

ECOLOGICAL BEHAVIOUR OF GENERATION Z IN POLAND

Magdalena Jaciow¹✉, Mirosław Wójciak¹, Konstancja Poradowska²

¹University of Economics in Katowice, Poland

²Wroclaw University of Economics, Poland

ABSTRACT

The purpose of this article is to present research on the ecological behaviour of Generation Z in Poland. The research was conducted with the use of CAWI techniques on a sample of 260 Polish consumers from Generation Z. With use of the Lance-Williams-Ward's agglomerative methods, three homogenous groups of Gen Z consumers were identified on the basis of self-evaluation of ecological behaviour and on the behaviour of their surrounding environment (household and friends), i.e. pro-ecological, ecological, and non-ecological. By means of non-parametric analysis of variances (Kruskal-Wallis test) and post hoc analysis, the significance of differences in the values of the analyzed variables was assessed, indicating differences in the ecological behaviors of the selected groups. The results of the analysis show that there are differences in the frequency of ecological behaviours that are undertaken within the selected groups.

Key words: Gen Z, generation Z, ecological behavior, behaviour, eco, Poland

INTRODUCTION

It is apparent that not only is the interest in the issue of ecological behaviour unflagging, it is also regaining momentum due to the climate crisis. There are a substantial number of scientific articles which address the subject of conscious consumption [Roux and Nantel 2009, Silva et al. 2012, Zalega 2013, Ratajczyk 2016, Radziszewska 2017, Filipiak 2018], sustainable consumption [Dolan 2002, Schaefer and Crane 2005, Huang and Rust 2011, Dąbrowska 2015, Zalega 2015, Łuczka 2016], responsible consumption [Fisk 1973, Web et al. 2008, Wasilik 2015, Teneta-Skwiercz 2018], eco consumption [Zrałek 2010], or ethical consumerism [Barnett et al. 2005, Lewis and Potter 2013, Bylok 2017]. There are many articles presenting research data on a range of ecological topics: products and

the conditions under which they have been produced; ecological behaviours such as water and energy consumption; food waste; frequency of purchasing new products and disposing of old products; and motivations underlying ecological behaviours. The publications also highlight the notion of deliberate purchasing decisions in terms of the amount of products bought, their quality, and origin. Moreover, the ecological behaviors of various social groups have likewise been analysed, including young adults [Balińska 2020] and the elderly [Zalega 2018]. The need to make deliberate decisions aimed at ecological consumption particularly affects young people.

There are many studies that identify factors that strengthen or hinder the intention of young consumers to buy a specific type of organic product, i.e., organic food [Houng et al. 2019, Kuźniar et al. 2021, Wierz-

Magdalena Jaciow <https://orcid.org/0000-0003-3518-923X>; Mirosław Wójciak <https://orcid.org/0000-0001-5509-361X>; Konstancja Poradowska <https://orcid.org/0000-0002-8000-5914>

✉magdalena.jaciow@ue.katowice.pl

© Copyright by Wydawnictwo SGGW



biński et al. 2021], fashion products [Seahee 2011, Sonali et al. 2019] and the use of new technologies that support ecological behaviour (applications, website, social media) [Jaciow and Wolny 2021].

People in close proximity to young consumers have a significant role in shaping pro-ecological eating habits, as do opinion leaders who are perceived as authorities on sustainable consumption. Family, friends and peer groups have the greatest impact on the formation of healthy eating habits among young people. A expression of concern for the environment can be seen in specific pro-ecological behaviour of young consumers, such as sharing food surpluses with others, resigning from the purchase of food products with environmentally unfriendly packaging, or eliminating products from consumption (e.g., meat) which are produced or transported in ways that pose a threat to the environment [Kuźniar et al. 2021, Wierzbiński et al. 2021].

The aim of this article is to identify groups of the Gen Z generation by the ecological activities they undertake, as well as those undertaken by the family and reference groups that comprise their surrounding environment. Part of the research objective is to also show the differences in ecological behaviours within the selected groups. The empirical part of the article was based on research conducted by the authors with the use of an Internet survey.

RESEARCH METHODOLOGY

Generation Z is generally composed of people who were born between 1995 and 2010. Actual participants in the study were born between 1997 and 2003, because those born in 1997 are already adults, and were therefore able to take part in the study without the consent of a guardian. The research was conducted nationwide across Poland in 2021 (February–March). The selection of the sample was non-random, the selection criterion was age. In the phase of data collection 378 responses were obtained, 260 of which were fully completed (contained all the answers required in the form) and were qualified for further statistical analyses. The demographic characteristics of the sample (gender, age, employment, education and residence status) are presented in Table 1.

Table 1. Demographics of respondents

Category		Percentage
Gender	female	56.5
	male	46.5
Age	18	13.1
	19	22.3
	20	26.9
	21	11.9
	22	9.6
	23	6.5
Professional status	employed	32.7
	unemployed	67.3
Educational status	yes	92.7
	no	7.3
Residence status	alone	2.3
	with parents	84.2
	with wife/husband	3.1
	with friends	10.4

Source: Authors' own elaboration.

The identification of ecological behaviors of Gen Z in Poland was performed in a two-stage method. The first step consisted of asking the respondents whether they consider themselves as being ecological (6 point grading scale, where 1 indicates 'definitely not', and 6 'definitely yes'). In the second step, the respondents were asked about the frequency of behaviours considered to be ecological, such as presented in Table 2.

The starting point in the analysis of the ecological behaviours of Polish Gen Z consumers was the perception of their own environmental behavior, as well as that of their household and their closest friends and acquaintances. The defined variables constituted the answers for the following questions:

- Question 1_a: Do you consider yourself an ecological person?
- Question 1_b: Do you consider your household ecological?
- Question 1_c: Do you consider your closest friends and acquaintances ecological?

Selected diagnostic variables are measured on a six-point Likert scale, thus they have identical titers and ranges of variation (ranges from which they assume values), which directly allows their comparison.

son and does not require normalization. The analysis methods used in the study are assigned to numerical scales, and the research was carried out on ordinal scales, which is perceived as quasi-numerical.

Table 2. Selected behaviours

Question 1	Selling used items
Question 3	Buying second-hand items
Question 4	Buying local products
Question. 5	Buying organic food
Question 6	Buying organic cosmetics and cleaning products
Question 7	Buying organic household chemicals
Question 8	Buying Fair Trade products
Question 9	Make purchases by list
Question 10	Collaborative consumption
Question. 11	Carsharing
Question 12	Sorting garbage
Question 13	Donating unnecessary items to friends/ /strangers/charity shops/free shops
Question 14	Sharing unused food
Question 15	Upcycling
Question 16_a	Using own shopping bags
Question 16_b	Using reusable bags for packing products in the store
Question 16_c	Buying products without packaging
Question 16_d	Repairing products instead of buying new ones
Question 16_e	Shutting down equipment that is not being used
Question 16_f	Abandoning car travel in favor on foot, bicycle, public transport
Question 16_g	Reducing water consumption
Question 16_h	Extinguishing lights in unused rooms
Question. 16_i	Using products until they break down

Source: Authors' own elaboration.

In this research, in order to identify homogeneous groups of consumers, classification from the Lance-Williams-Ward's agglomerative method was employed. Initially, in agglomerative algorithms (sequential and hierarchical) each feature of the discriminated set is treated as a separate subclass. In the distance ma-

trix, elements which are the closest to each other are searched, then combined into one class. Then a new distance matrix between the new class and the remaining features is created, while gradually diminishing the number of classes. The procedure is continued until all elements are combined into a single set. Different versions and names of agglomerative methods derive from various methods of defining the values of transformation parameters, i.e. in a different comprehension of the distance of clusters. Ward's method, employed in the study, is considered to be the leading method which is adapted to the taxonomy of features and objects. Distance is defined as the modulus of the difference between the sum of the squared distances of the points from the center of the groups to which those points belong. Since the number of groups of clusters is not determined, the relative 'stop' rule was used.

It is expressed by the formula:

$$q_j^{(1)} = \frac{d_{st}^{(j)}}{d_{st}^{(j-1)}}, (j = 2, \dots, k) \quad (1)$$

where: $q_j^{(1)}$ – measure of the relative 'stop' rule obtained at the j -th stage of agglomeration, $d_{st}^{(j)}$ – marks the distance between the clusters s and t in the j -th stage of agglomeration.

The division which corresponds to the highest value of the measure above is deemed to be the best. In the taxonomy of objects it is also important how the distance between features is defined. Among the possible distances, the square of the Euclidean distance was chosen.

In the next stage of the study, the analysis of variance was performed. Due to the unfulfilled assumptions of the classical analysis of variance, a non-parametric analysis of variance (Kruskal-Wallis test) was used. It allows to determine whether there are significant differences in the values of the analyzed variables between individual consumer groups. In order to investigate the differences in the results more thoroughly, a post-hoc analysis was implemented in order to determine among which classes the differences are statistically significant. By applying the stop formula conveyed by the sign (1), a division for three consumer groups was made. The descriptive statistics of the questions 1_a, 1_b, and 1_c are presented in Table 3.

Table 3. The descriptive statistics of Questions 1_a, 1_b, and 1_c

		Question 1_a	
3rd category Group	N	average	standard deviation
a	102	4.21	0.49
b	76	4.41	0.84
c	82	3.20	0.81
Total	260	3.95	0.88
		Question 1_b	
3rd category Group	N	average	standard deviation
a	102	4.05	0.41
b	76	4.83	0.64
c	82	2.79	0.83
Total	260	3.88	1.02
		Question 1_c	
3rd category Group	N	average	standard deviation
a	102	3.60	0.53
b	76	4.62	0.61
c	82	2.74	0.89
Total	260	3.63	1.00

Source: Authors' own elaboration

Based on the results obtained, Group A is characterized by a slightly increased average of Question 1_a 'I am ecological', a slightly increased average of Question 1_b 'ecological household', and an average of Question 1_c 'my closest friends are ecological' proved to represent the general level. Therefore, this group can be characterized as familial **pro-ecological**.

Group B represents a significantly increased average of Question 1_a 'I am ecological', average of Question 1_b 'ecological household', and average of Question 1_c 'my closest friends are ecological'. This group can be defined as **ecological**.

Group C, on the other hand, is contrary to Group B, with a significantly decreased average of Question 1_a 'I am ecological', average for Question 1_b 'ecological household', and average of Question 1_c 'my closest friends are ecological'. This group can be defined as **non-ecological**.

The Kruskal-Wallis test proved that the diagnostic variables (Questions 1_a, 1_b, and 1_c) discriminate the identified consumer groups ($H_{1_a} = 93.907$ with $p < 0.001$; $H_{1_b} = 177.72$ with $p < 0.001$; $H_{1_c} = 148.54$

with $p < 0.001$); while the post hoc analysis demonstrated that only in the case of Question 1_a, Groups A and B are not discriminated. The differences among all the groups within the remaining diagnostic questions occurred to be statistically significant.

Another stage of the analysis constituted an investigation of the variables of the differentiated groups in terms of metrics i.e. gender, age, professional activity, educational activity, and place of residence. Age was the only metric variable that was not measured on the dichotomic or polynomial disordered scale, which is why the Kruskal-Wallis test was performed; whereas in the instances of the remaining variables the χ^2 test was conducted. The resulting probability was higher than 0.05; thus, the metric variables occur independently in the particular groups.

RESULTS

As far as Questions 2, 3, 16_b, 16_c, 16_d, and 16_f are concerned, there do not exist any statistically significant differences among the analyzed consu-

mer groups. Correspondingly, within the analyzed groups, in terms of ecology, the consumers equally tend to: sell and buy second-hand items; use reusable shopping bags for packing products in the store; buy bulk food products without packaging, or by weight; repair products instead of buying new ones; or abandon car travel in favor of foot, bicycle, or public transport (Table 4).

The defined consumer Groups B (ecological) and A (pro-ecological) do not display any statistically significant discrepancies identified by the post hoc test of the nonparametric analysis of variance (the Kruskal-Wallis test). While considering questions 4 to 6, 8, 14, 15, and 16_e, Group A does not exhibit any differences in comparison to Group C (non-ecological). Therefo-

re, there do not exist any differences in: buying local products; buying organic food, or organic cosmetic products; Fair Trade products; sharing unused food; upcycling; shutting down unused equipment.

On the other hand, taking into account Groups B (ecological) and C (non-ecological), no differences were discovered in terms of Questions 9, 11, 14, and 15; hence both consumer groups show the same approach in relation to: making purchases by list, carsharing to work/school; sharing unused food; upcycling; shutting down unused equipment.

Question 9, i.e. referring to making purchases by list, constitutes the only example in which the differences between Group A (pro-ecological) and C (non-economical) were identified; whereas while compa-

Table 4. The probabilities observed in the nonparametric analysis of variance and the post-hoc test

	<i>H</i>	<i>p</i>	ε^2	A–B	A–C	B–C
Question 2	2.172	0.338	0.008			
Question 3	2.552	0.279	0.010			
Question 4	10.066	0.007	0.039	0.593	0.009	0.173
Question 5	16.341	0.000	0.063	0.457	0.001	0.054
Question 6	11.086	0.004	0.043	0.596	0.006	0.128
Question 7	11.309	0.004	0.044	0.801	0.042	0.012
Question 8	12.914	0.002	0.050	0.666	0.003	0.073
Question 9	8.512	0.014	0.033	0.940	0.066	0.043
Question 10	14.688	0.001	0.057	0.392	0.041	0.001
Question 11	9.553	0.008	0.037	0.075	0.727	0.014
Question 12	56.580	0.000	0.218	0.607	0.000	0.000
Question 13	13.355	0.001	0.052	0.985	0.008	0.009
Question 14	7.094	0.029	0.027	0.395	0.596	0.081
Question 15	7.431	0.024	0.029	0.998	0.111	0.132
Question 16_a	12.445	0.002	0.048	0.933	0.021	0.013
Question 16_b	5.911	0.052	0.023	0.646	0.289	0.062
Question 16_c	5.788	0.055	0.022	0.994	0.120	0.127
Question 16_d	5.870	0.053	0.023	0.644	0.065	0.437
Question 16_e	10.969	0.004	0.042	0.740	0.006	0.083
Question 16_f	0.855	0.652	0.003			
Question 16_g	25.988	0.000	0.100	0.973	0.000	0.000
Question 16_h	12.781	0.002	0.049	0.963	0.022	0.018
Question 16_i	21.453	0.000	0.083	0.958	0.001	0.001

Source: Authors' own elaboration.

ring Group B (ecological) and C (non-economical), no such differences can be observed.

It is worth noting that in the instances of Questions 14 and 15, the post hoc test did not prove any differences among the groups despite the Kruskal-Wallis test's significance. That may result from the limited number of conflicting answers which causes overstatement/ understatement of the range average, simultaneously generating the significance of the results for all the groups; nevertheless, in respect of the post hoc analysis, the obtained differences are too minor to be considered as statistically significant.

CONCLUSIONS

Generation Z undertakes a number of ecological behaviors. The most frequent activities include: extinguishing lights in unused rooms, using their own shopping bags, or using products until they break down; whereas sorting garbage or water consumption are slightly less common. By undertaking such behaviors, Generation Z stimulates their ecological self-awareness. According to the conducted research, 75% of respondents declared being ecological, 71.2% considered their household to be ecological, while 59.2% of respondents claimed to have ecological friends. In the examined sample, almost half of the respondents (48.1%) declared being ecological, simultaneously living in an ecological household and having ecological friends. Finally, 14% of respondents in the sample declared being ecological, and at the same time having an ecological household, yet they do not have ecological friends. The analysis shows that there is a small percentage of respondents who are ecological and have ecological friends, but they live in a non-ecological household, and who have ecological friends and ecological households, while not being ecological themselves.

The analysis also revealed that it is possible to identify the differences in the ecological behaviors of the Generation Z consumer group based on their self-perceptions and on their closest environment (Group A – pro-ecological, Group B – ecological, and Group C – non-ecological). The common denominator of those 3 groups is a low frequency

(rarely or very rarely undertaken) of behaviors related to buying and selling second-hand items, using reusable bags for packing fruits and vegetables in the store (instead of the common plastic bags), buying products in bulk (without plastic packaging), repairing broken products, or abandoning car travel in favor of foot, bicycle, or public transport. The remaining ecological behaviors are undertaken by the pro-ecological group with different frequencies (occasionally or frequently), ecological (frequently or very frequently), and non-ecological (never or very rarely).

While comparing the ecological behaviors of the pro-ecological and ecological groups, no significant differences in terms of their frequency were observed. Regardless of whether they function in more (Group A) or less (Group B) ecological environments, the consumers engaged in undertaking the analyzed ecological behaviors in a similar manner.

Certain economical behaviors that are displayed either very rarely or never by the pro-ecological group, compared to the non-ecological group, can be considered as mutual for both groups, especially in relation to: buying organic food and cosmetics, Fair Trade products, upcycling and sharing unused food. On the other hand, both groups frequently shut down unused equipment. However, it is the frequency of undertaking the remaining ecological behaviors that differentiates the behaviors of both groups: exercised by the pro-ecological group occasionally or frequently, while never or very rarely by the non-ecological group.

When looking at the behaviors of the ecological and non-ecological groups, a resemblance in regard to very low frequency in sharing unused food can be identified. Both groups rarely process waste or recreate items from products that they already own (so-called upcycling); both also seldom abandon the car in favor of moving on foot, bicycle, or public transport. In a similar manner, both groups often shut down unused equipment. Nonetheless, it is the frequency of undertaking the remaining ecological behaviors that differentiates the behaviors of both groups: displayed by the ecological group frequently or very frequently; while never or very rarely by the non-ecological group.

The presented study has some limitations. Firstly, the data was collected in only one country (Poland). Secondly, the study was conducted on a small sample. Therefore, we encourage scholars to incorporate other relevant and unusual measures to extend the findings of the present study.

REFERENCES

- Balińska, A., Gabryjonczyk, P., Zawadka, J. (2020). Pro-ecological behavior of students of the WULS-SGGW Faculty of Economics. *Annals PAAAE*, 22(4), 13–24.
- Barnett, C., Cafaro, Ph., Newholm, T. (2005). Philosophy and ethical consumption. [In:] R. Harrison, T. Newholm, D. Shaw (Eds), *The Ethical Consumer*. Sage, London, 11–24.
- Bylok, F. (2017). Moralność i konsumpcja etyczna: dyskusja nad wymiarami etycznymi w konsumpcji. *Władza Sądzenia*, 13, 193–206.
- Dąbrowska, A. (2015). Postawy polskich konsumentów – od konsumpcjonizmu do zrównoważonej konsumpcji (Morality and Ethical Consumption: Discussion on the Ethical Issues of Consumption). *Handel Wewnętrzny*, 355(2), 88–100.
- Dolan, P. (2002). The sustainability of “sustainable consumption”. *J. Macromarketing*, 22(2), 170–181.
- Filipiak, O. (2018). W kierunku świadomej konsumpcji – nowe konteksty (Towards conscious consumption – new contexts). *Rynek – Społeczeństwo – Kultura*, 4(30), 114–117.
- Fisk, G. (1973). Criteria for a theory of responsible consumption. *Journal of Marketing*, 37(2), 24–31.
- Huang, M.H., Rust, R.T. (2011). Sustainability and consumption. *J. Acad. Mark. Sci.*, 39(1), 40–54.
- Jaciow, M., Wolny, R. (2021). New Technologies in the Ecological Behavior of Generation Z. *Procedia Comput. Sci.*, 192, 4780–4789.
- Kuźniar, W., Surmacz, T., Wierziński, B. (2021). The impact of ecological knowledge on young consumers’ attitudes and behaviours towards the food market. *Sustainability*, 13(4), 1984.
- Lewis, T., Potter, E. (2013). *Ethical consumption: A critical introduction*. Routledge, London.
- Łuczka, W. (2016). Zrównoważona konsumpcja i uwarunkowania jej rozwoju (Sustainable Consumption and Determinants of Its Development). *Handel Wewnętrzny*, 365(6), 136–145.
- Radziszewska, A. (2017). Nowe wzorce konsumpcji w zachowaniach polskich konsumentów (New Consumption Patterns in Polish Consumers’ Behaviour). *Handel Wewnętrzny*, 366(1), 286–297.
- Ratajczyk, M. (2016). Przejawy świadomej konsumpcji w zachowaniach młodych konsumentów (Manifestations of Conscious Consumption Behavior of Young Consumers). *Przedsiębiorczość i Zarządzanie*, 17(4.3), 119–130.
- Roux, C., Nantel, J. (2009). Conscious Consumption and Its Components: an Exploratory Study. *NA – Advances in Consumer Research Volume 36*, 903–904.
- Schaefer, A., Crane, A. (2005). Addressing sustainability and consumption. *J. Macromarketing*, 25(1), 76–92.
- Seahee, L., (2011). Consumers’ value, environmental consciousness, and willingness to pay more toward green-apparel products. *JGFM*, 2(3), 161–169.
- Silva, M.D.G., Araújo, N.M.S., Santos, J.S. (2012). „Conscious consumption”: ecocapitalism as ideology. *Revista Katálysis*, 15(1), 95–111.
- Teneta-Skwiercz, D. (2018). Odpowiedzialna konsumpcja w świetle wyników badań (Responsible consumption in the light of research results). *Gospodarka w praktyce i teorii*, 51(2), 51–65.
- Wasilik, K. (2015). Idea Fair Trade. W kierunku odpowiedzialnej konsumpcji (The Fair Trade Idea. Towards Responsible Consumption). *Marketing i Zarządzanie*, (38), 101–109.
- Wierziński, B., Surmacz T., Kuźniar W., Witek, L. (2021). The role of the ecological awareness and the influence on food preferences in shaping pro-ecological behavior of young consumers. *Agriculture*, 11(4), 345, 1–14.
- Zalega, T. (2013). Nowe trendy i makrotrendy w zachowaniach konsumenckich gospodarstw domowych w XXI w. (New Trends and Megatrends in the Households’ Consumption Behaviour in the 21st Century). *Konsumpcja i rozwój*, 2, 3–21.
- Zalega, T. (2015). Zrównoważony rozwój a zrównoważona konsumpcja – wybrane aspekty (Sustainable Development and Sustainable Consumption: Selected Aspects). *Konsumpcja i rozwój*, 4(13), 3–26.
- Zalega, T. (2018). Świadoma konsumpcja i konsumpcja współpracująca w zachowaniach konsumenckich osób starszych w Polsce. Wyniki badań własnych (Conscious and Collaborative Consumption in the Consumer Behaviour of Polish Seniors : Results of Author’s own Research). *ZIWGIB*, 1(26), 103–120
- Zrałek, J. (2010). Ewolucja ekokonsumpcji i idei zrównoważonego rozwoju jako czynnik wpływający na zachowania podmiotów rynkowych (The Evolution of Green Consumption and Sustainable Development as a Factor Influencing Market Entities Behaviors). *Zesz. Nauk. Uniw. Szczec. Ekonom. Probl. Usług*, 55, 335–347.

ZACHOWANIA EKOLOGICZNE POKOLENIA Z W POLSCE

STRESZCZENIE

Celem artykułu jest identyfikacja zachowań ekologicznych pokolenia Z w Polsce. Badania zachowań ekologicznych pokolenia Z przeprowadzono techniką CAWI na próbie 260 respondentów. Za pomocą metod aglomeracyjnych z grupy Lance'a-Williamsa-Warda wyodrębniono trzy jednorodne grupy konsumentów z pokolenia Z: proekologiczną, ekologiczną i nieekologiczną. Za pomocą nieparametrycznej analizy wariancji (test Kruskala-Wallisa) oraz analizy *post hoc* oceniono istotność różnic wartości analizowanych zmiennych, wskazując na różnice w zachowaniach ekologicznych wyodrębnionych grup. Wyniki analizy wskazują na różnice w częstotliwości podejmowania zachowań ekologicznych w obrębie wyodrębnionych grup.

Słowa kluczowe: pokolenie Z, zachowania ekologiczne, zachowania, eco, Polska