

PRO-ENVIRONMENTAL ATTITUDES ACROSS DEMOGRAPHICS: A STUDY ON POLISH CONSUMERS

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Purpose: The paper aims to examine how demographic factors such as age, gender, place of residence, education, and income influence pro-environmental behaviors among Polish consumers. It seeks to understand the degree to which these variables affect individuals' environmental attitudes and their engagement in sustainable practices.

Design/methodology/approach: The study utilizes a quantitative approach based on data collected from an online survey conducted in 2023 with 551 Polish respondents. The survey included 32 variables measured on a five-point scale, focusing on different aspects of environmental attitudes and behaviors. Descriptive statistics and exploratory factor analysis were employed to identify key components that influence pro-environmental behavior.

Findings: The research reveals that higher education levels and female gender are significantly associated with stronger pro-environmental attitudes and behaviors. Age presents mixed results, with younger individuals showing more concern for the environment while older respondents are more likely to engage in specific actions like recycling. Additionally, place of residence and income also influence environmental behavior, with urban residents and higher-income individuals generally exhibiting greater environmental awareness and support for environmental policies.

Research limitations/implications: The reliance on self-reported data from an online survey may introduce biases, as respondents might overstate their pro-environmental behaviors and attitudes. The sample of 551 respondents may not fully represent the broader Polish population, which limits the generalizability of the findings. Furthermore, the cross-sectional nature of the study provides only a snapshot of behaviors and attitudes at a single point in time, without accounting for potential changes over time.

Practical implications: Policymakers and businesses can tailor their environmental strategies and campaigns to target specific demographic groups, to more effectively promote sustainable consumer behavior in Poland.

Originality/value: The paper provides a detailed examination of how specific demographic factors uniquely influence pro-environmental behavior among Polish consumers, providing insights that can enhance the effectiveness of targeted environmental policies and initiatives.

Keywords: consumer behavior, green consumption, environmentally friendly products, pro-environmental attitudes.

Category of the paper: JEL: M31.

1. Introduction

Climate change is an issue of global importance. It is one of the most important collective action problems of our time. There is no doubt that changes in human behavior are necessary (Oskamp, 2000; Saunders, 2003). Consumers have an undeniable role to play when it comes to achieving the sustainable development of a country in the long term. Research suggests that between thirty and forty percent of environmental degradation can be attributed to household consumption activities (Nair, 2015). Consumers are becoming increasingly aware of this fact and are showing concern about environmental degradation. Consumers are increasingly aware of the negative aspects of their consumption behaviors. When making purchasing decisions, they are more frequently considering the consequences these actions will have on people and the environment, both now and in the future (Paul et al., 2016; Carman, Cheng, 2016; Mostafa, 2006; Yang et al., 2015).

People have very different attitudes to environmental issues. While some people approach the environment with a practical mindset, others focus on environmental sustainability and maintaining an ecological balance. Environmental awareness and environmentally friendly behavior are influenced by many factors. There are numerous studies that look at the determinants of pro-environmental habits and examine the various factors that contribute to pro-environmental habits (e.g. Liu et al., 2017; Eze, 2020; Suki, Suki, 2015; Paul et al., 2016; Laroche et al., 2001). Trying to fully explain the differences in environmental awareness and pro-environmental behavior is an extremely complex undertaking. The aim of the article was to assess the differences in attitudes towards the environmental issues and pro-ecological behaviors of Polish consumers, depending on gender, age, place of residence and education level of the respondents.

2. Literature review

There are different types of factors that influence environmentally friendly behavior. This situation leads to a variety of theories to explain or predict which variables are particularly important. Various factors play a role in shaping an individual's pro-environmental behavior, whether positive or negative (Bamberg, Moser, 2007). Demographic factors (gender, age, education) and external factors such as social, economic, cultural and institutional factors are

very important. However, motivation, awareness, values, attitudes, emotions, environmental knowledge, responsibility and priority are also important factors (Kollmuss, Agyeman, 2002). Although specific results vary, many studies have shown that demographic characteristics (e.g., gender, age, and education) have a significant impact on people's pro-environmental behaviors, including environmentally friendly purchases (Xu, Li, Chi, 2021; Gong, Lei, 2007; Hong, Xiao, 2007; Chen et al., 2011; Zhang, 2016). Research indicates that the majority of environmentally conscious consumers are women, aged between 30 and 44, with a strong educational background, residing in households with a significant annual income (Pinto et al., 2014).

Age

Age is a frequently used demographic variable in many studies and analyses. Age is becoming one of the fundamental demographic factors influencing consumers' proecological behavior and purchasing decisions (Kiezel, Piotrowski, Wiechoczek, 2019). Although there are theoretical reasons to believe that young people are more concerned about the environment (Straughan, Roberts, 1999), the research findings are somewhat ambiguous. Most studies show that younger people report caring more about the environment than older people. Significant correlations have been observed, with concern for the environment being positively associated with age (Hirsh, 2010). Young people are more likely to support policies aimed at preventing future losses than older adults. Chan (1996) found that younger respondents in Canada were more likely to make environmentally conscious purchases.

However, some other studies (Gilg, Barr, Ford, 2005; Swami et al., 2011; Pinto et al., 2011) conclude that older people exhibit more environmentally friendly behavior than younger people. According to Gifford and Nilsson (2014), older people tend to prioritize environmental issues and show a stronger inclination towards various environmentally friendly actions, such as buying fair trade products and recycling.

Many studies have shown that age groups differ in terms of environmentally friendly behavior. And it is not possible to determine whether age influences consumers' pro-environmental behavior. Agoston et al. (2024) showed that eco-friendly clothing and the use of more environmentally friendly transportation are more prevalent among younger age groups, while older age groups show higher environmental awareness, recycling, lower meat consumption and boycott behavior. Young people are less likely than older people to recycle, use reusable bags, eat less meat and conserve water. According to the study by Xu, Li and Chi (2019), the younger and middle-aged groups tend to show higher levels of pro-environmental behavior in an organized setting, but less on an individual basis. The older group shows more pro-environmental behavior on an individual level. These results are consistent with previous research which found that older people enthusiastically participate in household recycling (Scott, 1999; Li, 2003).

However, it is worth mentioning, Gray et al. (2019) found little evidence that younger people are more concerned about declining environmental health. Similarly, no evidence was found that younger people are more inclined to support efforts to prevent future losses compared to older generations. Mehraj et al. (2023) study results show that age does not have a significant impact on young consumers' green consumer behavior.

Gender

The differences between men and women have an impact on their purchasing decisions and their environmentally friendly behavior. Many studies have found that gender has an impact on people's pro-environmental behavior. Women tend to report stronger environmental attitudes, concerns and behaviors than men (Xu, Li, Chi, 2019; Bronfman et al., 2015; Luchs, Mooradian, 2012; Scannell, Gifford, 2013; Tikka et al., 2000; Hirsh, 2010; Davidson, Freudenburg, 1996). Hunter et al. (2004) concluded that women are more committed to environmentally friendly behaviors such as recycling, buying organic products and reducing car use compared to men. According to Wang (2022), women are more interested in environmental issues, more likely to support measures to ban plastic, more positive about reducing plastic waste and more likely to take a reusable bag with them when shopping (reuse and recycle). Similar conclusions can be drawn from the study conducted on Polish women. They use reusable shopping bags significantly more often than men, try to avoid food waste, do not use single-use plastic products and buy organic products (Kieźel, Piotrowski, Wiechoczek, 2019).

Some scientists believe that personality mediates the effect of gender on sustainable consumer behavior. The feminine traits of "caring", "concern", "empathy" and "sensitivity" make women more likely to value environmental concerns (Nair, 2015; Luchs, Mooradian, 2012). Similar explanations assume that women, compared to men, are socialised to a greater extent to orient themselves towards others and to be socially responsible, which in turn can influence environmentally friendly behavior (Zelezny et al., 2000). Some scientist suggests that women are more likely to participate in pro-environmental activities behaviors due to the fact that women are traditionally more involved in household activities associated with environmental protection, such as purchasing detergents, cleaning, separating/recycling waste (Tindall et al., 2003; Gong, 2008; Li, 2011; Zhang, 2012).

There are many contradictory research findings in the literature on gender and green purchasing behavior. Some studies have found that gender has no influence on consumers' pro-environmental purchasing behavior (Zafer,2020; Suryawati et al., 2020; Mehraj et al., 2023; Akram et al., 2023).

Urban/rural domicile

Residents of rural areas experience the environment in a very different way to their urban counterparts; they are undoubtedly more in touch with nature. Research to date has provided contradictory answers.

Studies from numerous countries have produced contradictory results. Citizens in rural areas are often more in denial about climate change (Luebke, 2021) and less supportive of climate policy measures (Bonnie et al., 2020; Devine-Wright et al., 2015; Douenne, Fabre, 2020).

Urban–rural sprawl is a current global perspective as both developed and developing countries urbanize (Sivonen, 2023). It is uncertain whether there is a definitive link between place of residence and environmental attitudes, based on the current studies. A Swedish study found that residents of rural areas are less supportive of laws such as the carbon tax than urban residents (Ewald et al., 2021). This is also confirmed by researchers from the United States. Their study showed that rural residents are slightly less in favor of climate-related regulations than urban residents (Bonnie et al., 2020). Other studies have found that people living in rural areas are less concerned about environmental issues than citizens in urban areas. (Mustafa et al., 2019; Yu, 2014). In China, people living in larger cities were more likely to engage in pro-environmental behavior than people living in smaller cities (Chen et al., 2011).

Income

Consumers with higher incomes are more environmentally aware. The higher one's income, the greater the level of concern for the earth and the environment (Rawat, 2015). In addition, higher income reinforces pro-environmental behavior (Du, Cao, Huang, 2022). Many studies show that there is a positive and significant correlation between income level and green purchase behavior (Jain et al., 2023; Mehraj et al., 2023; Rawat, 2015). The logical explanation for this is that they can afford to bear the additional costs associated with greening products. The consumption of environmental goods is increasingly becoming an indicator of consumer status mainly because of their premium price (Dziewanowska, Kacprzak, 2013).

In turn, Xu, Li and Chi (2021) found that the personal monthly income is not statistically significant in relation to individual pro-environmental behaviors,

On the other hand, some studies (Akram et al., 2023; Binder, Blankenberg, Guardiola, 2020) have shown that individuals' income affects their pro-environmental behavior. This means that people in developing countries lead resource-intensive lifestyles as their income increases.

Educational level

There is a strong correlation between the level of education and pro-environmental behavior (Wang, 2022; Vicente, Marques, Reis 2021; De Silva, Pownall, 2014; Ivanova, Tranter, 2008).

A higher level of education leads to more environmentally friendly attitudes and behaviors and increases the willingness to pay for environmentally friendly products or environmental protection. The findings of Ivanova and Tranter (2008) emphasize the role of education in determining the extent to which individuals are willing to pay higher taxes for environmental protection. The higher the level of education, the more willing people are to pay higher taxes. A higher level of education increases the extent of pro-environmental behavior. Research by

Meyer (2015) has shown that education plays a role in making people more attentive to social welfare issues and more inclined to act in an environmentally friendly way. This means that education can lead to people being more aware of the external effects of their behavior and caring more about social well-being. A higher level of education is often associated with greater environmental awareness and knowledge. People with higher levels of education tend to be more aware of how their behavior affects the environment, making them more likely to take action to minimize negative environmental impacts. People with higher education tend not only to be more concerned about the environment, but also to participate in actions that promote and support policy decisions to protect the environment (Davis et al., 2011; Gelissen, 2007).

3. Research Design

The data were collected through an online research panel (Nationwide Research Panel Ariadna) with the usage of an online survey in 2023 on a total of 551 polish respondents. The dataset was created with IBM SPSS 27 (table 1).

Table 1.

Structure of the research sample

		N	%
Sex	Female	286	51.9
	Male	265	48.1
Age	up to 34 years	189	34.1
	35 to 54 years old	189	34.1
	55 years or older	176	31.8
Place of residence	Village	208	37.5
	City up to 99 thousand inhabitants	183	33.0
	City with 100 thousand inhabitants or more	163	29.4
Education	Elementary	215	38.8
	Secondary	197	35.6
	Post-secondary	142	25.6

Source: Own research.

The research procedure included the analysis of 32 variables, which were measured using a five-grade ordinal scale. Descriptive statistics regarding the studied variables are presented in the table 2.

Table 2.

Descriptive statistics of variables

Var.	Mean	Std. dev.	Var.	Mean	Std. dev.	Var.	Mean	Std. dev.
GEN1	3.17	1.10	CFLA3	3.52	1.06	BI2	3.27	1.11
GEN2	3.80	.85	ATT1	3.70	.98	BI3	3.37	1.12
GEN3	3.34	1.08	ATT2	3.81	.95	BI4	3.66	.98
EC1	3.84	1.02	ATT3	3.49	1.02	BSB1	3.28	1.28
EC2	3.92	1.02	WTP1	2.86	1.26	BSB2	3.45	.96
EC3	3.70	1.03	WTP2	2.78	1.27	BSB3	2.88	1.13

Cont. table 2.

CFCA1	3.79	.95	WTP3	2.75	1.29	BSB4	3.07	1.34
CFCA2	3.56	1.09	ENG1	3.05	1.15	COAL1	3.16	1.37
CFCA3	3.56	1.05	ENG2	3.10	1.17	COAL2	2.95	1.40
CFLA1	3.86	1.00	ENG3	2.97	1.19	COAL3	3.65	1.28
CFLA2	3.64	1.05	BI1	3.50	1.02			

Source: Own research.

The obtained results allow for the hierarchy of variables based on the mean value - the variables whose significance was rated the highest are: EC2 – the condition of the natural environment is deteriorating year by year ($\bar{x} = 3.92$), CFLA1 – manufacturers should be legally obliged to use recycled materials in the production or processing process ($\bar{x} = 3.86$), EC1 – I am concerned about the state of the natural environment ($\bar{x} = 3.84$), ATT2 – buying environmentally friendly products is a good idea ($\bar{x} = 3.81$), GEN2 – I care about future generations meeting their needs ($\bar{x} = 3.80$) and CFCA1 – serious changes in consumer behavior are necessary to protect the environment ($\bar{x} = 3.79$).

In turn, among the variables whose significance was rated the lowest, it is necessary to point out: ENG3 – I point out to my family/friends when I see that they consume products that are harmful to the environment ($\bar{x} = 2.97$), COAL2 – Poland should accelerate the phase-out of domestic coal mines ($\bar{x} = 2.95$), BSB3 – I limited my consumption for ecological reasons ($\bar{x} = 2.88$), WTP1 – I am willing to pay 10% more for my purchases to buy environmentally friendly products ($\bar{x} = 2.86$), WTP2 – I am willing to pay 10% more taxes if they were intended to prevent environmental pollution ($\bar{x} = 2.78$) and WTP3 – I am willing to pay 10% more for electricity if these additional fees were spent on investing in renewable energy sources ($\bar{x} = 2.75$).

In order to reduce a relatively large set of primary variables, the method of exploratory factor analysis was used. This allowed the identification of five new components, which included original variables whose factor loadings were not lower than 0.6. The results of the exploratory factor analysis are presented in Table 3.

Table 3.*Constructs and Items*

Component	Measurable variables	Factor loadings	Mean	St. dev.
COM1. Environmental Concern Level	EC1	0.717	3.84	.81
	EC2	0.749		
	EC3	0.726		
	CFCA1	0.750		
	CFCA2	0.639		
	CFCA3	0.647		
	CFLA1	0.652		
	CFLA2	0.644		
COM2. Green Influence Index	ENG1	0.728	3.13	.99
	ENG2	0.681		
	ENG3	0.725		
	BSB3	0.664		

Cont. table 3.

COM3. Eco Product Preference Index	ATT1	0.678	3.76	.83
	ATT2	0.686		
	ATT3	0.642		
	BI1	0.607		
	BI4	0.659		
COM4. Green Spending Readiness	WTP1	0.746	2.84	1.15
	WTP2	0.818		
	WTP3	0.813		
COM5. Coal Phase Out Support	COAL1	0.817	3.26	1.18
	COAL2	0.809		
	COAL3	0.752		

Source: Own research.

The results of the exploratory factor analysis allowed for the identification of five new components. The first component (COM1) – Environmental Concern Level includes variables related to consumer concern for the natural environment (EC), changes in consumer behavior to protect the environment (CFCA) and legal solutions obliging producers to protect the environment (CFLA). The second component (COM2) – Green Influence Index includes the consumer's involvement in promoting environmentally friendly products among friends (EC) and taking into account ecological motives in everyday shopping (BSB). The third component (COM3) – Eco Product Preference Index includes the consumer's attitude towards eco-purchases (ATT) and taking into account ecological aspects in purchasing decisions (BI). The fourth component (COM4) – Green Spending Readiness consists of variables defining the consumer's willingness to incur higher costs related to the purchase of eco products (WTP). The last, fifth component (COM5) – Coal Phase Out Support is the consumer's attitude reflecting Poland's resignation from coal (COAL).

The next step in the research procedure was to compare the importance of the identified components between the groups of surveyed respondents. First, the significance of the components was compared between groups of women and men – the results are presented in Table 4.

Table 4.

Assessment of pro-ecological attitudes depending on the sex of respondents

Component	Total average	Segment F M	t-test
COM1. Environmental Concern Level	3.84	3.95 ² > 3.73 ¹	3.22***
COM2. Green Influence Index	3.13	3.25 ² > 3.00 ¹	2.98***
COM3. Eco Product Preference Index	3.76	3.88 ² > 3.63 ¹	3.55***
COM4. Green Spending Readiness	2.84	2.88 ¹ ≈ 2.80 ¹	0.86
COM5. Coal Phase Out Support	3.26	3.28 ¹ ≈ 3.26 ¹	0.29

Sex: 'F' – female; 'M' – male
Significance levels (p values): ***p≤0.001, **p≤0.01, *p≤0.05

Source: Own research.

The analysis of the obtained results clearly indicates a greater importance of pro-ecological attitudes among women – the significance of the first three components is higher compared to their importance among men. In the case of components COM4 and COM5, their significance is similar in both groups.

In the next step of the research procedure, the importance of components regarding pro-ecological attitudes was compared among respondents of different ages – the results are presented in Table 5.

Table 5.

Assessment of pro-ecological attitudes depending on the age of respondents

Component	total average	segment			ANOVA
		<34	35-54	55+	
COM1. Environmental Concern Level	3.84	3.72 ¹	≈ 3.80 ¹	< 4.02 ²	7.02***
COM2. Green Influence Index	3.13	3.07 ¹	≈ 3.15 ¹	< 3.24 ²	2.55**
COM3. Eco Product Preference Index	3.76	3.60 ¹	≈ 3.73 ¹	< 3.96 ²	8.90***
COM4. Green Spending Readiness	2.84	2.76 ¹	≈ 2.80 ¹	≈ 2.97 ¹	1.63
COM5. Coal Phase Out Support	3.26	3.13 ¹	≈ 3.17 ¹	< 3.52 ²	6.06**

Age: '<34' – up to 34 years; '35-54' – 35 to 54 years old; '55+' – 55 years or older
Significance levels (p values): ***p≤0.001, **p≤0.01, *p≤0.05

Source: Own research.

The analysis of the obtained results indicates a greater importance of pro-ecological attitudes among the oldest group of respondents – this pattern can be observed for components COM1 – Environmental Concern Level, COM2 – Green Influence Index, COM3 – Eco Product Preference Index and COM5 – Coal Phase Out Support. For these components (COM1, COM2, COM3 and COM5) the role of the analysed attitudes is at a similar level (without statistically significant differences) in the groups of respondents up to 54 years of age. In contrast, the importance of COM4 – Green Spending Readiness is comparable across all groups of respondents.

The comparison of the importance of components regarding pro-ecological attitudes among respondents living in localities with different population sizes is presented in Table 6.

Table 6.

Assessment of pro-ecological attitudes depending on the respondents' place of residence

Component	total average	segment			ANOVA
		V	C<99	C100+	
COM1. Environmental Concern Level	3.84	3.79 ¹	≈ 3.81 ¹	≈ 3.95 ¹	2.12
COM2. Green Influence Index	3.13	3.15 ¹	≈ 3.15 ¹	≈ 3.08 ¹	0.30
COM3. Eco Product Preference Index	3.76	3.73 ¹	≈ 3.73 ¹	≈ 3.82 ¹	0.61
COM4. Green Spending Readiness	2.84	2.80 ¹	≈ 2.90 ¹	≈ 2.82 ¹	0.43
COM5. Coal Phase Out Support	3.26	3.13 ¹	≈ 3.15 ¹	< 3.57 ²	8.19***

Place of residence: 'V' – village; 'C<99' – city up to 99 thousand inhabitants; 'C100+' – city 100 thousand inhabitants or more
Significance levels (p values): ***p≤0.001, **p≤0.01, *p≤0.05

Source: Own research.

The analysis of the results presented in Table 6 indicates minimal variation in pro-ecological attitudes based on the respondents' place of residence – only in the case of COM5 – Coal Phase Out Support is a statistically higher significance identified among people living in cities with 100 thousand inhabitants or more. For the remaining components (COM1-COM4), their significance was assessed at similar levels (without statistically significant differences).

The final step of the research procedure is the comparison of the importance of pro-environmental attitudes among respondents with different levels of education - the results are presented in Table 7.

Table 7.

Assessment of pro-ecological attitudes depending on the education of respondents

Component	total average	segment B M H	ANOVA
COM1. Environmental Concern Level	3.84	3.77 ¹ ≈ 3.82 ¹ < 3.99 ²	3.39*
COM2. Green Influence Index	3.13	3.10 ¹ ≈ 3.08 ¹ ≈ 3.24 ¹	1.27
COM3. Eco Product Preference Index	3.76	3.68 ¹ ≈ 3.71 ¹ < 3.93 ²	4.36*
COM4. Green Spending Readiness	2.84	2.89 ¹ ≈ 2.76 ¹ ≈ 2.87 ¹	0.76
COM5. Coal Phase Out Support	3.26	3.13 ¹ ≈ 3.27 ¹ < 3.47 ²	3.77*
Education: 'B' – basic; 'M' – medium; 'H' – higher Significance levels (p values): ***p≤0.001, **p≤0.01, *p≤0.05			

Source: Own research.

The final step of the research procedure was the comparison of the importance of pro-ecological attitudes among people with different levels of education. The obtained results allowed for the identification of three statistically significant differences – individuals with higher education exhibit greater importance of pro-ecological attitudes for COM1 – Environmental Concern Level, COM3 – Eco Product Preference Index, and COM5 – Coal Phase Out Support.

4. Discussion and future research directions

The exploratory factor analysis identified five key components that define pro-ecological attitudes: COM1 – Environmental Concern Level, COM2 – Green Influence Index, COM3 – Eco Product Preference Index, COM4 – Green Spending Readiness and COM5 – Coal Phase Out Support. The study found significant differences in these components based on gender, age, place of residence, and education level. Women and older respondents demonstrated higher pro-environmental attitudes, while higher education was associated with greater concern for environmental issues and support for eco-friendly initiatives.

Some future research directions could be studies to: observe changes in pro-ecological attitudes over time and assess the impact of educational and awareness campaigns; investigate the effectiveness of various interventions aimed at increasing pro-ecological behaviors,

especially among groups with lower current engagement; analyse the impact of policy changes on public attitudes and behaviors, particularly in relation to legal obligations for manufacturers and support for renewable energy investments and compare different cultural and national contexts to understand the universal versus context-specific factors influencing pro-ecological attitudes. By expanding research in these areas, a more comprehensive understanding of how to effectively promote pro-ecological attitudes and behaviors across diverse populations and contexts can be developed. This will support the creation of targeted interventions, policies, and educational programs that foster sustainable practices and environmental stewardship.

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References

1. Ágoston, C., Balázs, B., Mónus, F., Varga, A. (2024). Age differences and profiles in pro-environmental behavior and eco-emotions. *International Journal of Behavioral Development*, 48(2), 132-144. <https://doi.org/10.1177/01650254231222436>
2. Akram, F., Gill, A.R., Abrar ul Haq, M., Arshad, A., Malik, H.A.M. (2023). Barriers to Enduring Pro-Environmental Habits among Urban Residents. *Appl. Science*, 13, 2497. <https://doi.org/10.3390/app13042497>
3. Bamberg, S., Moser, G. (2007). Twenty Years after Hines, Hungerford, and Tomera: A New Meta-Analysis of Psycho-Social Determinants of Pro-Environmental Behavior. *Journal of Environmental Psychology*, 27, 14-25. <http://dx.doi.org/10.1016/j.jenvp.2006.12.002>
4. Binder, M., Blankenberg, A.-K., Guardiola, J. (2020). Does it have to be a sacrifice? Different notions of the good life, pro-environmental behavior and their heterogeneous impact on well-being. *Ecol. Econ.*, 167, 106448
5. Bonnie, R., Diamond, E.P., Rowe, E. (2020). *Understanding rural attitudes toward the environment and conservation in America*. Durham: Duke University - Nicholas School of the Environment. Available at: <https://www.landcan.org/pdfs/understanding-rural-attitudes-toward-environment-conservation-america.pdf>

6. Bronfman, N.C., Cisternas, P.C., López-Vázquez, E., de la Maza, C., Oyanedel, J.C. (2015). Understanding Attitudes and Pro-Environmental Behaviors in a Chilean Community. *Sustainability*, vol. 7, 14133-14152; doi:10.3390/su71014133.
7. Carman, K.M.L., Cheng, E.W.L. (2016). Green purchase behavior of undergraduate students in Hong Kong. *The Social Science Journal*, 53(1), 67-76. <https://doi.org/10.1016/j.soscij.2015.11.003>
8. Chan, T.S. (1996). Concerns for environmental issues and consumer purchase preferences: A two country study. *Journal of International Consumer Marketing* vol. 9, no. 1, pp. 43-55.
9. Chen, X., Peterson, M.N., Hull, V., Lu, C., Lee, G.D., Hong, D., Liu, J. (2011). Effects of attitudinal and sociodemographic factors on pro-environmental behavior in urban China. *Environmental Conservation*, 38, 45-52. doi:10.1017/S037689291000086X.
10. Davidson, D., Freudenburg, W. (1996). Gender and environmental risk concerns: a review and analysis of available research. *Environment and Behavior*, 28(3), 302-339.
11. De Silva, D.G., Pownall, R.A.J. (2013). Going green: does it depend on education, gender or income? *Applied Economics*, 46(5), 573-586. <https://doi.org/10.1080/00036846.2013.857003>
12. Devine-Wright, P., Price, J., Leviston, Z. (2015). My country or my planet? Exploring the influence of multiple place attachments and ideological beliefs upon climate change attitudes and opinions. *Global Environmental Change*, 30, 68-79. <https://doi.org/10.1016/j.gloenvcha.2014.10.012>
13. Douenne, T., Fabre, A. (2020). French attitudes on climate change, carbon taxation and other climate policies. *Ecological Economics*, 169, <https://doi.org/10.1016/J.ECOLECON.2019.106496>
14. Du, S., Cao, G., Huang, J. (2022). The effect of income satisfaction on the relationship between income class and pro-environment behavior. *Applied Economics Letters*, 1-4. doi: 10.1080/13504851.2022.2125491
15. Dziwanowska, K., Kacprzak, A. (2013). Ekologiczna konsumpcja na pokaz. Analiza społecznych i marketingowych skutków kreowania „eko-ikon”. *Zeszyty Naukowe Uniwersytetu Szczecińskiego, No. 777, Problems Of Management, Finance And Marketing, No. 32*. Szczecin, Poland: Publishing House of Szczecin University, pp. 39-54, ISSN 1640-6818
16. Ewald, J., Sterner, T., Sterner, E. (2021). *Understanding the Resistance to Carbon Taxes: A Case Study of Sweden*. Washington, DC: Resources for the Future. Available at: https://media.rff.org/documents/WP_21-18_Ewald_et_al.pdf
17. Eze, E. (2020). Sociographic analysis of climate change awareness and proenvironmental behavior of secondary school teachers and students in Nsukka local government area of Enugu State, Nigeria. *International Research in Geographical and Environmental Education*, 29, 89-105. <https://doi.org/10.1080/10382046.2019.1657683>

18. Gifford, R., Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behavior: A review. *International Journal of Psychology*, doi:10.1002/ijop.12034
19. Gilg, A., Barr, S., Ford, N. (2005). Green consumption or sustainable lifestyles? Identifying the sustainable consumer. *Futures*, 37, 481-504. doi:10.1016/j.futures.2004.10.016.
20. Gong, W. (2008). A gender-based comparison of Chinese urban residents' environmentally friendly behaviors. *Collect. Women's Stud.*, 6, 11-17.
21. Gong, W., Lei, J. (2007). An analysis of gender difference in the environmental concern and environmentally friendly behaviors of Chinese urban residents, humanities & social sciences. *J. Hainan Unive.*, 340-345. doi: 10.15886/j.cnki.hnus.2007.03.018
22. Gray, S.G., Raimi, K.T., Wilson, R., Árvai, J. (2019). Will Millennials save the world? The effect of age and generational differences on environmental concern. *Journal of Environmental Management*, 242, 394-402. doi:10.1016/j.jenvman.2019.04.071
23. Hirsh, J.B. (2010). Personality and environmental concern. *Journal of Environmental Psychology*, 30(2), 245-248. doi:10.1016/j.jenvp.2010.01.004
24. Hong, D., Xiao, C. (2007). An analysis of gender difference in the environmental concern and environmentally friendly behaviors of Chinese urban residents—based on the research of GSS in 2003. *Human. Soc. Sci. J. Hainan Univ.*, 25, 340-345. doi: 10.19934/j.cnki.shxyj.2007.02.005
25. Hunter, L.M., Hatch, A., Johnson, A. (2004). Cross-National Gender Variation in Environmental Behaviors. *Soc. Sci. Q.*, vol. 85, pp. 677-694.
26. Ivanova, G., Tranter, B. (2008). Paying for Environmental Protection in a Cross-national Perspective. *Australian Journal of Political Science*, 43(2), 169-188. <https://doi.org/10.1080/10361140802035705>
27. Jain, V.K., Gupta, A., Verma, H., Anand, V.P. (2023). Embracing green consumerism: revisiting the antecedents of green purchase intention for millennials and moderating role of income and gender. *International Journal Of Sustainable Agricultural Management And Informatics*, doi: 10.1504/ij sami.2023.131887
28. Kieźel, M., Piotrowski, P., Wiechoczek, J. (2019). *Pro-ecological behaviors of Polish consumers*. Proceedings of 2nd International Conference on Research in Business, Management and Economics, 3 December 2019, Vienna, Austria, 101-116.
29. Kollmuss, A., Agyeman, J. (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239-260. <https://doi.org/10.1080/13504620220145401>
30. Krishna, Priya, B., Thenmozhi, S. (2021). Study on Self-efficacy and Pro-Environmental Behavior among School Students. doi: 10.25215/0902.184
31. Laroche, M., Bergeron, J., Barbaro-Forleo, G. (2001). Targeting consumers who are willing to pay more for environmentally friendly products. *Journal of Consumer Marketing*, 18(6), 503-520. <https://doi.org/10.1108/EUM0000000006155>

32. Li, D. (2011). On the role and contribution of women in environmental governance and sustainable development. *Fujian Tribune (Humanities and Social Sciences) 11*, 170-174.
33. Liu, W., Wang, X., Chen, Z. (2017). The consistency of rural residents' ecological consumption awareness and behavior based on the investigation of eco-civilization demonstration areas in Jiangxi Province. *Issues in Agricultural Economy*, 38, 37-49. <https://doi.org/10.13246/j.cnki.iae.2017.09.006>
34. Lübke, C. (2021). Socioeconomic roots of climate change denial and uncertainty among the European population. *European Sociological Review*. <https://doi.org/10.1093/ESR/JCAB035>
35. Luchs, M., Mooradian, T. (2012). Sex, personality, and sustainable consumer behavior: Elucidating the gender effect. *Journal of Consumer Policy*, 35, 127-144. doi:10.1007/s10603-011-9179-0.
36. Mehraj, D., Qureshi, I.H., Singh, G., Nazir, A., Nissa, V. (2023). Green marketing practices and green consumer behavior: Demographic differences among young consumers. *Business Strategy And Development*, doi: 10.1002/bsd2.263
37. Mostafa, M.M. (2006). Antecedents of Egyptian consumers' green purchase intentions: A hierarchical multivariate regression model. *Journal of International Consumer Marketing*, 19(2), 97-126.
38. Mustafa, G., Latif, I., Bashir, M. et al. (2019). Determinants of farmers' awareness of climate change. *Applied Environmental Education and Communication*, 18(3), 219-233.
39. Nair, P.B. (2015). Profiling Green Consumer Characteristics: An Eternal Quandary. *Journal Of Advanced Management Science*, Vol. 3, Iss. 2, pp. 174-178.
40. Oskamp, S. (2000). A sustainable future for humanity? How can psychology help? *American Psychologist*, 55(5), 496-508.
41. Paul, J., Modi, A., Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services*, 29, 123-134.
42. Pinto, D.C., Herter, M.M., Rossi, P., Borges, A. (2014). Going green for self or for others? Gender and identity salience effects on sustainable consumption. *International Journal of Consumer Studies*, vol. 38, pp. 540-549.
43. Pinto, D.C., Nique, W.M., Anana, E.d.S., Herter, M.M. (2011). Green consumer values: How do personal values influence environmentally responsible water consumption? *International Journal of Consumer Studies*, 35(2), 122-131. doi:10.1111/j.1470-6431.2010.00962.x.
44. Saunders, C. (2003). The emerging field of conservation psychology. *Human Ecology Review*, 10(2), 137-149.
45. Scannell, L., Gifford, R. (2013). The role of place attachment in receptivity to local and global climate change messages. *Environment and Behavior*, 45, 60-85.

46. Sivonen, J. (2023). Attitudes toward global and national climate policies in Finland – The significance of climate change risk perception and urban/rural-domicile. *GeoJournal* 88, 2247-2262, <https://doi.org/10.1007/s10708-022-10750-0>
47. Straughan, R.D., Roberts, J.A. (1999). Environmental segmentation alternatives: A look at green consumer behavior in the new millennium. *Journal of Consumer Marketing*, vol. 16, no. 6.
48. Suki, N.M., Suki, N.M. (2015). Consumption values and consumer environmental concern regarding green products. *International Journal of Sustainable Development & World Ecology*, 22(3), 269-278. <https://doi.org/10.1080/13504509.2015.1013074>
49. Surya, Rashmi, Rawat (2015). Impact of Age and Income Over Green Consumer Behavior. *Indian Journal Of Science And Technology*, 8, 13-22. doi: 10.17485/IJST/2015/V8IS4/60349
50. Suryawati., E, Lutfia, Zahra, Cholilawati (2020). The Understanding and Purchase Decision of Environmentally Friendly Products Based on Gender. *KnE Social Sciences*, doi:10.18502/KSS.V4I14.7928
51. Swami, V., Chamorro-Premuzic, T., Snelgar, R., Furnham, A. (2011). Personality, individual differences, and demographic antecedents of self-reported household waste management behaviors. *Journal of Environmental Psychology*, 31, 21-26. doi:10.1016/j.jenvp.2010.08.001.
52. Tikka, P.M., Kuitnen, M.T., Tynys, S.M. (2000). Effects of educational background on students' attitudes, activity levels, and knowledge concerning the environment. *Journal of Environmental Education*, 31(3), 12-19.
53. Tindall, D.B., Davies, S., Mauboules, C. (2003). Activism and conservation behavior in an environmental movement: the contradictory effects of gender. *Soc. Nat. Resour.*, 16, 909-932. doi: 10.1080/716100620
54. Vicente, P., Marques, C., Reis, E. (2021). Willingness to Pay for Environmental Quality: The Effects of Pro-Environmental Behavior, Perceived Behavior Control, Environmental Activism, and Educational Level. *Sage Open*, 11(4). <https://doi.org/10.1177/21582440211025256>
55. Wang, B. (2022). Is Female a More Pro-Environmental Gender? Evidence from China. *International Journal of Environmental Research and Public Health*, 19(13), 8002-8002. doi: 10.3390/ijerph19138002
56. Xu, Y., Li, W., Chi, S. (2021) Altruism, Environmental Concerns, and Pro-environmental Behaviors of Urban Residents: A Case Study in a Typical Chinese City. *Front. Psychol.* 12, 643759. doi: 10.3389/fpsyg.2021.643759
57. Yang, D., Lu, Y., Zhu, W., Su, C. (2015). Going green: How different advertising appeals impact green consumption behavior. *Journal of Business Research*, 68(12), 2663-2675. <https://doi.org/10.1016/j.jbusres.2015.04.004>

58. Yu, X. (2014). Is environment 'a city thing' in China? Rural-urban differences in environmental attitudes. *Journal of Environmental Psychology*. <https://doi.org/10.1016/j.jenvp.2013.12.009>
59. Zafer, Y. (2020). Green product consumption analysis: awareness, interest level and sensitivity of consumers. *Pamukkale University Journal of Social Sciences Institute*, doi: 10.30794/PAUSBED.687013
60. Zelezny, L.C., Chua, P.P., Aldrich, C. (2000). Elaborating on gender differences in environmentalism. *Journal of Social Issues*, 56, 443-457.
61. Zhang, L. (2012). Analysis on gender different of urban residents' participation in environmental protection. *J. Environ. Manage. Coll. China*, 22, 8-11.
62. Zhang, Y. (2016). An analysis of the multiple factors affecting the individual behavior of environmental protection. *Central China Normal Univ. J. Post graduates*, 2, 35-41.