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The current research and literature strongly affirm that the planet and humans in turn, are severely impacted by global warming and climate change. There is a widespread belief in the literature that the more educated you are, the more environmentally aware you will be. Existing research on the subject shows that education is a factor in environmental awareness, but scholars so far have only looked at education's effect on environmental values, not on environmental action. Using the latest data from the World Values Survey that includes 57 countries and over 87,000 individuals, and integrating it with other sources of data, this thesis analyzes whether higher education has an impact on environmental values as well as on individual and collective level environmental action. I use Pearson's correlation analysis, scatterplot analysis and multivariate regression analysis. I conclude that as educational level increases, the likelihood that people will value environmental protection increases but the likelihood that people will take environmental action or the likelihood that people will organize around environmental issues do not increase.

HIGHER EDUCATION AND ENVIRONMENTAL CONCERN:

A GLOBAL PERSPECTIVE

by

Shana L. Johnson

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Approved by

_____

Dr. Sahan Savas Karatasli
Committee Chair

DEDICATION

I dedicate this thesis to my grandmother, Hilda Gray Holder and my mother, Sandra Cheryl Johnson.

APPROVAL PAGE

This thesis written by Shana L. Johnson has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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This has been such a painstakingly long process occurring in the middle of a merciless pandemic and faceted by many personal and professional difficulties. I am thankful to God for bestowing such grace and favor upon me to see this through. I am also thankful for such an amazing support system during this process, and I would like to take a moment to recognize them. Hands down, this thesis would not have been possible without my thesis chair, Dr. Sahan Savas Karatasli. He stayed calm and consistent even in the midst of my shakiness and trepidations. He has committed such long hours and brilliancy to this piece and words can never express my immense gratitude. I also extend my sincerest thanks to my committee members, Dr. Sefika Kumral and Dr. Daniel Huebner, who have offered a great deal of expertise and advice during this process. To my praying grandmother who passed away this year, you are so loved and while I wish you were here long enough to see me finish, you now have the best seat in the house. To my mother, thank you for being such a determined and strong figure in my life and for helping me to lead by your example. To my significant other who gave countless encouragement and a listening ear to my feelings. To my boy who shared so many cuddles, smiles and laughs along the way. To my family, loved ones, professors, co-workers and friends, thank you for every late night, long, drawn out push to keep going. To every name and person mentioned thus far and for those who stayed for the journey… this one's for you.

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CHAPTER I: INTRODUCTION

This research is about the relationship between education levels and environmental concerns such as climate change and global warming. Both climate change and global warming are among the top environmental concerns in the early 21st century (Price et al., 2014; Moore 2016; Latour 2018; Jorgenson 2021). Global warming refers to the process associated with rapid warming-up of our planet Earth because of the rising concentrations of greenhouse gasses in the atmosphere due to human activities linked to burning coal, driving cars, farming, deforestation, etc. (Milfont 2010:3). Climate change is a related phenomenon but it is not merely linked to temperature increases alone. It also includes a broader spectrum of changes in the climate patterns such as rapid escalation of sea levels, floods, cyclones, droughts and landslips (Milfont 2010:3). Scientific studies show that both climate change and global warming are *anthropogenic,* or results of human activity (Wade 2022:323). Thus, their effects can be mitigated by human actions, if human beings decide to take action in this regard.

There is a widespread belief in the literature that the more educated you are, the more environmentally aware you will be. As Torgler and Garcia-Valinas (2007) put it, "[r]egarding educational issues, the literature has shown that formal education has a significant influence on environmental willingness to contribute" (p.518). Current literature supports the claim that "higher levels of education lead to higher preferences for environmental protection" (Torgler and Garcia-Valinas 2007:528; also see Blomquist and Whitehead, 1998; Engel and Pötschke, 1998; Witzke and Urfei, 2001; Israel and Levinson, 2004; Veisten et al., 2004).

Despite this popular belief, however, the effects of education on awareness and attitudes towards climate change and global warming have not systematically been analyzed at a global level in the existing literature. Does having a higher education make people more consciously

aware of climate change and global warming? More importantly, does having a higher education warrant or promote any real change in people's behaviors? Does education aid people in reducing their carbon footprints? Does it make them more willing to organize around environmental problems?

This thesis aims to answer these questions by focusing on education's effect on environmental values and on environmental action. I define environmental value as the degree to which environmental problems are cared about, paid attention to, and prioritized by individuals in their belief systems. Environmental values are about the degree to which individuals believe that the environment should be protected and be a priority in decision making. Put differently, environmental values are about willingness to protect and prioritize the environment. In contrast, environmental action refers to the degree to which individuals take actual steps to remedy those environmental concerns. Environmental actions are possible at the individual or collective level. For example, actions such as recycling, minimizing waste, walking more or carpooling, purchasing a fuel efficient car, turning off or unplugging things that use electricity when not in use, or composting, are examples of individual level environmental action. However, organizing or participating in social movements or environmental organizations that combat institutions or corporations that produce environmental problems, are examples of environmental action at the collective level.

Analyzing the latest panel (Wave 7) of the World Values Survey (Haerpfer et al 2022), in this research, I examine how people in different countries with different educational levels (1) value environmental issues such as climate change and global warming, (2) reduce their carbon-footprints, and (3) actively (or inactively) involve in environmental organizations. In doing so, I also aim to turn attention to a major problem in the way social scientists have analyzed the

effects of education on environmental concerns so far. Existing research on the subject shows that education is a factor in environmental awareness but scholars so far have only looked at education's effect on environmental values, not environmental action. Using the latest data from the World Values Survey and integrating it with other sources of data, I aim to understand whether education has an impact not only on values and attitudes but also on actual behaviors.

CHAPTER II. EFFECTS OF EDUCATION ON ENVIRONMENTAL VALUES AND ENVIRONMENTAL ACTION

Global Warming and Climate Change

As the dominant species, humans have more of an impact on the environment than we realize. As Shao et. al. (2016) put it "global warming is the result of human activity, and climate change has the potential of generating catastrophic conditions of global proportions" (p. 1023). Climate change is one of the most pressing issues facing our planet (Caney 2009; Schwartz 2019; Todorov 2010). The process "began with industrialization in the 1700s, but fully half of the excess greenhouse gases have been released in just the last thirty years" (Wade 2022:323). Over the past several decades—and especially in recent years—the world has seen this problem grow and has observed the devastating impacts that it has had on local communities and the global community at large (Price et al., 2014, p. 1; Moore 2016; Latour 2018; Jorgenson 2021).

According to Wade (2022), failure to limit global warming is "harming life on earth". As she puts it, as a result of global warming and climate change, today,

> "[s]pecies are disappearing, and ecosystems are becoming unstable, leading to the rise of dangerous disease vectors (like mosquitoes) and the disappearance of insects upon which agri-culture depends (like honeybees). A warming planet harbors more pathogens, while forest loss increases the likelihood that humans will encounter them. HIV, Ebola, and Covid-19 were all results of this process. There will be more, and more frequent, epidemics and pandemics" (Wade 2022:324)

Parant *et. al.* (2016) indicate that "[c]limate change and global warming are a growing problem in the world and for its future [... and] actions are quickly needed to reduce global climate

change" (p. 340; also see IPClimate change 2007). Likewise, Mazo (2014) argues that climate change and global warming affects us more than we may think or can even fathom.

> "Climate change caused by global warming is, arguably, a serious, even existential, threat to the world order and to the welfare of humanity. There are many repercussions that we have yet to fully comprehend. No one really knows; there are many uncertainties around the rate of warming and the severity of its environmental and social impacts, and hence the most effective, and cost-effective, ways to avoid or ameliorate them" (Mazo 2014, p. 41).

Moreover, global warming and climate change reproduce and deepen all forms of existing inequalities in our world. The majority of the greenhouse gasses are produced by core countries in the Global North and a handful of global corporations that are now called "Super-Polluters" (Grant *et. al.* 2020). However, those who will pay the steepest price are disproportionately poor, non-White and indigenous people of the peripheral countries of the Global South. This is why some scholars have called human-caused climate change "institutionalized global environmental racism" (Wade 2022:325). MacGregor (2009) argues that women will also suffer more in this process. Therefore, climate change can also be called institutionalized global environmental sexism.

Education and Environmental Concern

These disastrous consequences of global warming and climate change immediately bring the question of what can be done to mitigate or stop this environmental crisis that is rapidly unfolding in front of us. Interestingly, many scholars turn attention to increasing awareness

through education. As mentioned in the Introduction, there is almost a consensus in the literature regarding the positive effect of education on environmental awareness (Torgler and Garcia-Valinas 2007:528; also see Blomquist and Whitehead, 1998; Engel and Pötschke, 1998; Witzke and Urfei, 2001; Israel and Levinson, 2004; Veisten et al., 2004). It is assumed that "well-informed citizens who know about environmental problems might have stronger environmental attitudes because they are better aware of the possible damage" (Danielson et al 1995). We can summarize this argument as follows: *as educational level increases, the likelihood that people will value environmental protection increases.*

Existing research, however, introduces some qualifications to this statement. For example, Blomquist and Whitehead (1998) argue that together with formal education, informal education also matters. Some scholars argue that education's effect on environmental awareness are conditioned by ideological differences (see Stuart 2011). For example Hamilton (2010) finds that in the United States, "concern about climate change increased with education among Democrats, but decreased with education among Republicans" (p. 231). Smith et. al. (2017) find similar ideological differences in other countries as well.

Education and Environmental Action

Moreover, research conducted among students of higher education present several questions about the degree to which education affects environmental action (see Liu and Sibley 2011). For example, in a study with 394 college student participants in the United States, Belisle et. al (2020) found that "on average, participants were willing to do things such as forego access to high-emission commodities to delay a climate *Point of No Return"* (p. 64) but they did not actively take part in the efforts to slow down or mitigate climate change and global warming. Even

though some college students felt they could do more, they did not prioritize taking care of the environment.

In another research on students attending a Southeastern university, Ludwig et. al (1998) examined recycling habits amongst the students and found that college students are more willing to recycle if they are being encouraged or at least reminded to do so. But Ludwig et. al (1998) also found that college students preferred convenience and accessibility over environmental protection. For example, they observed that students did not bother recycling if receptacles were not in close proximity. This research illustrates the difficulty of actively combating environmental problems even in a micro-setting. Keep in mind that these are not large-scale burdens such as purchasing a fuel-efficient/electric car or installing solar panels on one's roof but very small and feasible tasks, e.g. picking up/throwing away trash and recycling. This generates concern over whether or not education will necessarily bring about activities that will slow down the harm caused by global warming and climate change.

A similar theme can be found in Truelove and Parks (2012) who examined college student attitudes concerning both macro-level environmental issues (such as global warming, greenhouse gas emissions) and micro-level ones (such as driving fuel efficient cars, walking more, recycling). Results concluded that many students admitted to not doing enough to care for the environment. Though many students were willing to introduce small changes into their daily routine. These included but not limited to, turning off lights, recycling, and adjusting the thermostat to an appropriate setting. Even though Truelove and Parks (2012) discovered that college students would be willing to drive less than they usually do, the students did not perceive this as a high priority. Interestingly enough, Truelove and Parks found within their case study that students at the college listed driving as a major contributor to global warming. This finding suggests that the smaller

changes are much easier for college students to implement into their daily lives than bigger environmental changes.

However, even though college students admitted that they should do more, Duchi et al, suggest that there is "a gap between students' informed view on human-caused climate change and their lack of environmental action" (2020, p. 10; also see Ferguson et al 2011). Although college students in particular, are more aware of environmental issues than ever before, they are not comprehending the full extent of these environmental harms and as a result, are not doing as much as they should to tackle them. This idea brings about a second argument regarding the effect of education on environmental actions: *as education level increases, the likelihood that people will take environmental action does not increase.*

Although this second argument seems to contradict the first one at first sight, it is different in the sense that it does not focus on "environmental values" but on "environmental action" at the individual level. As mentioned earlier, these may include driving a fuel efficient car, walking more, recycling, etc., in order to reduce one's own carbon footprint. Unfortunately, there does not seem to be much readily available research that looks at higher education's effect on individuals' carbon footprint. The effect of higher education on reducing one's carbon footprint is difficult to assess because increase in educational level produces two contradictory outcomes: On the one hand, through higher education, one can be more environmentally aware and willing to reduce their carbon footprint. On the other hand, as education level increases, people's income tends to increase. Consequently, they start to consume more commodities and energy than before. Hence higher education tends to increase carbon footprint as well.

Education Level and Environmental Collective Action

Obviously environmental action is not limited to individual-level efforts to reduce one's own carbon footprint. Many scholars also turn attention to the critical importance of organized environmental collective-action to mitigate the effects of global warming and climate change (Grant et al 2020; Moore 2016). One example of environmental collective action can be seen within a 2019 climate strike of global proportions. On September 20, 2019, people from all around the world were invited to partake in a school walkout meant to garner global support (Wade 2022:334-335). Several countries participated in the large-scale protest, calling for environmental action. Young teenage environmental activists were on the frontline.

Greta Thunberg, a Swedish teenager who feels strongly about environmental problems, was an icon of the global climate strike of 2019. Greta strongly feels that people -- including the most educated ones -- are not doing enough if anything at all to combat the negative effects associated with climate change and global warming. The overall theme of her influential speeches, which are compiled in her 2019 book, *No One Is Too Small to Make A Difference,* is a criticism of claiming to be aware of the climate crisis but doing virtually nothing about it. As she puts it

> "Some people say that we are not doing enough to fight climate change. But that is not true. Because to 'not do enough' you have to do something. And the truth is we are basically not doing anything" (Thunberg 2019, p15).

Thunberg's (2019) speeches remind us that knowing about environmental threats and doing something about them are two different things. Furthermore, they question whether higher education will contribute to environmental actions that can mitigate the effects of global warming and climate change. It is important to keep in mind that at the time this book was written, she was 16 years old and not in any form of higher education. However, even at her young age, she still is not able to conceptualize why people are not doing anything to tackle environmental threats. This

is a prime example of how higher education does not automatically mean that people will do something about the environment. Greta, a teenager, has been active in organizing collective action around environmental issues. In her mind, what creates environmental awareness is collective action. A global climate strike is the collective action that is needed to make an environmental impact on a global scale. Greta feels compelled to not only promote awareness about these issues but also to instill a sense of urgency in the need to do something about them.

These insights culminate in a third argument: *As education level increases, the likelihood that people will organize around environmental issues does not increase.*

CHAPTER III. METHODS AND DATA

Hypotheses

As I explained in Chapter II, three distinct arguments emerge out of my review of the literature. I summarize these arguments in as three hypotheses:

Hypothesis 1. As educational level increases, the likelihood that people will value environmental protection increases.

Hypothesis 2**.** As education level increases, the likelihood that people will take environmental action does not increase.

Hypothesis 3. As education level increases, the likelihood that people will organize around environmental issues does not increase.

This chapter explains the data and methodology used in this thesis to assess the validity of these three hypotheses.

Data

To assess the validity of these three hypotheses, I use the World Values Survey, Wave 7, 2017-2022 (Haerpfer et al 2022) as the primary data. The World Values Survey[1] (WVS) is a global research program dedicated to studying people's values in social, economic, political and cultural spheres. Launched in 1981 by Ronald Inglehart and his team, the WVS project has since been implemented in more than 120 countries throughout the world in the form of a global representative comparative social survey that is done every five years. Today, the WVS is often seen as the most authoritative and widely-used cross-national survey in the social sciences given its wide geographical and thematic breadth (see World Values Survey 2022).

[1] see https://www.worldvaluessurvey.org/WVSContents.jsp

In this study, I focus on the following 57 countries that are included in the WVS research: Andorra, Argentina, Australia, Armenia, Bangladesh, Bolivia, Brazil, Canada, Chile, China, Colombia, Cyprus, Ecuador, Egypt, Ethiopia, Germany, Greece, Guatemala, Hong Kong SAR, Indonesia, Iran, Iraq, Japan, Jordan, Kazakhstan, Kenya, Kyrgyzstan, Lebanon, Libya, Macau SAR, Malaysia, Mexico, Mongolia, Morocco, Myanmar, New Zealand, Nicaragua, Nigeria, Pakistan, Peru, Philippines, Puerto Rico, Romania, Russia, Serbia, Singapore, South Korea, Taiwan ROC, Tajikistan, Thailand, Tunisia, Turkey, Ukraine, United States, Venezuela, Vietnam, Zimbabwe.

Needless to say, like any large-scale dataset with such wide geographical and thematic scope, the World Values Survey must also be used carefully due to some of its potential limitations. One such issue arises from the difficulty of accurately comparing "values" across very different cultures. Although the World Values Survey is implemented in different countries by translating the main questionnaire into other countries' language, one must be ready to accept that the same concepts or same social issues might have different meanings in different cultures. More importantly, the biggest limitation of the World Values Survey for this research is that it focuses on "values" not on actual behaviors or action. Thus, in my analysis, I had to complement the World Values Survey with additional datasets to take into account people's actions.

Dependent Variables

In Wave 7 of the WVS, participants from all countries were asked a series of questions regarding their environmental values and action. In this research, I focus on three questions, which will constitute the three dependent variables of the analysis. To assess the validity of Hypothesis

1, I use Question 111 as a proxy of "environmental values". In Question 111, participants responded to the following:

> Here are two statements people sometimes make when discussing the environment and economic growth. Which of them comes closer to your own point of view? (Read out and code one answer):
> 1- Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs.
> 2- Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent.
> 3- Other answer (code if volunteered only!).

To simplify the analysis, I recode this variable by coding "3- Other answer" as missing, so that I examine only the first two answers. To help interpret this variable more easily, I also recode this variable as 0 and 1 where "0" means that people value economic growth and "1" means that they value "environment" more.

To assess the validity of Hypothesis 3, I use Question 99 as a proxy of the "tendency to organize around environmental issues" (i.e. environmental action at the collective level). In Question 99, the WVS discusses *Environmental Organizations.* In the question, participants responded to the following:

> Now I am going to read off a list of voluntary organizations. For each organization, could you tell me whether you are an active member, an inactive member or not a member of that type of organization? (Read out and code one answer for each organization):
>
> | Active member | Inactive member | Don't belong |
> |---|---|---|
> | 2 | 1 | 0 |

To assess the validity of Hypothesis 2, we need a variable that can be used as a proxy of respondents' carbon footprint. Unfortunately, however, the WVS does not ask any question about peoples' carbon footprints or consumption habits. That's why, for this section of the analysis, I use an ecological analysis, meaning, instead of analyzing respondents within each country, I analyze

countries' carbon footprints as a whole and assess the relationship of this variable to the countries' education level as a whole. I retrieve countries' carbon footprint from World Population Review (available at https://worldpopulationreview.com/country-rankings/carbon-footprint-by-country) .

Because I analyze Hypothesis 2 at the country level, I assess the validity of Hypothesis 1 and 3 both at individual and country level.

Independent and Control Variables

Educational level is the key independent variable of this research. In Wave 7 of WVS, Question 275 asks the following:

> What is the highest educational level that you have attained?
>
> 0 Early childhood education / no education
> 1 Primary education
> 2 Lower secondary education
> 3 Upper secondary education
> 4 Post-secondary non-tertiary education
> 5 Short-cycle tertiary education
> 6 Bachelor or equivalent
> 7 Master or equivalent
> 8 Doctoral or equivalent

In assessing the plausibility of the hypotheses, this research also relies on a set of control variables. The first control variable will be political attitudes that capture conservative, reformist and more radical ideologies that might affect the relationship between education and environmental attitudes and actions. For this, I use Question 42 of the WVS, where the respondents are asked:

> On this card are three basic kinds of attitudes concerning the society we live in. Please choose the one which best describes your own opinion? (Please, code only one option from the list below)

1 The entire way our society is organized must be radically changed by revolutionary action
2 Our society must be gradually improved by reforms
3 Our present society must be valiantly defended against all subversive forces

The second control variable is class. In Question 287 of the WVS, the respondents are asked:

People sometimes describe themselves as belonging to the working class, the middle class, or the upper or lower class. Would you describe yourself as belonging to the (read out and code one answer)?
1 Upper class
2 Upper middle class
3 Lower middle class
4 Working class
5 Lower class

The final control variable is age. The literature shows that the young individuals are more concerned about the environment than the elderly. To account for this matter, I use Question 262 in the World Values Survey, which asks for the age of all respondents.

Analytical Strategy

To assess the validity of the three hypotheses, I proceed in two steps. First, I analyze the data at the country-level by treating countries as a unit of analysis. In that section, I examine the scatterplots and Pearson correlation coefficients by focusing on the relationship between average educational level of countries and the (1) average environmental values, (2) CO2 emissions, and (3) mean membership to environmental organizations respectively. This ecological analysis aims to give readers a broad idea about the relationship between average educational level in these countries and carbon emissions and membership to environmental organizations at the country-

level. It will also help us properly account for the effect of carbon emissions data, which is available at the country level but not at individual levels. Considering the relatively low level of sample size and the absence of control variables at this level, I do not conduct a regression analysis in this section. However, Appendix A Table A4 provides readers a bivariate regression analysis for their convenience.

Although ecological analysis, meaning analyzing countries' values instead of the values belonging to individuals living in those countries, can be helpful, I consider the potential problem of ecological fallacy. Ecological fallacy refers to the methodological error of attributing group properties to individuals living in those groups. Precisely for this reason, I also conduct the analysis at the individual level as well.

In the second section of the findings, I analyze the data at the individual level by treating individuals as a unit of analysis. Here, I conduct multivariate regression analysis using education level as an independent variable and social class, age and political attitudes as control variables. I conduct three distinct sets of multivariate regression analyses. First, I use environmental values as a dependent variable. Then, I use membership to environmental organizations as a dependent variable. Finally, although the Carbon emissions data is not available at the individual level, I will also replicate the analysis using the carbon emission data that is available at the country level.

I use both SPSS v27 and STATA v14 softwares to produce the tables, graphs and to calculate the statistics.

CHAPTER IV. FINDINGS

Findings from Country-Level Correlation and Scatter Plot Analyses

In this section, I present the findings at the country-level where I test the validity of Hypotheses 1, 2 and 3. Table 1 presents the descriptive statistics of the independent variable (educational level) and three dependent variables (environmental value, membership to environmental organizations and Carbon emissions) used in the analysis.

Table 1. Descriptive Statistics of Country-Level Analysis

	Obs	Mean	Standard Deviation	Minimum	Maximum
Educational Level	57	3.47	0.88	1.85	4.99
Environmental Value	57	0.57	0.10	0.36	0.81
Membership to Environmental Organizations	57	0.18	0.14	0.01	0.57
CO2 emissions	56	4.93	4.17	0.15	15.22

As Table 1 shows, the data on the education level comes from 57 countries of the World Values Survey. Education level of each country is calculated by taking the average education level of each country on a scale of 0 (no education) to 8 (doctoral education). The row on "educational level" in Table 1 presents the mean of all country-level averages of educational level. The mean education of all countries is 3.47 with a standard deviation of 0.88 units. The minimum average educational level in a country is 1.85 and the maximum average educational level is 4.99.

The data on environmental value comes from 57 countries. The mean environmental value is 0.57 with a standard deviation of 0.10 units. Here the closer the values are to "0" it means that

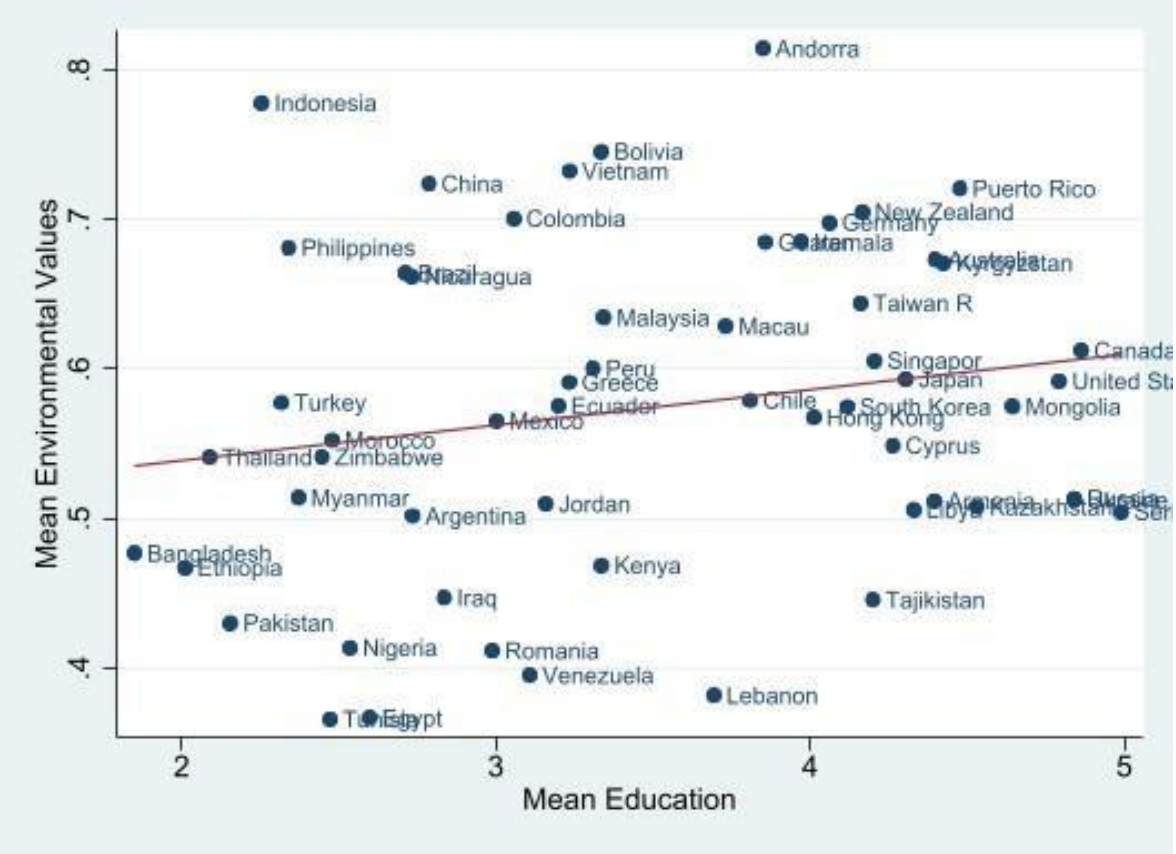
the individuals in these countries value environmental protection less, and the closer values are to "1" it means that the countries value environmental protection more. The minimum average environmental value in a country is 0.36 and the maximum average level is 0.81.

Likewise, the data on membership to environmental organizations comes from 57 countries of the WVS. The mean membership is 0.18 with a standard deviation of 0.14 units. The minimum average membership in a country is 0.01 and the maximum average membership is 0.57.

As Table 1 shows, The data for CO2 emissions level comes from 56 countries. The value for the CO2 emissions in Tajikistan is missing in the emissions data. The mean emissions is 4.93 with a standard deviation of 4.17 units. The minimum average emissions level in a country is 0.15 and the maximum average level is 15.22.

All information of the 57 countries used in the analysis can be found in Appendix A1.

Figure 1. Relationship between Environmental Values and Educational Level



It can be seen in Figure 1 that as the level of education increases, environmental value also increases to an extent (r=0.1911, p=0.1545). Figure 1 does well to show that a great deal of lower educated countries value the environment less, and higher educated countries value the environment more. This can be seen with countries such as Bangladesh, Ethiopia, Pakistan, Nigeria, Tunisia, Egypt, Iraq which are lower educated on average and appear to have low levels of environmental values on average, overall. Likewise, according to Figure 1, countries with a higher educational level such as the United States, Canada, Puerto Rico, New Zealand, Germany, Taiwan, Guatemala, Australia, Kyrgyzstan, Andorra also have higher environmental values (ranging between 0.6 to 0.9). Countries with lower education levels also have lower levels of environmental values.

However, as Pearson Correlation coefficient of 0.1912 and the non-significant p-value (0.154) suggest, the relationship is not a very strong one. As we can see from Figure 1, there are countries with high education levels and low environmental values. These countries include Tajikistan, Libya, Kazakhstan, Armenia and Ukraine, to cite a few. There are also countries with low education levels but high environmental values such as Indonesia, China, Philippines, Brazil, Nicaragua and Colombia. As a whole, however, Figure 1 shows a weak but positive association between educational level and environmental values as expected by Hypothesis 1.

Figure 2. Relationship between CO2 Emissions and Educational Level

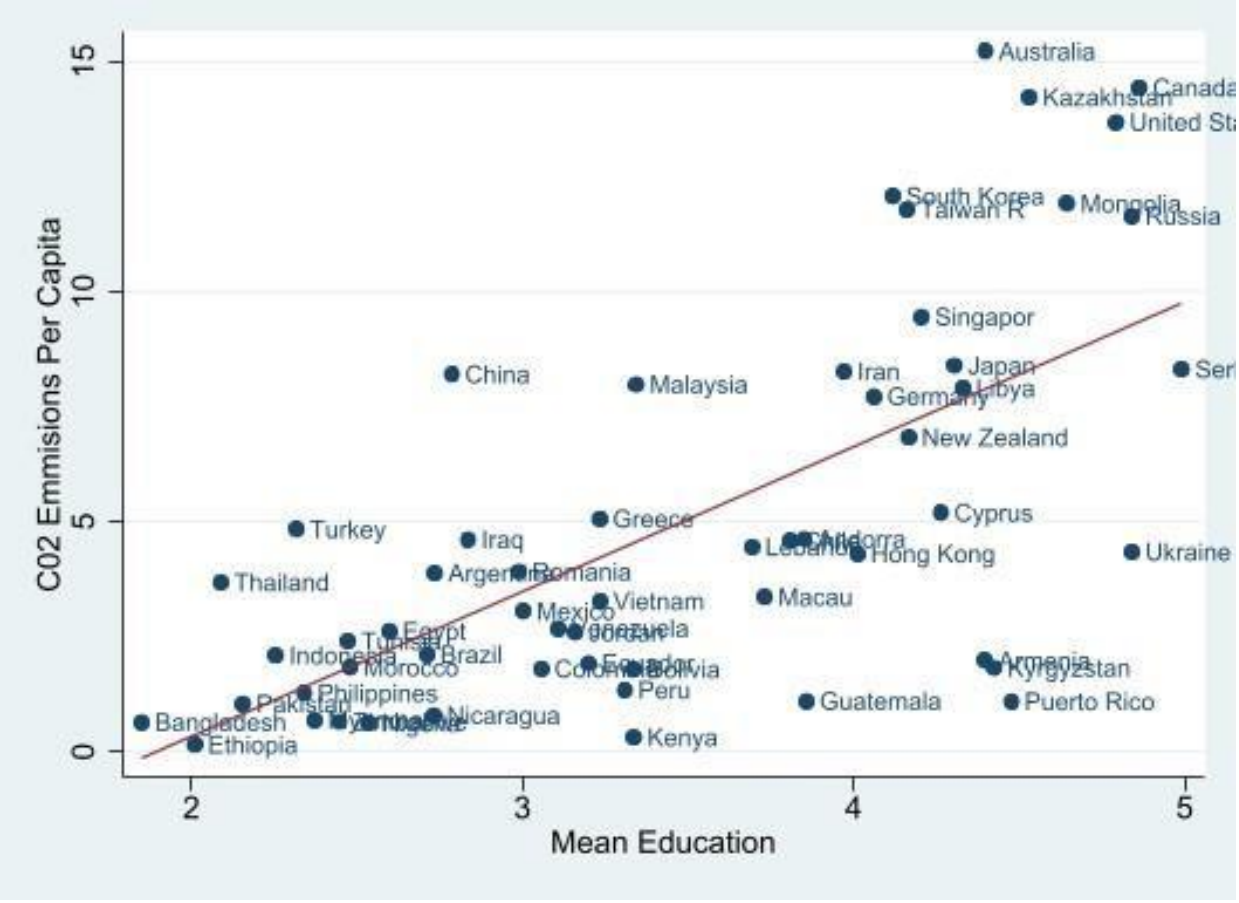
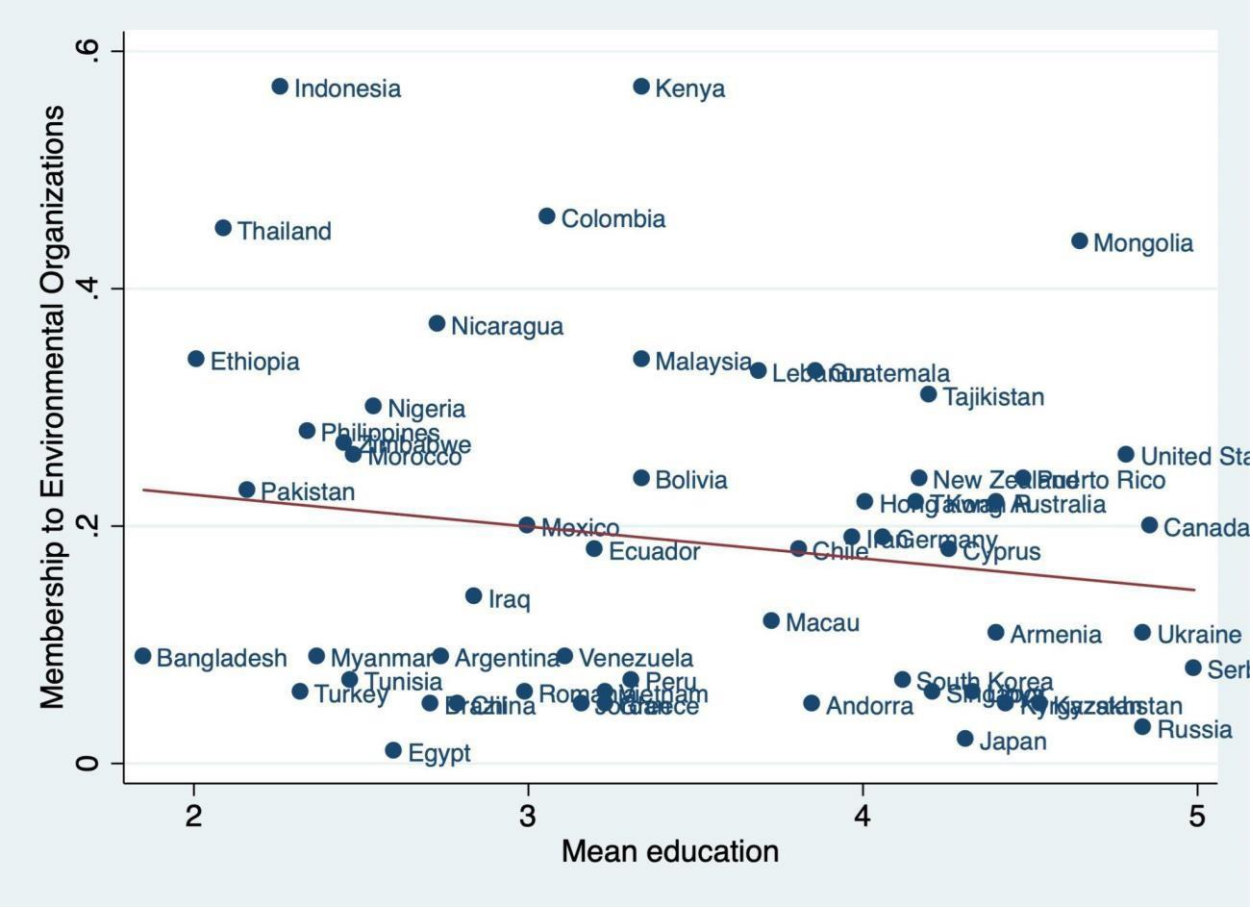


Figure 2 shows that as levels of education increase, carbon footprints do not decrease. In fact, as levels of education increase, so do carbon footprints. It can be seen in Figure 2, that as the level of education increases, CO2 emissions increase to a great extent. The correlation between

these education levels and CO2 emissions is a strong, positive and statistically significant relationship (r=0.6694, p=0.000). As Figure 2 shows, countries with lower levels of education have lower carbon footprints. This can be seen with countries such as Ethiopia, Bangladesh, Pakistan, Philippines, etc., who have lower education levels and lower carbon footprints. This is in comparison to countries such as Australia, Kazakhstan, Canada, the United States, Russia, etc., who have higher education levels and higher carbon footprints. This supports Hypothesis 2, which argues that as education level increases, the likelihood that people will take environmental action does not increase.

Figure 3. Relationship between Membership to Environmental Organizations and Educational Level



In Figure 3, it can be seen that as levels of education increase, the likelihood of being an active member in an environmental organization does not increase. In fact, Figure 3 shows that it

is more common for lower educated countries to have higher levels of membership to environmental organizations than for higher educated countries. There is a negative correlation between educational level of countries and membership to environmental organizations (r=-0.1706, p=0.2044). Overall, this does well to support Hypothesis 3, which suggests that *as education level increases, the likelihood that people will organize around environmental issues does not increase*. This can be supported by countries such as Indonesia, Thailand and Ethiopia which are lower educated but have higher environmental membership participation rates. Furthermore, countries with a high level of average education like Russia, Japan, Serbia, Ukraine, South Korea, Singapore have very low levels of membership to environmental organizations.

All Pearson correlation and significance levels can be found in Appendix, Table A2.

Findings from the Individual-Level Linear Regression Analyses

In this section, I go beyond the country-level analysis and examine the relationship between educational level and environmental concerns (environmental values, individual and collective-level environmental action) by examining individuals. Table 2 presents the descriptive statistics for the individual level analysis.

Table 2. Descriptive Statistics of Individual-Level Analysis

	Obs	Mean	Standard Deviation	Minimum	Maximum
Educational Level	87,004	3.546	2.025	0	8
Environmental Value	81,352	0.586	0.492	0	1
Membership to Environmental Organizations (0-Do not belong, 1-Inactive member, 2-Active member)	86,592	0.192	0.512	0	2

Social class (1-Upper class 2-Upper middle class 3-Lower middle class 4-Working class 5-Lower class)	85,520	3.25	0.974	1	5
Age	87,483	42.85	16.357	16	103
Political attitudes (1- Radical 2- Reformist 3- Conservative)	84,919	1.98	0.59	1	3

As Table 2 shows, data from educational level comes from 87,004 individuals. The mean education is 3.546 with a standard deviation of 2.025. Minimum education level is 0 and maximum is 8. The data from environmental value comes from 81,352 individuals. The mean environmental value is 0.586 with a standard deviation of 0.492. The minimum environmental value is 0 and maximum is 1. The data from membership environmental organizations comes from 86,592 individuals. The mean membership is 0.192 with a standard deviation of 0.512. The minimum environmental membership is 0 and maximum is 2. The data from social class comes from 85,520 individuals. The mean class position is 3.25 with a standard deviation of 0.974. It must be kept in mind that class is reverse coded where 1 means "Upper class" and 5 means "Lower class". The information on age comes from 87,483 individuals. The mean age is 42.85 years with a standard deviation of 16.357. The minimum age is 16 and the maximum age is 103. The data from political attitudes comes from 84,919 individuals. The mean political attitude is 1.98 with a standard deviation of 0.59. The minimum for political attitudes is 1 (which means "radical") and the maximum is 3 (which means "conservative"). Correlation table of all these variables can be found in Appendix A, Table A3.

Table 3. Linear Regression Analysis of Environmental Values

	Model 1	**Model 2**	**Model 3**	**Model 4**
Educational Level	0.0218 *** (25.50)	0.0225*** (24.66)	0.0222*** (24.15)	0.0221*** (23.79)
Social class (1-Upper class 2-Upper middle class 3-Lower middle class 4-Working class 5-Lower class)		0.005* (2.26)	0.00421* (2.22)	0.0045** (2.35)
Age			-0.0003*** (-3.12)	-0.0002*** (-2.02)
Political attitudes (1- Radical 2- Reformist 3- Conservative)				-0.0329*** (-11.05)
Constant	0.510*** (146.55)	0.493*** (61.43)	0.509*** (53.64)	0.568*** (51.46)
N	80,781	79,255	79,001	77,494
Adj. R-sq	0.008	0.008	0.008	0.010

Note: t statistics in parentheses, * $p<0.05$ **$p<0.01$ ***$p<0.001$

Table 3 shows the multivariate regression analysis results that use environmental value as dependent variable, educational level as independent variable and a number of control variables. As a whole, Table 3 supports Hypothesis 1 by demonstrating that increase in education level increases people's preference to protect the environment. Model 1 shows that one unit increase in the educational level increases the environmental values by 0.0218 units ($p<0.001$). Model 2 repeats the analysis in Model 1 by adding social class as a control variable. It shows that controlling for social class, the educational level increases environmental values by 0.0225 units ($p<0.001$);

and social class increases environmental values by 0.005 units ($p<0.05$). We must remember that social class is reverse coded so an increase in social class means moving from higher class to lower class. Model 3 repeats the analysis in Model 2 by adding age as a control variable. Controlling for everything else, education level increases environmental values by 0.2222 units and this is statistically significant at 0.001 level. Likewise, controlling for everything else, increase in age has a significant but negative effect on environmental values. This supports the idea that the youth value the environment more than the elderly. Model 4 adds political attitudes as an additional control variable. It shows that as political attitudes become more conservative, the likelihood to value the environment actually decreases by 0.0329 units ($p<0.05$). However, the effect of educational level, social class and age remain almost identical. As the educational level increases, environmental values also increase. As a whole Table 1 supports Hypothesis 1.

Table 4. Linear Regression Analysis of CO2 emissions

	Model 1	**Model 2**	**Model 3**	**Model 4**
Educational Level	0.760*** (101.77)	0.729*** (91.05)	0.790*** (100.61)	0.791*** (99.44)
Social class (1-Upper class 2-Upper middle class 3-Lower middle class 4-Working class 5-Lower class)		-0.198*** (-11.94)	-0.196*** (-12.13)	-0.203*** (-12.36)
Age			0.0607*** (65.86)	0.0606*** (64.46)
Political attitudes (1- Radical				0.268*** (10.48)
2- Reformist 3- Conservative)				

Constant	2.832*** (93.80)	3.582*** (50.70)	0.770*** (9.50)	0.246** (2.60)
N	80,620	78,946	78,882	76,860
adj. R-sq	0.114	0.115	0.161	0.163

Note: t statistics in parentheses, * p<0.05 **p<0.01 ***p<0.001

As mentioned earlier, there is no CO2 emission information from individuals in the World Values Survey data. The CO2 emission information that I used in the previous section was at the country level. Despite these limitations, to assess the validity of Hypothesis 2, in Table 4, I used the individual level information we have on education levels, social class, age and political attitudes of individuals to predict the overall CO2 emissions in their country. Table 4 strongly supports Hypothesis 2. All Models, from Model 1 to Model 4, show that an increase in education level increases CO2 emissions in a country. The effects are statistically significant at 0.001 level. Interestingly, the positive effect of educational level on CO2 emissions holds true even when we control for the effects of class, age and political attitudes.

Models 2, 3 and 4 in Table 4 also show that as social class increases, CO2 emissions increase (note that social class is reverse coded) and this effect is statistically significant at 0.001 level. Likewise Models 3 and 4 show that one unit increase in age increases the CO2 emissions by 0.06 units and this effect is statistically significant at 0.001 units. Finally, as political attitudes become more conservative, CO2 emissions increase when controlling for the effects of education, class and age. This effect is also statistically significant at 0.001 level.

Table 5. Linear Regression Analysis of Membership to Environmental Organizations

	Model 1	**Model 2**	**Model 3**	**Model 4**
Educational Level	0.00262** (3.04)	-0.000623 (-0.67)	-0.00235* (-2.52)	-0.00239* (-2.51)
Social class (1-Upper class 2-Upper middle class 3-Lower middle class 4-Working class 5-Lower class)		-0.0206*** (-10.69)	-0.0207*** (-10.76)	-0.0200*** (-10.21)
Age			-0.00171*** (-15.55)	-0.00164*** (-14.60)
Political attitudes (1- Radical 2- Reformist 3- Conservative)				-0.0145*** (-4.75)
Constant	0.182*** (51.53)	0.262*** (31.99)	0.341*** (35.36)	0.367*** (32.35)
N	85,912	84,048	83,784	81,557
Adj. R-sq	0.000	0.001	0.004	0.004

Note: t statistics in parentheses, * $p<0.05$ ** $p<0.01$ *** $p<0.001$

Table 5 uses membership to environmental organizations to assess the validity of Hypothesis 3. As Table 5 shows, the effect of education level on membership is not straightforward. Although Model 1 shows that increase in educational level increases the likelihood of membership to environmental organizations by 0.002 units ($p<0.01$), this effect disappears when controlled for the effects of class, age and political attitudes as seen in Models 2, 3 and 4. Furthermore, according to Models 3 and 4, the effect of education on membership to environmental organizations is a negative one, which is statistically significant 0.05 level. According to these models, as education level increases, people are *not* more likely to become

active members of environmental organizations. In fact, they are becoming *less* active the higher their education level. *Thus Models 2, 3 and 4 in Table 5 support Hypothesis 3.* As adjusted R-Square values of these models are higher than Model 1, I conclude that these Models have more explanatory power than Model 1.

Moreover, Models 2-4 show that, as people's class position increases (in a reverse coded scale), they become more likely to be members of environmental organizations ($p<0.001$). Models 3-4 demonstrate that as people get older, they become less likely to be members of environmental organizations ($p<0.001$). Finally Model 4 demonstrates that as people's political attitudes become more conservative, the likelihood to be members of environmental organizations decreases ($p<0.001$).

CHAPTER V. CONCLUSION AND DISCUSSION

Taking into account the extensive research and literature, the findings broadly support the three hypotheses that this thesis focused on. Though not overwhelmingly strong, there was some evidence to suggest a relationship between possessing a higher level of education and environmental values at the country-level correlation analysis. The individual-level multivariate linear regression analysis provided even stronger evidence for the relationship between educational levels and environmental values. These findings supported Hypothesis 1: *As educational level increases, the likelihood that people will value environmental protection increases.*

Even though a higher education level coincided with valuing environmental protection more, there seems to be no strong evidence to support higher education and its ability to produce environmental action. Both the country-level correlation and scatter plot analysis as well as the individual level multivariate regression analysis showed that as educational levels increased , carbon emissions increased. These findings did not only support Hypothesis 2: *As education level increases, the likelihood that people will take environmental action does not increase,* but they also suggested that the relationship was much stronger than expected. Countries with higher education levels have higher carbon footprints and thus are contributing more harm than countries with lower education levels.

Furthermore, findings also provided a certain degree of support to Hypothesis 3. Though valuing environmental protection increased as with the level of higher education, higher education had no strong effects on organizing around environmental issues. In fact, both the country-level correlation and scatterplot analysis as well as the individual-level regression analysis showed that countries and individuals with higher education levels do not necessarily have higher environmental membership participation than countries or individuals with lower education levels. Country-level analysis shows that the relationship was actually a negative one (but it was not

statistically significant at 0.05 level.) Individual-level multivariate regression analysis showed that when controlled for social class, age, and/or political attitudes, the relationship was a negative and significant one. Paradoxically, the lower educated groups were more likely to participate in environmental organizations and the higher educated groups were less likely to do so. This does well to advocate for the claim made in Hypothesis 3: *As education level increases, the likelihood that people will organize around environmental issues does not increase.*

Though the results broadly supported the claims made in Hypothesis 3, they also showed that the relationship between educational level and membership in environmental organizations is more complex than expected. Models 1-4 in the linear regression analysis in Table 5 showed that the effect of education level on membership is not straightforward. There is a noticeable sign changing from model 1 to model 4. Model 1 showed that as educational level increased, so did the likelihood of membership to environmental organizations. However, this was not the case for models 2, 3, and 4 when controlled for the effects of class, age and political attitudes. Essentially when controlling for one variable, one result may be obtained and when controlling, for another variable, another may be obtained. With these models, the results indicated that with an increase of higher education, people are doing less and becoming less active. This may raise concerns about whether or not education even matters due to the findings suggesting that education did little to nothing to compel people to take environmental action. This is valid, but higher education is still held in high regard within society and sought after as a way to open doors to careers, opportunities, financial security, etc. Therefore, continuing to look at higher education and its influence or lack thereof, on not just valuing environmental protection but individual and collective action is necessary.

What do these findings mean as a whole? There is just too much evidence to validate the seriousness of the existential threats associated with environmental issues relating to global warming and climate change. Though this is not to say that every being on planet earth possesses a concrete understanding of these threats to life as we know it. Thus education is necessary to make people aware of these threats and problems. Findings of this thesis show that there is some relationship between having a higher education and being aware of and prioritizing environmental problems. However, this understanding remains ineffective and incomplete unless it causes an actual change in people's *actions*. It would be wrong to assume that raising awareness about environmental issues will help resolve the problems associated with climate change and global warming. Although higher education does present a general care and desire to value environmental protection, the findings suggest that higher education fails to produce environmental action on an individual and collective level. Highly educated people would know that there is a serious environmental problem and they sincerely care about the problem, but this is not enough. In its current form, higher education does not result in environmental action. Rallying around efforts to promote and produce environmental change is needed. Thus educational systems should not only raise awareness about global warming and climate change but they should also teach individuals what they can actually do about these problems.

Findings that emerge in this research also turn attention to a fundamental problem in the way some scholars study environmental awareness. In order to see whether or not people care about environmental problems such as global warming and climate change, most social and political scientists ask people questions about their preferences in the abstract. As we have seen, the World Values Survey, for example, asks respondents whether "protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs" or

"economic growth and creating jobs should be the top priority, even if the environment suffers to some extent". Those who choose the former statement appear to value the environment more than those who choose the latter statement. As this thesis shows, this is a major fallacy. People in countries such as Ethiopia, Pakistan, Bangladesh appear to value the environment less than most developed countries but their contribution to environmental harm is minimal. Likewise, people in countries such as the United States and Canada appear to value the environment more than most other countries but they also contribute to carbon emissions more than others. Thus, there appears to be a major discrepancy between environmental values and environmental action. Researchers should find new methods to study actual actions of individuals together with their values.

Although this thesis broadly supported the three hypotheses, further research is necessary to further substantiate and advance the arguments presented in this thesis. At the theoretical level, there is a need to explain why environmental values and environmental action tend to diverge. This thesis points out this divergence but does not present a theoretical explanation to why this is the case. Furthermore, a more detailed empirical analysis is also needed. Especially the absence of carbon footprint data (or any other data that can be used to see the degree to which individuals protect the environment) at the individual level is a major limitation of this research. This is why the analysis presented in this thesis must not be seen as the last word on this subject but the beginning of a broader discussion.

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APPENDIX: SUPPLEMENTAL TABLES

Table A 1. Summary Data of Countries used in the Analysis

COUNTRY CODE	COUNTRY	MEAN EDUCATION LEVEL	MEAN ENVIRONMENTAL VALUE	MEAN MEMBERSHIP	CO2 EMISSION
AND	Andorra	3.851	0.815	0.050	4.620
ARG	Argentina	2.736	0.502	0.090	3.880
ARM	Armenia	4.397	0.512	0.108	1.980
AUL	Australia	4.398	0.673	0.218	15.220
BNG	Bangladesh	1.850	0.477	0.090	0.640
BOL	Bolivia	3.336	0.746	0.235	1.790
BRA	Brazil	2.712	0.664	0.054	2.110
CAN	Canada	4.864	0.612	0.203	14.430
CHL	Chile	3.810	0.579	0.176	4.580
CHN	China	2.787	0.724	0.054	8.200
COL	Colombia	3.057	0.701	0.458	1.800
CYP	Cyprus	4.264	0.549	0.185	5.190
DRV	Vietnam	3.234	0.733	0.058	3.270
ECU	Ecuador	3.199	0.575	0.176	1.920
EGY	Egypt	2.598	0.366	0.007	2.620
ETH	Ethiopia	2.010	0.467	0.336	0.150
GMY	Germany	4.061	0.698	0.188	7.720
GRC	Greece	3.233	0.591	0.045	5.060
GUA	Guatemala	3.858	0.685	0.331	1.100
HKG	Hong Kong	4.012	0.568	0.217	4.300
INS	Indonesia	2.256	0.778	0.567	2.090
IRN	Iran	3.971	0.685	0.192	8.260

IRQ	Iraq	2.836	0.447	0.140	4.610
JOR	Jordan	3.160	0.510	0.052	2.590
JPN	Japan	4.305	0.593	0.018	8.390
KEN	Kenya	3.337	0.469	0.571	0.310
KYR	Kyrgyzstan	4.425	0.671	0.049	1.820
KZK	Kazakhstan	4.531	0.508	0.048	14.220
LEB	Lebanon	3.693	0.382	0.327	4.450
LYB	Libya	4.329	0.506	0.059	7.900
MAC	Macau	3.732	0.629	0.120	3.360
MAL	Malaysia	3.344	0.634	0.339	7.980
MEX	Mexico	3.002	0.565	0.203	3.050
MNG	Mongolia	4.645	0.575	0.443	11.910
MOR	Morocco	2.479	0.552	0.260	1.830
MYA	Myanmar	2.372	0.514	0.094	0.690
NEW	New Zealand	4.166	0.705	0.241	6.830
NIC	Nicaragua	2.732	0.662	0.368	0.790
NIG	Nigeria	2.536	0.414	0.302	0.620
PAK	Pakistan	2.156	0.430	0.227	1.040
PER	Peru	3.309	0.600	0.072	1.340
PHI	Philippines	2.341	0.681	0.284	1.270
PRI	Puerto Rico	4.476	0.721	0.239	1.090
ROK	South Korea	4.118	0.575	0.067	12.070
ROM	Romania	2.989	0.411	0.065	3.910
RUS	Russia	4.841	0.513	0.027	11.640
SIN	Singapor	4.206	0.606	0.060	9.450
SRB	Serbia	4.991	0.504	0.076	8.310
TAJ	Tajikistan	4.200	0.446	0.312	

TAW	Taiwan R	4.160	0.644	0.223	11.780
THI	Thailand	2.089	0.541	0.453	3.680
TUN	Tunisia	2.473	0.366	0.067	2.400
TUR	Turkey	2.318	0.578	0.059	4.830
UKR	Ukraine	4.841	0.512	0.114	4.340
USA	United States	4.794	0.592	0.260	13.680
VEN	Venezuela	3.108	0.395	0.089	2.680
ZIM	Zimbabwe	2.447	0.541	0.271	0.650

Table A 2. Pearson Correlations for Variables used in Country-Level Analysis

	Mean Educational Level	Mean Environmental Value	Mean Membership to Environmental Organizations	CO2 Emissions
Mean Educational Level	r=1.0000			
Mean Environmental Value	r= 0.1911 p= 0.1545	r= 1.0000		
Mean Membership to Environmental Organizations	r= -0.1706 p= 0.2044	r= 0.1441 p= 0.2850	r= 1.0000	
CO2 Emissions	r= 0.6694 p= 0.0000	r= 0.1364 p= 0.3160	r= -0.1786 p= 0.1879	r= 1.0000

Table A 3. Pearson Correlations for Variables used in Individual-Level Analysis

	Education	Environm. Values	Membership	CO2 emission	Class	Age	Political Attitudes
Education	1.0000						
Environm. Values	0.0894	1.0000					
Membership	0.0104	0.0415	1.0000				
CO2 emission	0.3374	0.0313	-0.0469	1.0000			
Class	-0.3303	-0.0213	-0.0389	-0.1475	1.0000		
Age	-0.1210	-0.0213	-0.0550	0.1708	0.0361	1.0000	
Political Attitudes	-0.0179	-0.0431	-0.0223	0.0472	0.0046	0.0898	1.0000

Note: All p-values are 0.000

Table A 4. Linear Regression Analysis for Environmental Values, Carbon Emissions and Membership to Environmental Organizations

	Model 1. Environmental Values	**Model 2. Carbon Emissions**	**Model 3. Membership to Environmental Organizations**
Educational Level	0.0236 (1.44)	3.15*** 6.62	-0.0269 (-1.28)
Constant	0.4915*** (8.40)	-5.971*** (-3.51)	0.280*** (3.72)
N	57	56	57
Adj. R-sq	0.0365	0.4480	0.0115

Note: t statistics in parentheses, * p<0.05 **p<0.01 ***p<0.001. Dependent variable for Model 1 is Environmental Values, Model 2 is Carbon Emissions, and Model 3 is Membership to Environmental Organizations