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Iwona Chmura-Rutkowska

Adam Mickiewicz University in Poznan, Poland

e-mail: iwona.chmura-rutkowska@amu.edu.pl

ORCID: <https://orcid.org/0000-0002-9319-7767>

Agnieszka Kozłowska

Adam Mickiewicz University in Poznan, Poland

e-mail: agnes@amu.edu.pl

ORCID: <https://orcid.org/0000-0002-7614-6095>

Will Women Save the World? The Ecological Civic Activity of Girls and Women from Generation Z Representing ICT and STEM

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Abstract

The subject of the study is the gender gap in the environmental activism of young people from generation Z, related to the ICT and STEM sector, which plays a key role in the ecological transformation. Women are, according to world literature, more ecological than men in thinking, motivation and actions. The aim of the study was to check whether and to what extent this regularity applies to Poland and the masculinized ICT sector, where women constitute only about 20% of employees, and also what is the relationship between the level of environmental activism, environmental awareness and environmental behavior in the private sphere. The research sample consisted of 637 people born between 1995 and 2010 (Generation Z): 381 women (59.8%), 247 men (38.8%) and 9 non-binary people (1.4%). The data was taken from an extensive study carried out for the report on the values of ICT and STEM sector related young people from the generation Z. From the raw database, questions were extracted as indicators of awareness (15 questions on

the NEP scale), ecological knowledge, sense of influence on counteracting the ecological crisis, risk perception of ecological threats, ecological behavior in the private sphere, and ecological activism (environmental behavior in the civic sphere). The data analysis included: (1) calculation of the NEP Index (2) frequency tables, including cross-tabs for all variables broken down by gender, (3) testing gender differences (Student's *t* for continuous variables and Pearson's Chi-square for ordinal and nominal variables) and (4) testing the relationship between selected variables and the level of environmental awareness (one-way ANOVA or *t*-test). Women turned out to be more environmentally aware than men (NEP Index 0.70 vs. 0.57), had more knowledge, a greater sense of influence on combating the ecological crisis, and greater faith in the effectiveness of the institutional activities in this area; showed greener behavior in their private lives and greater environmental activism. The ANOVA analysis showed that, with the exception of two variables, the surveyed areas of civic activity were proportionally related to environmental awareness: the higher the level of environmentalism, the higher the mean on the NEP scale. Almost all examined differences were statistically significant at *p* level < 0.001.

Keywords: ecological civic activity, green citizenship, gender gap, NEP scale, generation Z, ICT STEM.

Introduction

This article and own research concern the assessment of gender differences of generation Z in the area of the so-called “green citizenship,” which we understand as ecological civic activity, or – active citizenship for ecology. In literature, one can also find synonymous terms, such as ecological citizenship or environmental citizenship, referring to civic activity for the natural environment in a global or national context (Berkowitz et al., 2005; Dean, 2001; Dobson, 2003; Dobson & Bell, 2006; Stevens, 2014).

We understand civic activity broadly as the people's personal and/or collective engagement, in different ways, in democracy at all levels of society (macro and micro).

Active citizenship therefore includes political, social, personal and change-oriented activities (European Commission, 1998, Putnam, 2000; Adler & Goggin, 2005; Kennedy, 2007; Nelson & Kerr, 2006; Krzywosz-Rynkiewicz & Zalewska, 2017). Diverse in terms of content and thematic content, measurement tools for civic participation fall into two broad categories (Veeh et al., 2019):

- (a) focusing on civic activities/behaviors that evaluate what people actually do (e.g. volunteering, attending public meetings, voting);
- (b) focused on citizenship attitudes that evaluate what people think or feel (e.g. sensitivity and interest in social problems, altruism, belief in social justice).

This study concerns both aspects: the awareness and motivational dimensions of civic activity, as well as specific decisions and behaviors. Our research includes young people from the Z generation associated with the ICT (*Informatics, Communication and Technology*) and STEM (*Science, Technology, Engineering and Mathematics*) sectors, crucial in overcoming the ecological crisis through an ecological transformation based on advanced technologies, and at the same time very masculinized. The selected generation, i.e. people born between 1995 and 2010, is at the same time the most threatened in history by the effects of the ecological and climate crisis (Faustini, 2014).

Ecological crises and challenges

The ecological and climate crisis is one of the most serious challenges of the present day. Growth limits and the effects of ignoring them were first described in a groundbreaking report by the Club of Rome in 1976 (Meadows et al., 1972), then developed and updated 30 and 50 years after its first publication (Bardi & Alvarez Pereira, 2022; Meadows et al., 2004). The UN Framework Convention on Climate Change (UNFCCC), adopted in 1992 during the Earth Summit in Rio de Janeiro, obliges 197 parties so far to comply with the international agreement and the constantly improved rules for combating climate change. The IPCC – Intergovernmental Panel on Climate Change, a UN body for assessing climate change, conducts continuous monitoring of the state of the climate system and publishes a summary report every 5–6 years based on thousands of scientific papers on effects and forecasts related to climate change (*Reports – IPCC*, n.d.). Each report includes a *Summary for Policymakers* – a summary of the most important facts that should be the basis of national policies. Should, but rarely are. On the one hand, we have visions of

the end of the world in an undefined future, unrealistic from the perspective of the anthropocentric faith in human ingenuity and innovation, and on the other – the growing human population, which needs more and more food, energy, infrastructure and services. To save the Earth, giving up comfort and space, radically reducing the consumption of goods and energy, travels, will be necessary. Meanwhile, the growing human population consumes and needs more and more space, energy, and resources; the production of food, including meat, is growing; the infrastructure of roads, water supply, sewage, fiber optics, air transport, etc. is growing (Meadows et al., 2004). The quality of human life is constantly improving – at the expense of the environment (Meadows et al., 2004). However, the slogan “Let’s limit ourselves!” would not be the best electoral program, which is why changes are progressing slowly. In the most conscious and ecologically engaged countries and political organizations, the accepted response to the ecological and climate crisis is the implementation of the idea of sustainable development (Portney, 2015; *Sustainable development – EU actions* | *European Union*, n.d.). In practice, it would include regulations on limiting consumption (*consumption corridors*), in such a way as not to put people at risk of lowering the quality of life below the established standard (Fuchs et al., 2021).

Researchers and participants in environmental policies (Dobson, 2003; Dobson & Bell, 2006; Giddens, 2011; Stott, 2021) see hope for change in active citizenship, grassroots environmental civic movements, which, by building social acceptance for the idea of limiting oneself in the name of the Planet, will gradually force systemic changes regulated by law. Such “green” civic activity may or may not be organized and registered. In practice, we observe a whole range of forms of action for the environment and climate. The need for such activity is particularly well understood by young people, especially young women.

The relationship between ecological and digital transformation

Among the actions necessary to protect the planet, the most important is to reduce the consumption. In the anthropocentric environmental philosophy, this goal is achievable without compromising the quality of life and development of human civilization. Instead of resigning from the current comfortable life and slowing down development, technologies should be harnessed to achieve ecological goals. Circular economy – the repeated use of raw materials through appropriate production technologies, enabling their subsequent recycling, up-cycling or reuse; closed water cycle associated with its purification and reuse; green energy, which uses renewable energy sources such as wind or sunlight; clean coal technology, allowing the capture and storage of CO₂ from industries emitting this greenhouse gas; energy efficient construction; low-emission transport, in vitro meat – these are only some directions of development of the green economy, aimed at achieving climate neutrality through the use of advanced technologies. Such solutions require appropriate scientific, educational, and human resources and entail social change, causing a global ecological transformation. They are strongly related to digital transformation, as digitization and the subsequent computerization, automation and robotization are the basis of advanced technologies used for ecological transformation. Saving the planet requires an army of computer scientists, engineers, automation specialists, specialists in robotics and AI, telecommunications and related areas – male, as well as female.

Youth civic activity

Research proves that the observed relatively low, compared to adults, civic activity of the conventional type, is an immanent feature of young people. It is therefore not surprising that young Poles (aged 18–24) constitute the largest percentage among the politically passive (Marchlewska et al, 2020; CBOS, 2018; CBOS, 2021). Civic inactivity results from the generally low level of interest of young people in political issues, which they perceive as having no direct impact on their lives, from young people's focus on their own personal

needs, negative attitudes towards politics and politicians, and the belief that the voice and opinions of young people are of little importance and influence on decisions made in the public sphere. Therefore, the reasons are seen both in the issues of specific development tasks of young people, reproduction of bad role models, passive attitudes by the older generation, deficiencies in civic education, challenges related to entering adulthood, economic and living situation, as well as in the impact of broader social processes, such as globalization, progressive stratification, ecological crisis and living in a risk society (Szafraniec, 2011; Szafraniec (Ed.), 2019; Szafraniec & Wernerowicz, 2017; Kopińska, 2019; Kozłowska et al., 2022).

“Green citizenship” of young people

The civic activity of young “digital natives” (Prensky, 2001) is generally less conventional, less political, less formalized and ritualized, more dispersed, and carried out by many different means, including largely the Internet (cyberactivism), and therefore difficult to measure. Young people in Poland, as in the entire EU, more often choose personal civic activity – direct, spontaneous, short-term, based on reaction and rebellion, utilizing issues and slogans quite different from those which are the subject of conventional politics. Young people show solidarity with global problems and communities around the world, victims of authoritarianism, cataclysms, wars, discriminatory practices, ecological disasters by signaling support and alliance, joining informal social movements, NGOs, actions in social media, discussions on forums, collecting signatures, petitions, boycotts, demonstrations and strikes, being convinced that it is as effective as elections in influencing politicians’ decisions (Szafraniec & Wernerowicz, 2017).

Many activities undertaken by young people are not classified as civic activity, they are not noticed, underestimated, downplayed and disregarded (Szafraniec & Wernerowicz, 2017; Szafraniec (Ed.), 2019). In a broader perspective, the problem can be analyzed in the context of feminist criticism of the ideological construction, which is the opposition between the public and private sphere (Lister, 2008). Ignoring those forms and areas of young

people's involvement and sense of agency, that break the traditional private vs. public division, is perfectly visible in the example of ecological awareness and civic activity, i.e. "green citizenship," to which the research presented here is devoted.

Gender differences in civic activity of the young generation

Research shows that in Poland, there are gender differences in various forms of civic activity, i.e., active participation in public life and taking actions aimed at influencing public policy (Siemieńska, 2005; Fuszara (Ed.), 2013; CBOS, 2013; Kinowska-Mazaraki, 2015; Chmura-Rutkowska, Mazurek, 2019). Women tend to be more involved in social activities and volunteering than men and are more likely than men to take action to solve social problems such as poverty, unemployment and discrimination. Women are more likely to participate in social and non-governmental organizations, as well as to take action to improve living conditions in their community. Men show a greater interest in conventional politics and are more likely to be involved in shaping it. Men tend to have more visible and formal roles in politics, such as membership in political parties, standing for election or holding public office. Clear gender differences appear primarily at the axionormative level. Young Polish women clearly more often than young men, declare and support liberal and left-wing ideas, parties and groups. Young men, on the other hand, show a radically greater tendency to support right-wing ideas and organizations (CBOS, 2021; Marchlewska et al., 2020). Gender differences in active citizenship are the result of various social and cultural factors, such as gender stereotypes, socialization and upbringing, inequalities in access to resources and power, as well as social and cultural pressures that influence how women and men perceive their role in public life (Siemieńska, 2005; Fuszara (Ed.), 2013; Kinowska-Mazaraki, 2015).

Gender differences in the context of the “green citizenship” of young people

Climate and environmental activism is part of civic activism, but with some specific characteristics. Environmental problems do not respect borders. Their sources may be far from the community that feels their effects; the effects can be felt far from the source. This is especially true of climate issues, where the most affected by the effects of the crisis are those who contributed least to it - underprivileged countries with a low level of economic development, low production and consumption. Therefore, the concept of “green” or “ecological” citizenship is developing on the basis of global thinking and action, as it pertains to cross-border problems, visible and understandable only from a more distant, supranational perspective (Dean, 2001; Schild, 2016).

Green citizenship is particularly attractive to young people, as they are extremely sensitive to climate and ecology issues. Their understanding of ecological issues contrasts with the indifference to the environment represented by the more anthropocentric thinking of older generations, who treat nature as a source of resources that simply need to be used. The difference in the perception of the ecological and climate crisis can be an important element of youth identity and the axis of a generational dispute. Youth Climate Strike, Extinction Rebellion, individuals like Greta Thunberg shout their demands in the streets and at the gates of parliaments. Their messages, addressed to politicians and decision makers, are born away from school and even in opposition to school.

The second factor noticeable in the area of ecological activity is gender. Ecology is the domain of women. Many studies related to ecological attitudes and behavior show the advantage of women over men both in the area of knowledge, awareness and behavior. Women are more environmentally conscious, as demonstrated by, among others, Zelezny et al. (2020) in his review work covering 54 literature items from the decade 1988–1998. In a Swedish study of over 2,400 pupils aged 12–19, girls showed a higher awareness of sustainability than boys, and the difference increased with the age of the pupils and was greater for schools that were environmentally oriented (Ruff

& Olson, 2009). Women are also more likely to vote green, as demonstrated by an analysis of referenda votes in Swiss cantons over more than 10 years (Funk & Gathmann, 2015). Activism expressed in street protests also has the face of a woman. In the photos from the climate protests, you can see a lot of young girls and women. The most recognizable activist in this field in the world, Greta Thunberg, began her activity as a 13-year-old girl, attracting crowds of female followers.

Among the mechanisms underlying this difference, socialization to gender roles is indicated, where girls are brought up in the ethics of care, and boys in the ethics of competition and profit. Ecology, associated with care, respect for life and altruism, is perceived as “feminine” or even “unmasculine” (Brough et al., 2016; Obermiller & Isaac, 2018). The reason for environmental activism gender gap may also be gender differences in the hierarchy of values, e.g. altruism, which plays an important role in ecological orientation, is more important for women than men (Dietz et al., 2002). Another possible source of gender differences in environmentalism is the perception of risk, where women’s higher sensitivity to risk changes their perception of the ecological crisis and ecological threats. The same environmental situations and events are assessed by women as more serious and with more dangerous consequences than men (Bord & O’Connor, 1997).

In Poland, the belief in the gender determinants of environmental awareness and behavior is not yet common, as evidenced by the fact that CBOS research on environmental awareness does not include gender in its analysis at all (CBOS, 2020; CBOS, 2018).

Own research methodology

Purpose of research and research questions

The aim of the study is to check whether the gender/gender differences observed in the world regarding green citizenship also apply to generation Z in Poland.

The main research problem is the question: Are young Polish women from Generation Z, compared to men from the same generation, more aware and

active in the field of green citizenship? This leads to the following detailed research questions:

Do young Polish women from Generation Z compared to men from the same generation:

- have higher ecological knowledge?
- are more environmentally aware?
- are more likely to perceive the risk of an ecological catastrophe?
- are more ecological in their behavior in the private sphere?
- are more involved in environmental activism (environmental citizenship)?
- have a greater sense of influence (agency) on the ecological situation?
- more positively assess the possibilities of influencing the ecological situation of institutions and organizations?

We assume that the mechanisms responsible for the presence of gender differences in ecological citizenship behavior are universal, therefore these differences will also be visible in the Polish population of Generation Z. We anticipate such a result in relation to all detailed research questions relating to ecological knowledge and awareness, perception of the risk of ecological disaster, ecological behavior at the individual and civic level, and the sense of agency at the individual and institutional level.

Characteristics of the research sample

The data was taken from an extensive collection of raw data collected by the Women in Tech Perspektywy Foundation, whose mission is to support women in technology, science and innovation. The Foundation collected data using an on-line survey, during mass events such as Women in Tech Global Summit, via the Foundation's website, and from students of technical faculties of universities. The comprehensive on-line survey for the Foundation was eventually completed by 701 people, and the research report was published in free access (Chmura-Rutkowska & Kozłowska, 2022). For the purposes of the current

study, the age group of the surveyed people was narrowed down to those born between 1995 and 2008 and 32 questions were selected as indicators of variables from individual research questions. This resulted in a sample of 637 respondents: 381 women (59.8%), 247 men (38.8%) and 9 non-binary people (1.4%). The mean age of the subjects was 21.7 years. The respondents came from both small rural towns with less than 5,000 inhabitants (23.1%), larger towns with up to 50,000 inhabitants (23.5%), medium and large cities over 50,000 (26.9%), and agglomerations over 500,000 inhabitants (26.5%), and the distribution for the residence category was even. However, at the time of the study, the majority (61.9%) lived in large agglomeration cities, and only 10% in small towns of less than 5,000 inhabitants.

The composition and indicators of study's variables

In the study, knowledge, ecological awareness, perception of the risk of ecological disaster, ecological behavior in the private sphere, ecological activism, and the sense of influence on overcoming the ecological crisis, both at the individual and institutional level, were examined. The indicators of ecological knowledge were questions about the causes of the climate crisis, sustainable development goals and vaccinations during the COVID-19 pandemic. Environmental awareness was measured using the New Ecological Paradigm (NEP) scale, the world's most widely used public environmental awareness tool (Anderson, 2012; Dunlap et al., 2000; Dunlap & Liere, 2008). Risk perception was measured by item 10 of the NEP Scale (*The so-called ecological crisis facing humanity is greatly exaggerated*). Ecological behavior in the private sphere was examined through questions about the level of consumption, ecological consumer choices regarding diet, such as giving up meat, dairy products), using organic products instead of chemicals at home, saving electricity, water, using public transport or a bicycle instead of a car, financing ecological organizations. Ecological civic activity was examined by asking questions about participation in the Climate Strike or other climate-related protests, activities in social media (liking, spreading, writing posts), acting in ecological organizations and leading actions and ecological organizations.

The sense of influence on overcoming the ecological crisis was examined with a direct question, both at the individual and institutional level (How do you assess your influence/influence of a given institution on overcoming the ecological crisis).

The demographic variables included in the study included age, gender, place of birth and place of current residence. Due to their disproportionate number in gender categories, the group of non-binary people was excluded from the analyses due to gender, using only two categories of this variable: women (60.7%) and men (39.3%).

Data processing and analysis

For all variables, the frequencies of individual response categories were calculated. For the NEP scale, the NEP Index and means were additionally calculated, according to the method used and described in detail by the Kozłowska et al (2023). For all variables, gender differences were tested using the Chi-square or t-student test, depending on the nature of the variable (nominal, continuous). Finally, a one-way analysis of variance of the NEP Index – the indicator of environmental awareness - was performed in terms of selected differentiating variables (knowledge, risk perception, environmental behavior, environmental activism, sense of influence). The SPSS Statistics program was used for the calculations.

Results

Environmental knowledge

In three questions that are indicators of ecological knowledge, women scored better. When asked about the causes of climate change, 71% of respondents indicated anthropogenic factors as primary factors responsible for the change (correct answer); 17% believe that anthropogenic factors are responsible for the climate crisis as much as natural ones; only natural conditions of climate change were indicated by 5.3% of respondents; the remaining 6.7% had no opinion on the matter. The correct answer was more often indicated by women (77.7% of women compared to 61.0% of surveyed men). The differences

between gender categories were statistically significant at $p < 0.001$. In turn, the most incorrect answer – “natural factors,” was chosen by men 7 times more often than women: this answer option was selected by 11% of men compared to 1.6% of women (Chart 1).

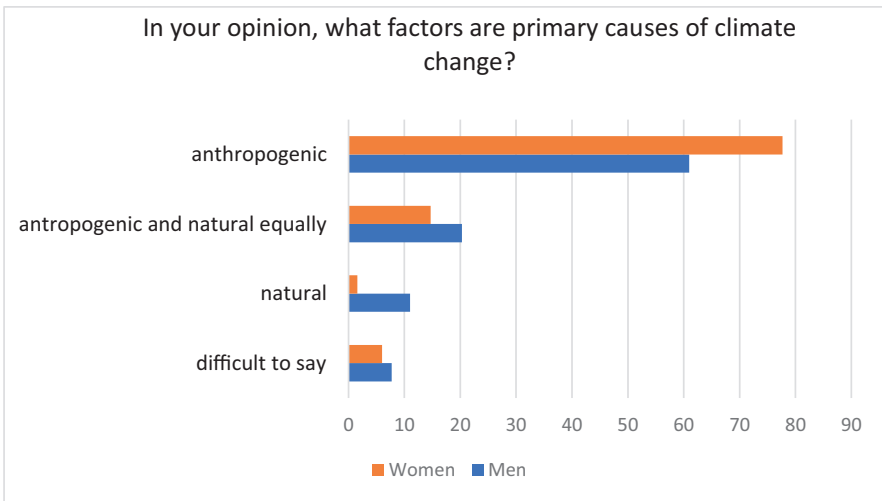


Chart 1. What factors are primary causes of climate change?

Source: Authors' research.

The question about vaccination confirmed the high awareness of the respondents regarding the role of vaccination in the pandemic. As many as 85.8% were vaccinated, much more than the average for the Polish population. This variable showed no gender difference ($p = 0.800$). On the other hand, only 8.1% of respondents answered, “I know them well” to the question “Do you know the 17 Sustainable Development Goals?”; almost half (49.8%) indicated that they did not know them, and 42% that they had heard of them. The answers were gender-differentiated: the answer “I know them well” was marked by 8.5% of women and 8.1% of men. The answer “I don’t know” was dominated by men: 56.1% of the surveyed men marked this answer against 44.5% of women. Differences measured by the Chi-square test were statistically significant at $p = 0.024$.

Environmental awareness

The ecological awareness of the respondents was expressed in the values of the NEP Index, the average values of the scale and the frequency of pro-ecological (values 4 and 5), non-ecological (values 1 and 2) and undecided (values 3) answers. The results were in the medium-high category for the whole group and turned out to be heterogeneous in terms of gender. Women showed significantly higher support for the New Ecological Paradigm than men. The results are presented in Table 1 and Chart 2.

Table 1. Results of the environmental awareness survey using the NEP Scale. N = 636

Ecological awareness assessment indicators	Overall score	Women	Men	Difference test
NEP index	0.65	0.70	0.57	student t $p < 0.001$
Mean	3.59	3.79	3.29	student t $p < 0.001$
Response rates				
· pro-ecological	• 60.5%	65.2	51.0	Pearson Chi-square $P < 0.001$
· non-ecological	• 24.0%			
undecided (hard to say)	• 15.5%			

Source: Authors' research.

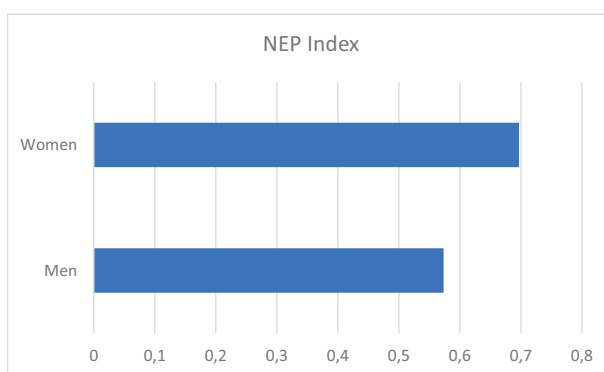


Chart 2. Gender differentiation of the ecological awareness of the respondents expressed by the NEP (New Ecological Paradigm) Index

Source: Authors' research.

Gender differences are significant, as the average-high category (3.51–4.0) is mainly driven by women’s scores, while the average of men is in the average-low score category, between 3.0 and 3.5 (Costache & Sencovici, 2019). Other forms of the NEP scores – NEP index and frequency in terms of ecological and non-ecological responses, confirmed the obtained result, in which women are more ecologically aware, and the difference is highly statistically significant.

Risk perception of ecological disaster

The indicator of this variable was item 10 of the NEP scale “The so-called ecological crisis facing humanity is greatly exaggerated,” in which women answered “Definitely not” much more often than men (52.6% of women vs. 26.8% of men). In turn, men agree with this thesis twice as often as women: 8.1% of men strongly agree, compared to 4.5% of women, and 16.7% of men surveyed tend to agree, compared to 5.3% of women (Chart 3).

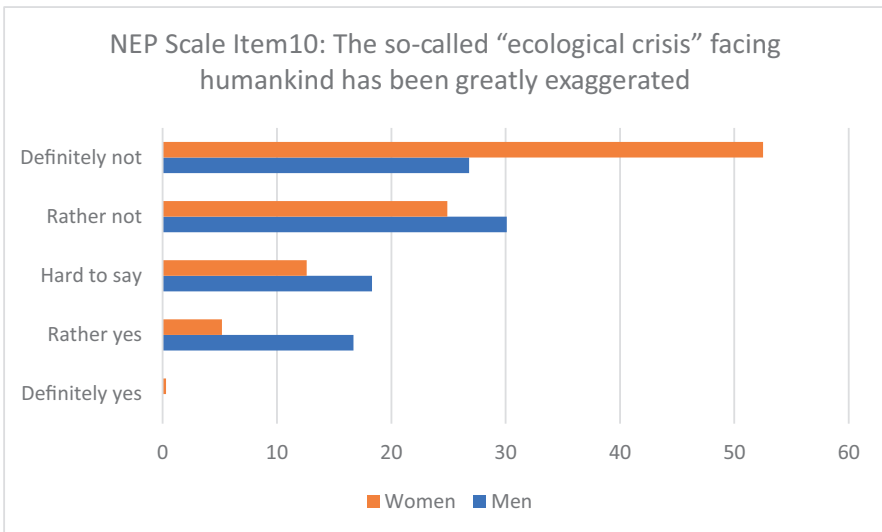


Chart 3. Gender differences in risk perception of ecological/environmental disaster measured by question 10 of the NEP scale

Source: Authors’ research.

Ecological behavior in the private sphere

The surveyed youth often behave pro-environmentally in their private lives. In the question concerning limiting consumption, resigning from buying new things, repairing old ones, and limiting the number of objects around them, only 3.8% indicated that they never do this. As many as 22.5% do it always, 47.2% often, and 24.2% – sometimes. Pro-environmental behaviors were more often shown by women than men. “Often” was indicated by 52.2% of the surveyed women, compared to 39.4% of the surveyed men.

Even greater differences appeared in the question about diet. 12.6% of respondents always give up meat (does not buy/eat) – 18.1% of women and 4.1% of men; 13.4% do it often (15.7% of women and 9.8% of men), and a further 30.3% do it sometimes (34.4% of women compared to 24.0% of men). 40.2% never take such action.

Only 4.1% of the respondents do not eat/buy dairy products always without exception; 12% do it often, 24.7% sometimes; 55.8% never give up dairy products. Women are also more eco-friendly here. In the “often” category, there were 17.1% of the surveyed women compared to 4% of the surveyed men, in the “sometimes” category – 27.8% of the women compared to 19.9% of the men.

Slightly smaller gender differences were revealed in the question “I save water, electricity, petrol.” A very large group of respondents save raw materials and energy (30.8% always, 42.9% often, 19.3% sometimes). The biggest differences were in the “always” category – it was marked by 71.0% of the surveyed women and 29.0% of the surveyed men.

Transport as a category of ecological behavior was not differentiated in terms of gender. The category “always” was chosen by 17.3% of the respondents, “often” – by 24.4% of the respondents, and 31.4% chose ecological transport “sometimes.” In turn, the use of organic cleaning products instead of chemicals in the household is a common behavior among the respondents. While only 12.1% of the respondents always do it, 24.4% do it often, and 31.4% of the respondents sometimes. One in five never use organic cleaning products. Here too, ecology is the domain of women. There are 13% more of

them in the “always” category, 33.5% more in the “often” category, over 35% more in the “sometimes” category. A similar pattern of behavior and gender differences was observed in the case of questions about eco-consumerism (buying seasonal, local, organic products) and financial support for environmental organizations.

Environmental activism

The indicators of this variable were questions about participation in the Youth Climate Strike, supporting environmental campaigns and organizations online (liking, sharing), signing pro-environmental petitions, creating ecological content (e.g. posts), activity in non-governmental organizations and leading organizations and actions. Respondents had the choice of answer options: always, often, sometimes, hard to say, never.

To the question “Have you participated in the Youth Climate Strike or other pro-ecological protests/manifestations?”, 78% of the respondents answered “No” (Chart 4). Men were more likely to be inactive in this area: 86.6% of the surveyed men did not participate in protests compared to 70.2% of women.

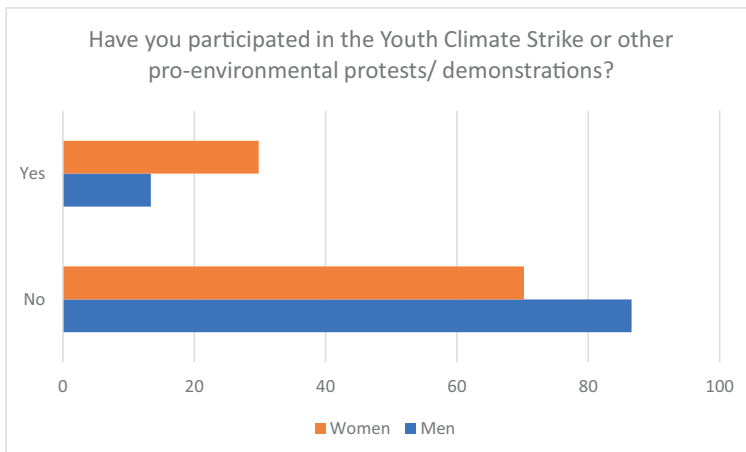


Chart 4. Gender differences in environmental activism (participation in the Climate Strike or other environmental protests)

Source: Authors' research.

Among the 22% of respondents who took part in pro-environmental manifestations and protests, women predominated. Almost 30% of the surveyed women were in this group compared to 13.4% of the surveyed men. Gender differences were statistically significant at $p < 0.001$.

In the next two questions regarding online activity, women showed a more pro-ecological attitude, which is illustrated in Chart 5. They liked, shared pro-ecological content and signed petitions several times more often than men; in turn, the category “never” gathered men three times more often than women. As many as 40.7% of the surveyed men and only 14.2% of women indicated that they never like or share pro-ecological information; the situation is similar in the question of signing a petition. Differences were statistically significant at $p < 0.001$.

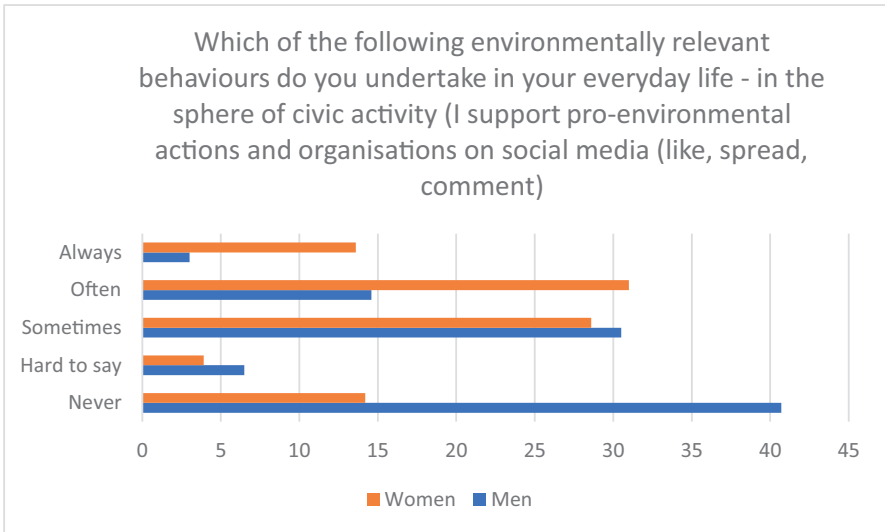


Chart 5. Gender differences in environmental activism (supporting environmental organizations online)

Source: Authors' research.

Creating ecological posts turned out to be a less frequent activity among the respondents. Only 3.7% of them indicated that they always do it. The category “often” was marked by 4.6% of the respondents. The “sometimes”

category was chosen by 13.9% of the respondents, 16.8% of women and 9.3% of men. 70.7% of respondents never do it, including 78.0% of men and 65.9% of women. The differences are statistically significant at $p = 0.014$.

Over 70% of the respondents are not involved in non-governmental activities for the sake of ecology. As in the previous questions, gender differences are evident. The category “never” was marked by 80.5% of the surveyed men and 63.5% of the surveyed women. 16.0% of the surveyed women and 7.3% of the surveyed men are sometimes involved in non-governmental activities. Only 5.8% of the surveyed women do it often, compared to 4.5% of men. The smallest percentage of women (5%) are always involved, compared to 2% of men. The differences are statistically significant at the level of 0.001.

The respondents are the least likely to engage in leading pro-eco actions and organizations. As many as 76.7% of the respondents marked the category “never” – 82.5% of men and 73% of women (Chart 6). Just over 8% (8.1) do it sometimes – 9.4% of women and 6.1% of men. The category “often” was marked by 4.9% of the respondents (5.2% of women and 4.5% of men), and

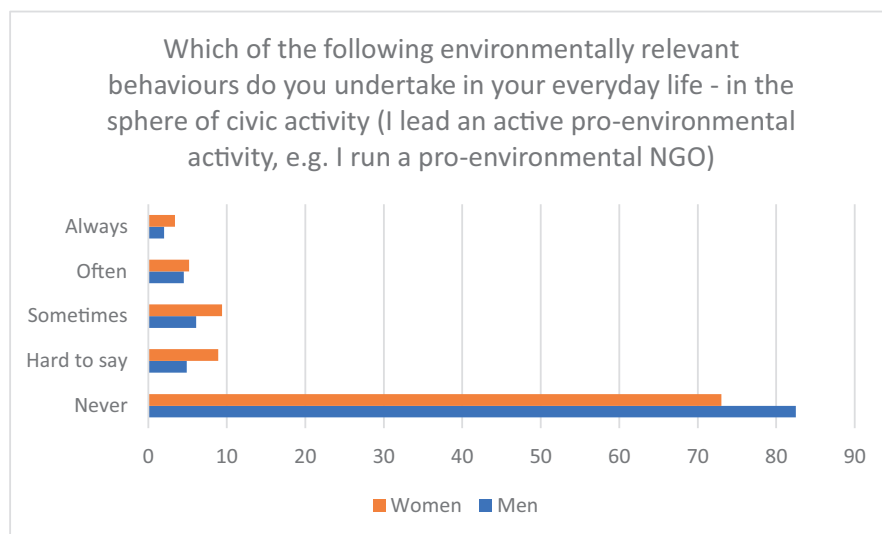


Chart 6. Gender differences in environmental activism (leadership of environmental organizations and actions)

Source: Authors' research.

the category of “always” was marked by 2.9% of the respondents, slightly more, i.e. 3.4% of the women surveyed, compared to 2.0% of surveyed men. The differences turned out to be statistically insignificant ($p = 0.08$).

A sense of agency

To the question “What impact do you have on preventing, reducing or reversing climate change?” only 12.6% of respondents answer “large.” As many as 69.1% indicated that they had little impact, and 13.2% believed that they had no impact on improving the climate situation at all; only 5.1% have no opinion on the matter. The results were strongly gender-differentiated. The answer “I have a lot of influence” was chosen by twice as many women as men: 16.0% of the surveyed women and 7.3% of men (Chart 7). The answer, “I don’t have influence” was chosen three times more often by men (21.5% of surveyed men and 7.9% of women). Differences between gender categories were statistically significant at $p < 0.001$.

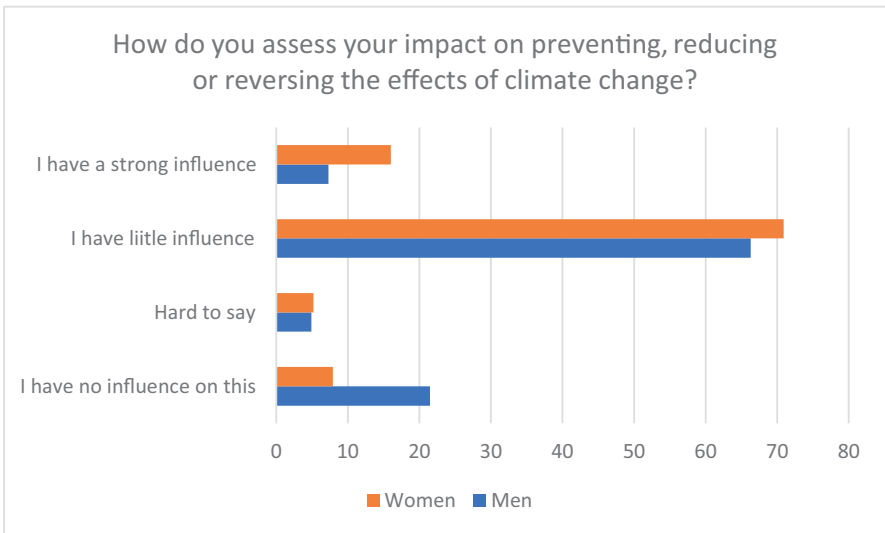


Chart 7. Gender differences concerning the sense of agency in tackling the climate crisis

Source: Authors' research.

Impact of institutions

In questions regarding the assessment of the impact of international organizations (UN), governments, business and citizens on overcoming the climate crisis, respondents marked their beliefs on a scale from 0 (no impact) to 5 (very high impact). The respondents showed the greatest trust in business. As many as 40.5% of the respondents marked the highest value of the scale – 5; value 4 – 22.2% of respondents. The Pearson chi-square test showed no statistically significant differences between the genders ($p = 0.13$).

According to the respondents, governments have slightly less driving power. High values of the scale were indicated by over 50% of respondents: value 5 – 32.2% of respondents, and value 4 – 23.6%. Gender differences were not statistically significant ($p = 0.243$). They were shown by questions about the influence of the UN and citizens. A total of 41.2% of respondents believe in the driving force of the UN (summed values of 4 and 5 on the scale), more than twice as many women as men (46.3% of women compared to 21.3% of men). Differences were significant at $p = 0.004$. On the other hand, about 1/3 of the respondents believe in the causative power of citizens. Women are almost twice as likely to think so. The upper end of the scale (value 5) was marked in this question by 27.2% of women and only 13.8% of men. The value 4 was marked by 19.5% of women compared to 13.0% of men. Zero influence of citizens was indicated by 9.8% of surveyed men and 5.9% of surveyed women; the value 1 was marked on the scale by 24.8% of men compared to 11.8% of women (Chart 8). Differences were statistically significant at $p < 0.001$.

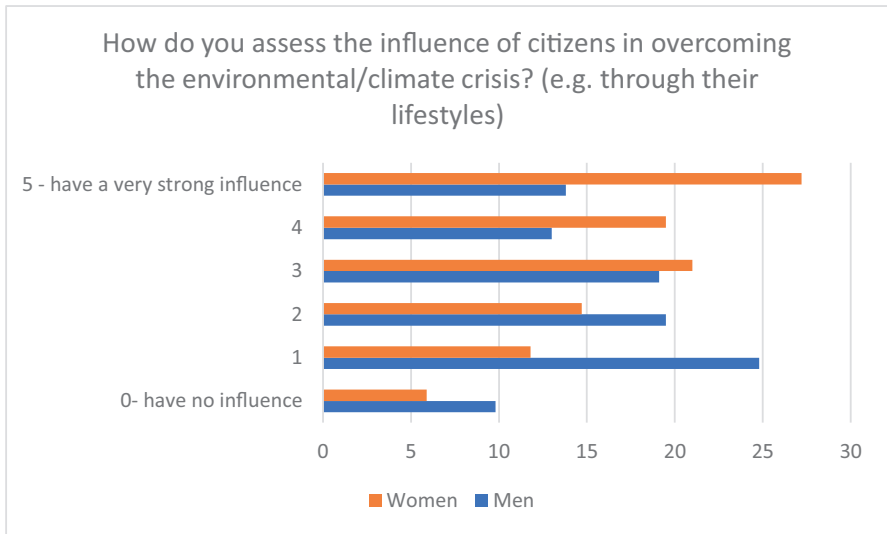


Chart 8. Gender differences in the assessment of the impact of citizens on tackling the climate crisis

Source: Authors' research.

Relationships between variables examining ecological knowledge and behavior and ecological awareness measured with the NEP scale

In the last stage of the analysis, a one-way analysis of variance of the results of the NEP scale (NEP Index – continuous variable) was performed in terms of nominal grouping variables, which were used to diagnose knowledge, risk perception pro-environmental behaviours, environmental activism and a sense of influence. In almost all cases, ANOVA revealed the following relationship: the higher the category of ecological behavior in the grouping variables, the higher the NEP Index score. E.g. For the variable *Ecological knowledge* measured by the question about the causes of climate change, people who correctly indicated anthropogenic factors as the main causes of climate change had the highest NEP scores (they were the most environmentally aware). Their NEP Index was = 0.68. The most incorrect answer “Only natural factors” was marked by people with the lowest average NEP score (NEP index = 0.46). People who indicated natural and anthropogenic factors equally, and those who had no opinion, obtained intermediate results on the NEP scale.

The other variables were characterized by the same pattern of dependence between the “greenness” of the category and the NEP score. Analysis of variance showed greater out-of-group differences than within-group differences; the results were significant at $p < 0.001$.

The 3 questions about environmental activism were the exception. In the question “I create and publish posts on ecological topics myself,” no statistically significant differences were found in the results of the NEP Index in relation to the variable category. For the next two variables of environmental activism – active participation in ecological organizations and actions and leadership of organizations and actions – the relationship was opposite to the previous one. The categories “always” and “often” were marked by people with the LOWEST scores on the NEP scale. Conversely, those who marked “sometimes,” “never,” or “don’t know” had the highest NEP scores.

Discussion

The obtained results, as a rule, confirm the gender difference in environmental awareness and activism observed in many studies. In the presented study, women showed higher ecological knowledge and awareness, more often than men indicated the seriousness of the threat of an ecological crisis, showed more pro-ecological behavior in private life, were more involved in ecological activism and had a greater sense of influence on the change of the climate situation and positive assessed the impact of international organizations and citizens on it. In some cases, gender differences were particularly notable. For example, the environmental awareness of the surveyed women was classified into the medium-high category, while men – medium-low, according to the nomenclature used by (Costache & Sencovici, 2019).

However, the generally high level of environmental awareness of the surveyed youth representing ICT and STEM should be emphasized. In the national sample from 10 years ago, described in Szostek’s work (2012) on the environmental awareness of Poles, the value of the NEP Index was 0.46 – almost 20 % less than in the Generation Z study presented here. This difference may be due to the passage of time: the last decade has been a period

of spectacular acceleration of both changes in the natural environment caused by the climate crisis, and policies aimed at preventing and adapting to climate change, such as the European “Green Deal” (*Delivering the European Green Deal*, n.d.) or the Polish *National ecological policy 2030* (*Polityka ekologiczna państwa 2030 – strategia rozwoju w obszarze środowiska i gospodarki wodnej*, n.d.). Intensive educational activities and the dissemination of the green transformation could have significantly influenced societal environmental awareness.

Another explanation may be the structure of the sample – the data quoted by Szostek came from international opinion polls, so they were representative for the whole of Poland, while in this study the sample is a small part of the national population, limited in terms of age (generation Z) and education (young people with the ICT sector). The lower age and better education of the respondents in this study, compared to a sample representative of the entire Polish population, may have influenced this difference, as young age and higher education positively correlate with the level of environmental awareness (Ostman & Parker, 1987; McMillan et al., 1997).

What is surprising, however, is not so much the lack of a relationship as the reversed direction of the correlation between environmental awareness and leadership in environmental organizations and actions. In our study, people most involved in leadership of environmental actions and organizations had the lowest scores on the NEP scale examining environmental awareness, while high NEP scores were characterized by those least involved in leading environmental groups. It is possible that this result is an artifact, a coincidence, and without confirmation of such a relationship, it is too early to theorize about the possible mechanism of this surprising relationship. If confirmed, it should be concluded that leadership qualities, commitment to leading groups, even for ecological purposes, for some reason conflicts with biocentric ecological awareness, which is indicated by high scores on the NEP scale.

An interesting thread for further exploration is also the high gender difference in the perception of the causes of climate change. Human responsibility was indicated by 71% of young people in our study – slightly less than in a similar study carried out at the Warsaw School of Economics, where an-

thropogenic factors were indicated by 74% of respondents (Kurowski et al., n.d.). The advantage of women among those giving the correct answer was over 15%: such an answer was given by almost 78% of the surveyed women compared to 61.0% of men.

The questioning of human responsibility for global warming and denial not only of climate change, but of scientific knowledge in general, is associated with right-wing populism (Kulin et al., 2021; Laferrière & Stoett, 1999; Stott, 2021, which is much more often supported by men than women (Gidengil et al., 2005; Givens, 2004; Spierings & Zaslove, 2015). The phenomenon in which scientific facts are omitted or discredited in the name of internal beliefs has been called post-truth and differs from ignorance, manipulation and lies by the supremacy of ideology over facts that can be freely ignored, selectively used in support of one's ideological beliefs, undermined, questioned, and present "alternative facts" as long as they support beliefs (McIntyre, 2018). The situation in which men more often become victims of the post-truth culture, uncritical followers of populist leaders, susceptible to the arguments of denialists, is socially dangerous, because they more often hold positions of power. As McIntyre (2018) notes, "When an individual is misinformed or mistaken, he or she will likely pay the price; wishing that a new drug will cure our heart disease will not make it so. But when our leaders – or a plurality of our society – are in denial over basic facts, the consequences can be world shattering" (p. 10).

We want to devote the final paragraphs of the discussion to observations on agency and discrepancy between ecological private-sphere behaviors and ecological public-sphere behaviors. These phenomena are, in our opinion, interrelated, and to reflect on the importance of gender differences in these areas is of utmost importance. As many as 82% of respondents are convinced that they have no or very little impact on preventing and counteracting the climate crisis. Only 12.6% of respondents, twice as many women as men, are convinced of their strong influence. Three times more men than women marked the lowest category of the variable: "I have no influence."

The majority of respondents, regardless of gender, are convinced that the effects of climate change can be mitigated thanks to business (63% of

respondents), and in the second place – government actions (55%). Only third and fourth place are international organizations such as the United Nations (40%) and actions of citizens (37%). In the latter two cases, women were more likely than men to believe in the causative power of an organization or group. Particularly when asked about the influence of citizens, the gender gap was large – almost twice as many women as men (47% vs. 27%). The low sense of self-efficacy or the efficacy of institutions appointed to improve the situation may be the answer to the question about the sources of inconsistency between frequent ecological behavior in private life and rare ecological activism. Young people apparently do not believe that anyone or anything can change the climate situation. Therefore, they implement their pro-ecological values in their private lives, over which they have control, without wasting time on what they cannot control. Women's higher sense of agency and faith in institutions may be related to their higher ecological involvement at the civic level.

The low involvement of men in environmental activism is a worrying result also because it is the citizens, through climate strikes and demonstrations, that exert bottom-up pressure on decision-makers to use the tools of power at their disposal and systemically change the situation. Many researchers in this area see citizens as the greatest chance to change climate policy (Stott, 2021; Dobson, 2003). The underestimation of these climate actors by those in power may be an obstacle to tackling climate change; in turn, the absence or insufficient presence of men in environmental movements deprives them of the diversity of perspectives needed to operate more effectively.

The above results and conclusions point to the need for environmental education, which should be enriched with elements related to building a sense of agency, developing skills in the field of active citizenship, and should be gender sensitive in order to equalize gender differences in knowledge, awareness and environmental commitment.

Conclusions

The gap in ecology observed in the research and the existing data on the scope and diversity of civic activity of young people, taking into account the difference in gender, allow an affirmative answer to the question posed in the title: Will women save the world? The ecological and climate crisis requires urgent action and activity on many levels of society. Women have a higher awareness of the ecological crisis, a more adequate risk perception, a greater belief in the possibility of change, and they show greater ecological activity both in the private and civic spheres. They also have more ecological knowledge and think more ecologically – further attributes useful in saving the world. The only thing they lack is formal power and tools of political influence that would make the mission to save the world a real future scenario. Therefore, in actions for ecological citizenship and activism, including formal and informal education, it is necessary to take into account the strengthening of women's position in this area – gaining and exercising power. Research leaves no doubt to whom the initiative in the ecological transformation of humanity belongs.

References

- Adler, R.P., & Goggin, J. (2005). What Do We Mean By “Civic Engagement”? *Journal of Transformative Education*, 3(3), 236–253, doi: 10.1177/1541344605276792.
- Anderson, M. (2012). New Ecological Paradigm (NEP) Scale. *Berkshire Encyclopedia of Sustainability*, 6, 260–262.
- Bardi, U., & Alvarez Pereira, C. (Eds.). (2022). *Limits and Beyond: 50 Years on from the Limits to Growth, What did We Learn and What's Next?: a Report to the Club of Rome*. Exapt Press.
- Berkowitz, A.R., Ford, M.E., & Brewer, C.A. (2005). A Framework for Integrating Ecological Literacy, Civics Literacy, and Environmental Citizenship in Environmental Education. In: E.A. Johnson, & M.J. Mappin (Eds.), *Education and Advocacy: Changing Perspectives of Ecology and Education* (pp. 227–266). Cambridge: Cambridge University Press.
- Bord, R.J., & O'Connor, R.E. (1997). The Gender Gap in Environmental Attitudes: The Case of Perceived Vulnerability to Risk. *Social Science Quarterly*, 78(4), 830–840.

- Brough, A.R., Wilkie, J.E.B., Ma, J., Isaac, M.S., & Gal, D. (2016). Is Eco-Friendly Unmanly? The Green-Feminine Stereotype and Its Effect on Sustainable Consumption. *Journal of Consumer Research*, 43(4), 567–582, doi: 10.1093/jcr/ucw044.
- CBOS. (2013). *Kobiety w życiu publicznym. Komunikat z badań* [Women in Public Life. Research Communication]. Warszawa: Centrum Badań Opinii Społecznej.
- CBOS. (2018). *Aktywność Polaków w organizacjach obywatelskich. Komunikat z Badań* [Activity of Poles in Civic Organizations. Research Communication]. Warszawa: Centrum Badań Opinii Społecznej.
- CBOS. (2018). *Polacy wobec zmian klimatu. Komunikat z Badań* [Poles Towards Climate Change. Research Communication]. Warszawa: Centrum Badań Opinii Społecznej.
- CBOS. (2020). *Świadomość ekologiczna Polaków. Komunikat z Badań* [Environmental Awareness of Poles. Research Communication]. Warszawa: Centrum Badań Opinii Społecznej.
- CBOS. (2021). *Preferencje partyjne najmłodszych wyborców i ich ewolucja w ostatnich dwóch dekadach. Komunikat z Badań* [Party Preferences of the Youngest Voters And their Evolution over the Past Two Decades. Research Communication]. Warszawa: Centrum Badań Opinii Społecznej.
- Chmura-Rutkowska, I., & Kozłowska, A. (2022). *Young Values. What Kind of World does the Part of the Z Generation Representing the Area of ICT and STEM want?* Warszawa: Perspektywy Women in Tech. Retrieved 21 March 2023 from: <https://womenintech.perspektywy.org/documents/raport-mlode-wartosci-2022-en.pdf>.
- Chmura-Rutkowska, I., & Mazurek, M. (2019). (Nie)widzialne różnice. Gender [(In) visible Differences. Gender]. In: K. Szafraniec (Ed.), *Młodzi 2018. Cywilizacyjne wyzwania. Edukacyjne konieczności* [Youth 2018. Civilizational Challenges. Educational Necessities], (pp. 128–145). Warszawa: A PROPOS. Retrieved 21 March 2023 from: <http://mlodzi2018.pl/>.
- Costache, A., & Sencovici, M. (2019). Age, Gender and Endorsement of the New Ecological Paradigm. In: *19th International Multidisciplinary Scientific Geo-Conference SGEM* (pp. 11–22). Retrieved 21 March 2023 from: https://www.researchgate.net/publication/334742406_AGE_GENDER_AND_ENDORSEMENT_OF_THE_NEW_ECOLOGICAL_PARADIGM.
- Dean, H. (2001). *Green Citizenship* [online]. London: LSE Reserach Online. Retrieved on 24 May 2023 from: <http://eprints.lse.ac.uk/353/>.
- Dietz, T., Kalof, L., & Stern, P.C. (2002). Gender, Values, and Environmentalism. *Social Science Quarterly*, 83(1), 353–364, doi: 10.1111/1540-6237.00088.

- Dobson, A. (2003). *Citizenship and the Environment*. New York: Oxford University Press.
- Dobson, A., & Bell, D. (Eds.). (2006). *Environmental Citizenship*. London–Cambridge, Massachusetts: MIT Press.
- Dunlap, R., & Liere, K. (2008). The ‘New Environmental Paradigm.’ *The Journal of Environmental Education*, 40, 19–28, doi: 10.3200/JOEE.40.1.19-28.
- Dunlap, R., Liere, K., Mertig, A., & Jones, R. (2000). Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale. *Journal of Social Issues*, 56, 425–442, doi: 10.1111/0022-4537.00176.
- European Commission. Delivering the European Green Deal. (n.d.). Retrieved 3 June 2022 from: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en.
- European Commission. (1998). *Education and Active Citizenship in the European Union*, Luxembourg: Office for Official Publications of the European Communities. Retrieved 21 March 2023 from: <https://op.europa.eu/en/publication-detail/-/publication/b33ea18c-355e-4fa5-bee6-cc07194831ad>.
- European Social Survey (ESS)* [online]. ESS Data Portal. Retrieved 21 March 2023, from: <https://www.europeansocialsurvey.org/data>.
- Faustini, P. (2014). *The Challenges of Climate Change: Children on the Front Line, Innocenti Insights*. Florence: UNICEF Office of Research. Retrieved 21 March 2023 from: <https://www.unicef-irc.org/publications/716-the-challenges-of-climate-change-children-on-the-front-line.html>.
- Fuchs, D.A., Gumbert, T., Sahakian, M., Maniates, M., Lorek, S., & Graf, A. (2021). *Consumption Corridors: Living a Good Life within Sustainable Limits*. New York: Routledge/Taylor & Francis Group.
- Funk, P., & Gathmann, C. (2015). Gender gaps in Policy Making: Evidence from direct democracy in Switzerland. *Economic Policy*, 30(81), 141–181, doi: 10.1093/epolic/eiu003.
- Fuszara, M. (Ed.). (2013). *Kobiety, wybory, polityka* [Women, Elections, Politics]. Warszawa: Instytut Spraw Publicznych.
- Giddens, A. (2011). *The Politics of Climate Change*. Cambridge, UK–Malden, MA: Polity Press.
- Gidengil, E., Hennigar, M., Blais, A., & Nevitte, N. (2005). Explaining The Gender Gap in Support for the New Right: The Case of Canada. *Comparative Political Studies*, 38(10), 1171–1195, doi: 10.1177/0010414005279320.

- Givens, T.E. (2004). The Radical Right Gender Gap. *Comparative Political Studies*, 37(1), 30–54, doi:10.1177/0010414003260124.
- Kennedy, K.J. (2007). Student Construction of ‘Active Citizenship’: What does Participation Mean to Students? *British Journal of Educational Studies*, 55(3), 308–324, doi: 10.1111/j.1467-8527.2007.00381.x.
- Kinowska-Mazaraki, Z. (2015). “Można zakasać rękawy.” *Aktywność obywatelska kobiet w środowisku lokalnym* [“You Can Roll up your Sleeves.” Women’s Civic Activism in the Local Environment]. Warszawa: Instytut Studiów Politycznych PAN, Oficyna Naukowa.
- Kopińska, V. (2019). Szkoła jako miejsce antyedukacji obywatelskiej [School as a place of civic anti-education]. In: K. Szafraniec (Ed.), *Młodzi 2018. Cywilizacyjne wyzwania. Edukacyjne konieczności* [Youth 2018. Civilizational Challenges. Educational Necessities], (pp. 149–161). Warszawa: A PROPOS. Retrieved 21 March 2023 from: <http://mlodzi2018.pl/>.
- Kozłowska, A., Chmura-Rutkowska, I., Buchnat, M., Cybal-Michalska, A., Cytlak I., Jaskulska, S., Kanclerz, B., Marciniak, M., Myszk-Strychalska, L., Szafran, J., & Wawrzyniak-Beszterda, R. (2022). Deficit of Nature as a Manifestation of a Hidden Curriculum of the School. *Poznan Educational Studies 2021. Polish Journal of Social Rehabilitation*, 24, 451–465, doi: 10.22432/pjsr.2022.24.28.
- Kozłowska, A. (2023). Zastosowanie skali NEP do badania świadomości ekologicznej młodzieży akademickiej [An application of the NEP Scale in Studying Environmental Awareness of Academic Youth]. *Lubelski Rocznik Pedagogiczny*, 42(2), 93–116, doi: 10.17951/lrp.2023.42.2.93-116.
- Krzywosz-Rynkiewicz, B., & Zalewska, A. (2017). Measuring Young People’s Citizenship Activity. *Citizenship Teaching & Learning*, 12(2), 141–150, doi: 10.1386/ctl.12.2.141_1.
- Krzywosz-Rynkiewicz, B., & Zalewska, A. (2015). Aktywność obywatelska polskiej młodzieży w relacji do innych Europejczyków i w zależności od fazy adolescencji [Citizenship activity of Polish Youth in Relation to Other Young Europeans and Adolescence Stages]. *Psychologia Rozwojowa*, 20(4), 11–23, doi: 10.4467/20843879PR.15.019.4462.
- Kulin, J., Sevã, I.J., & Dunlap, R.E. (2021). Nationalist Ideology, Rightwing Populism, and Public Views about Climate Change in Europe. *Environmental Politics*, 30(7), 1111–1134, doi: 10.1080/09644016.2021.1898879.
- Kurowski, Ł., Rutecka-Góra, J., & Smaga, P. (n.d.). *Co Polacy wiedzą o zmianach klimatu i czy podejmują ograniczające je działania?* [What do Poles know about climate change and are they taking mitigating actions?]. Gazeta SGH.

- Retrieved 22 March 2023 from: <https://gazeta.sgh.waw.pl/aktualnosci/co-polacy-wiedza-o-zmianach-klimatu-i-czy-podejmuja-ograniczajace-je-dzialania>.
- Laferrière, E., & Stoett, P.J. (1999). *International Relations Theory and Ecological Thought: Towards a Synthesis*. London–New York: Routledge.
- Lister, R. (2008). Od intymności do globalności: refleksje nad płciowym wymiarem obywatelstwa [From Intimacy to Globality: Reflections on the Gender Dimension of Citizenship]. In: E.H. Oleksy (Ed.), *Tożsamość i obywatelstwo w społeczeństwie wielokulturowym* [Identity and citizenship in a multicultural society]. Warszawa: Wydawnictwo Naukowe PWN.
- Marchlewska, M., Szczepańska, D., Furman, A., Górska, P., Molenda, Z., Michalski, P., Rogoza, M., & Maison, D. (2020). *Aktywizacja obywatelska młodych Polek i młodych Polaków. Raport z badań psychologicznych* [Civic Activation of Young Polish Women and Young Poles. Psychological Research Report]. Warszawa: Instytut Psychologii PAN. Retrieved 21 March 2023 from: https://psychopol.psych.pan.pl/images/Raporty/DIALOG_raport.pdf.
- McIntyre, L.C. (2018). *Post-truth*. Cambridge: MIT Press.
- McMillan, M., Hoban, T., Clifford, W., & Brant, M. (1997). Social and Demographic Influences on Environmental Attitudes. *Journal of Rural Social Sciences*, 13(1). Retrieved 21 March 2023 from: <https://egrove.olemiss.edu/jrss/vol13/iss1/5>.
- Meadows, D.H., Meadows, D.L., Randers, J., & Behrens, W.W. (Eds.). (1972). *The Limits to growth: A report for the Club of Rome's project on the predicament of mankind*. Washington: A Potomac Associates Book.
- Meadows, D.H., Randers, J., & Meadows, D.L. (2004). *The limits to growth: The 30-year update*. White River Junction, Vermont: Chelsea Green Publishing Company.
- Nelson, J., & Kerr, D. (2006). Active Citizenship in INCA Countries: Definitions, Policies, Practices, and Outcomes. INCA International Review of Curriculum and Assessment Frameworks Internet Archive. Retrieved 21 March 2023 from: <https://www.nfer.ac.uk/media/2104/qac02.pdf>.
- Obermiller, C., & Isaac, M.S. (2018). Are Green Men from Venus?: ¿Los hombres verdes son de Venus? *Journal of Management for Global Sustainability*, 6(1), 45–66, doi: 10.13185/jm2018.06103.
- Ostman, R.E., & Parker, J.L. (1987). Impact of Education, Age, Newspapers, and Television on Environmental Knowledge, Concerns, and Behaviors. *The Journal of Environmental Education*, 19(1), 3–9, doi: 10.1080/00958964.1987.10801954.
- Ministry of Climate. (2019). *The 2030 National Environmental Policy. Annex to the Resolution No. 67 of the Council of Ministers of 16 July 2019 (Item 794)*. Retrieved

- 19 January 2022 from: <https://bip.mos.gov.pl/strategie-plany-programy/polityka-ekologiczna-panstwa/polityka-ekologiczna-panstwa-2030-strategia-rozwoju-w-obszarze-srodowiska-i-gospodarki-wodnej/>.
- Portney, K.E. (2015). *Sustainability*. London, England: The MIT Press.
- Putnam, R.D. (2000). *Bowling alone. The Collapse and Revival of American Community*. New York: Simon & Schuster.
- Reports – IPCC. (n.d.). Retrieved 21 March 2023 from: <https://www.ipcc.ch/reports/>.
- Ruff, C., & Olson, M. (2009). The Attitudes of Interior Design Students Towards Sustainability. *International Journal of Technology & Design Education*, 19(1), 67–77, doi: 10.1007/s10798-007-9038-0.
- Schild, R. (2016). Environmental Citizenship: What Can Political Theory Contribute to Environmental Education Practice? *Journal of Environmental Education*, 47(1), 19–34, doi: 10.1080/00958964.2015.1092417.
- Siemieńska, R. (Ed.). (2005). *Płeć, wybory, władza* [Gender, Elections, Power]. Warszawa: Wydawnictwo Naukowe Scholar.
- Spierings, N., & Zaslove, A. (2015). Gendering the Vote for Populist Radical-Right Parties. *Patterns of Prejudice*, 49(1–2), 135–162, doi: 10.1080/0031322X.2015.1024404.
- Stott, P. (2021). *Hot air: The Inside Story of the Battle Against Climate Change Denial*. London: Atlantic Books.
- Sustainable development – EU actions | European Union. (n.d.). Retrieved 21 March 2023 from: https://european-union.europa.eu/priorities-and-actions/actions-topic/development-and-cooperation_pl.
- Szafranec, K. (2011). *Raport. Młodzi 2011* [Report. Youth 2011]. Warszawa: Kancelaria Prezesa Rady Ministrów.
- Szafranec, K. (Ed.). (2019). *Młodzi 2018. Cywilizacyjne wyzwania. Edukacyjne konieczności* [Youth 2018 Civilizational Challenges. Educational Necessities]. Warszawa: A PROPOS. Retrieved 21 March 2023 from: <http://mlodzi2018.pl/>.
- Szafranec, K., & Wernerowicz, M. (2017). Obecność młodych w sferze publicznej [Presence of Youth in the Public Sphere]. In: K. Szafranec, J. Domalewski, K. Wasielewski, P. Szyborski, & M. Wernerowicz (Eds.), *Zmiana warty. Młode pokolenia a transformacje we wschodniej Europie i Azji* [Changing of the guard. Young generations and transformation in Eastern Europe and Asia], (pp. 99–248). Warszawa: Wydawnictwo Naukowe Scholar.
- Szostek, M. (2012). Świadomość ekologiczna polskiego społeczeństwa [Environmental Awareness of the Polish Society]. In: A. Jasińska-Kania (Ed.), *Wartości*

i zmiany. Przemiany postaw Polaków w jednoczącej się Europie [Values and Change. The Transformation of Poles' Attitudes in a Unifying Europe], (pp. 243–261). Warszawa: Wydawnictwo Naukowe Scholar.

Veeh, Ch.A., Plassmeyer, M., Nicotera, N., & Brewer, S.E. (2019). A Combined Measure of Civic Engagement for Use Among Emerging Adults. *Journal of the Society for Social Work and Research*, 10(1), 13–34, doi: 10.1086/701948.

Zelezny, L.C., Chua, P.-P., & Aldrich, C. (2000). New Ways of Thinking About Environmentalism: Elaborating on Gender Differences in Environmentalism. *Journal of Social Issues*, 56(3), 443–457, doi: 10.1111/0022-4537.00177.