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Who Cares? Attitudes of High School Students From Various Countries Towards Global and Domestic Environmental Issues

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Abstract

This study focused on attitudes of 16 year-old students from six countries towards environmental issues on domestic and global scales. Male and female students from China, Guinea, Japan, Malaysia, Ukraine and Vietnam expressed their level of concern about the following in regard to their country and the world: (a) air quality, (b) drinking water quality, (c) pollution caused by atomic power plants, (d) clearing of forests, (e) extinction of plants and animals, (f) climate change and (g) global disaster. This research focused on gender and cultural variability and invariance under diverse conditions of students' backgrounds.

The most pronounced intercultural regularity found was the prioritization of certain issues. In all countries, both genders showed similar priorities when assessing global and domestic environmental issues. The differences were mainly in the level of anxiety expressed towards environmental problems. While in some countries the level of concern expressed by girls was higher than that of boys, there was no such pattern across all cultures. Only in Japan were the ratings given by boys higher when comparing to those of girls.

Another intercultural regularity was that the level of concern about the world's environmental problems listed above is higher for both genders than about own country with exceptions of specific pressing national problems.

Keywords: Adolescents, attitude, culture, environmental issues, gender

Who Cares? Attitudes of High School Students From Various Countries Towards Global and Domestic Environmental Issues

A connection and mutual influence between humans and their environment can create and destroy cultures. Early highly developed civilizations partly owe their achievements to favourable environmental conditions. In contrast, those who happened to live in unfavourable ones could regress. For example, Yakut, a traditionally nomadic culture presently residing in northern Russia, may have had writing forms, which were gradually forgotten when the environmental conditions became more severe (Yakut, 2018).

While the environment nourishes and provides humans with all necessities, it also poses dangers; natural disasters have occurred frequently throughout history. Modern technologies allow the prediction of such events to some extent, but they still may produce an enormous impact on cultures and even civilization as a whole. For example, the tsunami in South-East Asia in 2004 affected 14 countries and therefore had a profound effect on people all over the world. In old times, when disasters occurred without a warning and resulted in devastation, they were attributed to supernatural powers, such as mythical beings. In modern times, researchers have found that the influence of humans on their environment could contribute to their decline, such as on Rapa Nui (Easter Island) and in other places.

There are many examples of humans having failed to recognize and prevent dangers in the environment while also using it to an uncontrollable extent. Even now, we fail to recognize such dangers and often even prefer to do so. For example, while there is a compelling evidence of climate change, still many in the general public, even among politicians and scientists, continue to deny it and the role of industry in this phenomena. There are many reasons why people avoid analyzing and recognizing the risks of environmental pollution. One of the main reasons is that this recognition has to lead to action towards an environmental protection that may be difficult and costly to implement while also requiring significant changes in the ways of modern life.

To survive and let some of 'nature' survive, it is crucial to study and understand the environment, its regularities, our perception of it and the reasons for this perception. The attitudes of people from different localities, ethnicities and countries towards environmental issues should be studied in depth. These attitudes reflect a wide variety of regularities that are both fundamental, such as biological, and specific to nations and cultures. They are interconnected on many levels creating a complex pattern of local, ethnic and global views based on physiology and psychology, gender, national identity, history of culture, economy and so on. These views evolve and develop with time and under certain conditions, especially with changes in the environment.

Sometimes natural events on an enormous scale produce a major impact on civilization, thus changing the national and international 'psychology,' and possibly the course of history. Recent examples of such events are the Chernobyl accident, the tsunami in Asia in December of 2004 and the earthquake and tsunami in Japan in March of 2011. For instance, a systematic review of literature on psychological effects of the Fukushima

accident has concluded, based on nearly 60,000 cases, that a substantial proportion of the affected individuals experienced considerable psychological distress resulting in posttraumatic stress disorder, depression, anxiety symptoms, physical health changes and others (Harada et al., 2015). Since then, a public opinion on the safety of nuclear energy and possibilities of disaster prediction and prevention has changed substantially. The Chernobyl accident not only affected mental and physical health of thousands of people in the USSR and other countries (Danzer & Danzer, 2016; Havenaar, De Wilde, Van den Bout, Drottz-Sjöberg, & Van den Brink, 2016), but possibly changed the course of history. In particular, politicians, including M. Gorbachev, and researchers attributed the USSR collapse mainly to the Chernobyl disaster (Stern, 2013).

A significant number of studies, including major international projects, have explored the attitudes of international youth towards environmental problems (Atav, Altunoglu, & Sonmez, 2017; Hedlund-de Witt, De Boer, & Boersema, 2014; Martin et al., 2008; Martin, Mullis, Foy, & Stanco, 2012; Tucker & Izadpanahi, 2017). An example of a profound survey, while only partly focused on the perception of the environment, is the Relevance of Science Education (ROSE) project (Schreiner & Sjöberg, 2005; Sjöberg & Schreiner, 2008, 2010). A number of issues have been clarified by researchers as contributing to sociology, psychology and gender and cultural studies, among other domains. In particular, the ROSE project, based on results from over 30 countries, concluded that environmental issues are important for both genders, but more for females. In particular, girls, more than boys, agree that people should care more about protection of the environment and believe that they personally can influence what happens with the environment. Boys, more than girls, think that environmental problems are exaggerated and think that experts should cope with them. Boys also more often think that science and technology can solve all environmental problems. Girls believe that each individual makes a difference in terms of the environmental protection, and boys are more skeptic (Sjöberg & Schreiner, 2010).

Hedlund-de Witt and colleagues (2014) developed a survey on the basis of the Integrative Worldview Framework and administered it to over 1000 participants. The authors concluded that intrinsically oriented worldviews correlated with pro-environmental attitudes, while extrinsically oriented ones correlated with less environmental attitudes. In general, three major worldviews were found: traditional, modern and postmodern.

The TIMSS project, as a framework for the evaluation of adolescents' achievements in science, among others, studied students' understanding in major environmental issues among a wide range of countries (Martin et al., 2008, 2012). Meyers-Levi and Loken (2014) outlined three main theories on gender differences. The first is the social-cultural theory. It suggests that sexes have adopted social different roles, and these roles have inspired a development of believes related to males and females. The second, the evolutionary theory, implies that human beings have programs that were developed as a part of evolution, and these programs can be observed in the behaviour of present-day people. The third theory contributes to the other two as it studies biological differences in present-day males and females (brain, hormonal, etc.).

However, more research on students' perceptions of the environment and environmental issues is necessary in order to understand their various aspects, especially how age, gender, culture, ethnicity and other factors shape them. In particular, it would be valuable to investigate the attitudes towards environmental problems on various scales (global, national, local, etc.) of youth from different areas and backgrounds. Depending on the scale (global, domestic, local, etc.) and respondents' backgrounds (urban, rural, etc.), environmental problems may be perceived differently, and therefore, the level of concern expressed towards them may vary significantly. In research, however, participants are often asked to express their perception of such without any details.

This study explores the influence of gender and culture on the attitudes of international youth towards environmental issues, both domestically and globally. Such research would improve the present body of knowledge in gender and cultural studies, in particular in perception and empathy. Research in this area showed that females in average are more empathetic. For example, a study conducted among adults by Baron-Cohen and Wheelwright (2004) confirmed that women scored significantly higher in empathy than men. Another study on the empathy in relation to science enrollment has made several interesting findings. In particular, it concluded that empathy was a stronger predictor than gender for subject major enrollment. Authors suggested that low social skills and cognitive empathy predicted physical science enrollment. In contrast, high affective empathy predicted life science and social science enrollment. Students with majors in physical science and humanities did not differ in affective empathy (Thomson, Wurtzburg, & Centifanti, 2015).

Therefore, it is supposed that girls would express a higher level of concern towards environmental problems. This assumption is also based on the reports showing higher ratings of female students in a number of questions covering environmental issues and challenges (Sjoberg & Schreiner, 2008, 2010). However, the ROSE project did not explore adolescents' concern for particular environmental problems, which is the objective of this study. The objectives of the research were as follows:

Objective 1: to conduct a comparison of attitudes of male and female students from different cultures towards a number of environmental issues of domestic and global scales, i.e., of students' native countries and the world.

Objective 2: to identify consistent patterns in students' answers that characterize the influence of gender and culture.

Methods

Materials

This research was conducted through a survey (a questionnaire). Firstly, respondents had to indicate their gender and age. Then, they were asked to evaluate the level of concern about seven kinds of environmental issues in regard to own country (domestic scale) and the world (global scale). The issues were listed in the following order:

- a) air quality;
- b) drinking water quality;

- c) pollution caused by atomic power plants;
- d) clearing of forests for other land use;
- e) extinction of plants and animals;
- f) climate change;
- g) global disaster.

In contrast to others, the last issue (the 'global disaster') was not specified. Therefore, it could have a range of meanings and be interpreted differently depending on participants' nationality, gender, personal experience, etc. For example, students from Japan expressed a concern over earthquakes, tsunamis and a nuclear accident. Many students from Ukraine interpreted the 'global disaster' as a climate change with catastrophic consequences, such as continuous droughts, extremely cold and prolonged winters and so on.

Respondents were asked to express the level of concern by Linkert scale in the range from 1 to 4: (1) no concern, (2) a little concern, (3) a moderate concern, (4) a deep concern.

Participants

The participants in this study were 200 (100 male, 100 female) 16 year-old 2nd year high school students. Students from at least three schools from each country (both public and private) were included in the study.

Procedure

Schools and teachers in six countries were contacted by various means of communication, for example by e-mail or in person, and asked to participate in the survey.

The following criteria for data collection were designated with a purpose to have a representative pool of answers. Schools that were engaged in the research had to be those providing a general science education, i.e., not specialized in sciences, including environmental and life studies. A minimum of three public and private schools from each country were to be studied. Schools from various locations with different population densities had to be covered. One school from an area with a high population density (a capital or a major city) and one from a rather rural area were to be engaged. If a country had several major ethnic groups, students from all of them were to be involved in the survey.

The original questionnaire was designated in English. The author and colleagues from participating countries translated it into their respective languages. Formats of questionnaires in all languages were identical.

Copies of the questionnaire and instructions were sent by postal packages to the schools that agreed to participate in the research. If schools requested cover letters for students, such letters with an explanation about the research and instructions were added to the copies of the questionnaire. Teachers who participated in the study administered the questionnaires to students in their classes and collected them afterwards.

The results were delivered to the author by postal packages or scanned and sent by e-mail. In several cases, the documents were delivered to the schools and received by the author in-person. When the author received the results, 200 copies filled by students from all participating schools were randomly selected and analysed for each country.

Malaysian example

As an example, the data collection process in Malaysia is described below in detail. A list of public and private schools in Malaysia was identified using school directory information for this country. Fifteen schools were selected in different parts of the country and contacted by e-mail. From them, three schools answered positively to the invitation to participate in the survey. One school was located in Kuala Lumpur, the second one in Malacca (a city located approximately 150km south of Kuala Lumpur, population 485 thousand). The third one was a rather rural school located in Kedah State, approximately 400km north of Kuala Lumpur.

The schools had students from at least three ethnicities of Malaysia, i.e., Malay, Malaysian Chinese and Malaysian Indians. All three schools provided a general science education. The schools in Kuala Lumpur and Malacca were private; the school in Kedah State was public. The school in Kuala Lumpur was visited by the author, and the school in Kedah State was contacted through a teacher with whom the author met while visiting that area. The school in Malacca city was contacted only by e-mail.

The survey was conducted by the teachers, and the results were sent by an international postal service to the author. From the received results, 200 copies representing all three schools were randomly selected and analysed.

Results and Discussion

The summarized results of the survey from all countries are presented in Table 1. Respondents were asked about seven environmental issues.

Chinese High Schoolers (see Figure 1)

The attitudes of genders were similar in trends in regard to both own country and the world (see Figure 1).

Girls' concern level was slightly higher than that of boys towards all measured environmental issues, but the difference was mostly insignificant.

In regard to own country, both boys and girls expressed a moderate level of concern of five issues: air and water quality, clearing of forests, extinction of plants and animals and climate change.

Interestingly, both genders were the least concerned about a possible nuclear pollution in their country, which has nearly 60 nuclear power reactors in operation and under construction. More are being planned with a purpose to increase the nuclear capacity in the next several decades. This approach is pursued due to the air pollution from coal-fired plants. While China has substantially relied on nuclear energy, it has also tried to meet the world's highest standards in nuclear safety. With several agencies, both domestic and

Table 1
Students' Attitudes Towards Environmental Issues

Country	Boys						
	<i>a</i> 1	<i>b</i> 2	<i>c</i> 3	<i>d</i> 4	<i>e</i> 5	<i>f</i> 6	<i>g</i> 7
CN1	3.05	3.09	2.34	2.99	2.98	2.92	2.76
CN2	2.64	2.78	3.04	2.95	3.10	3.27	3.26
GN1	2.81	3.04	2.06	2.86	2.56	2.86	2.29
GN2	3.30	3.46	2.86	2.74	2.83	3.37	3.09
JP1	2.82	2.62	3.18	2.81	2.74	2.84	3.18
JP2	3.05	3.03	3.06	3.16	3.06	3.06	3.17
MY1	3.17	2.97	2.53	3.21	3.13	3.18	2.81
MY2	3.17	3.08	2.93	3.32	3.26	3.35	3.29
UA1	3.25	3.39	3.26	3.17	3.12	3.04	2.94
UA2	3.13	3.31	3.29	3.18	3.28	3.13	3.28
VM1	3.21	3.39	2.60	3.21	3.26	3.30	3.49
VM2	3.52	3.46	3.27	3.44	3.43	3.56	3.58
	Girls						
CN1	3.34	3.30	2.87	3.19	3.24	3.26	3.15
CN2	3.07	3.13	3.18	3.09	3.30	3.39	3.34
GN1	2.61	3.21	2.13	2.85	2.67	2.89	2.68
GN2	3.05	3.32	2.74	2.84	2.82	3.13	3.23
JP1	2.81	2.47	3.05	2.76	2.81	2.83	3.12
JP2	2.85	2.85	2.84	2.92	3.00	2.88	2.81
MY1	3.24	3.11	2.68	3.23	3.37	3.18	3.09
MY2	3.43	3.33	3.20	3.40	3.57	3.36	3.55
UA1	3.31	3.49	3.16	3.18	3.19	2.83	2.89
UA2	3.15	3.31	3.44	3.13	3.51	3.10	3.28
VM1	3.18	3.40	2.72	3.20	3.00	3.35	3.50
VM2	3.54	3.38	3.45	3.34	3.31	3.60	3.45

* $p < 0.05$, ** $p < 0.01$. Notes: CN-Canada; GN-Guinea; JP-Japan; MY-Malaysia; UA-Ukraine; VM-Vietnam; Students' attitudes towards environmental problems in regard to their country are marked by '1' and in regard to the world by '2.' The values range from 1 - no concern, 2 - a little concern, 3 - a moderate concern, to 4 - a deep concern. Issues: (a) air quality; (b) drinking water quality; (c) pollution caused by atomic power plants; (d) clearing of forests for other land use; (e) extinction of plants and animals; (f) climate change; (g) global disaster.

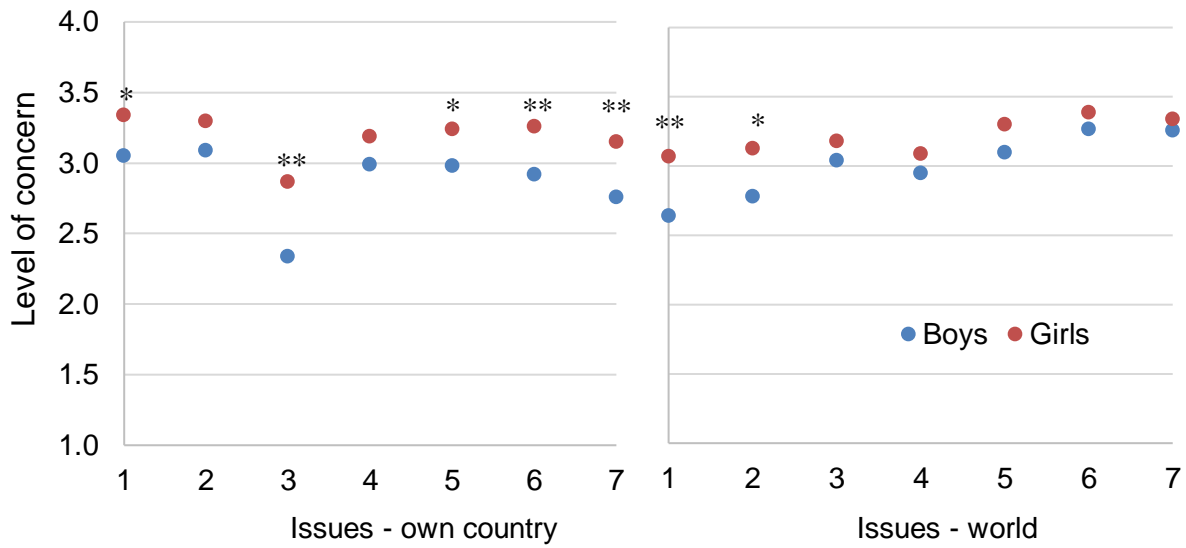


Figure 1. **China**: Concern about own country (left side) and about the world (right side); Issues: (1) air quality; (2) drinking water quality; (3) pollution caused by atomic power plants; (4) clearing of forests for other land use; (5) extinction of plants and animals; (6) climate change; (7) global disaster. * $p < .0.5$; ** $p < .01$.

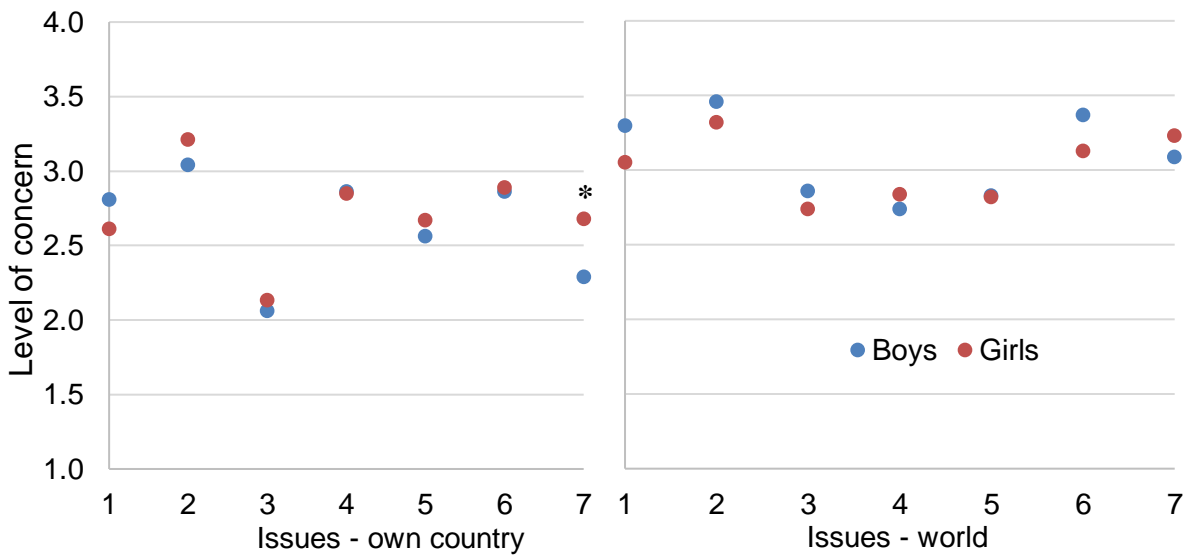


Figure 2. **Guinea**: Concern about own country (left side) and about the world (right side); Issues: (1) air quality; (2) drinking water quality; (3) pollution caused by atomic power plants; (4) clearing of forests for other land use; (5) extinction of plants and animals; (6) climate change; (7) global disaster. * $p < .0.5$.

international, performing safety checks of power plants, the nuclear power in China may be evaluated by citizens as a rather safe energy source. Therefore, students may have a lower level of concern in this regard.

In regard to the world, the most concerning issues were the extinction of plants and animals, climate change and a global disaster.

On issues of the air and water quality, both genders were more concerned in regards to their native country (air quality: M boys = 3.05, M girls = 3.34; water quality: M boys = 3.09, M girls = 3.3) when compared to the world (air quality: M boys = 2.64, M girls = 3.07; water quality: M boys = 2.78, M girls = 3.13). In d) clearing forests, the level of concern in relation to both categories was almost the same (boys: M country = 2.99, M world = 2.95; girls: M country = 3.19, M world = 3.09). On issues of the nuclear pollution, species extinction, climate change and global disaster the concern about the world was higher.

Guinean High Schoolers (see Figure 2)

The attitudes of genders are very similar in trends at both global and domestic scales. The only significant difference was observed in regard to the risk of a global disaster in own country where girls showed a higher level of concern.

In regard to own country, both genders expressed the highest level of concern towards the drinking water quality (M boys = 3.04, M girls = 3.21). The lowest level of concern was shown towards the pollution caused by atomic power plants (M boys = 2.06, M girls = 2.13), possibly as there are no such in Guinea.

In regard to the world, the highest level of concern was also expressed towards drinking water quality (M boys = 3.46, M girls = 3.21), with air quality, climate change and global disaster following it.

Interestingly, students were more concerned about environmental issues on the global scale than on the domestic one, with only one exception of d) clearing of forests.

Japanese High Schoolers (see Figure 3)

The attitudes of genders were similar in regard to both own country and the world. The only significant difference is towards a global disaster in the world where boys showed a higher level of concern. At the same time, interestingly, only in Japan did male students show a slightly higher level of concern over all listed issues except one. Possibly a larger sample size could provide a more pronounced difference or confirm a similarity of genders' assessments.

In regard to own country, both genders expressed the highest level of concern towards c) pollution caused by atomic power plants (M boys = 3.18, M girls = 3.05) and g) global disaster (M boys = 3.18, M girls = 3.12). The survey was conducted 3 years after the major earthquake that triggered a tsunami and caused the Fukushima accident. The high awareness of participants about such environmental issues is explainable by these events. Unfortunately, such data prior to the accident are unavailable, while their comparison would be of considerable interest. Among environmental issues on the domestic scale, students were rather less concerned about the quality of drinking water (M boys = 2.62, M girls = 2.47). In Japan, this issue does not receive as much attention as others included into the

present survey, as many areas of this country have an abundance of fresh water.

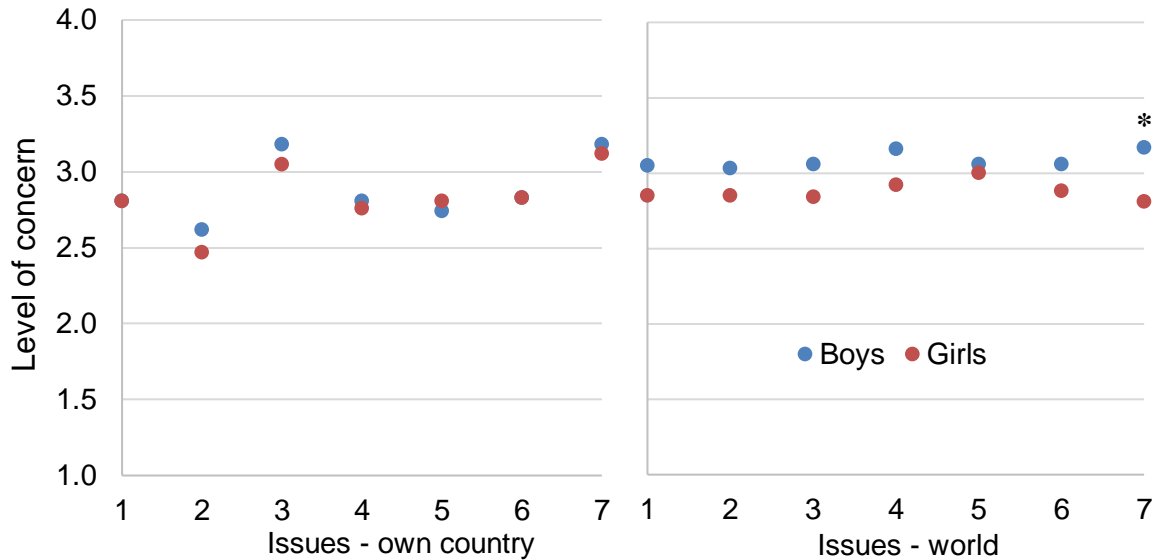


Figure 3. **Japan:** Concern about own country (left side) and about the world (right side); Issues: (1) air quality; (2) drinking water quality; (3) pollution caused by atomic power plants; (4) clearing of forests for other land use; (5) extinction of plants and animals; (6) climate change; (7) global disaster. * $p < .05$.

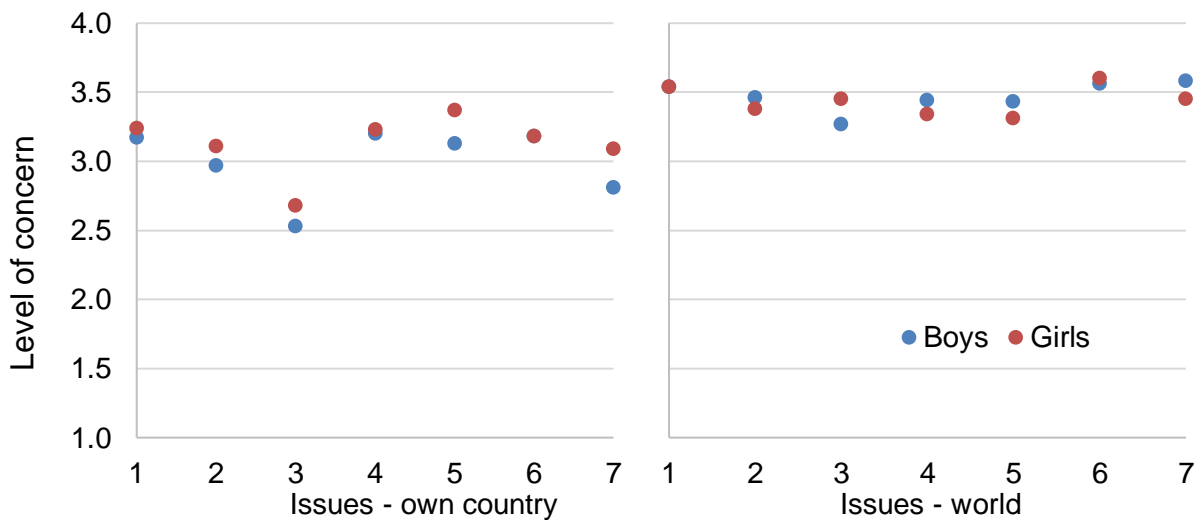


Figure 4. **Malaysia:** Concern about own country (left side) and about the world (right side); Issues: (1) air quality; (2) drinking water quality; (3) pollution caused by atomic power plants; (4) clearing of forests for other land use; (5) extinction of plants and animals; (6) climate change; (7) global disaster.

At the global scale, the difference in attitudes between issues was minor, with a slightly higher concern of girls towards extinction of species and of boys towards clearing of forests and a global disaster.

Students appeared to be more concerned about environmental issues on the global scale than on the domestic one, with exceptions of a nuclear pollution and a global disaster. While for girls in several issues the difference was minor, for boys it was more pronounced.

Malaysian High Schoolers (see Figure 4)

The attitudes of genders were very similar in trends in regard to environmental issues of both own country and the world. However, girls appeared to be more concerned about 5 out of 7 issues on the global scale.

In regard to own country, both genders expressed similar attitudes towards a number of issues (a), d), e), f) for boys and all except the nuclear pollution for girls. The lowest level of anxiety was shown towards the pollution caused by atomic power plants (M boys = 2.53, M girls = 2.68), possibly as there are no such in Malaysia.

In regard to the world, both genders also expressed similar levels of concern towards most of the issues.

Students were more worried about environmental issues on the global scale than on the domestic one, with only one exception of a) air pollution for boys.

Ukrainian High Schoolers (see Figure 5)

The attitudes of genders were very similar in trends at both scales.

In regard to own country and the world, both genders expressed similar levels of concern towards most of the issues.

Similarly to their peers in China, Guinea and Malaysia, both boys and girls from Ukraine were more worried about a possibility of a global disaster for the world than for own country.

Students appeared to be more concerned about species extinction, climate change and global disaster at the global scale than at the domestic one. For girls it was so for nuclear pollution, too. It was the opposite for air and drinking water quality, i.e., students appeared to be more worried about domestic issues.

Vietnamese High Schoolers (see Figure 6)

The attitudes of genders were almost the same in trends in regard to both own country and the world.

Similar levels of concern were expressed towards most of the issues. with the only substantial difference in regard to nuclear pollution on the domestic level. In Vietnam, there are no atomic power plants, and in 2016 the government decided to stop preparations for their operation after several decades of planning.

Interestingly, students appeared to be rather concerned over a risk of a global disaster at the domestic level. While respondents were not asked to provide more information on this

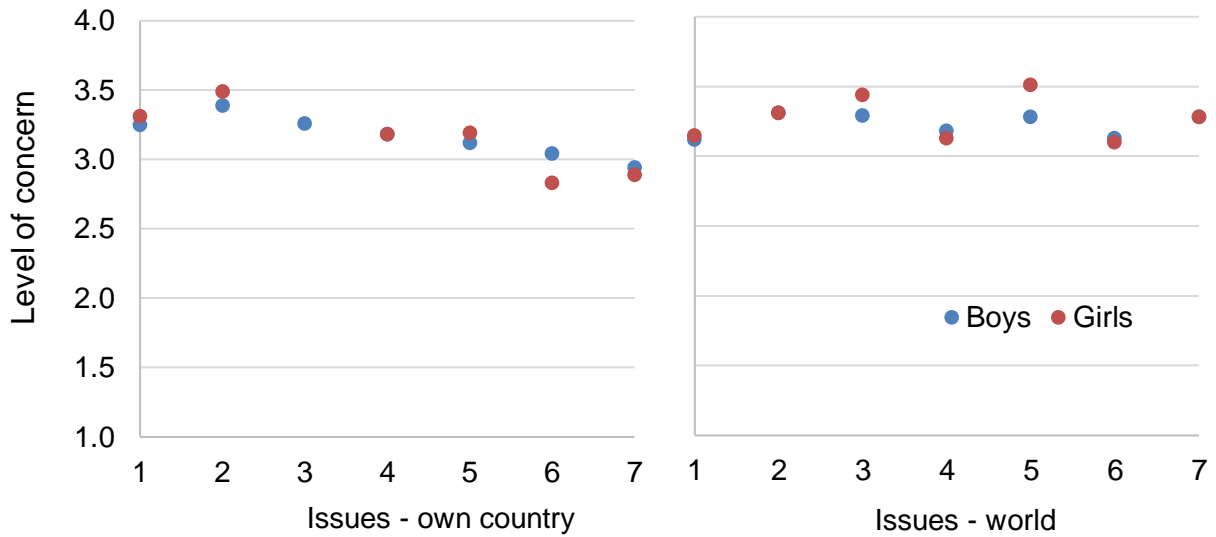


Figure 5. **Ukraine:** Concern about own country (left side) and about the world (right side); Issues: (1) air quality; (2) drinking water quality; (3) pollution caused by atomic power plants; (4) clearing of forests for other land use; (5) extinction of plants and animals; (6) climate change; (7) global disaster.

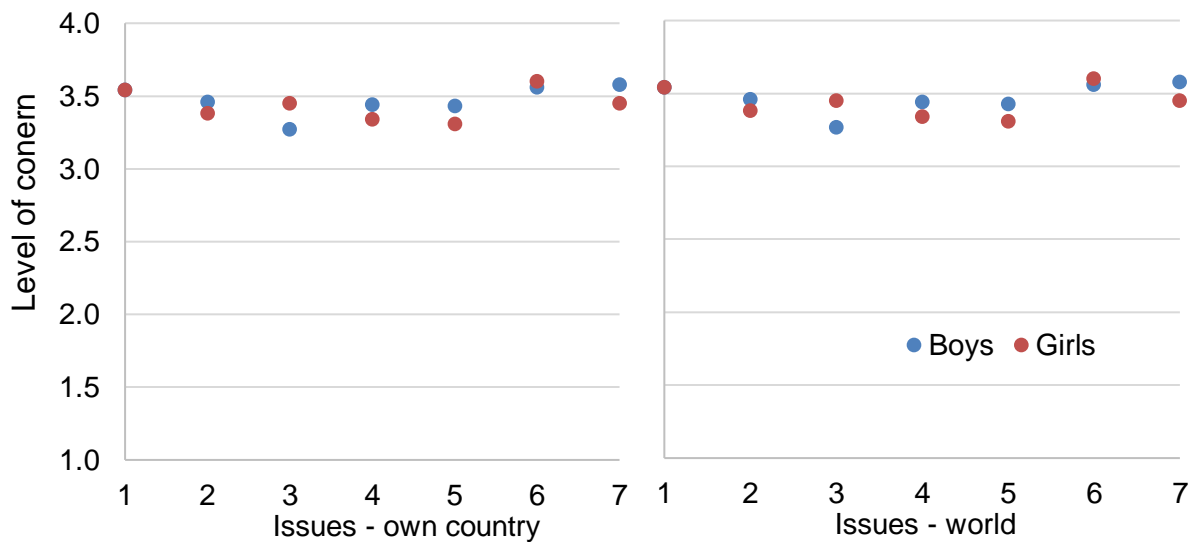


Figure 6. **Vietnam:** Concern about own country (left side) and about the world (right side); Issues: (1) air quality; (2) drinking water quality; (3) pollution caused by atomic power plants; (4) clearing of forests for other land use; (5) extinction of plants and animals; (6) climate change; (7) global disaster.

question, some of them expressed a concern over floods in the Mekong delta and a possibility of major earthquakes and tsunamis.

Students appeared to be more concerned about environmental issues on the global scale than on the domestic one. The exceptions were for drinking water quality and a global disaster in which the difference was minor.

General results

The trends of students' answers were very similar for both genders in each country. The differences were mostly in the level of concern. Therefore, within a particular country genders appeared to have similar priorities, but somewhat differ in the intensity of emotions expressed towards them.

The level of concern of girls was higher than that of boys about all issues (in regard to the country and the world) in China. The same pattern is present in Malaysia, but the ratings of genders are equal in regard to 'climate change.' In Guinea, Ukraine and Vietnam the gender difference varies between measurements. Interestingly, only in did Japan male students show a slightly higher level of concern for all listed issues except one. The difference, however, was insignificant and unclear in some cases. Possibly, a larger sample size could produce a clearer insight into this pattern.

In general, for both genders concern about the world was higher than about own country. Exceptions were present for: a) air quality (China, Ukraine); b) drinking water quality (China); c) pollution caused by atomic power plants (Japan). The difference in some cases is unclear. For example, in Ukraine and Vietnam regarding the drinking water quality, in China and Ukraine regarding clearing forests and in Vietnam regarding the global disaster. It is obvious that when students show a higher concern at the domestic level than at the global one, the issues are specific and pressing for these nations. For example, air and water pollution are known to be especially severe in China.

While reasons of students' generally higher concern over global issues were not questioned, several explanations may be applied. For example, unfamiliarity and lack of specific knowledge of global issues might contribute to higher anxiety and concerns over them when compared to domestic ones. Also, the variability in ratings across issues was larger for national issues than for global ones, which likely reflects students' lack of specific knowledge of global issues.

Conclusions

The most pronounced intercultural regularity observed in this survey was the prioritization. In all participating countries both male and female students appeared to have similar priorities when assessing global and domestic environmental issues. If gender differences occurred, they were mainly in the intensity of emotions expressed, not in the difference of priorities.

It was initially supposed that females would express a higher level of concern over environmental issues than males. The results, however, only supported this presumption for two countries (China and Malaysia) out of six. Therefore, it was not confirmed at the intercultural level. Only in Japan may the level of concern of girls be lower than that of boys. However, to either confirm or reject this finding, a larger sample of answers is needed.

A rather surprising intercultural regularity was that the level of concern about the world's environmental issues was higher for both genders than about one's own country. Exceptions can be found for specific pressing national problems. It is considered that unfamiliarity and lack of specific knowledge of global issues might contribute to higher anxiety and concerns over them.

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