)" and "Family financial comfort (X_7)". The models were estimated after identifying and removing outliers and confirming the absence of multicollinearity, measured by tolerance and Variance Inflation Factor (VIF) (Pallant, 2020). In the estimated regression models, F test was used to confirm the suitability of the model to describe part of the association between the independent variables and the dependent variable (Pestana & Gageiro, 2014).

The analytical study was performed at a significance level of 5%. The decision rule is to reject the null hypothesis when the probability of significance (p-value) is inferior or equal to the significance level. The significance level corresponds to the Type I Error, that is, to reject the null hypothesis when the hypothesis is true (Marôco, 2021).

Ethical issues

In this research, individuals were invited to participate voluntarily and were informed about the objectives and scope of the study. They were guaranteed the confidentiality of the data and the non-disclosure of individual data, since the answers were treated and analyzed by specialists in an aggregate way, in accordance with the Law 58/2019 on the Protection of Personal Data. The participants consented to participate and agreed with the research procedures.

Results

This study involved the use of a sample that included 696 individuals of Portuguese nationality, aged between 18 and 74 years old. The mean age was 28.97 years old (SD = 12.81). The mode age was 18 years old and the median was 22 years old (Table 2).

Regarding marital status, 72.0% of the respondents were single, 23.0% were married or lived in cohabitation, 4.2% were divorced or separated and less than 1.0% were widowers. As for the education level, the majority of the respondents answered that they had completed secondary education or equivalent (51.3%), 42.1% had higher education, 5.0% had completed the 3rd cycle and 1.6% had qualifications below the 3rd cycle. Regarding household income level, 141 respondents answered that they have an income less than 705 euros, 62.2% have an income between 705 and 2115 euros, 12.8% between 2116 and 3525 euros and only 4.7% have an income greater than 3525 euros. Most households (57.5%) included 3 (27.7%) or 4 people (29.6%) and about 26.9% of the respondents claim to live with major (2.0%) or some financial difficulties (24.9%), as shown in Table 2.

Table 2: Socioeconomic characterization of the sample

Variables	Groups	Frequencies	
		Absolute (n)	Relative (%)
Gender	Female	438	62.9
	Male	254	36.5
	Non-binary	4	0.6
Age	18 to 22	349	50.1
	23 to 27	89	12.8
	> 27	258	37.1
Marital status	Single	501	72.0
	Married/cohabitation	160	23.0
	Divorced/separated	29	4,2

	Widow	6	0,9
Education level	1st cycle	4	0.6
	2nd cycle	7	1.0
	3rd cycle	35	5.0
	Secondary education or equivalent	357	51.3
	Higher education	293	42.1
Household income level (euros)	< 705	141	20.3
	705 - 1410	261	37.5
	1411 - 2115	172	24.7
	2116 - 3525	89	12.8
	> 3525	33	4.7
Household size	1 person	92	13.2
	2 people	133	19.1
	3 people	193	27.7
	4 people	206	29.6
	> 4 people	72	10.3
Family financial comfort	I live with great financial difficulties	14	2.0
	I live with some financial difficulties	173	24.9
	I live in some financial comfort	432	62.1
	I live comfortably financially	77	11.1
Measures of central tendency and dispersion – age Mean = 28,9; Median = 22,0; Mode= 18; SD = 12,81; Minimum= 18; Maximum = 74			

Most participants (57.6%) lived in three specific districts from the North of Portugal, namely, Porto (26.1%), Bragança (18.4%) and Braga (13.1%), as shown in Figure 1. It is important to highlight that all districts of mainland Portugal, except Évora, were represented in the sample.

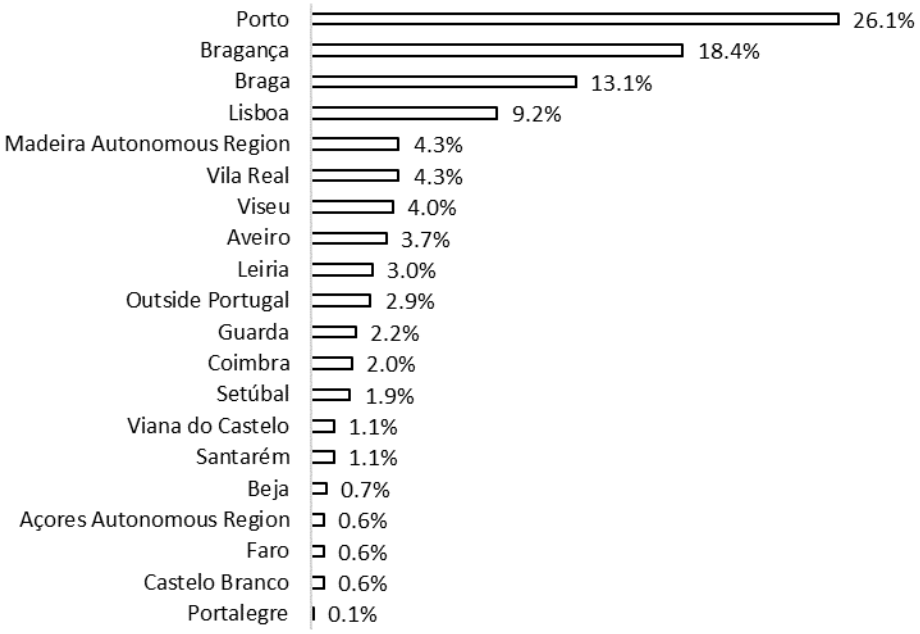

Fig 1. Respondents distributed by district of residence

The Cronbach's Alpha coefficient (α) values were satisfactory for all dimensions, indicating good internal consistency; varying between 0.7 and 0.8 for the dimensions "Knowledge of ecological issues", "Ecological purchasing habits" and "Conscientious purchase planning", and very good, with values greater than 0.9 for the dimensions "Interest in the ecological knowledge" and "Ecological attitude" (Table 3).

Table 3: Dimensions' level, mean ($\bar{x}$), standard deviation (SD) and Cronbach's Alpha (α)

Dimensions	$\bar{x}$	SD	Internal consistency		Level
			α	Classification	
Interest in the ecological knowledge	4.91	1.474	0.911	Very good	Above moderate
Knowledge of ecological issues	5.20	1.422	0.884	Good	Above moderate
Ecological purchasing habits	4.37	1.571	0.870	Good	Moderate
Conscious purchasing planning	5.28	1.336	0.878	Good	Above moderate
Ecological attitude	4.82	1.291	0.940	Very good	Above moderate

Legend: 1-3.44: Below moderate; 3.45-4.44: Moderate; 4.45-7: Above moderate

All correlations were found to be statistically significant at the 1% significance level and positive (Table 4). Values ranged from Rho = 0.504 for Knowledge of ecological issues and "Ecological purchasing habits", to Rho = 0 .920 for "Ecological attitude" and "Ecological purchasing habits". Interest in ecological knowledge proved to be moderately correlated with Knowledge of ecological issues (Rho = 0.555), Ecological purchasing habits (Rho = 0.663), Conscious purchase planning (Rho = 0.565) and Ecological attitude (Rho = 0.699) dimensions. Knowledge of ecological issues showed to be moderately correlated with Ecological purchasing habits (Rho = 0.504), Conscious purchasing planning (Rho = 0.505) and Ecological attitude (Rho = 0.554). On the other hand, Conscious purchasing planning registered moderate correlations with Ecological purchasing habits (Rho = 0.540), Knowledge of ecological issues (Rho = 0.505) and Interest in the ecological knowledge (Rho = 0.565). Finally, strong correlations (> 0.7) were recorded between Ecological purchasing habits and Ecological attitude (Rho = 0.920) and between Conscious purchasing planning and Ecological attitude (Rho = 0.810) (Table 4). These findings, that is, moderate and strong high correlations indicated the adoption of a greener ecological attitude by the consumer.

Table 4: Correlations between the dimensions of the ecological attitude

Dimensions	Statistics	(1)	(2)	(3)	(4)	(5)
(1) Interest in the ecological knowledge	Rho p-value	1 -				
(2) Knowledge of ecological issues	Rho p-value	0,555* 0,000	1 -			
(3) Ecological purchasing habits	Rho p-value	0,663* 0,000	0,504* 0,000	1 -		
(4) Conscious purchasing planning	Rho p-value	0,565* 0,000	0,505* 0,000	0,540* 0,000	1 -	
(5) Ecological attitude	Rho p-value	0,699* 0,000	0,554* 0,000	0,920* 0,000	0,810* 0,000	1 -

** The correlation is significant at 0.01 significance level.*

In the estimated regression models, all F tests present statistically significant values, confirming the suitability of the model to describe part of the association between the independent variables and the dependent variable (Table 5).

Taking into account the dependent variable "Ecological purchasing habits (Y_1)" (Model A), the statistically significant explanatory variables were "Interest in ecological knowledge (X_1)", "Knowledge of ecological issues (X_2)", "Age (X_4)" and "Household income (X_6)". All variables show positive correlations, with the exception of the "Household income level" variable. This means that the household's income level varies in the opposite direction of ecological purchasing habits. However, the greater the interest in ecological knowledge, and the level of knowledge about ecological issues, the greater the habit of making ecological purchases. In addition, older respondents are the ones who have more conscious purchasing habits. In this model, 57.6% of the total variation in ecological purchasing habits is explained by the independent variables (Table 5). In Model B, whose dependent variable is "Conscientious purchase planning (Y_2)", the statistically significant independent variables were "Interest in ecological knowledge (X_1)" and "Knowledge of ecological issues (X_2)". In this model, interest in ecological issues and knowledge of ecological issues account for 54.3% of conscious purchasing planning (Table 5).

Finally, Model C, which has "Ecological attitude (Y_3)" as a dependent variable, the statistically significant variables that explain 64.5% of the variance of the dependent variable were "Interest in ecological knowledge (X_1)", "Knowledge of ecological issues (X_2)" and "Age (X_4)", as shown in Table 5. According to the results (Table 5), all models show as predictors, "Interest in ecological knowledge (X_1)" and "Knowledge of ecological issues (X_2)". On the other hand, of the three models presented, Model C has the highest explained variance.

Table 5: Estimated multivariate regression models

Independent variables	Dependent variables		
	Ecological purchasing habits (Model A) (Y_1)	Conscious purchase planning (Model B) (Y_2)	Sustainable attitudes and behaviors (Model C) (Y_3)
Interest in the ecological knowledge (X_1)	0.616** (0.034)	0.363** (0.030)	0.480** (0.025)
Knowledge of ecological issues (X_2)	0.237** (0.035)	0.384** (0.031)	0.296** (0.026)
Gender (X_3)	0.155 (0.080)	-0.083 (0.070)	0.047 (0.060)
Age (X_4)	0.014** (0.003)	-0.002 (0.003)	0.007* (0.002)
Education level (X_5)	0.017 (0.058)	0.011 (0.052)	0.008 (0.044)
Household income level (X_6)	-0.087* (0.042)	0.008 (0.036)	-0.049 (0.031)
Household size (X_7)	-0.006 (0.033)	-0.027 (0.029)	0.006 (0.025)
Family financial comfort (X_8)	0.76 (0.067)	0.002 (0.059)	0.041 (0.051)
Constant	-0.531 (0.391)	1.673** (0.342)	0.599* (0.295)
N	684	685	690
R^2	0.576	0.543	0.645
$R^2_{Adjusted}$	0.571	0.538	0.640
F	114.822	100.64	154.555
p-value	0.000**	0.000**	0.000**
Tolerance	> 0.1	> 0.1	> 0.1
VIF	< 5	< 5	< 5

** Significant at 0.05 significance level.*
*** Significant at 0.01 significance level.*
Values between brackets are standard deviations.

Discussion

The present research explored the association between ecological purchasing habits, conscious purchasing planning, sustainable attitudes and behavior and consumers' ecological knowledge and interest. Three multivariate regression models were developed to analyze the influence of different factors on sustainable consumption choices. The results show that concern for the environment, knowledge about ecological issues, and household income level are the factors with the greatest impact on explaining ecological purchasing habits (Model A) and sustainable attitudes and behaviors (Model C). On the other hand, conscious purchasing planning (Model B) is more influenced by concern for the environment and not by gender. However, in general, in the literature, women's lifestyles are more ecologically and socially sustainable than men's in the western countries (Salonen et al., 2014). A research study developed by Lehikoinen and Salonen (2019) found that Finnish women were more aware of environmental issues. Other studies show a greater interest in sustainability by women than men (Panzone et al., 2016; Tobler et

al., 2011). Cooking and shopping continue to be done mainly by women, which may explain women's greater interest in food sustainability and sustainable consumption (García-González et al., 2020).

Other socioeconomic variables also show some significant associations with the dependent variables. For example, age (X_4) seems to be an important factor to explain ecological purchasing habits (Model A) and sustainable attitudes and behaviors (Model C), but it does not present a significant association with the conscious purchasing planning (Model B). Research suggests that older people lead more sustainable ways of life than younger citizens (Salonen & Tast, 2013). The literature indicates that age and education level are differentiating factors of responsible pro-environmental behavior (Diamantopoulos et al., 2003; Rokka & Uusitalo, 2008). The lower interest in sustainable food among the younger group may be due to this group's low responsibility for cooking and household purchases (Achón et al., 2017; García-González et al., 2018), or to a lower interest in sustainability. This result is interesting and somewhat controversial, since other research studies show a greater concern about the environment and food sustainability in the younger population (Azzurra et al., 2019; Bollani et al., 2019; Vermeir & Verbeke, 2006). Likewise, household income level (X_6) shows a negative and significant association with ecological purchasing habits (Model A), but does not show a significant association with the other dependent variables, which may suggest that, with regard to sustainable behaviors, knowledge and environmental awareness are more important than economic factors.

Model A, which explores the association between ecological purchasing habits and interest in ecological knowledge and conscious purchase planning, finds results consistent with other research studies that indicate knowledge as an important factor in the adoption of ecological behaviors (Chan, 2001; Mostafa, 2007). Furthermore, the literature suggests that ecological consumption habits are influenced by attitudes towards the environment (Yadav & Pathak, 2016; Nilsson et al., 2016). The results of the research conducted by Khan et al. (2020) indicate that both knowledge and attitude have a considerable and positive impact on consumers' ecological behaviors. This model showed that ecological purchasing habits are positively associated with the interest in ecological knowledge and knowledge of ecological issues. This can be explained by the fact that individuals who are more aware of ecological issues tend to be more likely to buy ecological products and support sustainable practices (Barr & Gilg, 2006; de Sio et al., 2022).

Model B, which analyzes the association between conscious purchasing planning and knowledge and attitudes towards sustainability, is also supported by previous research that highlights the importance of attitudes in the adoption of sustainable behaviors (Botonaki et al., 2006; Testa et al., 2021). Conscious purchasing planning involves considering the environmental implications of products before they are purchased. The results show that consumers who plan their purchases are more likely to adopt sustainable behaviors. Planning purchases can lead to a reduction in excessive consumption, which is one of the main causes of negative environmental impacts (Janssens et al., 2019). Adopting environmentally friendly food consumption behaviors, such as choosing products that have been manufactured in an ecological way, represents a viable way forward for sustainable development (Thøgersen, 2010; Argyropoulos et al., 2013).

Model C shows that sustainable attitudes and behaviors can be influenced by consumers' interest and ecological knowledge (Liu et al., 2020). That is, individuals who are more aware of environmental issues tend to have more favorable attitudes towards sustainable practices and to adopt more ecological behaviors (Gram-Hanssen, 2010; Bratu, 2017). Knowledge can be a powerful behavior change technique when adapted to the entire purchasing process, including planning, executing and thinking through consumers' food purchases. Understanding food purchases as a set of behaviors that interact over time can help design more effective information-based behavior change interventions (Ran et al., 2022).

Conclusion

In this research, the factors that influence ecological purchasing habits, conscious purchasing planning, and sustainable behavior were evaluated. The results obtained suggest that interest in ecological knowledge, knowledge of ecological issues, and age are important factors that influence these behaviors. The age of consumers can influence their purchasing habits and attitudes towards sustainability. Although, younger people show more knowledge and interest in ecological attitudes, it was found that this does not translate into behavior, with the older age group being more likely to value environmental and social issues in their purchasing decisions. Women tend to have greener purchasing habits and plan purchases more consciously than men, which may be related to greater participation in family tasks. However, in the present research, this association was not found in none of the three models. The association between household income level and financial comfort and consumers' ecological choices did not prove to be very strong. Furthermore, there appears to be no significant influence of household size on consumers' ecological purchasing decisions, suggesting that individual factors carry more weight than contextual ones. The promotion of educational strategies aimed at raising knowledge of environmental issues, especially among younger people, can be an important measure to encourage the adoption of sustainable behaviors.

Green consumers play a critical role in sustaining environmentally development into the future, helping to preserve the health of the planet and society. Studies suggest that changing food consumption patterns can have positive results for the human health and the climate. However, there is still much work to be done to understand and monitor eating behaviors. Improving environmental awareness, involvement in the consumption of sustainably produced food, as well as the conviction that each consumer plays an important role in protecting the environment can, in fact, promote the individual well-being and create value for the whole society. Therefore, it is important to find ways to guide consumers towards environmentally friendly food choices.

Finally, it is important to emphasize that, although the results of this research may be useful to guide public policies aimed at promoting sustainability, it is necessary to carry out additional research to deepen the knowledge about the factors that influence these behaviors and to identify more effective strategies to promote sustainability.

This research presents some limitations related to the sample nature. In fact, a non-probabilistic sample composed only by Portuguese individuals (residing in Portugal or abroad) was used not allowing the generalization of the results to the population. In addition, the sample was collected through an online survey, which may have excluded certain groups of the population. Also, the cross-sectional nature of the research gives a static image of the studied phenomenon.

For future research, a possibility is to carry out the study including other countries in order to verify whether the results obtained are consistent in different cultural contexts. The inclusion of other variables relevant to understand eco-friendly behaviors such as the availability of sustainable products, peer influence, and the accessibility and convenience of eco-purchasing behaviors could be another possibility. Finally, longitudinal research could provide a better understanding of the phenomenon over time.

This study presents significant contributions to the scientific literature in the field of sustainable consumption behavior, addressing different issues that have an impact on the adoption of more environmentally friendly consumption practices. One of the fundamental contributions of this study is to highlight the importance of ecological knowledge and environmental awareness in the adoption of ecological purchasing behaviors. By identifying this positive association, it reinforces the need for educational and awareness strategies aimed at improving consumers' knowledge of environmental issues, enabling the adoption of more sustainable behaviors. Another important contribution of this study is the specific contextualization in a given cultural, social and economic environment. This is important because

sustainable consumption choices can be influenced by specific contextual factors. In fact, this study fills a knowledge gap in this regard, providing valuable insights into the determinants of ecological purchasing behaviors, conscious purchasing planning and sustainable attitudes in Portugal. By considering the age of consumers, this study recognizes the importance of sociodemographic characteristics in promoting sustainable consumption. The results indicate that age plays a significant role in the adoption of ecological purchasing behaviors and sustainable attitudes. This suggests that differentiated approaches, adapted to different age groups, may be necessary to maximize the impact of sustainability promotion strategies. Finally, the contribution of this study to the literature is reinforced by the confirmation and expansion of existing knowledge. By aligning with previous studies and providing consistent empirical evidence, the scientific foundation on sustainable consumption behavior is strengthened. This, in turn, paves the way for future research and promotes continued advancement in this area of study.

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