

Article

Exploring the Associations Between Green Attitudes, Pro-Environmental Behaviours, and Organic Food Consumption Among Mothers of Young Children in Poland

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Abstract

Pro-environmental behaviours (PEBs) and organic food consumption (OFC) are key components of sustainable consumer practices. This study aimed to examine the associations between PEB, green attitudes (GAs), and OFC among Polish mothers of children under six years of age. A cross-sectional survey was conducted among 667 participants using a study-specific questionnaire. Data were analysed using descriptive and inferential statistical methods to assess associations between variables and differences across socio-demographic factors. The results indicate that respondents most frequently engaged in economically beneficial PEB, including reducing waste and conserving resources. Higher levels of PEB were observed among women aged 35 years and older, those with better self-reported financial status, and residents of large cities. PEB was significantly associated with OFC and GAs, indicating consistency between environmental attitudes and behaviours. Selected GAs were significantly associated with OFC, indicating that other factors beyond GAs may contribute to consumers' organic food choices. The findings suggest that PEB, GAs and OFC should be considered as components of a broader pattern of sustainable consumer behaviour rather than independent phenomena. These findings provide empirical evidence on the associations between these factors and may support the development of interventions promoting sustainable consumer practices.

Keywords: green attitudes; organic food consumption; sustainable consumption; environmental awareness; consumer behaviour



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1. Introduction

In the face of the accelerating climate crisis, addressing environmental challenges requires not only ambitious policy measures but also bottom-up initiatives and consumer engagement. It is estimated that consumers' purchasing decisions and behaviours significantly affect the environment, accounting for over 60% of global greenhouse gas (GHG) emissions and 50–80% of total land, material, and water use [1,2]. According to the latest Euromonitor International report (2024), more than 60% of global consumers strive to make a positive environmental impact, while nearly two-thirds express concern about climate change [3]. Consumers can mitigate their ecological footprint (EF) by engaging in pro-environmental behaviours (PEBs), such as conserving energy, using public transportation,

reducing waste, adopting eco-friendly/pro-environmental products and services, recycling, and pursuing more sustainable consumption patterns [4,5].

The EAT–Lancet Commission recommends transforming food systems by changing food consumption patterns, including shifting toward a healthy diet (the planetary health diet) and reducing food loss and waste. Such changes are expected to substantially reduce environmental pressures on the climate, biodiversity loss, water resources, and pollution [6]. According to the FAO and WHO, a sustainable diet should integrate health, socio-cultural, and environmental aspects and be characterised by a low environmental impact [7]. IFOAM—Organics International has long promoted the production and consumption of organic food as a model of sustainable development, emphasising that organic farming systems reduce greenhouse gas emissions and energy use through the elimination of synthetic fertilisers and the reliance on on-farm resources, while improving soil quality, enhancing biodiversity and carbon sequestration, and promoting social justice [8].

Shifting towards more sustainable dietary and consumption patterns is an important component of sustainability transitions. These processes can be explained within the framework of the Theory of Planned Behavior (TPB), which assumes that individual behaviour is influenced by attitudes, social norms, and perceived behavioural control. In line with this perspective, green attitudes (understood as proactive beliefs, values, and orientations aimed at protecting the natural environment) and environmental concern (the degree to which consumers perceive environmental issues as important) can influence green purchase intentions and translate them into actual pro-environmental purchasing behaviours [9–12]. Numerous studies indicate that consumers buy sustainable, organic products because they believe that their choices have pro-environmental and ethical implications [9,13–17]. This relationship is consistent with the assumptions of TPB, which link attitudes with behavioural outcomes. It should be noted that other studies have observed the phenomenon of the “green attitude–behaviour gap”, whereby consumers’ declarations of pro-environmental beliefs and concern for the natural environment do not always translate into pro-environmental behaviour (PEB) or sustainable consumption choices [18–24].

In Poland, numerous studies have examined the motivations behind organic food consumption (OFC), and all consistently indicate that the primary driver is the perceived positive impact on health rather than environmental concern [25–32]. However, the literature examining green attitudes (GAs), pro-environmental behaviours (PEBs), and their associations with organic food consumption (OFC) among Polish consumers was very limited before this study was conducted and has only recently become the subject of more intensive research in Poland [19,27,33–36]. This study contributes to the literature by addressing this research gap through the examination of pro-environmental behaviours (PEBs) and green attitudes (GAs) and their association with organic food consumption (OFC), based on actual behaviours rather than behavioural intentions, which have dominated previous research.

The study group represents a particularly relevant segment of organic food consumers [4,19,35,37,38]. Numerous studies indicate that women are more concerned about environmental issues than men [39–43]. Women’s political participation has been linked to more pro-environmental attitudes and policy orientations [44–46]. At the same time, women raising young children often have a higher food-related ecological footprint (EF) due to increased nutritional demands (approximately 20–25% higher energy intake during lactation) and higher requirements for food quality [41]. Households with children are generally more likely to waste food than those without [47,48]. In this context, it becomes crucial to explore mothers’ green attitudes (GAs) and pro-environmental behaviours (PEBs) as potential pathways toward more sustainable everyday practices. Beyond the Polish

context, this study also contributes to the broader literature on sustainable consumption by providing empirical evidence on whether environmental attitudes are reflected in actual pro-environmental behaviours and organic food consumption, thereby informing the ongoing debate on the attitude–behaviour associations.

1.1. Hypotheses

PEBs represent everyday actions aimed at reducing the negative environmental impact of human activity and are widely recognised as an important component of sustainable consumption. Likewise, OFC is considered an environmentally responsible practice because organic production contributes to biodiversity conservation, reduced use of synthetic inputs, and more sustainable food systems. Previous studies have shown that consumers with stronger pro-environmental attitudes and more sustainable practices are more likely to purchase organic food [25,26,32,49,50]. Therefore, the following hypothesis was formulated:

H1. *Pro-environmental behaviours (PEBs) are positively associated with organic food consumption (OFC).*

Green attitudes (GAs), understood as beliefs, values, and orientations supporting environmental protection, are considered an important predictor of sustainable consumption. Previous studies indicate that consumers with stronger green attitudes are more likely to purchase organic food [32,50–52]. Therefore, the following hypothesis was formulated:

H2. *Green attitudes (GAs) are positively associated with organic food consumption (OFC).*

According to the Theory of Planned Behavior, attitudes play an important role in shaping behaviour. Therefore, examining the associations between green attitudes and everyday pro-environmental behaviours provides an important basis for understanding sustainable consumer behaviour, including organic food consumption. Previous studies have reported positive associations between environmental attitudes and pro-environmental behaviours [4,5,32,40]. Therefore, the following hypothesis was formulated:

H3. *Green attitudes (GAs) are positively associated with pro-environmental behaviours (PEBs).*

1.2. Research Questions

While the hypotheses address the associations between the main constructs examined in this study, the exploratory research questions were formulated to provide additional descriptive and contextual information regarding respondents' pro-environmental behaviours, motivations, and sources of environmental knowledge. Together, they provide a more comprehensive understanding of sustainable consumption among the studied group of mothers of young children. The following research questions were formulated:

RQ1: What types of pro-environmental behaviours (PEBs) are most frequently undertaken by respondents?

RQ2: How do socio-demographic characteristics differentiate respondents' engagement in pro-environmental behaviours (PEBs)?

RQ3: What are the main motivations for environmental protection among respondents?

RQ4: What are the primary sources of environmental knowledge among respondents?

2. Materials and Methods

2.1. Study Design

This study was a part of the ‘BIO for Mother and Child’ educational and research project implemented by the Warsaw University of Life Sciences in Warsaw in 2020–2022. The participant recruitment process consisted of three stages:

(1) Stage I—Project-defined study area and target population. The project predefined both the geographical scope of this study (Mazowieckie, Lubelskie, and Podlaskie provinces) and the target population. For the purposes of the present study, the target population comprised mothers of children under six years of age residing in these provinces.

(2) Stage II—Invitation-based recruitment of childcare institutions (nurseries and kindergartens) located within the study area were invited to participate in the project. Invitations were broadly distributed among eligible institutions, and those that agreed to participate were included in this study.

(3) Stage III—Voluntary convenience sampling of participants; mothers attending the participating institutions were invited to take part in this study. Participation was voluntary and based on informed consent, and questionnaires were completed only by women who agreed to participate.

2.2. Data Collection

The survey was conducted between July 2020 and May 2021. The research tool was a questionnaire that was administered in two ways: (i) a printed version distributed in selected establishments (the PAPI method) (89% of respondents); (ii) an online version available on the project website (the CAWI method) (11% of respondents).

2.3. Study Sample

The target group of this study was adult mothers of children under 6 years of age, living in the Mazowieckie, Lubelskie, or Podlaskie provinces. A total of 1142 survey forms were correctly completed. Of the 1142 respondents, 674 women who were able to choose the correct description of organic food were selected for further analysis, and those who were unable to choose the correct answer were rejected. The authors considered it necessary to assess women’s consumption of organic food reliably. This is because women who do not fully understand what organic food is may have incorrectly assessed the proportion of organic food in their diets. In addition, 7 respondents with vocational and primary education were excluded from the sample of 674, as they represented a very small group that could not be included separately in the statistical analyses. Finally, 667 women were included in this study.

The majority of respondents were married/in a civil partnership (93%), had higher education (85%), and had good or very good financial status (85%). Most of them lived in small towns (10 k–100 k inhabitants) (41%), had one child under the age of 6 (58%) and lived in a four-person household (49%). Detailed characteristics of the study group are presented in Results.

2.4. Study Questionnaire

The questionnaire was extensive. This article presents analyses of three sections:

2.4.1. Frequency of Organic Food Consumption (OFC)

The assessment of organic food consumption (OFC) was based on participants’ self-reported intake frequency for individual food groups. Seventeen organic food groups were analysed: (1) bread, (2) cereal products, (3) milk, (4) dairy products, (5) eggs, (6) vegetables, (7) fruit, (8) vegetable and fruit products, (9) processed meats, (10) meat, (11) fish,

(12) legumes, (13) ready meals, (14) confectionery, (15) honey, (16) coffee and tea, and (17) alcoholic beverages. The frequency of daily consumption for each food group was quantified using the following scoring system: several times a day (2 points), once a day (1 point), several times a week (0.5 points), once a week (0.14 points), 1–3 times a month (0.06 points), and never (0 points). The scores for all food groups were summed to calculate an overall dietary score, and the total sum of points constituted the “OFC score”, ranging from 0 to 34. Results of 0 points were interpreted as a consumer without organic food consumption (NON OFC). Results from 0.01 to 8.49 points were interpreted as occasional OFC (OCC OFC), indicating an average OFC of less than once a week. Scores ranging from 8.5 to 34.0 points were interpreted as regular OFC (REG OFC), indicating an average frequency of consumption at least once a week. The threshold of 8.5 points was derived directly from the scoring system and corresponds to an average consumption frequency of the analysed organic food groups of at least once a week ($17 \text{ food groups} \times 0.5 \text{ point} = 8.5 \text{ points}$). More details on the development and interpretation of the OFC score are provided by Woś et al. [30]. Table 1 presents the characteristics of participants grouped by their reported frequency of organic food consumption (OFC).

Table 1. The characteristics of the study group based on the organic food consumption ($n = 667$).

Average Frequency of Organic Food Consumption (OFC)	Organic Food Consumer Category	Number of Respondents ($n = 667$)	Share of Respondents (%)
At least once a week	regular (REG OFC)	290	43.5
Several times a month but less than once a week	occasional (OCC OFC)	342	51.3
Never	non-consumer (NON OFC)	35	5.2

2.4.2. Frequency of Pro-Environmental Behaviours (PEBs)

Study-specific questionnaires were based on selected items included in the surveys of environmental awareness and behaviour of polish residents, which are regularly conducted by the Ministry of Climate and Environment of the Republic of Poland (MCE) [43,53,54].

Each respondent assessed the frequency of twelve pro-environmental behaviours (PEBs): (1) I try to buy products that have pro-environmental packaging (only necessary or recyclable packaging). (2) I pay attention to eco- and environment-related labels on product packaging. (3) I use reusable bags (e.g., fabric, linen). (4) I try to choose goods produced in my local area. (5) I walk short distances. (6) I crush packaging before throwing it in the trash. (7) I limit my paper consumption (e.g., I print or write on both sides of the paper). (8) I participate in pro-environmental campaigns and actions. (9) I reduce water consumption in my home. (10) I reduce electricity consumption in my home. (11) I reduce food waste in my home. (12) I choose pro-environmental solutions, even if it means additional costs. Each item was rated on a five-point scale: always (4 points), often (3), sometimes (2), rarely (1), and never (0). The total sum of points constituted the “PEB score,” ranging from 0 to 48. Higher scores indicated more frequent and diverse engagement in pro-environmental behaviours. The Cronbach’s alpha for the standardised positions was $\alpha = 0.778$, which indicates good internal consistency of the scale. An analysis of changes in the coefficient after removing individual positions did not reveal any significant improvements to the scale; consequently, the scale was left unchanged.

Respondents were also asked about their waste segregation practices (single-choice), the main barriers to waste separation, and methods for reducing water and energy consumption (multiple-choice). All questions were closed-ended.

2.4.3. Green Attitudes (GAs), Motivations and Sources of Knowledge

The assessment of respondents' green attitudes (GAs) was based on six questionnaire items: GA1: How important is environmental protection to you? GA2: To what extent do you consider yourself environmentally conscious? GA3: Were issues related to ecology and environmental protection addressed during your school education? GA4: How would you assess the current state of the natural environment in Poland? GA5: To what extent are you interested in the activities of environmental organisations, e.g., Greenpeace, Our Earth Foundation (Fundacja Nasza Ziemia)? GA6: How do you manage household waste? The remaining four questions were included to address the research questions by collecting descriptive information on respondents' environmental motivations and experiences: Do you consider it important to teach children about caring for the environment and pro-eco behaviours from an early age? Please indicate up to two reasons why you think it is important to protect the environment. In your opinion, on what does the state of the environment depend the most? Where do you usually get your information about environmental-related topics? All questions were closed-ended.

2.5. Statistical Analysis

The survey data were entered into an Excel spreadsheet and then processed—structured, verified, and cleaned. The data were coded and statistically analysed using SPSS Statistics software, version 28.0 (IBM Corp., Armonk, NY, USA). Since the data did not meet the assumptions of normality, nonparametric tests were applied for comparisons between two groups; the Mann–Whitney U test was performed, whereas comparisons involving more than two groups were conducted with the Kruskal–Wallis test, followed by appropriate post hoc analyses when significant differences were detected. Where statistical significance has been found in addition to p -values, effect sizes were calculated to evaluate the magnitude of observed differences. For Mann–Whitney U tests, the effect size r ($Z/\sqrt{N}$) was reported. For Kruskal–Wallis tests, epsilon squared (ϵ^2) was calculated. Spearman's rho was interpreted as both the correlation coefficient and the effect size. Results are presented as mean $\pm$ SD, median, and range. Associations between categorical variables were examined using the chi-square test of independence. As all components of the PEB scale were treated as equivalent, Cronbach's alpha was used to assess internal consistency. A p -value < 0.05 was considered statistically significant.

2.6. Ethics Statement

This study was conducted in accordance with the Declaration of Helsinki and approved by the local Ethics and Scientific Research on Humans Commission at the Institute of Human Nutrition Sciences of the Warsaw University of Life Sciences (approval no. 21/2020, 21 July 2020). All participants provided informed consent to participate in this study, and participation was voluntary and anonymous.

3. Results

3.1. The Types of Pro-Environmental Behaviour (PEB)

Results indicating the type and frequency of 12 PEBs undertaken by mothers of young children are presented in Table 2. The most common actions were using reusable bags (92% of respondents do so always or often), crushing packaging before throwing it away (91% do so always or often), and paying attention to reducing water consumption (89% do so always or often). The least frequently undertaken PEB was participation in pro-eco campaigns and actions (84% of respondents reported doing so rarely or never).

Table 2. The types of pro-environmental behaviours (PEBs) among mothers of young children ($n = 667$).

The Type of PEB:	Distribution of Respondents by Frequency of Reporting Analysed Type of PEB—Number (%) of Respondents				
	Always	Often	Sometimes	Rarely	Never
I try to buy products with pro-environmental packaging (only necessary or recyclable materials).	21 (3)	215 (32)	247 (37)	144 (22)	40 (6)
I pay attention to eco- and environment-related labels on product packaging.	17 (3)	195 (29)	245 (37)	167 (25)	43 (6)
I use reusable bags (e.g., fabric, linen).	309 (46)	306 (46)	36 (5)	14 (2)	2 (0)
I try to choose goods produced locally.	33 (5)	263 (39)	197 (30)	136 (20)	38 (6)
I walk short distances.	196 (29)	280 (42)	132 (20)	52 (8)	7 (1)
I crush packaging before throwing it away.	411 (62)	195 (29)	36 (5)	20 (3)	5 (1)
I limit my paper consumption (e.g., I print or write on both sides of the paper).	213 (32)	304 (46)	106 (16)	35 (5)	9 (1)
I participate in pro-environmental campaigns and actions.	3 (0)	31 (5)	78 (12)	218 (33)	337 (51)
I reduce water consumption in my home.	313 (47)	282 (42)	20 (3)	51 (8)	1 (0)
I reduce electricity consumption in my home.	313 (47)	271 (41)	31 (5)	52 (8)	0 (0)
I reduce food waste in my home.	99 (15)	342 (51)	89 (13)	122 (18)	15 (2)
I choose pro-environmental solutions, even if it means additional costs.	22 (3)	182 (27)	153 (23)	279 (42)	31 (5)

Bolded values are the most frequently selected answers by the respondents.

The survey also showed that 87% of respondents segregate waste regularly, 10% sporadically, and 3% throw everything into one bin. Segregation is hindered mainly by: lack of space at home (301 indications), lack of practical information on waste segregation (149), lack of appropriate containers in the surrounding area (97), household members' disbelief that waste will be reused (90), additional costs (75), unwillingness (74), lack of knowledge (61), and lack of time (51) (multiple answers were possible; responses do not sum to 667).

The most frequently indicated ways to reduce water use were: not running water while brushing teeth (597 indications), not washing dishes under running water (397), and taking showers instead of baths (457). To save energy, respondents most often mentioned turning off lights in unused rooms (573), using energy-saving bulbs (551), and buying energy-efficient appliances (360) (multiple answers were possible; responses do not sum to 667).

3.2. Socio-Demographic Determinants of Pro-Environmental Behaviour

The median PEB score among respondents was 31 out of a maximum possible score of 48 (Table 3). The lowest recorded score was 4, and the highest was 45. Analysis of demographic factors indicated that PEB scores were higher among respondents with a better financial situation ($p = 0.006$) and among residents of the largest city (Warsaw) compared to those living in smaller towns ($p = 0.004$). Spearman's rank correlation revealed that PEB scores slightly increased with age ($p = 0.006$). Nevertheless, all statistically significant associations were characterised by negligible or small effect sizes. The Mann–Whitney U test confirmed significantly higher PEB scores among women aged 35 and above ($p = 0.015$). No statistically significant associations were found between PEB and education level, household size, or the number of children under six years of age.

Table 3. Pro-environmental behaviours (PEBs) of respondents depending on socio-demographic factors.

	Total (<i>n</i> = 667)	% of Total	PEB Scores [0–48]			<i>p</i> Values
			Mean ± SD	Median	Min–Max	
The entire study group	667	100	30.6 ± 5.8	31	4–45	
Age						
Under 35 years old	327	49	30.0 ± 6.1	30 a	4–44	0.015 (<i>r</i> = 0.094)
35 years old and more	340	51	31.2 ± 5.4	31 b	16–45	
Educational Level						
Secondary	103	15	29.7 ± 6.9	30	4–44	NS
Higher	564	85	30.8 ± 5.6	31	12–45	
Household Financial Situation						
Good and very good	571	85	30.9 ± 5.7	31 a	4–45	0.006 (<i>r</i> = 0.106)
Average, bad and very bad	96	15	29.2 ± 6.2	29 b	16–44	
Place of Residence						
City > 500,000 inhabitants (inhab.)	165	25	31.7 ± 6.3	32 a	4–44	0.044 * (ε^2 = 0.009)
City of 100,000–500,000 inhab.	118	18	30.4 ± 5.4	31	18–44	
City of 10,000–100,000 inhab.	270	41	30.2 ± 5.9	31 b	4–45	
Rural areas/towns ≤ 10,000 inhab.	114	17	30.3 ± 5.1	30	19–41	
Number of People in The Household						
2–3	205	31	30.2 ± 6.4	30	4–45	NS *
4	325	49	30.8 ± 5.4	31	4–44	
5 and more	137	21	30.8 ± 5.9	31	16–43	
Number of Young Children (Up To 6 Years Old) In The Household						
1	386	58	30.7 ± 6.0	31	4–45	NS
2 and more	281	42	30.6 ± 5.6	31	4–44	

Median values shown in bold and marked with different letters differ significantly statistically ($p < 0.05$); SD—standard deviation, NS—no statistically significant differences; the Mann–Whitney U test or * the Kruskal–Wallis test; effect sizes are reported only for statistically significant results: r ($Z/\sqrt{N}$) was used for the Mann–Whitney U test, and ϵ^2 was used for the Kruskal–Wallis test.

3.3. Association Between PEB and Organic Food Consumption (OFC)

As shown in Table 4, REG OFC had the highest PEB scores, significantly higher than OCC OFC and NON-OFC. Higher frequency of organic food consumption was associated with higher PEB scores, with a medium effect size ($p < 0.001$, $\epsilon^2 = 0.120$). The obtained results provide evidence to confirm the H1.

Table 4. Associations between pro-environmental behaviours (PEBs) and organic food consumption (OFC).

Consumer Type by Frequency of OFC	PEB Scores [0–48]			<i>p</i> Value
	Mean $\pm$ SD	Median	Min–Max	
NON OFC (<i>n</i> = 35)	27.1 $\pm$ 6.6	27 a	4–39	<0.001 (ϵ^2 = 0.120)
OCC OFC (<i>n</i> = 342)	29.1 $\pm$ 5.4	29 a	12–44	
REG OFC (<i>n</i> = 290)	32.8 $\pm$ 5.5	33 b	4–45	

Median values marked with different letters differ significantly statistically ($p < 0.05$); SD—standard deviation; the Kruskal–Wallis test and ϵ^2 were used for effect size calculation.

3.4. Association Between Green Attitudes and PEB or OFC

As shown in Table 5, most respondents demonstrated green attitudes (GAs): they considered environmental protection to be quite important (67%), rated themselves as moderately environmentally conscious (58%), reported that topics related to ecology and environmental protection were rarely discussed during their school education (65%), assessed the current state of the environment as poor (56%), were not very interested in the activities of environmental organisations (47%), and regularly sorted waste (87%).

Statistical analysis revealed that more frequent OFC and higher PEB scores were observed among respondents who agreed more strongly with selected GA statements, including expressing greater concern for environmental protection, higher declared environmental awareness, and greater interest in environmental organisations (Table 5). Respondents who had learned about ecology and environmental protection at school also achieved higher PEB scores. The findings partially support H2, indicating that selected dimensions of GAs were positively associated with OFC, whereas other analysed indicators showed no statistically significant relationship. The findings support H3, indicating that all analysed dimensions of green attitudes were significantly associated with pro-environmental behaviours.

Given the multidimensional nature of GAs and the number of statistically significant associations identified, Figure 1 provides a descriptive summary of the statistically significant associations identified between GAs, PEB, OFC, and selected socio-demographic factors, showing only the statistically significant associations observed in this study.

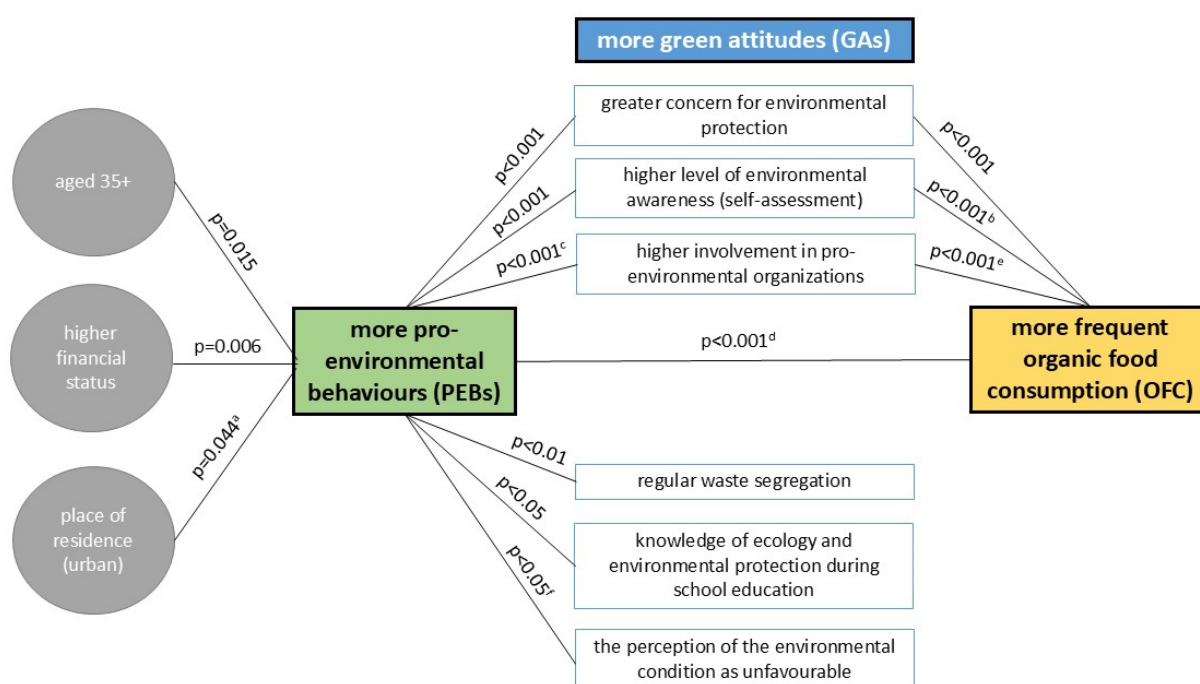


Figure 1. Descriptive representation of statistically significant associations between the analysed factors. Note: The figure provides a descriptive representation of the statistically significant associations identified in this study. It is intended solely to summarise the observed associations and should not be interpreted as a causal model. Statistically significant associations were observed between (a) residents of Warsaw (city > 500,000 inhabitants) and those living in cities with 10,000–100,000 inhabitants; (b) respondents with high environmental awareness and others; (c) respondents with low interest in environmental organisations and those not interested; (d) regular organic food consumers and others; (e) respondents highly interested in environmental organisations and the remaining respondents; and (f) respondents assessing the state of the environment as “poor” and those selecting “hard to say”.

Table 5. Associations between green attitudes (GAs) and organic food consumption (OFC) or pro-environmental behaviour (PEB).

GA Items	Response Options	All Respondents (<i>n</i> = 667)		OFC Scores [0–34]			<i>p</i> Values	PEB Scores [0–48]			<i>p</i> Values
		<i>n</i>	%	Mean ± SD	Median	Min–Max		Mean ± SD	Median	Min–Max	
How important is environmental protection to you?	Very important	176	26	3.8 ± 3.5	2.7 a	0–21.5	<0.001 ($\epsilon^2 = 0.052$)	33.6 ± 6	34 x	4–45	<0.001 ($\epsilon^2 = 0.139$)
	Quite important	445	67	2.6 ± 2.7	1.8 b	0–16.4		30.1 ± 5	30 y	12–41	
	Not important	46	7	1.5 ± 2.2	0.7 c	0–10.9		24.8 ± 6.1	25 z	4–44	
To what extent do you consider yourself environmentally conscious?	To a great extent	193	29	3.9 ± 3.2	3.0 a	0–13.8	<0.001 ($\epsilon^2 = 0.067$)	34.1 ± 5.0	35 x	20–45	<0.001 ($\epsilon^2 = 0.171$)
	To a moderate extent	385	58	2.4 ± 2.5	1.7 b	0–13.8		29.8 ± 5.2	30 y	12–44	
	To a small extent/not at all	89	13	2.3 ± 3.6	1.0 b	0–21.5		26.7 ± 6.2	27 z	4–39	
Were issues related to ecology and environmental protection addressed during your school education?	Yes, to a large extent	86	13	3.5 ± 3.8	2.1	0–21.5	NS	32.4 ± 5.8	33 x	4–44	<0.05 ($\epsilon^2 = 0.017$)
	Yes, but to a small extent	430	65	2.8 ± 2.8	1.9	0–16.4		30.7 ± 5.4	31 y	17–45	
	Not at all	151	22	2.7 ± 2.9	1.6	0–13.8		29.5 ± 6.7	30 y	4–44	
How would you assess the current state of the natural environment in Poland?	Rather good	153	23	3.3 ± 3.6	1.9	0–21.5	NS	30.8 ± 5.9	31	4–44	<0.05 ($\epsilon^2 = 0.007$)
	Rather poor	372	56	2.9 ± 2.9	2.0	0–16.4		31.0 ± 5.6	31 x	12–45	
	Hard to say	142	21	2.2 ± 2.1	1.5	0–11.5		29.5 ± 6.2	30 y	4–43	
To what extent are you interested in the activities of environmental organisations, e.g., Greenpeace, Our Earth Foundation (Fundacja Nasza Ziemia)?	I am interested to a large extent.	244	36	3.7 ± 3.2	2.8 a	0–14	<0.001 ($\epsilon^2 = 0.065$)	33.4 ± 5	34	19–44	<0.001 ($\epsilon^2 = 0.172$)
	I am interested to a small extent.	310	47	2.3 ± 2.4	1.5 b	0–12.6		30.0 ± 5.0	30 x	16–45	
	I am not interested at all.	113	17	2.4 ± 3.4	1.2 b	0–21.5		26.2 ± 6.5	26.5 y	4–39	
How do you manage household waste?	Regular waste segregation	579	87	2.9 ± 2.9	1.9	0–22	NS *	30.9 ± 5.7	31	0–45	<0.01 * ($r = 0.128$)
	Occasional or no waste segregation	88	13	2.8 ± 3.3	1.8	0–14		28.5 ± 6.2	29	4–40	

Median values shown in bold and marked with different letters differ significantly statistically ($p < 0.05$); SD—standard deviation, NS—no statistically significant differences; the Kruskal–Wallis test or * the Mann–Whitney U Wilcoxon test; effect sizes are reported only for statistically significant results: ϵ^2 was used for the Kruskal–Wallis test and r ($Z/\sqrt{N}$) was used for the Mann–Whitney U test.

3.5. Motivations and Environmental Awareness

Among the reasons considered most important for environmental protection, respondents most frequently cited concern for human health (398), nature as a value in itself (336), concern for future generations (300), and economic or cost-related considerations (39).

A vast majority of respondents (93.8%) stated that they considered it highly important to teach children to care for the environment and to develop pro-environmental behaviours from an early age. Only 4.5% regarded this as important to a small extent, and 1.7% had no opinion.

Respondents indicated that the factors having the greatest impact on the state of the environment were (multiple answers were possible; responses do not sum to 667): individual actions (258 indications), public recognition of environmental issues as important (135), effective legal regulations and their enforcement (105), governmental prioritisation of environmental protection (81), the country's financial situation (34), local authorities' activity (28), the amount of environmental information in the media (14), and corporate responsibility (10). Thirty-five respondents were unable to specify which factors were most influential.

Figure 2 presents the most frequently indicated sources of information about the natural environment (up to three responses could be selected): the internet (76% of respondents), television (56%), and documentary or nature films (39%).

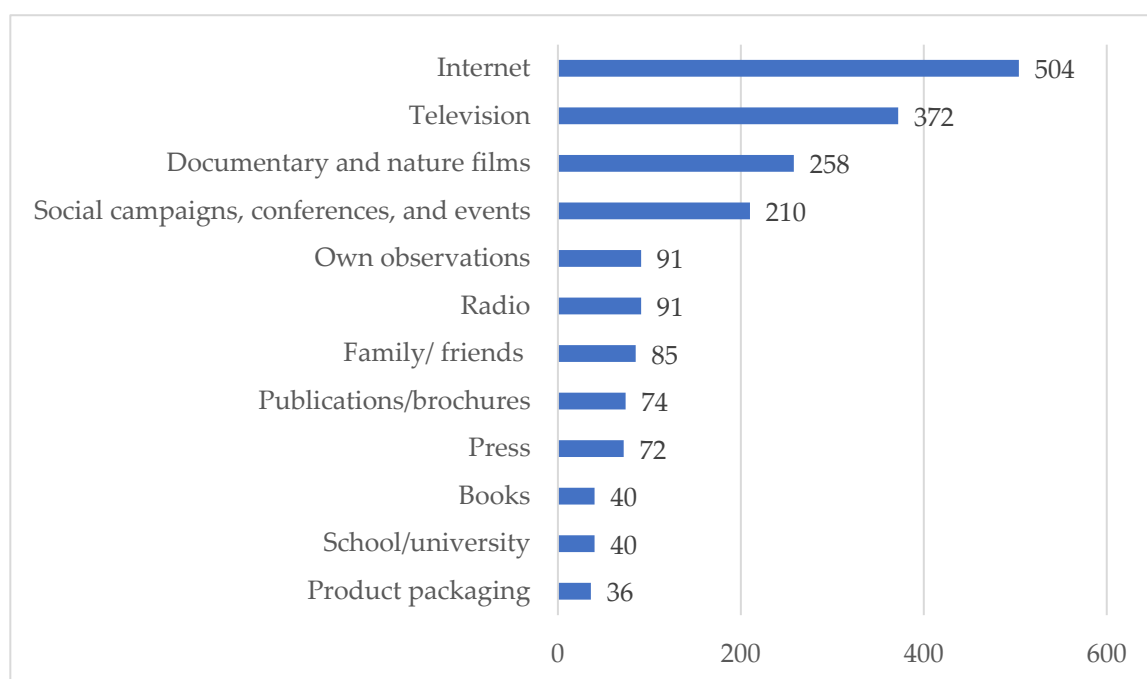


Figure 2. Sources of information about the natural environment. Note: Number of indications; up to three responses per respondent.

4. Discussion

The main objective of this study was to analyse PEB and OFC among Polish mothers of young children. The findings of this study provide sufficient evidence to support H1 regarding the association between PEB and OFC and H3 regarding the association between GAs and PEB. Whereas H2 was partially supported, indicating that the associations between GAs and OFC were dimension-specific rather than consistent across all indicators of GAs.

At the same time, the results addressing the research questions provide a broader context for interpreting the observed associations. They indicate that respondents most frequently engaged in simple, economically beneficial pro-environmental behaviours,

while environmental motivations were primarily driven by health and concern for future generations. The findings further show that socio-demographic characteristics and sources of environmental information contribute to understanding differences in pro-environmental engagement.

A key contribution of this study lies in its focus on actual behaviour rather than behavioural intentions. While previous studies have frequently examined behavioural intentions within the framework of the TPB, the present study examined associations between environmental attitudes, self-reported pro-environmental behaviours, and organic food consumption.

Although the present study was conducted in Poland, the findings contribute to the broader international discussion on sustainable consumer behaviour by providing evidence that environmental attitudes are positively associated with both everyday pro-environmental behaviours and organic food consumption within a population considered particularly relevant for sustainable food choices. These findings support previous observations from other countries while extending the evidence to Central and Eastern Europe, where empirical studies simultaneously examining these constructs remain relatively limited.

4.1. Pro-Environmental Behaviours Are Primarily Driven by Cost Considerations

Table 2 shows that the most frequently undertaken PEBs included using reusable bags, crushing packaging before disposal, and reducing water and energy consumption. The results indicate patterns consistent with other studies conducted among representative samples of the Polish population [4,54,55]. The overall level of engagement observed in this study was equal to or higher than that found in the general population [43,54].

The prevalence of simple and cost-effective behaviours can be partly explained by regulatory measures. For example, the introduction of fees for single-use plastic bags in Poland led to a significant decline in their use—from about 300 to fewer than 10 bags per person per year [56]. This demonstrates how economic stimuli can effectively influence everyday pro-environmental practices.

Other frequently practised PEBs identified in this study were also financially beneficial for households, such as reducing water and energy use, minimising food waste, lowering transport costs, and limiting paper and packaging consumption. However, most respondents did not engage in PEBs that require greater personal or financial commitment, such as paying attention to eco-labels, choosing environmentally friendly products despite higher prices, or participating in pro-environmental campaigns and initiatives.

These findings are consistent with other research [54,55,57,58], which shows that while Poles increasingly recognise the importance of environmental issues, they tend to adopt mainly economically advantageous PEBs, whereas more active environmental engagement remains limited.

4.2. Pro-Environmental Behaviour Varies Across Socio-Demographic Groups

This study showed that selected socio-demographic factors, including age, financial situation, and place of residence, were significantly associated with pro-environmental behaviours. In particular, higher levels of PEB were observed among older respondents, those with a better financial situation, and residents of large urban areas.

It should be noted that the study group consisted exclusively of women of reproductive age, which limits direct comparisons with studies covering broader age ranges. While the literature often suggests that younger individuals express greater environmental concern [33,36,59–61], this does not always translate into actual pro-environmental behaviours [4,5,58,62,63].

The positive association between financial situation and PEB observed in this study is consistent with previous findings in the Polish context [35,36,40,64].

Similarly, higher levels of PEB among residents of large urban areas may reflect both greater environmental awareness and better access to sustainable infrastructure and products. Similar patterns have been reported in other Polish studies in the context of choosing cosmetics, public transportation, or reusable bottles [40,65] and purchasing organic food more often than residents of smaller towns [51].

The lack of a significant association between educational level and pro-environmental behaviours should be interpreted with caution, as the study sample was highly homogeneous in terms of education, with approximately 85% of respondents having higher education. This limited variability may have reduced the ability to detect potential differences between educational groups.

Overall, the results suggest that socio-demographic factors differentiate pro-environmental behaviour to a limited extent, supporting the view that attitudinal factors may play a more important role than demographic variables.

4.3. Pro-Environmental Behaviour Is Positively Associated with Organic Food Consumption

The obtained results provide evidence to confirm H1. They showed that respondents who engaged more frequently in PEBs were also more likely to consume organic food (Table 4). This finding is consistent with other Polish studies indicating that respondents with stronger pro-environmental attitudes [35,36], higher environmental awareness [19], and more sustainable food-related practices [34] were significantly more likely to choose organic products. Moreover, a systematic review of 67 peer-reviewed studies confirmed that environmental concern is a universal driver of organic food consumption [61]. Therefore, organic food consumption may be viewed as one of the possible components of a pro-environmental, sustainable lifestyle that is also reflected in other PEBs. The findings of this study provide useful insights for stakeholders involved in promoting sustainable food consumption. In particular, they highlight the importance of aligning communication strategies with consumers' environmental values and preferences. Emphasising both the environmental and health-related benefits of organic products may strengthen their perceived value and support more sustainable purchasing decisions.

4.4. Some Green Attitudes May Affect PEB and OFC

Our results provide evidence to partially support the hypothesis H2 and confirm H3. The findings confirm that selected GAs may affect OFC and PEB. Most respondents considered environmental protection important. All analysed dimensions of green attitudes were significantly associated with pro-environmental behaviours. Specifically, the perceived importance of environmental protection, self-declared environmental awareness, environmental education received at school, assessment of the state of the natural environment, interest in the activities of environmental organisations, and household waste segregation were each significantly related to PEB. In contrast, only the perceived importance of environmental protection, self-declared environmental awareness, and interest in environmental organisations were significantly associated with organic food consumption. The observed associations between all analysed dimensions suggest that GAs are more closely aligned with everyday PEBs than OFC. The observed associations between GAs and PEB indicate consistency between environmental attitudes and everyday pro-environmental practices [43,66]. In contrast, no statistically significant associations with OFC were observed for environmental education received at school, assessment of the current state of the natural environment in Poland, or household waste management practices. This may indicate that purchasing OFC depends not only on environmental attitudes but also on

additional factors, such as price, availability, or perceived product attributes [18–20,23]. The results also suggest that environmental education contributes to higher engagement in PEB, supporting previous findings that ecological knowledge is linked to more sustainable behaviours [35,50,57]. This highlights the importance of strengthening environmental education as a means of fostering everyday pro-environmental practices and encouraging more sustainable consumer choices.

The majority of respondents assessed the state of the natural environment in Poland as rather poor, indicating a more critical perception than that reported in national surveys. While recent data suggest an improvement in the overall evaluation of environmental conditions in Poland, assessments remain less favourable at the national level than at the local level [54]. Interestingly, since 2011, Poles have consistently rated the state of the environment in their local area higher than that of the country as a whole [54]. This suggests that perceptions of environmental quality are shaped primarily by everyday experiences and local conditions.

Respondents' perceptions of environmental conditions and their relatively low engagement with environmental organisations reflect patterns observed in other Polish studies [58,67]. According to the World Giving Index 2024, Poland ranks among the lowest countries in terms of social engagement, with only 7% of individuals participating in volunteering activities and 15% donating to charitable causes [68].

This study showed that the majority of respondents regularly separated waste, although comparative data remain inconsistent. While some reports indicate lower levels of waste segregation in Poland compared to the EU average, others suggest relatively high but declining rates in recent years [54,69]. These findings indicate that waste management practices still require improvement. The main barriers identified include organisational constraints and insufficient knowledge, which is consistent with previous studies [43,54,63].

The findings of this study are consistent with the assumptions of the TPB and prior research on green consumption. In particular, the results confirm that selected GAs were found to be associated with PEB and OFC. A key contribution of this study lies in its focus on actual behaviour rather than behavioural intentions. The findings support the importance of environmental attitudes in explaining pro-environmental behaviours and organic food consumption, in line with selected assumptions of the TPB.

Importantly, no clear attitude–behaviour gap was observed in this study, in contrast to previous research reporting discrepancies between declared environmental concern and actual behaviour [20,23]. One possible explanation for the consistency observed between GAs and PEB in the present study is the specific profile of the study population. The sample consisted predominantly of highly educated mothers with relatively favourable financial situations who correctly identified organic food, a group that has previously been shown to demonstrate greater environmental awareness and stronger engagement in sustainable consumption practices. Consequently, the attitude–behaviour gap described in more heterogeneous populations may have been less pronounced in the present study. It should also be recognised that the strength of the association between environmental attitudes and pro-environmental behaviours may not be uniform across all individuals. Previous studies have suggested that personality traits may moderate the extent to which environmental attitudes are translated into pro-environmental behaviours [70,71]. Although personality characteristics were beyond the scope of the present study, future research should investigate their potential moderating role in the associations observed here.

4.5. Environmental Motivations Reflect Health and Altruistic Concerns

Among the main reasons cited for protecting the environment, respondents most frequently mentioned concern for human health, nature as a value in itself, and concern

for future generations. Health-related motives have also been identified as a key factor influencing the purchase of organic food in numerous previous studies [25,26,28,31]. National reports provide a slightly different perspective, indicating that concern for future generations has consistently been one of the most frequently cited motivations, often exceeding health-related motives [53–55]. At the same time, the importance of perceiving nature as a value in itself has increased in recent years [54]. Overall, these findings suggest that while health-related motives remain dominant, there is a growing importance of altruistic and biospheric values, indicating a gradual shift towards more environmentally orientated motivations.

In this study, the vast majority of respondents (94%) emphasised the importance of educating children about environmental protection and fostering PEBs from an early age. This is consistent with evidence showing that parents are actively engaged in environmental communication and everyday practices with their children, such as saving energy, separating waste, and conserving water [43]. These findings suggest that parents of young children constitute an important target group for initiatives aimed at promoting everyday pro-environmental behaviours among consumers.

Respondents indicated that individual actions have the greatest impact on the state of the environment, which is consistent with findings from national reports [53–55]. This aligns with other studies showing that a sense of personal responsibility [33] and moral obligation [27,34] plays a key role in shaping sustainable behaviours. These findings suggest that environmental education needs to go beyond simply providing information and may support initiatives aimed at promoting behavioural change. In this context, communication efforts undertaken by public institutions, mainstream media, and market actors can play a significant role in fostering environmentally friendly attitudes and practices in everyday life.

4.6. *The Internet Plays a Key Role in Environmental Communication*

Figure 2 indicates that the Internet and television are the main sources of environmental information among respondents, which is consistent with national data highlighting the growing importance of digital media [54,72]. Previous research also suggests that media exposure is closely linked to environmental knowledge and public concern about environmental issues [57]. In addition, recent studies show that online content can influence consumers' knowledge, attitudes, and purchasing behaviours, particularly when information is perceived as credible and trustworthy—especially when audiences strongly identify with and trust influencers [73–75]. Such reports highlight the importance of promoting reliable information on climate change and pro-environmental consumer behaviour across online and traditional media channels, as well as the need to counter misinformation and fake news. Given that Polish teenagers spend more than 5.5 h online each day, digital media may play a key role in shaping future pro-environmental attitudes and behaviours [76].

The findings are consistent with selected assumptions of the Theory of Planned Behavior, particularly the role of attitudes as an important antecedent of behaviour. However, the present study did not aim to test the full TPB model and therefore should be interpreted as providing evidence of associations between environmental attitudes, pro-environmental behaviours, and organic food consumption. The findings provide empirical support for considering everyday behaviours and food consumption practices within a broader framework of sustainable consumer behaviour, highlighting the interconnected nature of these domains. Although the observed associations are consistent with the theoretical assumptions of the TPB, the cross-sectional design of this study does not allow conclusions regarding the direction or causality of these relationships. Future longitudinal studies are needed to better establish the temporal sequence and causal nature of these relationships.

5. Limitations

When interpreting the results of this study, it should be taken into account that women tend to display stronger pro-environmental attitudes and engage more frequently in pro-environmental behaviours (PEBs) than men [4,40,54,57]. Therefore, the findings should be understood as referring specifically to the studied group—or more broadly, to highly educated and financially stable mothers of young children in Poland—rather than as representative of the entire Polish population.

As noted in the description of the research sample (Materials and Methods), this study included only mothers of children up to 6 years of age (95% of the sample were aged 25–43), which limits the generalisability of the results to the entire adult population of Poland. The participating women were mostly highly educated (85%) and reported good or very good financial situations (85%). This is not a representative sample of Polish society as a whole, where, in 2021, 46% of adults had higher education [77], and 65% expressed satisfaction with their material conditions and only 36% with their income levels [78]. Although the present study included selected socio-demographic characteristics, additional contextual and psychosocial factors, and personality-related factors, such as political orientation, religiosity, lifestyle, or personality traits, were not examined and may also contribute to pro-environmental behaviours and organic food consumption. Furthermore, some determinants of organic food consumption, including economic barriers, product availability, and willingness to pay, have been investigated separately in our previous publication based on the same study cohort [30] and were therefore beyond the scope of the present analysis. Future studies integrating these factors within a single analytical framework could provide a more comprehensive understanding of the determinants of sustainable consumer behaviours. In addition, although this study was guided by the TPB, it did not include two of its key constructs—subjective norms and perceived behavioural control. Consequently, the findings should not be interpreted as a comprehensive empirical test of the TPB model. Future studies incorporating these constructs could provide a more complete understanding of the mechanisms underlying pro-environmental behaviours and organic food consumption.

Due to the cross-sectional design of this study, the observed relationships should be interpreted as associations rather than evidence of causal relationships. Longitudinal studies are needed to confirm the temporal direction of these associations.

Furthermore, only questionnaires in which respondents provided the correct definition of organic food were included in the analysis (59% of all fully completed surveys). Therefore, the surveyed group of women may have had greater knowledge of environmental issues and practised more sustainable behaviours than the average Polish woman. This study was based on self-reported questionnaire data, which may be subject to several sources of bias. Social desirability bias cannot be excluded, as respondents may have tended to report environmentally desirable attitudes and behaviours. Recall bias may also have influenced responses concerning previous environmental experiences and behaviours. In addition, because all variables were collected using the same questionnaire at a single time point, the possibility of common method bias should be considered when interpreting the findings. Nevertheless, the anonymous nature of the survey and voluntary participation may have reduced the risk of these biases, although they cannot be completely excluded.

Furthermore, the analyses were based on bivariate statistical methods and therefore did not allow assessment of the independent contribution of individual variables after adjustment for potential confounding factors. Future studies employing multivariable analytical approaches are warranted to further investigate these relationships.

6. Conclusions

This study examined the associations between pro-environmental behaviours (PEBs), green attitudes (GAs), and organic food consumption (OFC) among Polish mothers of young children in the context of sustainable consumer practices. The findings confirm H1 and H3, providing empirical evidence that PEB, GAs, and OFC are interrelated components of sustainable consumer behaviour. However, H2 was partially supported; not all of the analysed GAs were significantly associated with OFC. This suggests that OFC represents a complex consumer behaviour that could not be influenced by additional determinants.

The results further show that PEBs are linked to OFC, supporting the view that sustainable behaviours and consumption patterns form a coherent system. At the same time, respondents were more likely to engage in simple and cost-effective PEBs, while more demanding behaviours were less frequently adopted.

The analysis also indicates that socio-demographic characteristics differentiate PEB to a limited extent, suggesting that attitudinal factors play a more important role than demographic variables. In addition, environmental motivations were primarily associated with health and altruistic concerns, and the Internet was identified as a key source of environmental information.

Although conducted in a Polish population, the present study contributes to the growing international evidence on sustainable consumer behaviour by demonstrating consistent associations between PEB, GAs and OFC. This study contributes to the literature by focusing on actual behaviours and consumption patterns rather than solely on behavioural intentions. These findings provide insight into how environmental attitudes may be reflected in real-life practices and may support efforts to promote more sustainable consumption patterns. The findings suggest that interventions promoting sustainable consumption should not focus exclusively on strengthening environmental attitudes, as these were only partially associated with organic food consumption. Instead, educational and communication strategies should combine environmental and health-related messages while encouraging everyday pro-environmental behaviours, particularly among families with young children. The high proportion of respondents (94%) who declared the importance of teaching children about environmental protection highlights the potential for developing bottom-up pro-environmental initiatives and strengthening sustainable engagement among mothers of young children.

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Abbreviations

The following abbreviations are used in this manuscript:

PEBs	Pro-Environmental Behaviours—selected actions that are taken with the intention of benefiting or reducing negative human impacts on the natural environment.
GA	Green Attitudes—values, mindsets and features that support actions and decisions promoting environmental protection, social equity, and long-term economic well-being.
OFC	Organic Food Consumption—purchasing and consuming sustainably produced food certified as organic.
TPB	The Theory of Planned Behavior

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