An International Survey Initiative on "Students, Consumption and Environment"

NARRATIVE REPORT

A Seed Grant Project of the Brown International Advanced Research Institute (BIARI) on Climate Change

Implemented by:

Funded by:

November 2012 – June 2014

I. Rationale

The climate change issue is a complex global problem directly involving the awareness and understanding of society, in order to raise participation level, policy making and adaptation strategies in all sectors. In this context, the effectiveness of public and private undergraduate Environmental education could play an important role. Assessment of student's awareness regarding the co-relation of their consumption habits and Environmental problems that can lead to global warming seems to be a crucial matter, as well as the further development of tools and methodologies. These students may soon be in charge of policies and decisions in their respective countries and the issues of environmental education, communication and participation of these students in climate change actions and polices are closely intertwined.

The inspiring survey "Students, Consumption and Environment was conducted in 2011 among 1250 students from private Universities in Rio de Janeiro, Brazil and presented at BIARI 2012. In the survey these students confirm that environment is an important issue for them, just after education and career. However, when making their purchasing decisions, environment is not considered a fundamental requirement. Although concerned, the surveyed are apparently responding to the expectations that approach them to political correctness, upheld by the media campaign. The work raises questions and provides trends on consumer actions, responsibility assignments and meanings attributed to consumption, citizenship and environment by young university students who will soon be assuming positions and making decisions in the job market and society, as well as opens new questions regarding the standards of education in other places in the world, in what concerns to environmental awareness and information.

Therefore, re-fining, adapting and expanding this survey to other countries offers a great opportunity for a long-term collaborative research fellow work, in which the main objective turns to be, besides the assessment of schools, a possibility to develop new ideas and communicational tools to raise students level of environmental information and participation in climate related issues.

II. Background

The three countries selected to start this world wide survey are Brazil, China and The Philippines.

Brazil is a giant country, with an area of 8.5 million km2 and 190,000 million people, occupying the lead of “mega diverse” among the world. It´s territory holds more them 13 of the planet´s species and the largest tropical rainforest in the planet. It also has the largest water reserve of the planet´s freshwater, especially in the Amazon Basin. Brazil is the largest country in South America and the fifth largest in the world, with 191 M people (IBGE 2010). Regarding under graduation numbers, we went from 3,5 M undergraduate students in 2002 to 6,2 M in 2012 (Instituto Popular 2012). Those numbers are still growing, and so are our climate change related events, specially flooding, which have been more and more common.

In the post Presidential PPA 2012-2015 is highlighted the importance of projects that mitigate or minimize the Environmental impacts caused by major constructions, population growth and supply chains (related to consumption growth). Law nº 7.795/1999 which deals with National Environmental education reinforces the importance of the efforts in this field. Our Government prepared a Climate Change Plan (PNMC) in 2008. Nevertheless, the Plan basically contains biodiversity protection actions and mitigation suggestions. In August 2012, the Government launched a new Plan, Risks and Natural Disasters, with investments of circa 9,4 Billion Dollars in prevention and co-related actions related to natural disasters, mostly towards communities at risk. However, the challenge remains at all levels and modalities of the educational process, in such way as to produce substantial changes in behaviors and habits. Environmental Education is not a mandatory discipline at Universities and although Brazilian Students are already aware of climate change, the research will show that they do not feel prepared for it.

Since China’s reform and opening-up in the late 1970s, this area has experienced rapid urbanization with fast economic development and population growth. As a result of this rapid development, various environmental problems such as air and water pollutions, municipal wastes, ecosystem segmentation and disruption are becoming increasingly severe. Climate change and its interactions with different Earth system components add another layer of complexity to this urbanization problem. On the other hand, with the fast economic

development the buying power and consuming pattern have experienced vast change. How much of this change has contributed to the undergoing environmental problems such as resource depletion or climate change? Do people think about their ecological and carbon footprint in their consumption decisions? Given China's huge population, its environmental awareness and attitudes toward climate change as well as personal contribution is vital in conserving the global carbon and ecological balance.

College students, as a class with rising social and economic status in the next few decades, their consumption needs and environmental awareness in large determines the society's attitude. In China, more than 6.5 million students graduate from college each year. This population will also soon become the parents, so their environmental awareness and world view will greatly impact those of the next generation. College education serves not only the harbor for them to seek knowledge, but also the place to establish and exchange their world attitudes and personal values.

Zhejiang University, located at the frontier of Yangzi Delta as one of the most populated and rich regions in East Asia, is in the unique geographic and financial position to take such study. At present, a total of more than 44,000 full-time students enrolled at Zhejiang University, including approximately 22,600 undergraduates. In addition, there are about 2,700 international students currently attending Zhejiang University. Graduates from the university are pursuing career and personal goals at different parts of the world as well as holding important positions at various sectors in China's society. The College of Environmental and Resource Sciences (CERS), established in June 1999 as one of the oldest and most known institute in China, is offering regular introductory environmental courses to over 500 freshmen each semester, plus summer school to the outstanding junior and senior college students across the nation. The proposed survey can serve as a tool to assess measure and propose new tools and methodologies to raise awareness, foster information exchange and participation in climate related issues.

The Philippines, as a developing country with a growing population, has had to contend with a host of environmental challenges, such as natural resource management, air and water quality management, solid waste management, biodiversity conservation, ecosystem rehabilitation, and land use planning. Climate change has also been recognized as a stressor, and current initiatives focus on mainstreaming climate change action planning into disaster

risk management, governance and development planning in general. Given limited resources, importance is given to actions that have several environmental, social and economic co-benefits in order to promote sustainable development pathways. Thus, viable solutions will require an understanding of the dynamics of the natural environment, the complexities of human society and a strong foundation in both the sciences and management.

The Ateneo de Manila University (ADMU), as Jesuit school that places itself in service of national development, has made addressing sustainability and environmental issues one of its top priorities. ADMU was the first and only to offer a Bachelor of Science degree in Environmental Science (BS ES) in the country. Other degree programs offered are the Master of Science in Environmental Science (MSES) and the Master in Environmental Management (MEM). Currently, the Department of Environmental Sciences is a Commission on Higher Education (CHED) Center for Development. The department strives to develop curricula that provide the holistic and interdisciplinary approach needed to meet today's challenges. In this way, the university hopes to instill at least an awareness and appreciation of the challenges involved in environmental protection and sustainable development.

The proposed survey "Students, Consumption and Environment", which "aims to understand the meanings given to environmental issues by university students", can serve as a tool to help our Universities to evaluate whether its goals for environmental education are being met, propose new tools and methodologies in environmental education, especially in what concerns consumption habits and their impacts on climate change issues.

In addition, since this will be an international initiative, it will help Universities involved to benchmark its performance against other universities around the world.

III. Objectives

Main Objective:

To assess and understand the meanings given to environmental issues by university students, comparing awareness, information level and environmental education in researched countries, launching a worldwide survey in a longer-term collaborative goal.

Specific Objectives:

- To develop a preliminary environmental education awareness assessment pilot framework (e.g. survey questionnaire) and cross-mediation methodology applied to environmental education.
- To help Universities involved benchmark their performance against other universities around the world
- To identify gaps that need to be bridged between perception and action towards climate change reduction through consumption habits
- To highlight new studies that can improve on climate change education and communication

IV. Activities and Methodology

The activities conducted under this project include the following:

1. Developing and adapting the survey to country context, translation, discussion and finalizing of survey protocol (e.g. rules for which student groups to target);
2. Coding online and pilot-testing with a small group;
3. Applying Actual online survey of target group;
4. Processing and report-writing of pilot group;
5. Discussing the needed changes for the enlarged survey;
6. Applying actual online survey of target group;
7. Gathering results of each country;
8. Discussing and analyzing results of each country separately;
9. Developing cross-mediation framework sections and methodology;
10. Applying cross-mediation to compare the results from the three countries involved;
11. Writing the results report and further recommendations;
12. Developing proposal for research publications and further studies;
13. Inviting other countries to join this conversation.

IV.1 Survey Design

The survey instrument was developed jointly by the three universities, based on the original survey of Dr. Trannin used in her dissertation work, "Students, Consumption and Nature Protection: 'Fashion is to Look Green'" and other sources. The questionnaire is organized into four parts:

1. Personal Information

This section collects basic information on the respondents such as their age, gender, course, year of study, whether they are also currently working, and whether they have taken courses related to the environment. This information will be used to create comparative analyses (e.g. contrasting responses of freshmen and sophomores vs. juniors and seniors, of those who have taken environmentally-related courses vs. those who have not).

2. Activities and Lifestyle

This sections aims to collect information describing the consumption profile and priorities of students. It includes questions on how students spend their time and money, and on their actual practices regarding diet, transport, energy usage, water usage, purchase of products and waste generation. In this section, there are a few differences in the questions among universities to account for cultural or contextual differences.

3. Perceptions of Impact

This section probes the students' perceived impacts of their activities and lifestyles. They are asked to gauge the extent (e.g. personal or family level, community-level, city level, etc.) and the type (e.g. social, economic, environmental) of impact their decisions might cause. They are also asked whether they are aware of their household's resource usage, and if the extent they consider their lifestyles to be environmentally-friendly. Lastly, students are asked who they feel should be responsible for taking care of the environment.

4. Attitudes and Beliefs on Climate Change

This section focuses on specifically on climate change, whether respondents believe it is happening, and if so, what may be causing it. Students are asked to identify what they feel is the most serious impact of climate change, the extent to which different units (e.g. family,

city, country) is affected, and whether these units are prepared. On a more personal level, students are asked to rate whether their lifestyle decisions and consumption habits contribute to the impacts of climate change. Lastly, students are asked for their top-rated sources of information on climate change and environmental information, and the level of trust in the different sources of communication.

IV.2 Pilot-testing and Implementation

The pilot survey was conducted online at the Universidade Estácio de Sá, Brazil, from January 20, 2013 until March 1, 2013 through SurveyMonkey (www.surveymonkey.com). A feedback section was added to the end of the survey to collect comments on the clarity and length of the survey and on any technical errors that may have been encountered. Students of different courses were asked to answer the survey. The main survey was implemented from April 2013 to September 2013. A sample of 208 valid questionnaires were collected. Highlights of survey results are summarized in in the Results section.

The pilot survey was conducted online at the Zhejiang University (ZJU), China, from January 20, 2013 until Feb 19, 2013 through SurveyMonkey (www.surveymonkey.com). A feedback section was added to the end of the survey to collect comments on the clarity and length of the survey and on any technical errors that may have been encountered. The main survey was implemented from March 2013 to June 2013, with the advertisement via "Save Energy and Reduce Emission" working group of ZJU. A sample of 481 valid questionnaires was collected. Highlights of survey results are summarized in the Results section.

The pilot survey was conducted online at the Ateneo de Manila University, Philippines, from January 20, 2013 until February 6, 2013 through SurveyMonkey (www.surveymonkey.com). A feedback section was added to the end of the survey to collect comments on the clarity and length of the survey and on any technical errors that may have been encountered. Students of different courses under a Science and Society class, the Environmental Science Society (ESS), and environmental science majors were asked to answer and disseminate the pilot survey among their networks. The main survey was implemented from February 18 to April 5, 2013 (the end of the school year) targeting undergraduate students of the ADMU Loyola Schools. A sample of 1,215 students out of the 8,154 enrollees was created by requesting for the email addresses of every 5^{th} student in an

alphabetized list of students per year level. These students were sent targeted emails and weekly reminders to participate in the survey. However, since not all who were emailed opted to complete the survey, flyers were also disseminated through email to faculty and online student groups. A few flyers were also posted in public places on campus. A sample of 441 were complete responses was collected. Highlights of survey results are summarized in in the Results section. Additional analyses were conducted by making comparisons between the groups (e.g. males vs. females, students who took environmental courses vs. those who did not, across year levels). These can be found in the attached full report from the Ateneo de Manila University.

IV.3 Cross-Country Comparisons

To evaluate the impacts of perceptions on sustainable lifestyle and behaviors, we conducted a multiple-mediation analysis to examine the difference in climate change perceptions and consumptive behaviors among the three countries. We have several putative mediators (M, as shown in Equ.1) to account for the relationship between the difference in national background (X) and lifestyle (Y), whose presence can explain the indirect effect of X to Y.

$$M_i = \alpha_i X + \varepsilon_i \qquad (1)$$

Substituting equation (1) into the equation describing the direct effect of X to Y (Equ. 2), we get another regression equation (3) to describe the relationship between X and Y. And the total effect (τ) is ultimately the sum of direct effect (τ') and indirect effect ($\alpha_i\beta_i$).

$$Y = \tau X + \varepsilon_X \qquad (2)$$

$$Y = \tau' X + \sum_{i=1}^{n} \beta_i M_i + \varepsilon \qquad (3)$$

The responses about lifestyle and perceptions were also digitalized into a scale from 1 to 5 (Gao et al, in preparation), and divided into two categories depending on the tendency of respondents' attitudes toward these factors. The first category, which we call the typical factors refers to factors traditionally associated with environmental issues such as water usage, energy usage and waste generation. The second category are those that also have environmental impacts but are less strongly associated by the students with the environment, such as mode of travel, diet and consumption of electric devices, we define them as Atypical factors.

V. Summary of Results and Discussion

The full results from each country are included as attachments to this narrative report. The major findings and insights from the implementation in each country are summarized here, with the sections on perceptions discussed prior to the section on actual consumption choices.

V.1. Brazil

In total, during the survey period, out of the 1200 students selected, only 148 have completed the survey and were therefore used in this analysis. Considering that in Department of Ecological Social Science in Rio de Janeiro main Campus we have circa 4.000 Students, we successfully completed the survey with 148 Students, this yields at a 95% confidence level.

Personal Information

Table V.1.: Year level of respondents at ESTACIO DE SÁ

Year Level	Response Percent
Freshman	10,6%
Sophomore	68,1%
Senior/Super Senior	21,3%

Table V.1.2: Gender of respondents at ESTACIO DE SÁ

Gender	Response Percent
Female	57.0%
Male	4.0%

Table V.1.3: Age of respondents at ESTACIO DE SÁ

Age	Response Percent
Below 17 years old	0,5%
17-19 years old	9,2%
20-22 years old	21,7%
23-25 years old	14,5%
26-30 years old	13,0%
31-40 years old	24.7%
Above 40 years old	16,4%

Over 68% of respondents are around the middle of their courses. 24% of the Students are between have 31 and 40 years old, 21.7% are younger, between 20-22 years old and 16,4% are above 40 years old. 66,7% have taken Environmental Science.

Attitude and Beliefs on Climate Change & Perceptions of Impact

In this section, respondents were asked to select the three top global challenges of today (Figure V.1.1). Poverty and social inequality ranked (73%), followed by Air, water and soil Pollution, including waste disposal (70%) are the main challenges to be faced. Climate Change is their fourth concern (22%).

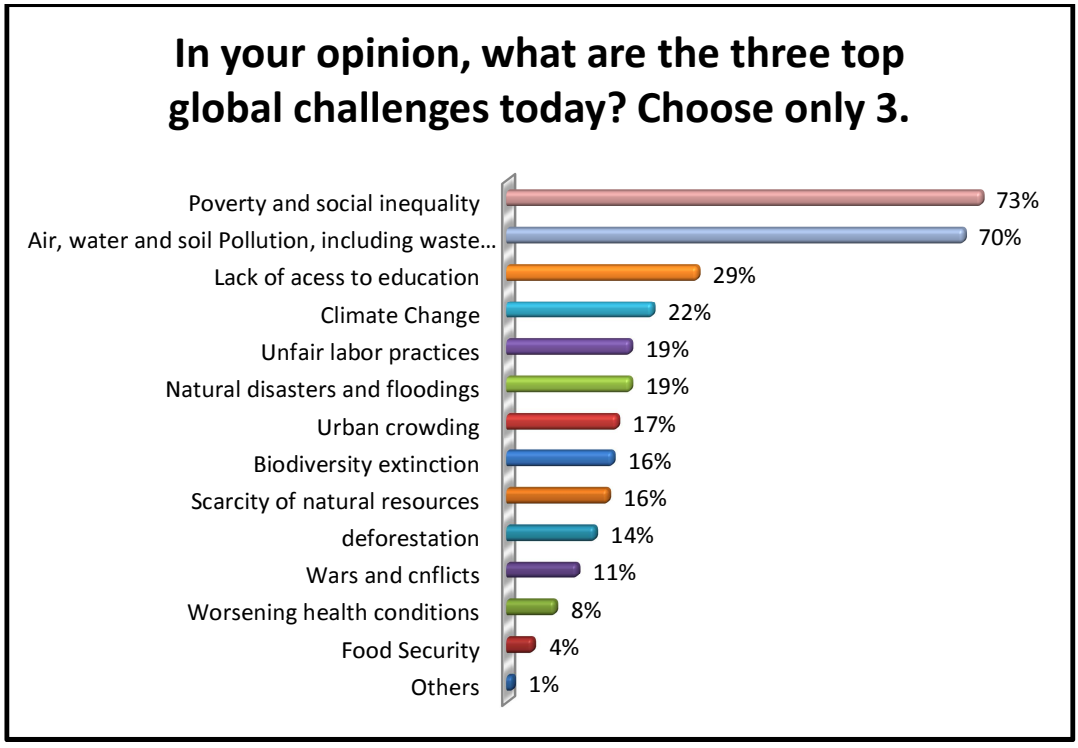


Figure V.1.1. ESTACIO DE SÁ Environmental Challenges

94,6% of the student population believe that climate change is happening, and more than half see this as being driven by both human and natural causes (53,1%). (Here again, Brazil seem to more worried about Climate Change but lack in perception of anthropogenic impacts, when compared to the Philippines).

Most (52.4%) are “moderately worried.” Most impacts, according to the results, will affect the city and the country (outside: not at an individual level), especially reducing Biodiversity and Food and Water Supplies. When the question extend to a Country level, so

to say, perceiving the most serious impacts of climate change in Brazil, they believe to be the risk posed by more frequent or severe extreme weather events (32,0%) followed by decreased capacity of ecosystem services (27,2%) and the loss of Biodiversity (18,4%). This result is very similar to the one in the Philippines.

Personal lifestyle choices regarding waste generation, energy and water usage were ranked as having more contribution than travel and food and electronics consumption (Figure V.1.2). Activities involved in study and recreation were mostly ranked as having "a little" impact, which calls for our attention, since they do not seem to recognise the water, energy and material resources used in this activities along the production chain.

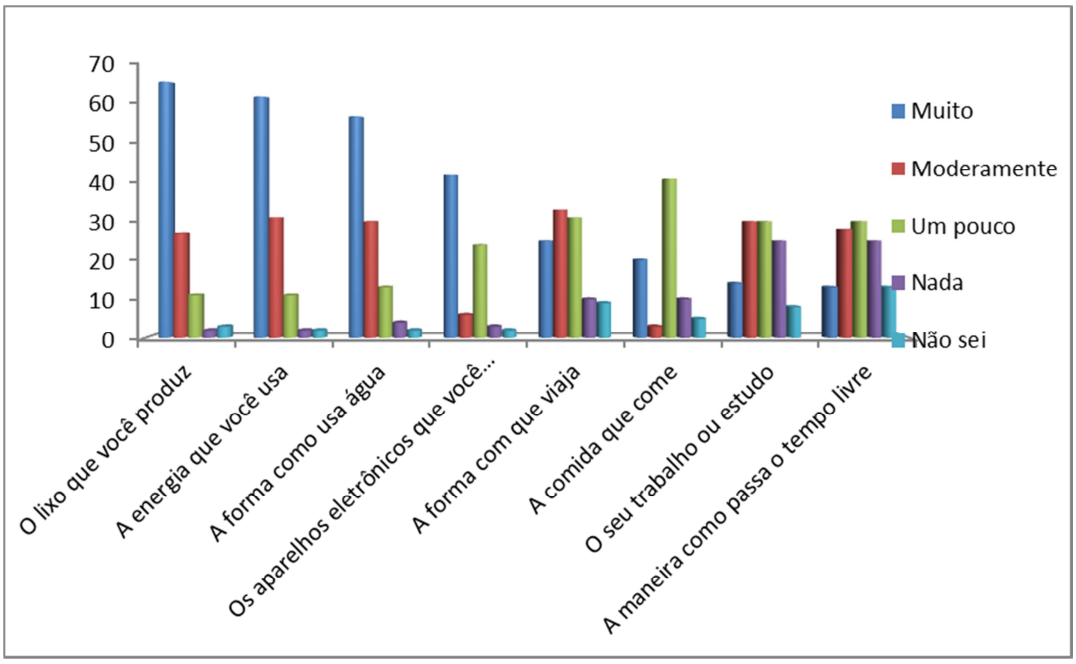


Figure V.1.2. ESTACIO DE SÁ Students contribution of your current lifestyle to Climate Change *. * From bottom left to right: The waste you produce; the energy you use; the water you consume; the electronics devices you use; the way you travel; the food you eat; working or studying; the way you spend your free time.

Codes: Blue – a lot; Red – moderate; Green – Nothing; Light Blue – I don´t know

When asked if they are prepared for Climate Change, in a Country, Community and City Level basis, the respondents point out that they are "Not prepared at all". Curiously, when the question lowers down to a Family based level or Individual level, the responses increase to "Somehow prepared".

When asked about their source of information for climate change and environmental issues and level of trust, Brazilian selected the internet, followed by television and newspapers as their main sources, but when it comes to trust, scientists and professors are the mostly cited.

Activities and Lifestyle

The results describe the typical lifestyle of a middle- to upper-middle-class undergraduate student of the Rio de Janeiro, Brazil. Students mostly spend their time studying/working, listening to music, singing or dancing, followed by Social Networking (such as Facebook, Twitter and Messenger). Most of them go to work by Public Transportation (54,4%), but still a large number uses a private car (27,2%).

Most people eat Meat and Poultry, followed by rice and beans. Beverages in plastic PET bottles are purchased a few times a week on average, mainly due to the lack of options other than PET bottles. Each day, most students take less than 10 minutes to shower and use air conditioning units 48,6% use air conditioning units everyday, for 5-8 hours. At home, approximately 65% do not practice waste segregation, because they claim to lack the support system (My community still does not have this Policy).

57% purchase a new mobile phone every two years, most cited reason is because the mobile phone they had is “Broken, lost or stolen”. 52,2% never bring your own canvass or paper bags when shopping, followed 34,4, that do it “sometimes”.

When asked what respondents do with their old or damaged belongings, the respondents answered that in the case of clothes and shoes, they give it for donation, while they try to repair electronics.

Price and quality are the general priorities in making purchases. Electronics such as celular phones and computers include and technology as a purchase decision factor; and the purchase of Clothing is driven by Fashion. Environmental Friendliness is the last factor considered in their purchasing decision.

When asked what factors would make them willing to spend more for a product, respondents cited quality of the product, health benefits and multi-purpose use. Only 36,1% considered the waste produced from the product and its packaging, followed by 33,9% that valued the ecological aspect of the product, and the environmental/social justice practices of the manufacturer.

General Results

Given the above results, the student respondents in Brazil believe that climate change is happening, in large part due to human activities, but do not correlate some of their actions to the increase of Climate Change. Also, their perception indicates that Climate Change is happening, but it will affect first the others, not themselves.

Their consumption habits (air conditioning use, use of private vehicles, purchase of beverages in PET bottles, AC use and others) are still carbon-intensive. Furthermore, although they consider their own lifestyle to be mostly environmentally-friendly, they choose their products by price and quality; mostly do not recycle and do not see the water consumption in their food diet that has meat as its the primary source. The environmental repercussions of personal choices did not seem to have factored significantly into the responses on perceptions of impacts. Poverty and social inequality, followed by Air, water and soil Pollution, including waste disposal are the main challenges to be faced. Climate Change is their fourth concern. The main impact of Climate Change will be on Populations at risk to more frequent or severe extreme weather events, followed by a Decreased capacity of ecosystem services.

The Government is identified as the primary responsible for taking care of the environment, yet is and their less trusted source of information. 70% are afraid of what may occur due to Climate Change in the following years, but feel little or not prepared at all for disasters that may occur as a consequence of Climate Change. In regard to Climate Change adaptation, which measures recommended to the Government and NGO´s include Preventive measures such as relocating communities at risk, Environmental Education at Public Schools, especially at risk areas and Risk communication and disaster preparedness through Television

To summarize, results from this survey seem to denote the following:

(1) Perception of climate change is high, but is not related to daily activities such as studying or working. There is little connection between theory and praxis, since the students do not segregate waste, do not consider the whole production chain in their analysis;

(2) Education might need to add new tools, and connect with social media; professors and science makers should make an effort to re-think how to impact these Students with help from these new media.

(3) That Public Authority in Brazil needs to consider their mistrust regarding Climate Change Policies, since they are considered the primary responsible actors, but the less trusted sources;

(4) That we need to rethink Environmental Education and Climate Communication effectiveness towards an improvement of participation and increase of citizenship responsibilities towards Climate Change issues.

V.2. China

Personal Information

There are 495 valid survey results. The number of freshmen, sophomore and junior or senior accounts for 37.4%, 38.3%, 13.9% and 10.4%, respectively. The share between female and male is 49.5% and 50.5%. 29.9% students work aside from studying. 14.3% students report they have taken some environment related courses. Only a limited number of students have taken professional courses like Environmental Science (12.3%) or Globalization and its Impact on the Environment (7.7%).

Table V.2.1: Year level of respondents at ZJU

Year Level	Response Percent
Freshman	37.4%
Sophomore	38.3%
Junior	13.9%
Senior/Super Senior	10.4%

Table V.2.2: Gender of respondents at ZJU

Gender	Response Percent
Female	49.5%
Male	50.5%

Table V.2.3: Age of respondents at ZJU

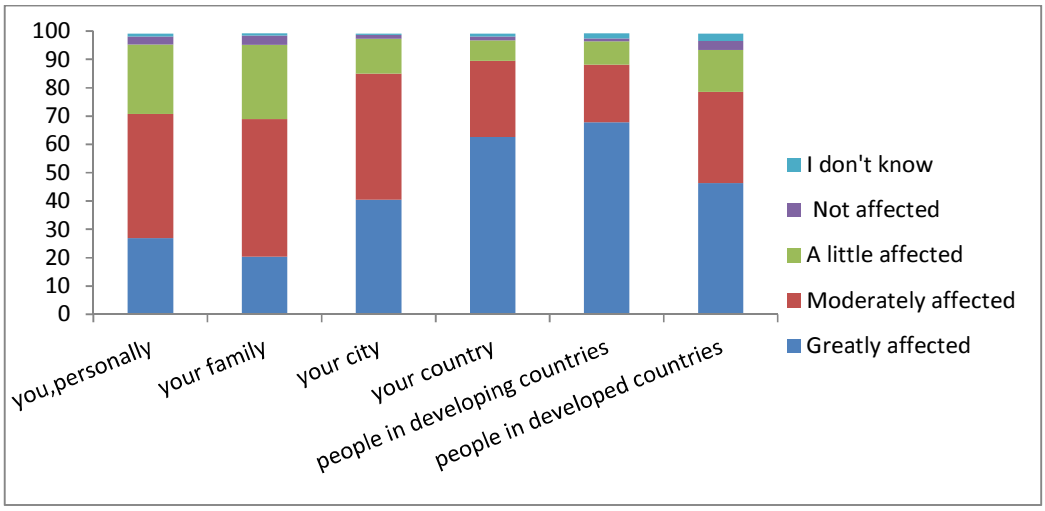
Age	Response Percent
Below 17 years old	3.9%
17-19 years old	65.1%
20-22 years old	29.3%
23-25 years old	1.4%
26-30 years old	0.2%
31-35 years old	0.2%

Attitude and Beliefs on Climate Change

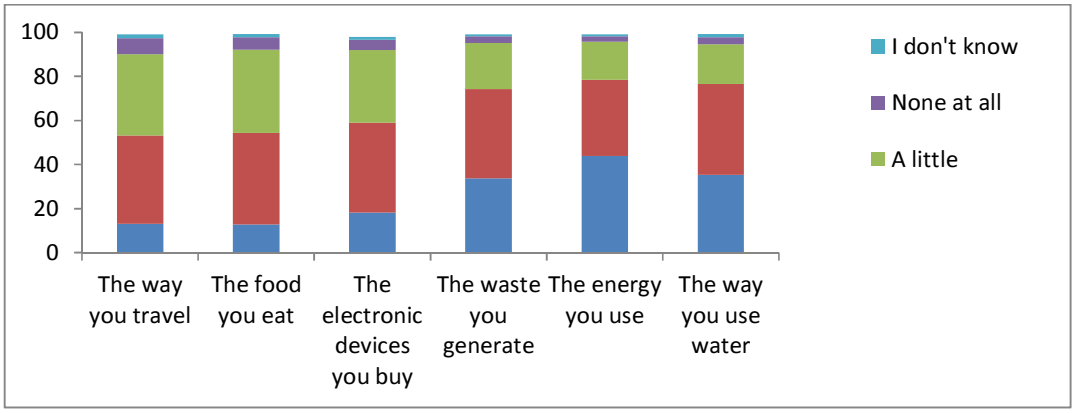
In this section, respondents were asked to select the three top global challenges of today. Poverty and social inequality ranked first (58.0%), followed by pollution and waste management (56.8%), and population growth and urban crowding (35.6%). Climate change ranked fourth (33.3%).

91.7% of the student population believe that climate change is happening, and more than half (59%) see this as being driven by both human and natural causes. The most serious impact of climate change in China was perceived to be the risk posed by more frequent or severe extreme weather events (40.1%)， followed by decreased capacity of ecosystem services (27.9%).

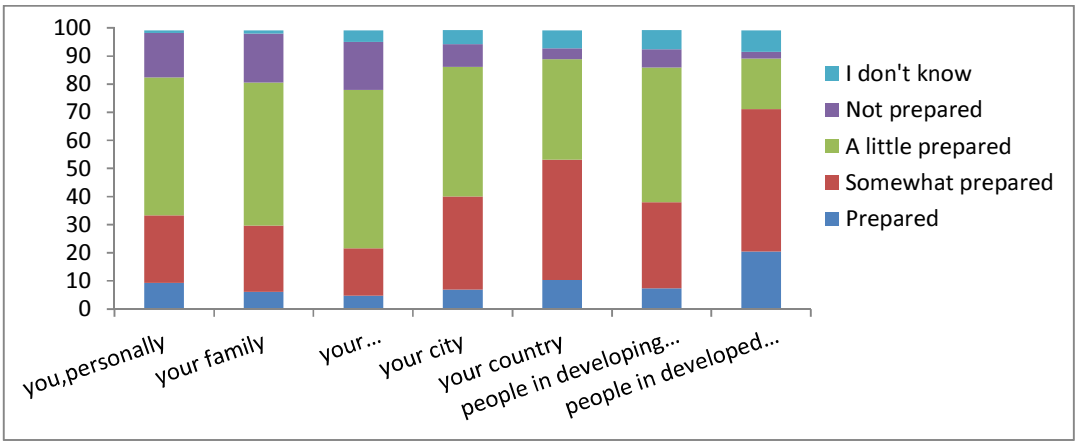
Chinese students think the larger the scope is, the greater influence is and they think people from developing countries suffer more than those from developed countries. In their opinions of the most influential factors contributing to climate change, the most mentioned answers are the way one uses energy (43.8%), water (35.2%) and generates waste (33.7%). And they think people in developed countries have more fully preparation than others.



a. To what extent do you feel climate change will affect the following?



b. How much do the following contribute the impacts of climate change?



c. How prepared would you say the following are for climate change?

d.

Figure V.2.1 Zhejiang University students' perceptions of impact due to climate change (a), how different behaviors are contributing to climate change (b), how people of different scopes are prepared for climate change (c).

Lifestyle and Perceptions of Impact

First part of this section asks students questions regarding their energy usage and waste disposal habits. In terms of travel, most students choose public transportations (50.5%) or ride bicycles (31.8%). While almost half of the respondents (48%) state they would use air conditioning (AC) every day in winter and summer, 49.3% and 36.4% of them set the temperature between 20-24°C and higher in summer, respectively. The policy to charge for plastic bags at stores has been implemented for six years, as a result 23.7% and 55.9%of the respondents always or sometimes bring their own bags when shopping, respectively. Waste disposal behaviors reveal the least environmentally friendly response, only 15.6% of the respondents say they segregate waste at school or home, and the top reason for not doing so is that "I am aware of the policy but not used to it yet or do not know how". Meanwhile, 25.2% and 42.3% of the respondents buy beverages in plastic PET bottles a few times a week and a few times a month, respectively; and more than half of these PET bottles are thrown in any trash can.

Second part of the section concerns students' perceptions of impact. Most respondents believe the way they travel, the food they eat and the electronics they buy mainly lead to economic impacts. On the contrary, energy and water use as well as waste management cause more environmental impacts. And their work or study and the way they spend spare time cause more social impact. In answering who is responsible for taking care of the environment, the respondents rate government as the most responsible one, followed by companies and individuals. Most respondents (46.4%) think they are at least a little living a pro-environmental life, and 41.4% think their lifestyle are somewhat environmentally-friendly.

Given the above results, the students in China believe climate change is happening, but only a few think their lifestyle and consumption behavior greatly affect it. To further explore the reasons, we conducted a further survey by telling students the result of what they do in setting AC temperature, disposing PET bottles and using canvass or paper bags when shopping. The result collected from ~90 respondents shows that students tend to improve the environmental-friendliness of their lifestyles. For example, they say they would set AC temperature higher and throw PET bottles into recycling can (Figure V.2.2).

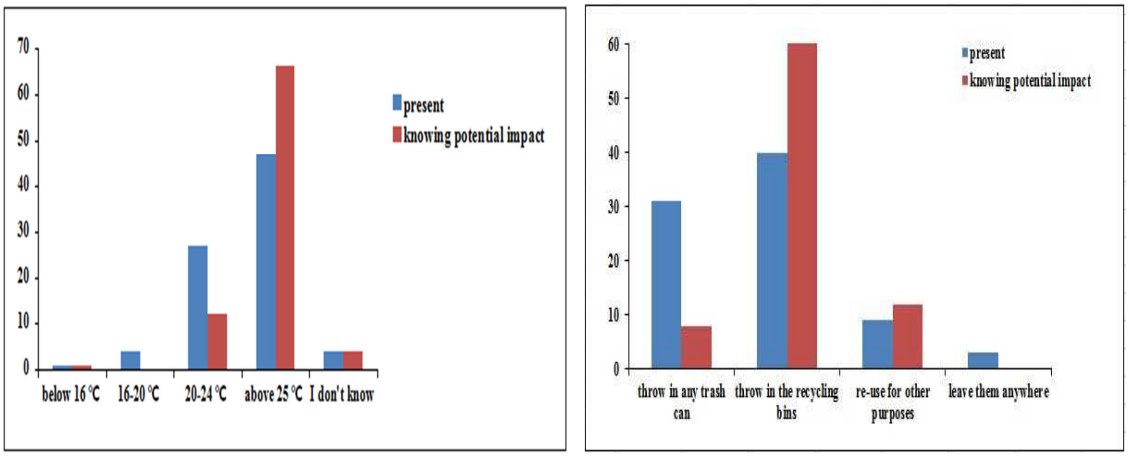


Figure V.2.2 Difference in responses when students were told about the environmental consequences of their behaviors of AC temperature setting (left) and disposal of plastic bottle (right) .

V.3. The Philippines

In total, during the survey period, out of the 1,215 students who were sent weekly emails and others who received flyers through online groups of their professors, only 578 visits were made to the survey site. Of these 578 visits, only 441 were complete responses and were therefore used in the analysis. This yields a 4.54 confidence interval at a 95% confidence level.

Personal Information

The breakdown by school is as follows: School of Science and Engineering (SOSE) = 156 respondents; John Gokongwei School of Management (JGSOM) = 144 respondents; School of Social Science = 101 respondents; and School of Humanities = 40 respondents. The breakdown in terms of year level, gender and age are as follows:

Table V.3.3: Year level of respondents at ADMU

Year Level	Response Percent
Freshman	32.4%
Sophomore	23.8%
Junior	17.9%
Senior/Super Senior	25.9%

Table V.3.4: Gender of respondents at ADMU

Gender	Response Percent
Female	58.5%
Male	41.5%

Table V.3.5: Age of respondents at ADMU

Age	Response Percent
Below 17 years old	3.9%
17-19 years old	65.1%
20-22 years old	29.3%
23-25 years old	1.4%
26-30 years old	0.2%
31-35 years old	0.2%

Roughly half (47.6%) of the respondents have taken the basic Environmental Science (ES10/12) course, and roughly half as well (44.9%) have taken the Science and Society course (Sci10) which includes a module on the environment and sustainable development.

Attitude and Beliefs on Climate Change

In this section, respondents were asked to select the three top global challenges of today. Poverty and social inequality ranked first (68.5%), followed by pollution and waste management (51.9%), and declining natural resources and biodiversity loss (34.7%). Climate change ranked fifth (31.5%).

95% of the student population believe that climate change is happening, and more than half see this as being driven by both human and natural causes. Most (51.7%) are "moderately worried" as they see the impacts of climate change affecting them and their families "moderately", while the greater impacts are to be felt over the rest of the city, country, and people in both developing and developed countries in general. The most serious impact of climate change in the Philippines was perceived to be the risk posed by more frequent or severe extreme weather events (40.3%) followed by decreased capacity of ecosystem services (23.4%).

When asked to estimate the contributions of their personal lifestyle choices to the impacts of climate, energy and water usage and waste generation were ranked as having more contribution than travel and food and electronics consumption (Figure V.3.1). The way the students spend their time through study or recreation was predominantly ranked as having "a little" impact, which is interesting given the responses in the section on personal lifestyle.

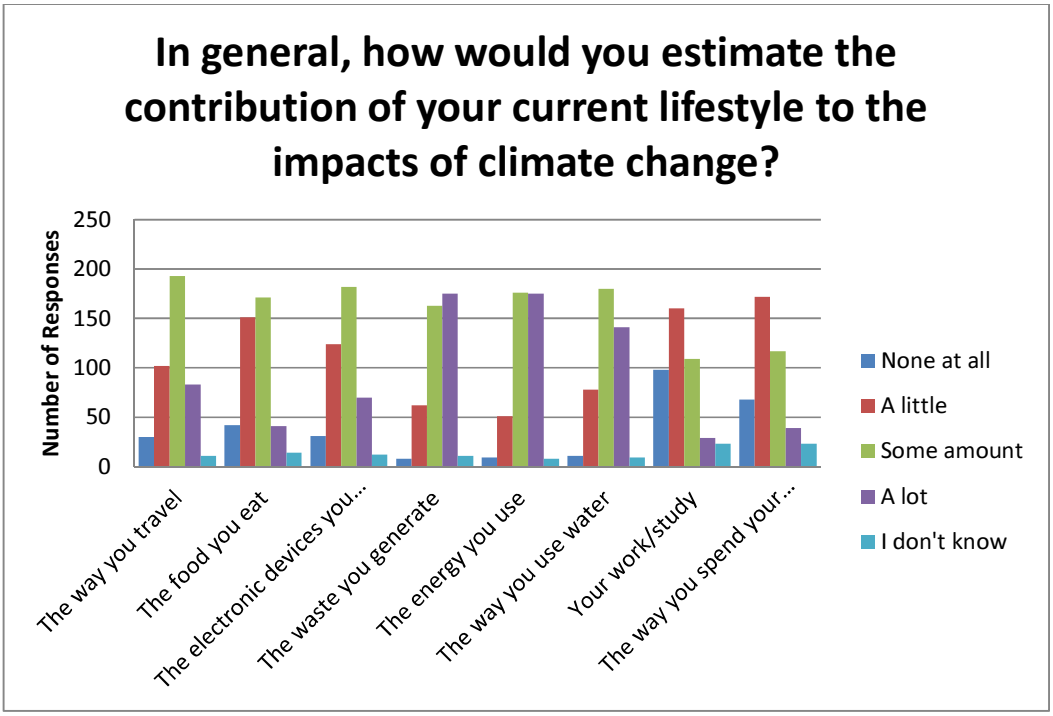


Figure V.3.1. ADMU students' perceived contribution of current lifestyle to impacts of climate change

Perceptions of Impact

In response to who they see as being discernibly affected by their lifestyle decisions, fewer respondents ranked themselves as being affected by water and energy usage and waste generation compared to the mode of transport, food and electronics consumption, and study/work and recreational activities. Conversely, impacts on the city, country and global communities were ranked low in the latter set of lifestyle parameters.

When asked to identify the types of impacts – whether economic, social or environmental impact, more than one or none – of their lifestyle choices, students primarily identified water use, energy use and waste generation as having predominantly environmental impacts (Figure V.3.2). However, while students more students claimed to be aware of household water, electricity and fuel use, fewer were aware of the types of volumes of waste they produce and where these go after they are thrown away.

Modes of travel, food consumption and electronics consumption were identified has having primarily economic impacts. How they spend study/work or spend their free time were identified as having primarily social impacts. In addition, most respondent also perceived their lifestyles to be between "a little" to "somewhat" environmentally-friendly.

These responses are somewhat contradictory to the responses to the question on who is most responsible for taking care of the environment – the majority response (i.e. having the most #1 rank) is oneself, followed by the government.

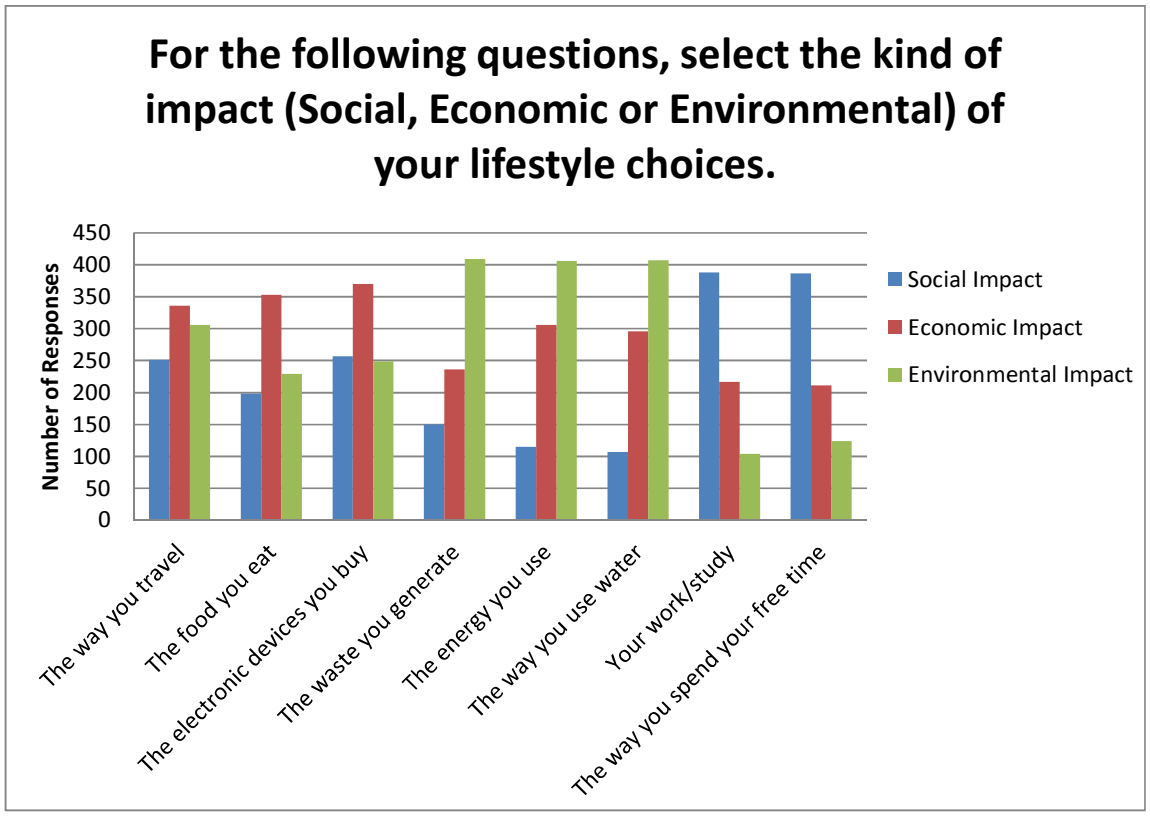


Figure V.3.2 ADMU students' perceptions of type of impact

Activities and Lifestyle

The results describe the typical lifestyle of a middle- to upper-middle-class undergraduate student of the Ateneo. Students mostly spend their time studying/working, social networking, watching TV or movies, or listening to music, singing or dancing. The top-ranked dietary components are meat and rice, and beverages in plastic PET bottles are purchased a few times a week on average, mainly due to preference and convenience. Each day, most students take 10-20 minutes to shower and use air conditioning units for 5-8 hours at a 16-20°C setting. Private vehicles are the primary means of transport to the university, followed by the public mass transport system and walking (many students opt to live in apartments or off-campus dormitories within walking distance).

At home, approximately half the respondents do not practice waste segregation, because they claim to lack the support system and because the mainly see the effort as futile because they believe the garbage collections mix the waste anyway despite having policies for segragation. However, when asked what respondents do with their old or damaged belongings, re-sell or donation, repair or re-purpose, or in the case of books, just keeping the old/damaged item, were more dominant practices over simply disposing of the product. Cellphone purchase was used as an indicator of consumption in this survey, and most respondents indicated that they only purchase a new unit every few years when their current ones are broken, lost or stolen.

In terms of being proactive by not patronizing products that are not environmentally-friendly, 81.2% of the respondents answered that they would sometimes do this. Price and quality are the clear top factors in deciding whether to purchase a product rather than environmental performance (except for cars and motorcycles). When asked what factors would make them willing to spend more for a product, respondents cited more pragmatic factors such as urgency of need, quality of the product, multi-purpose use, health benefits, and rarity. Less than 50% valued the ecological aspect of the product, and the environmental/social justice practices of the manufacturer, and only 31.3% considered the waste produced from the product and its packaging.

Given the above results, the student respondents have perhaps correctly self-diagnosed their lifestyles and attitudes as being only a little to moderately environmentally friendly, despite the fact that they identify the self as primarily responsible for taking care of the environment. Students believe that climate change is happening, in large part due to human activities, but their own everyday activities (e.g. TV/movie watching) and consumption habits (air conditioning use, travel via private vehicles, purchase of beverages in PET bottles) are somewhat carbon-intensive. The environmental repercussions of personal choices did not seem to have factored significantly into the responses on perceptions of impacts. This seems to denote the following:

(1) That awareness of environmental impacts relating to water, energy and waste is divorced or compartmentalized from (rather than integrated into) their understanding of the economic and social systems;

(2) That knowledge gaps may still exist with regards to the environmental impacts of agriculture and the electronics industry impacts, and the waste management chain as contextualized through a more comprehensive life cycle analysis.

(3) That little connection is seen between what they learned of environmental issues and their personal lifestyle choices. Students may not have internalized classroom lessons enough to be aware of their personal footprints, and to translate these lessons into concrete actions. Students perceived pollution, waste management, natural resource management and climate change to be among the top global challenges, but are not making the connection to their own ecological footprints and waste generation on a personal or household level.

The full reports for the Ateneo de Manila University are attached to this Narrative Report.

VI. Country Comparisons

VI.1. Sample characteristics

The survey is conducted by 441 students from Ateneo de Manila University, the Philippines, 481 students from Zhejiang University, China and 148 students from Estácio de Sá in Rio de Janeiro, Brazil.

Note that only one university from each country was surveyed in this study, which has implications on whether the samples are truly representative, given the heterogeneity that exists within each country. In Zhejiang University, around half of the students are recruited from around the nation while the rest from Zhejiang province, an east-coastal developed area with fast economic growth and high consumption level. Responses collected in this study are, albeit representative of the whole country, higher in carbon intensity and environmental impact.

The Ateneo de Manila University in the Philippines represents a medium-sized, Jesuit university in the National Capital Region. While the university accepts students coming from other provinces, most live within and around this region. It is likely that consumption patterns are higher here in the urban capital. Furthermore, since the university is private and Catholic, there may be cultural differences compared to the larger public and state-run universities.

The Universidad de Estacio de Sá is the largest private University in Brazil, with 40 years at the Market and present at 20 States, with over 330 thousand Students. The University offers Undergraduation and pos-graduation courses, both presential and at distance.

The sample characteristics are detailed in Table VI.1.

Table VI.1. the detailed characteristics of students from three countries

		China	Brazil	The Philippines
Grade	Freshman（%）	37.4	10.6	32.4
	Sophomore（%）	38.3	68.1	23.8
	Junior（%）	13.9	21.3	17.9
	Senior/Super Senior（%）	10.4		25.9
Gender	Male（%）	50.5	/	58.5
	Female（%）	49.5	/	41.5
Work aside from studying (or not)	Yes（%）	29.9	30.0	19.5
	No（%）	70.1	70.0	80.5
Have taken courses related to environment (or not)	Yes（%）	12.3	66.7	47.6
	No（%）	87.7	33.3	52.4

VI.2. The international comparison on college students' perception of climate change

Students from three countries have similar perception of climate change. They all regard poverty and social inequality as one of the three biggest challenges in the current world instead of climate change. The result is similar to the Chinese students' response in the investigation done by a Norway study, where students in Norway regard climate warming as the main threat[1]. These results indicate that people from the developing countries are likely to pay more concern on the basic social development.

Over 90% students believe climate change is happening in all three countries. Over 50% students from China and the Philippines think it is caused by both human activities and natural changes, while over 50% students from Brazil think it is mostly due to by human activities. The extent to which students are worried about climate change is different among the three nations, with Brazil students worrying more about climate change than those from other two countries (Table VI.2).

Table VI.2. How worried are students from the three counties about climate change

	China	Brazil	The Philippines
Very worried（%）	16.6	40.8	22.6
Moderately worried（%）	46.0	52.4	51.7
A little worried（%）	31.5	5.4	24.3
Not at all worried（%）	5.9	1.4	1.4

As for the question "To what extent do you feel climate change will affect the following", students from all three countries think that the larger the scope is the greater influence is, and they think people from developing countries suffer more than those from developed countries. It is worth pointing out that 62% students from the Philippine and 67% students from Brazil think climate change affect their cities a lot, both higher than Chinese students (41%). A possible reason is the geographic difference: The Philippines is located along Pacific Rim of Fire and the typhoon belt[3]. According to statistical analysis conducted by the official weather bureau, the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), using data from 1928 to 2010 an average of 20 tropical cycles form or cross the Philippine area of responsibility (PAR) annually[4]. Metro Manila, the National Capital Region and location of the Ateneo de Manila University, was recently devastated by major flooding events in recent years, such as those caused by typhoon Ketsana in 2009, then monsoonal rains in 2012 and 2013. Policy initiatives and planning are currently focusing on articulating the conceptual linkages of and mainstreaming climate change action planning and disaster risk management [5].

Estácio is located in Rio de Janeiro, which also suffered a lot in recent years due to climate abnormality. In 2010, heavy rain in Brazil caused floods and landslides, which killed 85 people in three States including Rio de Janeiro and over 1000 people were forced to leave their houses[6]. In 2012, Rio de Janeiro experienced the record-high temperature (43.2°C) since 1915[7]. The results therefore suggest that students in the Philippines and Brazil, who witnessed the disasters induced by extreme weather events, tend to recognize these as a primary impact of climate change.

Zhejiang University is located in Hangzhou, a city in East China which is also called "paradise" owing to its pleasant climate and rare natural hazards. Although typhoons come through Hangzhou every year, they seldom land in Hangzhou, causing little losses. The result is similar to Spence et al [8] who found that people experienced flooding express more concern over climate change, seeing it as less uncertain and feeling more confident that their actions will have an effect on climate change. This can also explain Brazil students who think themselves as the most affected by climate change also worry most about the consequences.

In the preparation for climate change, students from Brazil and China make quite different choices, Most Chinese students think people at different scales all have some or a little preparation, while most Brazil students think they are "not prepared at all". On the other hand, the Brazil government has paid great effort to deal with climate change in recent years. "National climate change project" has been issued in 2008, and greenhouse gas emissions reduction targets have been made in the following year. If the public see these efforts, they will not choose "not prepared at all". The contradiction is probably related to the credibility of government (Table VI.3), or the relatively stronger environmental awareness of the Brazil citizens. In addition, according to the multiple-mediation analysis (Gao et al, in preparation), students who have taken courses related to environment usually feel discontent to the preparations for climate change, which may contribute to Brazil students' choice. (This question is not included in the survey in the Philippines.)

Table VI.3. the credibility of environmental information (rating average)

	Local government	Federal government
China	2.28	2.50
Brazil	2.12	2.31
The Philippines	2.52	2.82

VI.3 The international comparison on college students' low-carbon consumption behavior

VI. 3.1 Lifestyle Comparison

The comparison of students' lifestyle reveals much difference existing in the three countries. First of all, in terms of transportation, while over 50% students from all three countries choose public transportation, 27% students from Brazil and 38% students from the Philippines choose driving and only 0.8% Chinese students choose so. This is likely because most students in Zhejiang university in China live on-campus, which is not the case for the universities in Brazil and the Philippines; therefore, driving is more necessary for the larger fraction of the student population not living in on-campus dorms. In addition, effective mass transportations options in this area of the Philippines are limited.

Secondly, approximately 50% students from the Ateneo university in the Philippines segregate their waste, but only 16% of the Chinese students do so. Only approximately 65 % do not practice waste segregation, because they claim to lack the support system (My community still does not have this Policy) and because the mainly see the effort as futile because they believe the garbage collections mix the waste anyway.

One third of the Chinese students explain their community still does not have this policy, and another one third say they are not used to it yet or do not know. The explanation is similar with the investigation conducted in universities in Xiasha Higher Education Park, Hangzhou[9], which found that although college students know something about waste segregation, and know it has environmental and economic benefits, they have a nebulous idea of telling which garbage is recyclable in detail.

Thirdly, students from the Philippines and China do better in bringing own canvass or paper bags when shopping. The reason is that the free plastic bags are banned in China and the Philippines (in most cities/municipalities of Metro Manila) since 2008 and 2011, respectively, and this scheme has worked well in general. In Brazil the ban began at 2012 but it did not work, and after a few months the supermarkets started offering plastic bags again.

Lastly, when students make a decision to buy some products, environmental friendliness is only taken in consideration when the product is a car. This could be because the environmental impact of a car (e.g. in terms of fuel consumption and air pollution) is more directly observable compared with impacts associated with the life cycle of food, clothes, electronics, etc. Chinese students are less willing to pay more to support the environmental-friendly products than students from other two countries (Table VI.4). There are several reasons, but the best explanation may be that few Chinese students think their consumption behavior can affect their city, country or even the global community.

Table VI.4. Students who are willing to pay more because the product is more environmental-friendly

	The product is organic or ecologically-friendly	The garbage is recyclable or biodegradable
China	30.9%	18.6%
Brazil	50.0%	36.1%
The Philippines	49.0%	31.1%

VI.3.2 Comparison of students' perception of impact

There exists a huge difference among students' perception of their behaviors' impact from three countries. Most Chinese students think what they do only affect themselves and family at most, only a very few think their behaviors can affect the global community (Fig VI.1). The Brazil students are on the contrary (Fig VI.2), and the Philippines are in the middle (Fig VI.3). Furthermore, students from three countries make different choices on who should be most responsible for taking care of the environment (Table VI.5).

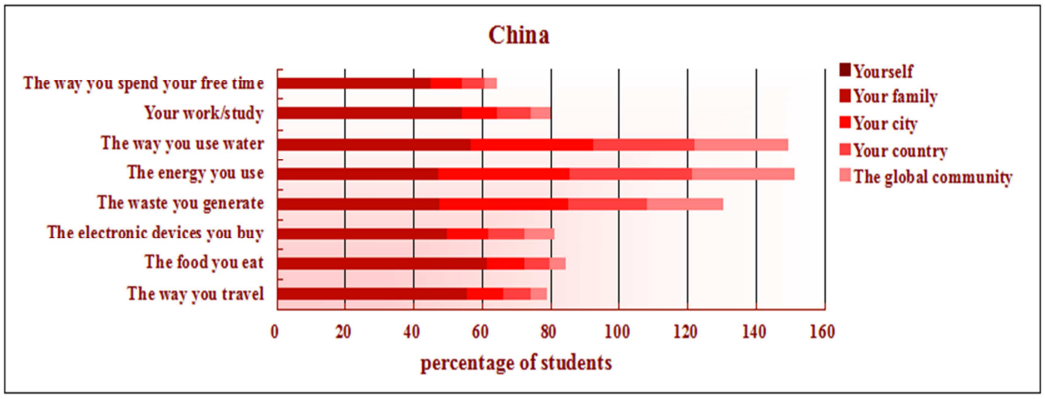


Figure VI.1 Students' perception of impact in China

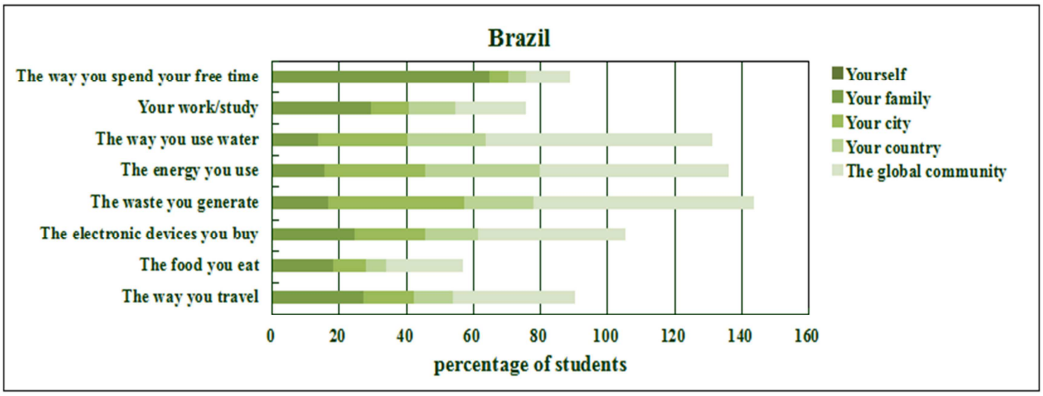


Figure VI.2 Students' perception of impact in Brazil

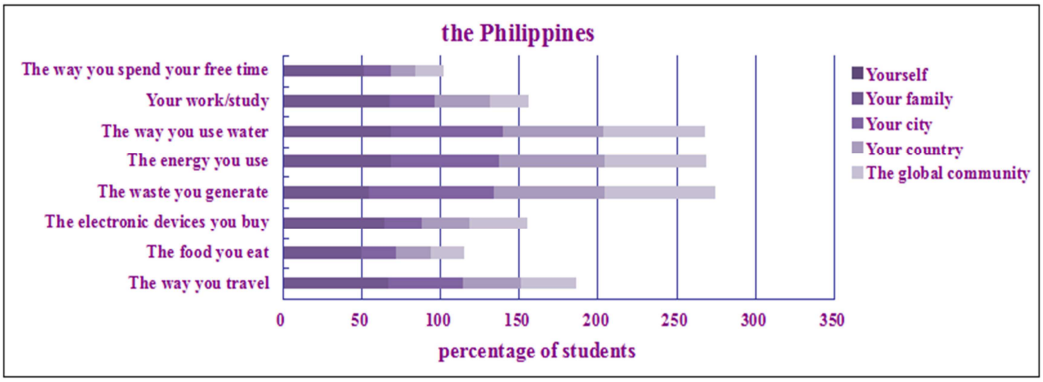


Figure VI.3 Students' perception of impact in the Philippines

Table VI.5 Who should be most responsible for taking care of the environment?

(For China and the Philippines: ranking was implemented so the smaller number, the higher in the rank of responsibility; For Brazil, the question was implemented as simple selection.)

	China	Brazil	The Philippines
Government	1.7	94.1%	1.9
NGOs	2.4	14.5%	2.2
Companies	1.9	74.3%	2.4
School/ University	2.5	26.3%	2.5
Yourself	2.2	90.8%	1.6

These results may be related to the culture and education at different countries. Chinese people believe in Confucian culture and inherit traditional education, which emphasizing top-down policy[11]. As a result, they are more likely to believe authorities[12], which can explain why we hold our government to do more to protect the environment instead of ourselves. But submissiveness is never emphasized in Brazil culture. They are more outgoing and express themselves more directly[13]. Reed Elliot Nelson compares the Chinese and Brazilian culture and reveals Chinese culture lays emphasis on loyalty and leadership while Brazilian culture on sociability and exposition[14]. In the Philippines, it is difficult to make a general conclusion because the Ateneo de Manila University stresses the ideal of “men and women for others”, which may have resulted in the high ranking of the self as a contributor to the community, in addition to the government. Further study would have to be conducted to confirm if thissuch ranking of the self extends to students in other universities.

The comparison of students’ perception of their behaviors is shown in Figure VI.4. As we can see, the trends from three countries are almost the same. Most students consider their lifestyle as a little or somewhat environmentally-friendly. However, the percentage of students from Brazil who think their lifestyle is very environmentally-friendly is the highest among three countries, and the percentage of students from China is the lowest. The Doctrine

of the Mean that roots deeply in the Chinese Confucian culture may also helps to explain why a larger percentage of the Chinese students chose " a little" and "moderately".

The comparison of students' actual lifestyle shows that while students from Brazil and the Philippines tend to reuse, repair or recycle products more, Chinese students do better when it comes to the way they travel and to compliance with the ban on plastic bags. This results suggest that whether the college students are environmentally-friendly or not depends highly on their specific contexts – e.g. on university or government policies, on education and their living situation. However, in all cases, there is still much to be done to improve on students' perceptions of impacts and corresponding actions.

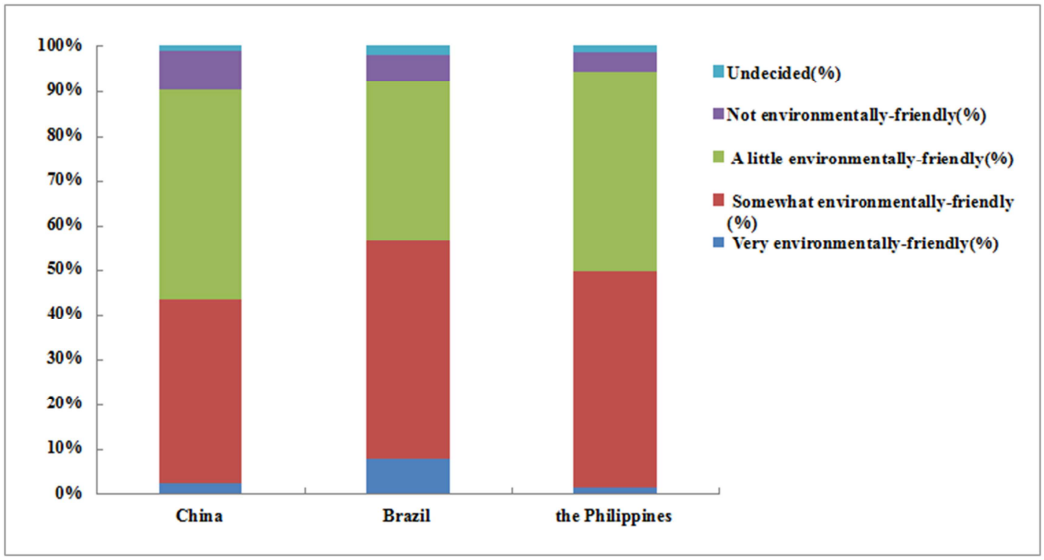


Figure VI.4. Students' perception of their behaviors

VI.4. Multiple-mediation analysis

To evaluate the impacts of aforementioned cultural and geographic difference on sustainable lifestyle and behaviors, we conducted a multiple-mediation analysis to examine the difference in climate change perceptions and consumptive behaviors between students in China and the Philippines, as well as those between China and Brazil using the multiple-mediation analysis (Gao et al, in preparation). The result shows that students from China are more environmental friendly than those from the Philippines (with combined direct and indirect effects: $b=-1.429$, $t=-6.075$, $p<0.01$).

We propose a hypothesis that difference in the belief, worry and the perception of degree of impact (both city and country and overall) between students from two countries are attributed to the geographic factors, recalling that universities in Brazil and the Philippines are more prone to natural hazards than Zheijiang in China. We quantize the four putative mediators, and the result shows that students from the Philippines tend to believe slightly more and worry absolutely more about climate change ($b=0.109$, $t=2.109$, $p<0.05$; $b=0.315$, $t=3.747$, $p<0.01$), which agrees with the result shown in Table 2. In terms of the mediators' impact on actual lifestyle behaviors, the statistics reveal that the how people worry about climate change and perception of the degree of its impact at city and country scales are positively related to their behaviors ($b=0.487$, $t=3.910$, $p<0.01$; $b=0.561$, $t=1.708$, $p<0.1$), and their believe about climate change negatively affect students' behavior ($b=-0.455$, $t=-2.320$, $p<0.05$) (Fig VI.5). The latter result may seem out of characteristic, and possible explanation is that climate change is just one of the environment issues, a relatively remote one at least in the eyes of the Chinese students. Environmental friendliness of life, on the other hand, may involve our concerns toward all environment issues such as air and water pollutions. In addition, students who worry more about climate change and who think climate change has a bigger impact on their city and country are more environmental-friendly. Besides the four putative mediators, the negative value in the direct effect assessment ($b=-1.572$, $t=-6.632$, $p<0.01$) suggesting that some other factors related to geography are affecting the students' lifestyle and causing Chinese students to live an overall more environmental-friendly lifestyle.

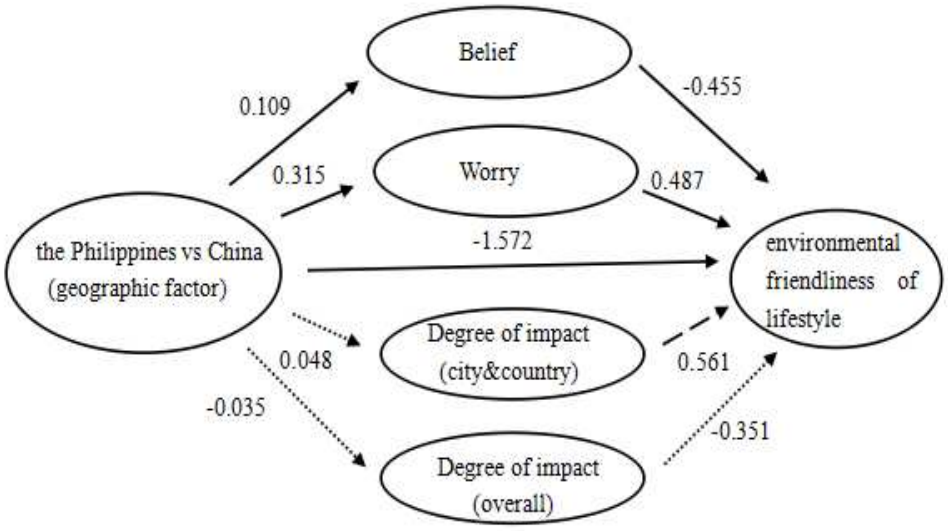


Figure VI.5. Impact of geographic factor on environmental degree of life between the Philippines and China. Values provided are beta weights indicating the strength of the relationship between variables. Solid lines indicate significant pathways at 95% confidence level, dashed lines indicate significant pathways at 90% confidence level, dotted lines indicate pathways that are not significant.

Furthermore, we want to test the hypothesis that the difference in students' perception on the reason that cause climate change, the typical factor' impacts (those traditionally associated with environmental issues such as water usage, energy usage and waste generation), atypical factors' impacts (those that also have environmental impacts but are less strongly associated by the students with the environment, such as mode of travel, diet and consumption of electric devices), and the responsibility on climate change are due to culture factors. Our result shows that students from the Philippines are more inclined to attribute climate change to human activities ($b=0.191$, $t=2.449$, $p<0.05$), and they think both atypical and typical factor have a bigger impacts ($b=0.894$, $t=14.332$, $p<0.01$; $b=1.667$, $t=16.771$, $p<0.01$), which means they think the garbage they generate, the way they use energy and water, the way they travel and what they eat can all have a great influence on their family, city, country and even the whole world (Fig. VI.6). They also think individuals instead of the government should take more responsibility on protecting the environment ($b=1.176$, $t=10.226$, $p<0.01$). Among the four mediators mentioned above, the difference of typical factors' impact is the most obvious one. In terms of the impact on behaviors, only the perception on the cause of climate change affects students' lifestyle ($b=0.169$, $t=1.701$, $p<0.1$), which illustrates that students who are more inclined to attribute climate change to

human activities tend to be more environmental-friendly. The other three factors are not statistically significant (Fig VI.6). Again, the negative value in the direct effect assessment (b=-1.719, t=-6.120, p<0.01) suggesting that certain cultural factors other the four examined here are contributing towards Chinese students' overall environmental-friendliness.

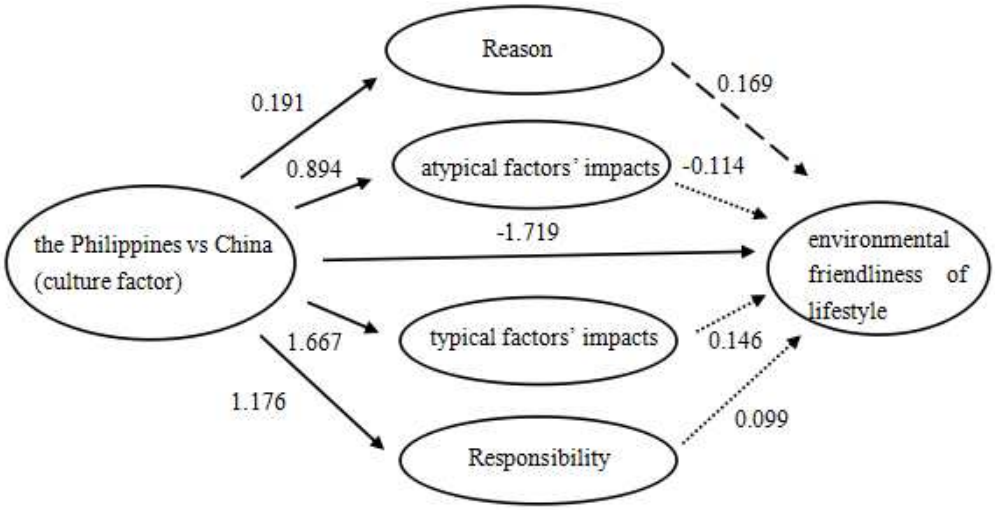


Figure VI.6. Impact of cultural factor on environmental degree of life between the Philippines and China. Values provided are beta weights indicating the strength of the relationship between variables. Solid lines indicate significant pathways at 95% confidence level, dashed lines indicate significant pathways at 90% confidence level, dotted lines indicate pathways that are not significant.

We performed the same study between Brazil and China, and the result reveals that it cannot easily tell students from which country are more environmental-friendly(b=0.260, t=0.795, p=0.427). From the geographic point of view, students from Brazil are more worried about climate change (b=0.990, t=8.588, p<0.01), and they think climate change having a greater local impact on their city and country as well as a greater overall impact on human beings (b=0.198, t=3.027, p<0.05; p=0.176, t=2.93, p<0.05). As for the second part of the transmission procedure, the statistics show that students who are more worried about climate changes live a more environmental-friendly life (b=0.373, t=2.551, p<0.05) (Fig. VI.7), which is the same as the conclusion draw from China and the Philippines.

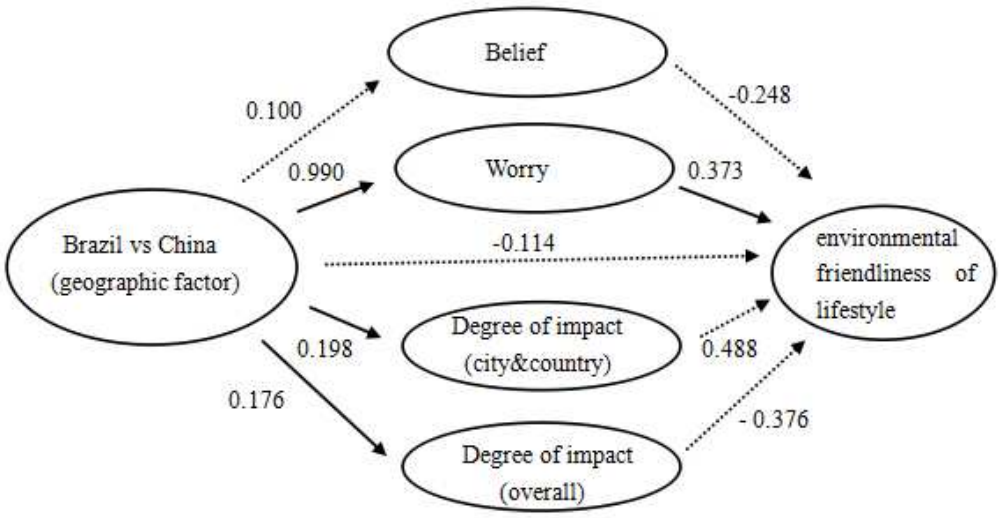


Figure VI.7. Impact of geographic factor on environmental degree of life between the Brazil and China. Values provided are beta weights indicating the strength of the relationship between variables. Solid lines indicate significant pathways at 95% confidence level, dashed lines indicate significant pathways at 90% confidence level, dotted lines indicate pathways that are not significant.

From the culture factor, students in Brazil are more inclined to attribute climate change to human activities ($b=0.411$, $t=3.71$, $p<0.05$), and they think atypical factor having a greater influence on their family, city, country and even the whole world ($b=0.140$, $t=2.202$, $p<0.05$). On the other hand, they think their city and country are not well prepared for climate change ($b=-1.001$, $t=-12.228$, $p<0.01$); in fact, they think human beings in general are not fully prepared($b=-0.703$, $t=-10.282$, $p<0.01$). In contrary, Chinese students think their city and country as well as the human beings generally have a better preparation for climate change. Among the six mediators, the students' perception on how prepared their city and country toward climate change differs the most. As for the second part of the multiple mediation analysis, the statistics show that the perception of preparedness is negatively related to students' lifestyle. Those who think their city and country have a better preparation for climate change are less environmental-friendly ($b=-0.852$, $t=-2.617$, $p<0.05$), while the ones who think the general human beings have a better preparation for climate change are more environmental-friendly ($b=1.222$, $t=3.137$, $p<0.05$). It is interesting that students' perceptions of preparedness have both positive and negative impact on their lifestyle, depending on the scale of the body under consideration. A possible reason is that if the students think people closely related to themselves are not well prepared for climate change, they will live more environmental-friendly and try to mitigate climate change. Then if they think that the entire

society especially people from other nations are well prepared, this make them to reflect on and improve they own behavior as a "peer pressure".

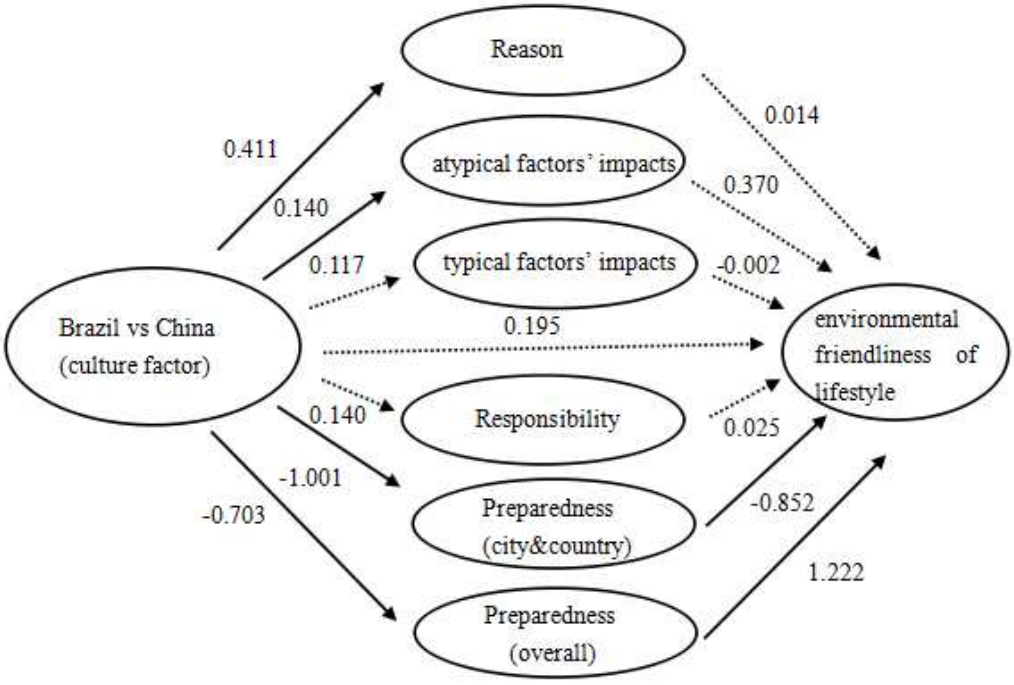


Figure VI. 8. Impact of geographic factor on environmental degree of life between the Brazil and China. Values provided are beta weights indicating the strength of the relationship between variables. Solid lines indicate significant pathways at 95% confidence level, dashed lines indicate significant pathways at 90% confidence level, dotted lines indicate pathways that are not significant.

VII. Recommendations

This international survey initiative has indeed been an enlightening endeavor not only for the respective purposes for the individual universities involved but also for the global challenge of enabling a more environmentally-friendly and climate-friendly lifestyle. We see that although there are contextual differences, there are also commonalities for which we can develop concerted, cross-cultural solutions, specifically involving our approach to environmental education.

However, this project represents the first attempt at what is envisioned as a broader international network of universities. As such, there are several recommendations that have emerged to improve on the project and to extend it:

- Replicate in more universities within the same country to get a more representative sample. Only limited conclusions could be made on the effect of culture or context since only one university within each country was surveyed. The results therefore do not reflect the country in general. For this to happen, however, we must perhaps explore other funding options, networks and/or national platforms which can help expand on this project on a national level.

- Revise the survey instrument to facilitate statistical and other quantitative analysis. Many options in the survey were of qualitative nature. While these can be translated into numeric codes for the purpose of statistical treatment, as in the MMA methods described, there may be a more standardized way (i.e. similar to Lickert scales) to rank the options for each question.

- Review and test MMA method for sensitivity to parameter options. For example, the transportation option made a great impact in the analysis of environmental-friendliness of lifestyle.

- Consider adding on geographic or geo-physical factors to strengthen the hypothesis regarding the influence of geography on behaviors. This was a hypothesis we had explored via the MMA method using the differences in country as a proxy for the differences in geography, but it may be advantageous to include direct geographic questions (e.g. location, ecosystem type, natural hazards experienced). This will be useful when extending the survey to other universities within the same country

because then it would be possible to analyze the responses vis-à-vis participants experiences of environmental phenomena and climate change impacts (e.g. if students located in a university within a floodplain or near a coastal area answer differently from those who are not).

- Other countries have been invited to join this initiative via BIARI 2014. Prior to implementing the survey in an expanded network, it would be important conduct comprehensive and interactive discussions amongst the participating countries to achieve the following objectives:

    - Develop theoretical framework, hypotheses, and methodology for cross-country comparison (e.g. testing effects of geography and culture) prior to survey implementation to ensure that crucial questions are harmonized among countries.
    - Determine which sets of questions require flexibility to be adapted to specific contexts (e.g. the lifestyle question) and address how these differences will be treated in the data analysis (i.e. can we maintain the main categories of typical and atypical factors?).
    - Based on the above, develop a protocol for survey implementation among the countries involved that will include not just a harmonized questionnaire but also guidelines for how the survey should be implemented (e.g. online, through SurveyMonkey? Mix of online and paper?) and how data should be collected and formatted.

Moving forward, it is recommended that current and future participating universities discuss the above recommendations and develop a new grant proposal to support the expanded initiative.

References

[1] Geir Inge Orderud, Luo Jing, Zhuang Guiyang. A Comparative Study on Attitudes Towards Climate Change between the Chinese and Norwegian University Students[J]. Chinese Journal of European studies, 2010(6): 89-101.

[2] National Geographic. Greendex: Survey of sustainable consumption. 2009-2012, Available at http://environment.nationalgeographic.com/environment/greendex.

[3] Manalad J. E, Wu Hao yun. Natural Disaster Management in Philippines[J]. Shanghai Water Conservancy, 1992, 1: 42-45.

[4] Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAG-ASA). Technical report: Climate change in the Philippines. 2011. Retrieved from: http://kidlat.pagasa.dost.gov.ph/cab/climate_change/Climate%20change%20in%20the%20Philippines%20-%20August%2025%202011.pdf.

[5] Philippine Climate Change Commission (CCC). National Climate Change Action Plan (NCCAP) 2011-2018. Retrieved from: http://adaptationmarketplace.org/data/library-documents/NCCAP_TechDoc.pdf.

[6] http://news.xinhuanet.com/photo/2010-01/06/content_12762203.htm

[7] http://news.xinhuanet.com/world/2012-12/28/c_124161988.htm

[8] A Spence, W Poortinga, C Butler, et al. Perceptions of climate change and willingness to save energy related to flood experience[J]. Nature Climate Change, 2011, 1: 46-49.

[9] Yu Meng ting, Sun Jie han, Zhu Rong. On Investigating Waste Classification in College District of Xiasha[J]. Economic Research Guide, 2012(16): 300-301.

[10] http://www.chinanews.com/gj/2012/02-03/3644065.shtml

[11] Du Mei, Jiang Zhu qing. The role of individual practice in the mitigation of climate change[J]. Modern Business Trade Industry, 2010(1): 73-74.

[12] Cai De lin, Jin Hai feng. Confucian ethics in the era of globalization[M]. Tsinghua University press, 2007.

[13] Zhou Da wei. A brief analysis of culture and economy in Brazil[J]. Economic vision, 2012(2): 74-75.

[14] Reed Elliot Nelson. Leadership, Personal Values, and Cultural Context in Brazil, China, and the USA[J]. BAR-Brazilian Administration Review, 2014, 11(1): 47-63.