The Impact of the Educational Level on the Adoption of Pro-Environmental Behaviors

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Abstract: - This quantitative research aims to identify whether there is a correlation between the education level of consumers and their environmental attitudes and behavior. The sample test involved 2,687 Greek consumers aged between 18 to 29 years. The non-parametric Kruskal Wallis test to investigate possible differences in the environmental awareness of the survey participants about their educational level showed that consumers with a higher level of education are more likely to be aware of environmental protection issues, which is reflected in their daily habits. Our findings suggest that a further increase in the supply of education can improve current environmental problems, not only in Greece, but also globally.

Key-Words: - Level of education, pro-environmental behavior, environmental awareness, protection of the environment, environmental impact, sustainable consumption.

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1 Introduction

Consumerism is very much embedded in human cultures and demonstrates a great capacity to redefine itself and constantly adapt to new social and economic conditions, so sometimes it is difficult to even recognize that it is a cultural construct, [1]. Consumerism, as an economic or, as mentioned above, cultural phenomenon that encourages the acquisition of goods and services in ever-increasing amounts, has a significant impact on the environment, [2]. The relentless pursuit of material goods leads to overproduction and overconsumption, resource depletion, pollution, climate change and loss of biodiversity, [3]. Industries must extract huge quantities of natural resources to meet consumer demands, often leading to deforestation, mining and other activities that disrupt ecosystems and contribute to climate change, [4]. In addition, the production, transport and disposal of consumer goods produce significant greenhouse gas emissions and waste, aggravating global environmental problems, [5]. Even household consumption has a significant contribution to climate change. In particular, household waste accounts for 3/4 of GHGs, with transport, housing and food accounting for the largest share, [6]. Underlying this consumer society is the dominant ethic of growth [7] or, alternatively, the myth of limitless economic growth [8], i.e. the belief that there can be a continuous increase in the production and consumption of goods and services. In response to the environmental impact of consumerism, there is a growing movement towards green or ethical or sustainable consumption, [9]. These concepts include making purchasing decisions that are not only economically sound but also environmentally friendly and socially responsible, [10]. Green consumption focuses on products and practices that reduce environmental harm, such as using

renewable energy, reducing waste, and minimizing carbon footprints, [11]. Ethical consumption emphasizes fair trade, humane working conditions and support for businesses that uphold social justice, [12]. Sustainable consumption takes into account basic needs and avoids overconsumption, focuses on protecting the environment and the ability to meet the needs of future generations, and promotes quality of life in relation to material living conditions, [13]. In view of all the above, it is clear that sustainable consumption involves and in many ways is identical to the related concepts of green and ethical consumption, [14].

Environmental awareness and consciousness are critical drivers of green, ethical and sustainable consumption, [15]. The term environmental awareness and consciousness includes understanding environmental issues, recognizing the impact of human activities on the environment, and engaging in actions and behaviors that support environmental sustainability, [16]. As consumers become better informed about the environmental and social impacts of their purchasing decisions, they are more likely to seek out and support sustainable products and practices, [17]. This behavior refers to green consumption, pro-environmental policy, alternatives to land use, activism and collectivism, [18]. Furthermore, this awareness is often cultivated through education, media and advocacy by environmental organizations, which highlight the consequences of unsustainable practices and promote alternatives, [19]. Increased environmental awareness can lead to behavioral changes such as reduced consumption, increased recycling and greater support for policies that protect the environment, [20]. As part of a deeper understanding of the link between consumer behavior and environmental sustainability, the aim of this research is to identify whether there is a correlation between consumers' level of education and their environmental attitudes and behavior.

2 Literature Review and Hypothesis Development

Several studies have shown that people with more years of education and study have more knowledge about the environment and tend to be better informed about environmental issues [21] since they have access to more sources and types of information, [22]. As a result, individuals with higher levels of education have a fuller understanding of complex environmental issues such as climate change and are therefore more involved in pro-environmental activities, [21], [23], [24]. In this context, a survey of a sample of 30.170 European citizens showed that individuals with higher levels of education tend to be more involved in climate change mitigation activities, [25].

Another survey of a sample of 728 Bulgarian residents [26], showed that people with higher levels of education exhibit higher levels of water saving and carbon reduction behavior. In terms of energy consumption, individuals with higher levels of education are more likely to use energy-saving devices identified as environment-friendly [27] and to own hybrid cars [28].

Researchers studied the levels of environmental attitudes and awareness of 326 residents in Ibadan, southwestern Nigeria based on their demographics, [29]. According to the results of their study, significant statistical differences were found between the different educational levels of the sample. More specifically, those with tertiary education, compared to those with secondary education, showed higher levels of: 1) knowledge about the environment and environmental issues, 2) concerns about the environmental impacts of their choices when consuming goods and services, 3) actions and habits that minimize environmental impacts, and 4) seeking information about environmental issues.

Another study [30] aimed to examine the impact of socio-demographic factors on the promotion of pro-environmental behaviors, attitudes and beliefs. To this end, the researchers used data from the database of a survey conducted in 2012 by the Centre for Sociological Research in Spain, with a sample of 2472 individuals. The results of this study showed that the higher the educational level of citizens, the more responsible purchases they make and the more they recycle.

There is another survey [31] that was aiming to attempt a holistic approach to the national recycling campaigns that took place in Malaysia in 1993 and 2000, regarding their effects on citizen participation and awareness. More specifically, a quantitative survey was conducted on a sample of 460 households in selected urban areas that have active recycling programs in the Federal Territory of Kuala Lumpur. The study identified the socio-economic characteristics of household and non-household recyclers and their levels of knowledge about recycling by applying discriminant function analysis. According to the findings, the profile of household recyclers is characterized by higher income earners, with higher educational backgrounds, with privately owned homes, who see recycling as a socially necessary norm. Non-

recyclers had lower income and educational backgrounds and were tenants in single-story houses, with little knowledge of recycling and its necessity. The study summarized the urgent need for a more strategic and targeted approach to recycling campaigns at the local level, taking into account the socio-economic background of the community, to enable more active participation in recycling at all levels.

A research [32] using a dataset of around 5000 households in 10 EU countries and Norway showed that higher educational attainment was associated with the adoption of energy-efficient technology and the use of energy-saving practices. Indeed, the reasons for adopting these technologies and practices are mainly for environmental reasons, such as greenhouse gas reduction, rather than economic reasons. The aim of a different analysis [33] was to investigate individual preferences regarding environmental protection and social and economic well-being. Using data from more than 1400 households in the Netherlands, the authors showed that individuals with a higher level of education are more willing to reduce their current standard of living to preserve the environment for future generations.

A study on a sample of 5,073 people in China [34] showed that there is a positive correlation between high educational level and environmental awareness and consciousness. In the same context, the aim of another research [35] was to identify a correlation between the education level of 8,710 Chinese residents in the year 2013 and their environmental behavior. The results of the research showed that higher levels of education and literacy lead to the improvement of individuals' environmental knowledge levels and therefore increase their awareness levels regarding environmental pollution issues, positively influencing their environmental behavior as reflected in their daily habits. The researchers concluded that a further increase in the supply of environmental education can improve China's current environmental problems.

In view of the above, it is clear that higher levels of education are associated with greater knowledge of environmental issues. Individuals with higher levels of education are more likely to be aware of the scientific and socioeconomic aspects of environmental problems such as climate change, pollution and biodiversity loss [36] as they have more opportunities to access information and resources on environmental issues through academic institutions, professional networks and digital platforms, [37]. At the same time, educational curricula at the higher education level often include content on sustainability and sustainable development, [38]. In addition, higher education develops critical thinking and problem-solving skills, allowing individuals to understand complex environmental issues and critically evaluate information from multiple sources, [39]. Higher-educated individuals tend to have stronger pro-environmental attitudes and behaviors, recognizing the importance of protecting the environment to achieve sustainability and supporting policies aimed at addressing environmental challenges, [40]. For example, individuals with higher levels of education are more likely to engage in recycling, bioavailability conservation efforts and sustainable consumption practices, [41], [42], [43]. Finally, individuals with a higher level of education are more involved in environmental advocacy organizations and environmental initiatives at the local level, [44].

Based on the above, the main hypothesis of this research is:
H1: Consumers with a higher level of education are more likely to be aware of issues related to environmental protection, which is reflected in their daily habits.

3 Research Methodology (Method)

2687 people (random sampling) aged between 18 and 29 (stratified sampling) participated in the present research. The criteria for participation in the research that were set and covered were: (1) Men and Women, aged over or equal to 18 years and up to 29 years, working or not, of all educational levels and (2) Ability to read Greek and connect to Internet.

The basic demographic characteristics of the participants are presented in Table 1 (Appendix). Of the total of 2,687 participants, the majority were women (62.3%, N=1674). The sample consists mainly of participants aged 18-21 years (59.7%, N=1604).

Regarding their professional status, 64.1% (N=1721) were students and private employees followed with a much lower percentage (15.5%, N=416). Regarding their educational level, it is noted that 70.7% (N=1899) of the participants have finished secondary education and 18.5% (N=18.5) have completed undergraduate studies.

The research data was collected through the Google Form platform, which provides a direct way to collect the questionnaires. Then, after the data collection process was completed, the first necessary

process was carried out, the coding of the variables in order to enter them into the STATA statistical program for further analysis. During the coding process, participant responses were checked to identify any incorrect entries, missing values as well as outliers. This step is necessary to ensure the accuracy and reliability of the data before applying the final analyses.

After creating an error-free coded data file, the first exploratory analysis of variables was performed through descriptive statistics. This analysis provides an illustration of the main characteristics of the sample as well as the remaining questions.

After the descriptive analysis, a non-parametric Kruskal Wallis test was performed to identify possible differences in the environmental consciousness of the research participants in relation to their educational level, in order to investigate the given research hypothesis. The specific control was chosen based on the nature of the data and the requirements of the research. In summary, the use of the Google Form platform to collect the sample as well as the use of the statistical program STATA for the analysis and interpretation of the data constitutes an integrated process for drawing the research conclusions.

4 Results

Survey participants were asked from which sources they had acquired knowledge about environmental issues and to what extent (from **Not at all**=1 to **Very much**=5). The results of their responses (Mean Value=MV and Standard Deviation=SD) are presented in Table 2 (Appendix), from which it follows that the internet (MT=3.99 & TA=0.95) is the source they most often choose for information regarding environmental issues followed by the family (MT=3.55 & TA=0.99), the school (MT=3.54 & TA=0.95), the media (MT=3.18 & TA=1 .01), books (MT=3.03 & TA=1.13) and other sources (MT=2.76 & TA=1.23).

Next, the survey participants were asked to provide answers regarding the frequency (ranging from Never=1 to Always=5) of specific activities and daily habits, which frame their environmental consciousness and awareness. The results of their responses (Mean Value=MV and Standard Deviation=SD) are presented in Table 3 (Appendix), which shows that the survey participants rarely leave the tap running while brushing their teeth (MV=4.13 & SD= 1.13) and whether in moderate frequency (sometimes) when they buy a product they take into account the pollution it causes to the environment (MV=3.45 & SD=1.12). Likewise, it follows from Table 3 (Appendix) that the sample with less than moderate frequency when shopping tries not to use plastic bags but paper or net (MV=2.69 & SD=1.23) and that separates the household waste for recycling (MV=2.39 & SD=1.30).

It was checked whether the distribution of the above questions concerning environmental consciousness and awareness per category of educational level follows the normal distribution. The normality factor was estimated using the Kolmogorov-Smirnov test. It emerged that none of the variables follow a normal distribution (p-value < 0.05), therefore non-parametric tests were used to assess their association. In appendix, Table 4, Table 5, Table 6 and Table 7 present the results of non-parametric Kruskal Wallis tests to investigate possible differences in participants' environmental awareness in relation to their educational level.

Statistically significant differences were observed concerning the question "*Do you leave the tap on while brushing your teeth*?" (Kruskal Wallis H=30.014, p <0.001), with participants who have completed secondary education stating that they never leave it on while brushing their teeth, while participants who have received a university degree (Median=5 vs Median =4, p=0.020), hold a master's/doctorate degree (Median=5 vs Median=4, p<0.001) or have done other studies (Median=5 vs Median=4, p=0.002) stated that they rarely leave the tap on (Table 4, Appendix).

Regarding the question "Do you separate your household waste for recycling?" statistically significant differences were observed in the responses of individuals depending on their educational level (Kruskal Wallis H=29.700, p-value <0.001). Participants who have completed secondary education separate household waste for recycling less often than participants who have obtained a university degree (Median=2 vs Median=2, p<0.001) or hold a master's/doctorate degree (Median=2 vs Median=2, p<0.001). Also, university degree holders (Median=2 vs Median=3, p=0.01) and masters/doctorate holders (Median=2 vs Median=3, p<0.001) separate their waste more often than those who have done other studies (Table 5, Appendix). In addition, statistically significant differences were also observed as regards the question "When you shop, do you try not to use plastic bags but paper or net?" (Kruskal Wallis H=25.289, p-value <0.001). Those who have completed secondary education are less likely to choose not to use plastic bags when shopping compared to participants who have obtained a university degree (Median=3 vs Median=2, p

<0.001) or hold a master's/doctorate degree (Median=3 vs Median=2, p=0.005).

Also, university degree holders (Median=2 vs Median=3, p=0.040) and masters/doctorate holders (Median=2 vs Median=3, p=0.040) use paper bags or net more often than those who have other studies (Table 6, Appendix). Finally, statistically significant differences were also found regarding the question "When you buy a product, do you take into account the pollution it causes to the environment?" (Kruskal Wallis H=56.735, p-value <0.001), as those who have completed secondary education are less likely to consider the environmental pollution caused by the product they purchased compared to participants who have obtained a university degree (Median=4 vs Median =3, p<0.001) or hold a master's/doctorate degree (Median=4 vs Median=3, p<0.001). Also, Masters/PhD holders are more likely to consider the environmental pollution that the product they buy may cause than those with other degrees (Median=3 vs Median=4, p=0.04) (Table 7, Appendix).

5 Conclusions

The present study addressed the possible relationship between the educational level and the environmental consciousness of individuals. The findings showed that people of higher education (holders of a bachelor's degree, master's degree or doctorate) appeared to be more aware of issues concerning the protection of the environment, which is reflected in their daily habits. Holders of higher degrees compared to participants who completed secondary education were more likely to recycle their household waste, avoid using plastic bags and use bags made from more environment-friendly materials such as paper or net finally take into consideration the pollution that a product they buy may cause.

In general, there is a well-documented positive correlation between educational level and environmental consciousness and awareness. Higher education equips individuals with the necessary knowledge, skills and values to understand and address environmental challenges, leading to more sustainable behaviors and greater support for environmental policies. It is becoming clear that promoting environmental education at all educational levels and encouraging lifelong learning can further strengthen this relationship, contributing to wider environmental sustainability efforts.

Declaration of Generative AI and AI-assisted Technologies in the Writing Process

The authors wrote, reviewed and edited the content as needed and they has/have not utilised artificial intelligence (AI) tools. The authors take full responsibility for the content of the publication.

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The authors equally contributed in the present research, at all stages from the formulation of the problem to the final findings and solution.

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Conflict of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

APPENDIX

Table 1. Demographic characteristics of respondents

	N	%
Sex		
Man	1013	37.7
Woman	1674	62.3
Age		
18-21	1604	59.7
22-25	509	18.9
26-29	574	21.4
Profession		
Public servant	133	4.9
Freelancer	158	5.9
Private employee	416	15.5
Student	1721	64.1
Unemployed	117	4.3
Other	142	5.3
Educational level		
Secondary education	1899	70.7
University Degree	496	18.5
Master's degree	132	4.9
PhD	17	0.6
Other	143	5.3

Table 2. Sources of knowledge regarding environmental issues

	MV	SD
From what sources have you acquired knowledge about environmental issues and to what extent?		
School	3.54	0.95
Family	3.55	0.99
Mass Media	3.18	1.01
Books	3.03	1.13
Internet	3.99	0.95
Other sources	2.76	1.23

Table 3. Activities and daily habits that frame environmental consciousness and awareness

	MV	SD
Do you leave the tap on while brushing your teeth?(*)	4.13	1.13
Do you separate your household waste for recycling?	2.39	1.30
When you shop do you try not to use plastic bags but paper or net?	2.69	1.23
When you buy a product do you Take into consideration the pollution it causes to the environment?	3.45	1.12

- Regarding the question¨: "*Do you leave the tap (faucet) on while brushing your teeth*?" the calculation of the **Mean Value** and the **Standard Deviation** was based on the following scale: Always=1 -Never=5.

Table 4. Kruskal Wallis test results for the evaluation of the question "Do you leave the tap (faucet) on while brushing your teeth?" in relation to educational level

	Educational level	N	Median (q1-q3)	Kruskal-Wallis	Hp
Do you leave the water	High school diploma	1899	5(4-5)	30.014	<0.001
Tap on while brushing	University Degree	496	4(3-5)		
Your teeth?	Master's/PhD holder	149	4(3-5)		
	Other	143	4(3-5)		

Table 5. Kruskal Wallis test results for the evaluation of the question "Do you separate your household waste for recycling?" in relation to educational level

	Educational level	N	Median (q1-q3)	Kruskal-Wallis	Hp
Do you separate your household waste					
For recycling?	High school diploma	1899	2(1-4)	29.700	<0.001
	University Degree	496	2(1-3)		
	Master's/PhD holder	149	2(1-3)		
	Other	143	3(1-4)		

Table 6. Kruskal Wallis test results for the evaluation of the question "When you shop, do you prefer to not use plastic bags but paper or net instead?" in relation to educational level

	Educational level	N	Median (q1-q3)	Kruskal-Wallis	Hp
When you shop do you Try not to use plastic bags but paper					
Or net?	High school diploma	1899	3(2-4)	25.289	<0.001
	University Degree	496	2(2-3)		
	Master's/PhD holder	149	2(2-3)		
	Other	143	3(2-4)		

Table 7. Kruskal Wallis test results for the evaluation of the question **"When you buy a product do you take into account the pollution it causes to the environment?"** in relation to educational level.

	Educational level	N	Median (q1-q3)	Kruskal-Wallis	Hp
When you buy a product	High school diploma	1899	4(3-4)	56.735	<0.001
Do you consider the	University Degree	496	3(2-4)		
Pollution it causes to the	Master's/PhD holder	149	3(2-4)		
Environment?	Other	143	4(3-4)		