ABSTRACT

Valuing the Environment: A Comparison of Western Europe, the US, and Canada

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Using the World Values Survey, we evaluate the differences in environmental preferences between the United States and two other global leaders, Western Europe and Canada, in order to discover whether there is evidence, at the citizen level, to support the international criticism that the majority of Americans are not concerned for the environment and are a hindrance to its protection. In addition, we study what individual characteristics are correlated with pro-environmental preferences. We do not find evidence that supports the criticism that the majority of Americans are less environmentally conscious than Western Europe and Canada in several indicators of environmental concern. In addition, we find that individual-level characteristics such as gender, age, size of the town of residence, employment status, education, and income are significant predictors of environmental preferences.

Valuing the Environment: A Comparison of Western Europe, the US, and Canada

by

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CHAPTER ONE

Introduction

Western Europeans and Canadians often criticize Americans as lacking environmental concern and failing to act to correct or prevent environmental degradation. For example, members of the EU and Canada are consistently at odds with the US in negotiations on how to deal with climate change. In their eyes, "it is an understatement to say that the issue of climate change has far less salience in the United States [than in Europe]" (Sunstein 2006, 8). The European Parliament blames the US for the breakdown of the Kyoto Protocol and released a statement that said it was "appalled that the long-term interests of most of the world's population were being sacrificed for short-term corporate greed in the US" (BBC News 2001). Equally critical, the Canadian Prime Minister, Paul Martin, said in his speech at the UN climate change conference: "To the reticent nations, including the United States, I say there is such a thing as a global conscience, and now is the time to listen to it" (New York Times 2005). The EU has also criticized the US on its policies regarding the registration, evaluation, authorization, and restriction of chemicals (REACH) regulation proposal. When the US suggested that trade and economic effects should be considered before the REACH proposal moved forward, Justin Wilkes, the chemical safety campaigner of the World Wildlife Fund (WWF) condemned the possibility saying that it was "only part of a continuing US effort to weaken REACH to the benefit of its chemicals industry" (Euractiv Network 2006). In another example, the EU has criticized the US for its position in the dispute over genetically modified organisms (GMOs) in food production. Adrian Bebb, genetically

modified (GM) food campaigner at the Friends of the Earth Europe, stated that "the WTO, the US administration and biotech firms should stop their bullying and let Europeans decide what food we should eat" (Geneva AFP 2006). In these environmental disputes, the US has been labeled a bully, a reticent nation, and a dissenter in the campaign for environmental quality. The purpose of this paper is to discover whether there is evidence, at the citizen level, to support these harsh criticisms.

We analyze individual-level data contained in the World Values Survey (WVS) to compare the level of environmental concern of US citizens to their Western European and Canadian counterparts. Contrary to media reports and international political criticisms, we find that Americans are more likely to agree to an increase in taxes for the sake of the environment, are more concerned for local environmental quality, and, in a number of areas, do not have significantly different environmental views than Canadians and Western Europeans. Further, we find that respondent characteristics such as age, gender, income, and education also play a role in determining an individual's environmental attitudes. More specifically, we find that individuals who are female, college educated, younger, not unemployed, of an upper income class, and from an urbanized area are more likely to have pro-environmental attitudes. This is consistent with the previous research that analyzes individual level environmental attitudes (Franzen and Meyer 2010; Gelissen 2007; Israel and Levinson 2004; Torgler and Garcia-Valinas 2007). In sum, the results of the study do not support the allegations of Western Europe or Canada that the US does not care about environmental quality, at least at the citizen level.

Much of the research on the demand for environmental goods involves survey data. Environmental goods, by their nature, are non-market goods, and thus, one of the primary approaches to elicit information about environmental preferences is through the contingent valuation method (CVM). The CVM estimates non-use values by directly asking individuals, through surveys, about their environmental preferences and ultimately, how much they are willing to pay for environmental goods. Israel and Levinson (2004) point out that other methods exist, such as travel costs, hedonics, and averted behavior, but these methods still require a market through which the demand for environmental goods can be derived. For example, the hedonic method employs prices in the housing market in order to estimate the value of a lake view or the damage created by a Superfund (toxic waste) site to an area's aesthetic value. The CVM is the only method of the four primary approaches that estimates environmental values without the use of an existing market. The WVS provides a wealth of information regarding an individual's general willingness to pay and their level of concern for environmental quality, which can be used to elicit an individual's general environmental attitudes through the CVM approach. A shortcoming, however, of the WVS is that it fails to elicit quantitative measures of an individual's willingness to pay. Torgler and Garcia-Valinas (2006) point out that, as a result of the more general nature of the WVS questions, it is not entirely a contingent valuation study, but it does "offer the chance to investigate environmental preferences" (539).

Several studies analyze cross-national surveys of individuals' environmental concern and preferences in order to make comparisons across nations. Until recently, psychologists and sociologists conducted much of this research using cross-national

surveys. Perhaps most notably, Inglehart (1995), one of the first to study global environmental concern extensively, uses the World Values Survey (WVS) in order to understand the differences in environmental preferences between developed and developing nations. Reflecting upon his findings that both developed and developing nations exhibit high levels of environmental concern, he developed a theory of "objective problems and subjective values." He theorizes that poor nations show high levels of concern for the environment because they are faced with daily environmental (objective) problems, while wealthy nations have high levels of environmental concern because of cultural (subjective) values. As some countries have grown more developed and wealthy, their values have shifted from Materialist, or emphasizing economic and physical security, to Post-Materialist, or focused on self-expression and quality of life. This shift in cultural values to Post-Materialism is thought to be linked with increased environmental activism and concern. Inglehart's theory stimulated many studies comparing environmental preferences of developed and developing nations (e.g. Dunlap and Mertig 1995; Aoyagi-Usui et al 2003; Diekmann and Franzen 1999; Franzen 2003; Brechin 1999; Franzen and Meyer 2010; Gelissen 2007; Israel 2004). The present study takes a different approach, and investigates whether differences exist among developed nations with regards to environmental preferences, specifically, whether the environmental preferences in the US differ from those in Canada and Western Europe.

Individual specific characteristics are important predictors of environmental preferences. Gelissen (2007) asserts that in order to understand cross-national differences, we need to understand the compositional characteristics of the populations (i.e. income, educational attainment, age, etc). He states that:

> Earlier studies have focused predominantly on the examination of aggregate-level relationships, without controlling possible compositional effects. Consequently, they have ignored potentially meaningful individual-level variance in outcome measures and an important possible explanation for cross-national differences in pro-environmental attitudes (Gelissen 2007, 394).

Educational attainment, gender, and age are the characteristics that are the most often studied (Kemmelmeier 2002; Franzen and Meyer 2010; Gelissen 2007; Israel and Levinson 2004; Israel 2004; Torgler and Garcia-Valinas 2007). Several authors also find significant relationships between an individual's environmental preferences and the population of the town they inhabit and their relative income level (Israel, 2004; Israel and Levinson, 2004). In addition, Torgler and Garcia-Valinas (2007) look at employment status. We control for individual level characteristics, including gender, age, size of town, relative income level, employment status, and educational attainment, as we compare the environmental attitudes of respondents in the US to those from Canada and Western Europe.

Much of the literature that compares environmental preferences across nations focuses on sociological theories and comparisons of developed and developing nations. However, to our knowledge, no studies have analyzed the differences in environmental concern among nations of similar development and wealth. The primary focus of this paper is to assess whether there is evidence, at the individual level, to support the criticism from Western Europe and Canada that the US lacks an environmental conscience. In order to answer this question, we explore whether there are overall differences in environmental concern among these three developed nations (the US, Canada, and Western Europe), and whether different individual-level characteristics and preferences are playing a role in determining the degree of environmental concern.

CHAPTER TWO

Theoretical Model

Our empirical question is based on the theory that the demand for environmental quality is determined by individual preferences. Roca (2003) outlines the basic principles of this theory. The utility function of each individual in a society is formulated as:

$$U(C, P(C, A)) \text{ subject to } Y = C + A \quad (1)$$

where C, P, A, and Y represent consumption goods, pollution, abatement costs, and income, respectively. The solution to this utility function, assuming that there is at least some spending on pollution abatement, is:

$$U_c + U_P P_c = U_P P_A \quad (2)$$

which can be interpreted as the marginal utility of putting one additional unit of income toward consumption (U_c) plus the additional disutility (a negative value) this causes because of an additional unit of pollution ($U_P P_c$). The sum of U_c and $U_P P_c$ yields the marginal utility an individual receives for each unit of income that is put towards pollution abatement rather than consumption. This implies that there is a tradeoff between consumption and pollution abatement. The amount of utility that an individual receives from abating pollution or consuming goods is dependent on the personal characteristics of the individual. Pollution in this model is a function of the level of consumption goods, a positive correlation, and abatement, which is a negative correlation. Characteristics that may play a role include gender, age, economic situation, employment status, town size, and education level. The role that these characteristics play in

determining the utility that is derived from environmental protection and consumption of goods may vary due to unique country-specific characteristics that impact the individual.

CHAPTER THREE

Data

The data for this project come from the World Values Survey (WVS), a large set of cross-national survey interviews of a random sample of individuals. The WVS was developed in 1981 by a group of social scientists who were interested in studying sociocultural and political change. The survey team recorded data about basic values and beliefs for individuals from 97 different societies with the sample covering 88% of the world's population. While the survey addresses a wide variety of topics, the collection of environmental questions in the survey is most relevant to this study. These environmental questions can be used to assess an individual's general willingness to pay (WTP) for environmental quality, their concern for their local environmental quality, and their concern for global environmental issues. Since the WVS is administered worldwide, we can compare individual-level environmental attitudes across countries. There have been five different periods of data collection. Each period is referred to as a Wave[1]. After Wave 5, a total of 257,000 individuals had been interviewed by the WVS organization since its inception. Wave 5, which covers the time period from 2005-2008, contains the most comprehensive set of environmental questions of all waves. As a result, this study will be focusing on the survey responses from Wave 5.

Wave 5 also contains data for all countries that are of interest in this study. The countries we are studying, the United States, Canada, and countries of Western Europe, were surveyed in 2005 and 2006. The Western European countries in this study are

[1]Wave 1 was conducted from 1981-1984, Wave 2 from 1989-1993, Wave 3 from 1994-1999, Wave 4 from 1999-2004, and Wave 5 from 2005-2008.

Finland, France, Germany, Italy, Great Britain, Netherlands, Norway, Spain, Sweden, and Switzerland. There are 1,147 observations for the United States, 1,729 observations for Canada, and 6,066 observations for the countries in Western Europe.

Wave 5 contains a total of ten environmental questions. Four questions were administered in earlier waves, and focus on an individual's willingness to give part of their income for environment, an individual's willingness to bear higher taxes for the environment, the role of government in environmental protection, and whether environmental protection should be favored over economic growth. There are also six questions unique to Wave 5 that focus on the level of concern survey respondents feel for aspects of their global and local environment. These new questions are important because they provide a more well-rounded view of an individual's environmental concern than do the original questions alone. Brechin and Kempton (1997) criticize previous WVS waves for their focus on pollution alone without discussing "species protection, global problems, local resources, or sustainability issues" (18). Wave 5 covers all of these topics as well as focusing on pollution. It is important to note, however, that the results for the WVS questions must be interpreted qualitatively because they either do not refer to specific monetary amounts in the WTP questions or ask respondents to report their level of concern or level of agreement. Despite this shortcoming, the WVS questions still elicit responses that can help us make comparisons between nations regarding general environmental attitudes and WTP for environmental quality.

The WVS includes a question that elicits individuals' willingness to trade-off economic growth for environmental protection[2]. This question is different from the

[2]Responses for environmental protection are coded as 1. Responses for economic growth are coded as 0.

others in the study because it is not reported on a scale. Rather, individuals are simply asked to choose between environmental protection and economic growth. Among all three nations, 61.9% of the respondents selected environmental protection over economic growth. This is significantly larger than 50%, which is the majority.

The questions that elicit individuals' general willingness to pay for environmental protection ask respondents to report their WTP on a Likert-type scale. Respondents are asked to report their level of agreement or disagreement to a set of statements, where '4' is strongly agree, '3' is agree, '2' is disagree, and '1' is strongly disagree. The average level of agreement, across all of the countries, to the statement "I would give part of my income for the sake of environment" is 2.556, while the average level of agreement for the statement "I would agree to an increase in taxes for environmental protection" is significantly lower (although not qualitatively different) at 2.460[3]. This mean lies between "2" and "3" on the Likert scale, which is between "disagree" and "agree."

The WVS also investigates how individuals view government involvement in environmental protection and the costs that entails. Respondents are asked to indicate their level of agreement to the statement "the government should protect the environment without costing me money." In order to enhance the comparability of this question with the other WTP questions in this study, we report the level of *disagreement* to this statement so that all questions are interpreted as levels of increasing environmental concern. The average level of disagreement for this statement concerning government involvement in environmental protection is 2.180, which is significantly lower than the mean responses to the statements regarding giving income or bearing taxes for the

[3]Two-sample mean t-tests were performed in order to draw these conclusions. Significance is at the $p<0.01$ level.

environment. However, the responses to the general willingness to pay questions were significantly greater than two and significantly less than three. As such, respondents are generally neutral towards all three WTP statements.

On average, responses regarding local and global environmental concern are significantly different. The questions eliciting the level of concern for the local and global environment also employ a Likert-type scale. These questions asked respondents to report how serious they thought a list of local and global environmental issues were. The respondents were asked to respond with a "4" if they thought the issue was very serious, "3" if they thought the issue was somewhat serious, "2" for issues they thought were not very serious, and "1" for issues they felt were not serious at all. The questions regarding an individual's concern for their local environment ask about local water quality, local air quality, and local sewage and sanitation. The mean response level, for all countries in the study, regarding local issues is 2.077 for local sanitation/sewage issues, 2.088 for local water quality issues, and 2.257 for local air quality issues. The concern for local air quality issues is significantly higher than the concern for local sanitation and local water quality. There is no significant difference between levels of concern for local water quality and local sanitation. All three of the mean levels of concern for the local environment are significantly greater than two and less than three, which implies that respondents find these local issues to be between not very serious and somewhat serious. The questions regarding an individual's concern for the global environment ask about global warming, global biodiversity, and global water quality. The mean level of concern for global issues, with respect to all nations in the study, is significantly higher than the mean level of concern for local environmental issues. The

mean responses are 3.406 for concern for biodiversity, 3.487 for global warming issues, and 3.606 for concern for global water quality. Thus, individuals, on average, have the highest level of concern for global water quality and the lowest level of concern for global biodiversity. It is important to note that all three questions eliciting levels of concern for the global environment have mean response levels that are significantly greater than three, which suggests the respondents find these global issues to be between somewhat serious and very serious. Summary statistics for the environmental questions across all countries are provided in Table 1.

Table 1: Summary Statistics: Dependent Variables All Countries Included

Indicators of Environmental Concern	Mean (SD)	N
Level of agreement to give part of income for environmental protection	2.556 (0.889)	7053
Level of agreement to increase taxes for environmental protection	2.460 (0.907)	7075
Level of disagreement that government should protect environment without costing me money	2.180 (0.930)	7115
Environmental protection should be favored over economic growth[a]	0.619 (0.486)	8116
Level of concern for local water quality	2.088 (1.149)	7190
Level of concern for local air quality	2.257 (1.129)	7208
Level of concern for local sewage/sanitation	2.077 (1.135)	7151
Level of concern for global warming	3.487 (0.696)	7135
Level of concern for global biodiversity	3.406 (0.717)	7171
Level of concern for global water quality	3.606 (0.609)	7202

[a]Recall that this question is not on a scale. The responses will lie between 0 (favor economic growth) and 1 (favor environmental protection).

The summary statistics for the environmental question responses, delineated by country, are reported in Table 2. We perform a t-test to compare the indicators of environmental concern between countries without controlling for individual level characteristics in order to see if any large differences exist. Both respondents from the US and Western Europe have significantly lower mean levels of concern than respondents from Canada with regards to concern for global water quality, willingness to bear an increase in taxes for environmental protection, and willingness to give part of their income for the sake of the environment; however, respondents from Western Europe and the US are not significantly different from each other with respect to the three aforementioned environmental concern indicators. All three countries are significantly different from each other with respect to concern for local water and air quality and local sanitation and global warming and global biodiversity issues. The US has significantly higher mean levels of concern for local environmental quality, while Canada and Western Europe have significantly higher mean levels of concern for global warming and global biodiversity.

The WVS includes several respondent-specific characteristics that can be used as predictors for environmental quality and concern in addition to the country-level effects. In Table 3, we report the summary statistics for the respondent characteristics for all three countries collectively and then separately report the summary statistics for the individual characteristics by country in Table 4 to discern whether any significant compositional differences exist across the nations.

We include several respondent-specific characteristics in our analysis because our theoretical model assumes that individual-level characteristics significantly affect an

individual's environmental preferences[4]. Our sample has 40.8% of individuals in the upper income level[5,6]. In our sample, 42.9% of individuals have at least some experience at the college level[7]. Overall, our sample has 46.6% of individuals living in an urbanized area[8]. The other controls included in this study are gender, age, and unemployment status.

We report the summary statistics and the t-test results, delineated by country, in Table 4. There are significant differences between the nations with respect to several individual-specific characteristics. Canada has a significantly smaller proportion of

[4]We split the income, education, and urbanized area variable into two groups for interpretation purposes. We performed t-tests with the different groupings in order to see where there was a threshold to support where we made the splits. We were able to find a threshold for both urbanized area and education in a majority of the environmental indicators, but the income variable did not have a split that dominated. However, where we made the income split was present in some of the environmental indicators, so we made the best decision we could, given our data limitations.

[5]The relative income level is structured on a ten step scale where respondents are asked to self-select their income step. We recoded this characteristic into two groups. One group contains the lowest five income levels (coded as 0) and the other group contains the highest five income levels (coded as 1). For a complete list of the original categories, see Appendix B. A shortcoming of this income variable is that it cannot be standardized across nations due to the lack of currency ranges. There is a question in the WVS that asks individuals to choose their income step based on currency ranges. However, there is much less data for this question and the currency ranges are not consistent. Nonetheless, this question can still be used to investigate whether a general relationship between environmental preferences and income exists.

[6]The self-selected social class of an individual was investigated in this study, but the variable was of questionable quality and was not significant. Therefore, social class is not included in any of the regressions.

[7]We narrowed the education categories from eight categories to two. Our categories are split into groups that have had at least some university-level education and those that have not. The first group contains those individuals with a secondary (high school) degree and no college (coded as 0), and the next group are those individuals who have some college or hold a college degree (coded as 1). Previous studies have established that educational experience at the tertiary (university) level has a significant impact on environmental preferences (Israel 2004; Duroy 2008; Gelissen 2007). For a complete list of the original categories, see Appendix B.

[8]We narrowed the town size categories from eight categories to two. We use the Census Bureau's definition of an urbanized area (UA) in order to make the split. An urbanized area is defined as an area with more than 50,000 residents. After reaching a population of 50,000, an area is on its way towards developing into a city or metropolitan area with infrastructure and higher population densities. Overall, the two groups include individuals who live in towns of 50,000 individuals or less (coded as a 0), and individuals who live in areas of more than 50,000 people (coded as a 1). For a complete list of the original categories, see Appendix B.

Table 2: Summary Statistics: Dependent Variables By Country[9]

Indicators of Environmental Concern	United States		Canada		Western Europe	
	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N
Level of agreement to give part of income for environmental protection	2.501‡ (0.779)	1143	2.801Ψ† (0.785)	1675	2.474‡ (0.937)	4235
Level of agreement to increase taxes for environmental protection	2.452‡ (0.834)	1139	2.680Ψ† (0.772)	1681	2.376‡ (0.959)	4255
Level of disagreement that government should protect environment without costing me money	2.140 (0.855)	1140	2.159 (0.852)	1693	2.198 (0.977)	4282
Environmental protection should be favored over economic growth[a]	0.548Ψ‡ (0.498)	1136	0.748Ψ† (0.434)	1537	0.598†‡ (0.490)	5443
Level of concern for local water quality	2.827Ψ‡ (1.081)	1147	2.380 Ψ† (1.157)	1716	1.777†‡ (1.038)	4327
Level of concern for local air quality	2.947Ψ‡ (1.014)	1144	2.449Ψ† (1.133)	1723	2.000†‡ (1.064)	4341
Level of concern for local sewage/sanitation	2.726Ψ‡ (1.090)	1141	2.243Ψ† (1.134)	1701	1.840†‡ (1.067)	4309
Level of concern for global warming	3.227Ψ‡ (0.873)	1143	3.635Ψ† (0.601)	1687	3.498†‡ (0.658)	4305
Level of concern for global biodiversity	3.254 Ψ‡ (0.794)	1143	3.571Ψ† (0.629)	1705	3.381†‡ (0.715)	4323
Level of concern for global water quality	3.582‡ (0.625)	1139	3.793Ψ† (0.444)	1722	3.538‡ (0.645)	4341

Note: T-test results are reported for $p<.05$. Ψ represents a significant difference from Western Europe. ‡ represents a significant difference from Canada. † represents a significant difference from the US.

[a]Recall that this question is not on a scale. The responses will lie between 0 (favor economic growth) and 1 (favor environmental protection).

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Table 3: Summary Statistics: Independent Variables All Countries Included

Respondent Characteristics	Mean (SD)
Upper Income Level	0.408 (0.492)
Male	0.476 (0.499)
Age	47.839 (17.018)
At Least Some College	0.429 (0.495)
Unemployed	0.068 (0.252)
Urbanized Area	0.466 (0.252)
Observations	8942

males and a significantly higher proportion of individuals living in urbanized areas than either Western Europe or the US, who do not have proportions that are significantly different from each other. The US has a significantly lower proportion of individuals who have had at least some college compared to Western Europe and Canada, who are not significantly different from each other. In addition, there are significant differences between all three countries with respect to income level and unemployment status. Canada has the highest proportion of individuals reporting that they are in the relative upper income level, while Western Europe has a significantly lower proportion of individuals reporting that they are in the relative upper income category. The US has the lowest proportion of individuals reporting they are unemployed, while Canada has the highest. We include country dummies in our regression to capture any remaining differences among the nations that are not explained by the individual-level characteristics in our analysis.

Table 4: Summary Statistics: Independent Variables By Country

Respondent Characteristics	United States	Canada	Western Europe
Upper Income Level	0.411$^{\Psi\ddagger}$ (0.492)	0.486$^{\Psi\dagger}$ (0.500)	0.385†‡ (0.487)
Male	0.509‡ (0.500)	0.416 $^{\Psi\dagger}$ (0.493)	0.487‡ (0.500)
Age	48.027 (16.812)	48.311 (17.324)	47.669 (16.968)
At Least Some College	0.321 $^{\Psi\ddagger}$ (0.467)	0.477† (0.500)	0.436† (0.496)
Unemployed	0.037 $^{\Psi\ddagger}$ (0.467)	0.101 $^{\Psi\dagger}$ (0.301)	0.065†‡ (0.247)
Urbanized Area	0.424 ‡ (0.494)	0.532 $^{\Psi\dagger}$ (0.499)	0.455‡ (0.498)
Observations	1147	1729	6066

Note: T-test results are reported for $p<.05$. Ψ represents a significant difference from Western Europe. ‡ represents a significant difference from Canada. † represents a significant difference from the US.

CHAPTER FOUR

Results

We group our presentation of the analysis and results into five sections: (1) the trade-off between environmental protection and economic growth; (2) general willingness to pay for environmental quality; (3) individuals' level of concern for local environmental quality issues; (4) individuals' level of concern for global environmental issues; and (5) analysis of respondent characteristics.

Analysis of Indicators of Environmental Concern

Environmental Protection and Economic Growth

The results for the analysis of the trade-off between environmental protection and economic growth are presented in Table 5. We find that Canadian and Western European respondents are more likely to favor environmental protection over economic growth than their American counterparts. This finding is consistent with the criticism cited in the media reports.

General Willingness to Pay for Environmental Protection

We report the findings on individuals' general willingness to pay for environmental protection in Table 6. We find that Americans report significantly lower levels of agreement than Canadians to giving part of their income or bearing an increase in taxes for the sake of environmental protection, but, significantly higher levels of agreement than Western Europeans. There is no significant difference between US

Table 5: Environment and Economic Growth

Respondent Characteristics	Environmental protection should be favored over economic growth
Upper Income Level	0.022 (0.031)
Male	- 0.071** (0.029)
Age	- 0.003*** (0.001)
At Least Some College	0.403*** (0.033)
Unemployed	- 0.250*** (0.058)
Urbanized Area	0.019 (0.029)
Canada	0.503*** (0.052)
Western Europe	0.090** (0.042)
Observations	8942

***p*<.05 ****p*<.01

respondents and their Canadian and Western European counterparts regarding the level of disagreement to the statement that the government should fix environmental problems without increasing costs to the respondent. These findings may provide some evidence that the harsh criticisms against the US may be unwarranted, especially from Western Europeans.

Concern for Local Environmental Quality

In Table 7, we report the results for the questions regarding individuals' concern for their local environment. Somewhat surprisingly, we find that Americans are significantly more likely to report that they are concerned for their local water quality, local air quality, and local sewage and sanitation than their Canadian and Western European counterparts, all else equal. The results from this analysis also bring into question the harsh criticisms that the US receives from abroad.

Table 6: Willingness to Pay for Environmental Protection

Respondent Characteristics	Level of agreement to give part of income for environmental protection	Level of agreement to increase taxes for environmental protection	Level of disagreement that government should protect environment without costing me money
Upper Income Level	0.150***	0.151***	0.224***
	(0.028)	(0.028)	(0.028)
Male	- 0.016	- 0.004	0.0101
	(0.026)	(0.026)	(0.026)
Age	0.001	0.001	0.002**
	(0.001)	(0.001)	(0.001)
At Least Some College	0.457***	0.478***	0.431***
	(0.028)	(0.028)	(0.028)
Unemployed	- 0.296***	- 0.298***	- 0.188***
	(0.053)	(0.054)	(0.054)
Urbanized Area	0.144***	0.159***	0.140***
	(0.027)	(0.027)	(0.026)
Canada	0.301***	0.188***	- 0.064
	(0.042)	(0.042)	(0.042)
Western Europe	- 0.075**	- 0.143***	0.014
	(0.036)	(0.036)	(0.036)
Observations	7053	7075	7115

**p<.05 ***p<.01

Concern for Global Environmental Quality

With respect to global environmental quality, we find that Canadians and Western Europeans are significantly more likely to be concerned about global warming and global biodiversity. Interestingly, while Americans are significantly less likely to be concerned about global water quality than Canadians, they are significantly more likely than Western Europeans. These findings are reported in Table 8.

Analysis of Respondent Characteristics

Our analyses reveal that individual-level effects play a role in predicting environmental preferences. In general, we find that younger, female, more educated, not unemployed individuals from urbanized areas are significantly more likely to have pro-environmental attitudes. Some intriguing exceptions to these general findings exist,

Table 7: Concern for Local Environmental Quality

Respondent Characteristics	Level of concern for local water quality	Level of concern for local air quality	Level of concern for local sewage/sanitation
Upper Income Level	- 0.035 (0.029)	- 0.001 (0.028)	- 0.076*** (0.029)
Male	- 0.004 (0.027)	- 0.020 (0.026)	- 0.0005 (0.027)
Age	- 0.004*** (0.001)	- 0.003*** (0.001)	- 0.004*** (0.001)
At Least Some College	- 0.112*** (0.029)	0.014 (0.028)	- 0.017 (0.029)
Unemployed	0.096 (0.054)	0.048 (0.053)	0.053 (0.054)
Urbanized Area	- 0.013 (0.027)	0.357*** (0.027)	0.103*** (0.027)
Canada	- 0.398*** (0.042)	- 0.530*** (0.042)	- 0.455*** (0.042)
Western Europe	- 1.023*** (0.037)	- 0.945*** (0.037)	- 0.874*** (0.037)
Observations	7190	7208	7151

***p*<.05 ****p*<.01

however. Interestingly, while higher income levels are associated with higher general willingness to pay for the environment, gender is not a significant predictor of WTP. The individual-level characteristics that are significantly linked with local quality are somewhat different from those associated with concern for the trade-off between the environment and economic growth and the general willingness to pay for environmental quality. Younger individuals from urbanized areas are more likely to express concern for their local environment, but also, poorer individuals are more likely to be concerned for local sanitation and less-educated individuals are more likely to be concerned for local water quality, all else equal. We also find that poorer individuals are more likely to be concerned for global biodiversity and global water quality. The relationship between the

individual-level characteristics (i.e. gender, age, educational attainment, and population of city inhabited) and environmental attitudes, that we find in our analysis is, in general, consistent with the findings in the literature

Table 8: Concern Global for Environmental Quality

Respondent Characteristics	Level of concern for global warming	Level of concern for global biodiversity	Level of concern for global water quality
Upper Income Level	- 0.043 (0.031)	- 0.068** (0.030)	- 0.068** (0.032)
Male	- 0.171*** (0.028)	- 0.139*** (0.028)	- 0.176*** (0.030)
Age	0.001 (0.001)	- 0.004*** (0.001)	- 0.001 (0.001)
At Least Some College	0.170*** (0.031)	0.189*** (0.030)	0.282*** (0.034)
Unemployed	0.017 (0.059)	- 0.071 (0.057)	- 0.153** (0.060)
Urbanized Area	0.032 (0.029)	0.120*** (0.028)	0.154*** (0.031)
Canada	0.625*** (0.046)	0.483*** (0.045)	0.451*** (0.051)
Western Europe	0.371*** (0.038)	0.166*** (0.038)	- 0.119*** (0.041)
Observations	7135	7171	7202

**p<.05 ***p<.01

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CHAPTER FIVE

Discussion

Analysis and Discussion of Indicators of Environmental Preferences

Western Europeans and Canadians criticize Americans as a group of individuals who are not concerned for the environment and who prevent others from protecting its quality. The primary goal of this study is to uncover whether there is evidence, at the individual level, that either supports or contradicts the criticisms that are leveled against the US by Western Europe and Canada. The fifth wave, covering 2005-2008, of the WVS includes ten questions that elicit environmental attitudes, concerns, and trade-offs that reflect respondents' overall environmental values. Our findings suggest that some of the criticisms against the US may be unwarranted.

Analysis of Indicators of Environmental Preferences

Western Europeans and Canadians typically focus on one specific topic (e.g. global warming and the failure to sign the Kyoto Protocol) through which they derive the general conclusion that the American public is not environmentally-conscious. However, researchers have made the point that we cannot use one dependent variable (i.e. willingness to bear higher taxes for environmental protection) in order to draw conclusions about environmental preferences as a whole (Brechin and Kempton 1997; Torgler and Garcias-Valinas 2007). In this study, we use ten indicators of environmental concern in order to evaluate the criticism in the US and draw conclusions about individuals' environmental preferences. We find that Americans are significantly more

concerned than Western Europeans and Canadians about local environmental issues. Americans are also significantly more likely to agree to an increase in taxes or to give part of their income for environmental protection than Western Europeans[1]. In contrast, we find that Americans are significantly less concerned than Western Europeans and Canadians about global warming and global biodiversity and are less willing to trade-off economic growth for the environment. These results, when viewed as a whole, do not support the criticism that Americans lack pro-environmental attitudes altogether. Rather, the results suggest that Americans simply have pro-environmental preferences that are focused in different areas than those of Canadians and Western Europeans.

In our analysis of the data, we control for individual characteristics such as income, education, and gender. Therefore, compositional differences in the populations in these areas are not driving the country-level differences between countries. Brechin (1999) points out that many outside factors influence the beliefs of a nation's citizens. He says:

> In short, environmentalism is most likely a complex social phenomenon, a mixture of social perceptions, local histories and environmental realities, international relationships and influences, and unique cultural and structural features of particular countries and regions (807).

Brechin's assessment is reaffirmed in Israel and Levinson's (2004) research. They find that country effects explain a lot of the variation among nations, even when controlling for individual characteristics. Further research is needed in order to understand what country-level effects are active in each country and how these effects influence individual-level environmental attitudes.

[1]The difference in the level of WTP may be attributed to a difference in tax structure between the US and Western Europe. However, this would not explain Canada's higher level of WTP compared to the US. In addition, the higher taxes in Western Europe are for a number of issues, not necessarily environmental in nature. Therefore, we cannot assume that the tax structure would be driving the differences in WTP for environmental protection.

Discussion of Summary Statistics

Without controlling for individual-level characteristics, we can make some interesting observations about the mean environmental preferences of individuals in each nation. First, the proportion of individuals that report they favor environmental protection over economic growth is significantly over 50% in each nation, which means that the majority of individuals in Canada, Western Europe, and the US are willing to trade-off economic growth for the sake of environmental protection. Therefore, while Canada and Western Europe have significantly more individuals willing to make the trade-off of economic growth for the environment, the majority of Americans still have preferences that coincide with their critics'.

Individuals' general willingness to pay for environmental quality lies between "disagree" and "agree" (neutral) in all three nations. This is interesting because individuals usually feel strongly about decisions and projects that have direct costs to them. However, the distribution of attitudes for each nation regarding the general willingness to pay questions is uniform or bell-shaped. There is no bi-modal distribution that would suggest that there are two camps, one that strongly agrees that they are willing to pay for environmental quality and one that strongly disagrees that they are willing to pay.

Individuals' level of concern for environmental quality has surprising characteristics. The US and Canada have mean levels of concern for their environment that are between "not very serious" and "somewhat serious"; however, respondents in Western Europe report that they believe local environmental conditions are between "not very serious" and "not very serious at all." The mean level of concern for local water

quality and local air quality is significantly less than two and the mean level of concern for local air quality is not significantly different from two. This is a surprising result since developed nations are thought to have comparable environmental conditions, especially with regards to sewage and sanitation. Analysis of national environmental quality measures could be used to verify this[2].

The mean level of concern for global environmental quality is significantly higher than concern for local environmental quality in all three nations. In fact, the level of concern for global environmental issues is significantly greater than three in all nations in this study. This means that respondents in all three nations report that they believe that global warming, global biodiversity, and global water quality are at least "somewhat serious". Once again, Americans have environmental preferences that coincide with their critics.' While Western Europeans and Canadians report higher levels of concern for global warming and global biodiversity issues, it is important to note that Americans also report that, on average, they believe that global issues (i.e. global warming, global biodiversity, and global water quality) are at least "somewhat serious".

Overall, our study finds that there are significant differences between the responses of US citizens and the responses of citizens in Western Europe and Canada. We find that the US has pro-environmental attitudes that focus on local environmental

[2] We looked at data from the World Bank in order to see whether this difference in concern for local environmental quality is driven by differences in actual environmental conditions across nations. While there are data limitations that prevent us from being able to empirically test whether there are significant differences in environmental quality across nations, we can see that the US does not have local environmental quality conditions that lag behind Western Europe or Canada. For example, all three nations provide improved sanitation facilities to 100% of their populations. In addition, the country level PM10 (to compare local air quality), which is10 micrograms of particulate matter per cubic meter, in the US is 22.15, in Canada is 18.63, and in Western Europe is 22.04. Finally, the measure of organic water pollutant (BOD) emissions (to compare local water quality) in kg/day/worker is 0.14 for the US, 0.16 for Canada, and 0.16 for Western Europe. These indicators of local environmental quality do not have marked enough differences in order for us to think that higher levels of concern for local environmental quality in the US are driven by environmental conditions that are poorer than those in Western Europe or Canada.

quality and compel individuals to be more willing to pay, in general, for environmental quality than Western Europeans and Canadians. Canadians and Western Europeans are more concerned for global environmental quality and are more willing to trade economic growth for the environment than are Americans. This difference in the distribution of environmental preferences does not mean that Americans have anti-environmental attitudes; their concern is simply focused on a different aspect of environmental quality than Western Europeans and Canadians.

In sum, despite the results that show Americans are less likely to be concerned for global environmental issues or to trade-off economic growth for the environment than Western Europeans or Canadians, we can make general observations about the mean response levels that we saw in the summary statistics in order to suggest that the majority of Americans have environmental preferences that coincide with those of their Western European and Canadian counterparts. Considering the results from our summary statistics and our empirical analysis, we can conclude that there is evidence that brings the harsh criticisms the US receives from abroad into question.

Discussion of Respondent Characteristics

Individual characteristics such as education, relative income, gender, age, employment status, and population of the town inhabited, can predict an individual's environmental preferences (Franzen and Meyer 2010; Gelissen 2007; Brechin 1999; Israel and Levinson 2004; Torgler and Garcia-Valinas 2007). First, we find that individual's at higher income levels are significantly more likely to agree to an increase in taxes or to give part of their income for the sake of the environment. In our theoretical model, we are assuming that income can be spent on the consumption of goods and the

abatement of pollution. As income increases, it is less of a burden for individuals to allocate their income to the environment (by abating pollution). As a result, they are more likely to be willing to do so.

We find that gender is a significant predictor of individuals' willingness to trade-off economic growth for the sake of the environment and individuals' concern for global environmental issues. Gelissen (2007) uses traditional gender roles to help explain this phenomenon. According to Gelissen, "male socialization…emphasizes an economic provider role…[and] unecological attitudes emphasizing economic growth" (399). Thus, men are less willing to trade economic growth for the environment; they are the traditional breadwinners that need to provide for their families first, environment later. Gelissen goes on to explain the traditional gender socialization of women as "a motherhood mentality or an ethic of care" (399), which can explain women's higher level of concern for global issues that do not necessarily directly impact them. An interesting related question for future research is whether this dynamic changes as more women join the workforce and are more directly subjected to the impacts of economic growth changes.

We find that age is negatively correlated with pro-environmental attitudes. Torgler and Garcia-Valinas (2007) explain that there are two aspects of age that impact these attitudes: the life cycle effect and the cohort effect. The life cycle effect suggests that older people are less likely to feel the need to protect the environment because they will not be alive long enough to extract benefits of creating a healthier environment, and as a result, the net benefits of doing so are negative. The cohort effect is a generational effect where individuals and their peers are impacted by similar socialization, life

experiences, and economic conditions. Heightened global awareness of environmental problems could help explain why younger individuals experience more concern; they have grown up with more media exposure to environmental issues.

Having at least some college level education is positively correlated with pro-environmental attitudes. Gelissen (2007) attributes this result to the "enlightenment hypothesis" where an individual with higher educational attainment experiences a "greater commitment to the common good" (399). This explains why more educated individuals are concerned for global environmental quality and are willing to pay more for environmental protection, all else equal.

Our study shows that unemployment status is negatively related to an individual's pro-environmental attitudes. Individuals who are unemployed are going to be significantly less willing to trade-off economic growth for the sake of the environment because they need economic growth in order to help them find a job. Those who are employed or who are not in need of a job do not have this same need for economic growth because their physical and economic security needs are satisfied; therefore, the trade-off of economic growth for the environment is seen as a benefit rather than a burden. In addition, individuals who are unemployed are going to be willing to pay, in general, significantly less than individuals who are not unemployed, all else equal. This is because unemployed individuals are living with a heightened level of uncertainty regarding their economic future. Until individuals are convinced that they can care for their own physical and economic needs, they will not be willing to give money to the protection of the environment.

Our findings also show that individuals from more populated areas are more likely to have pro-environmental attitudes. Franzen and Meyer (2010) conclude that this finding is related to the manner in which individuals evaluate the quality of their environment. Individuals cannot see air pollutants such as greenhouse gases or water pollutants such as pharmaceuticals. Therefore, Franzen and Meyer (2010) explain that "factors such as a region's…degree of urbanization might instead exert greater influence on individuals' evaluation of environmental quality than objective levels of pollution" (222). This implies that individuals in urbanized areas feel more concern for their local environment because they are directly confronted with the environmental effects of human consumption on a daily basis. Individuals in more populated areas also report higher levels of concern for global environmental quality. This can be attributed to individuals feeling concern for the rest of the environment due to their personal experiences with local environmental quality. As a result of their heightened concern for the environment, either at a local level or a global level, individuals in more populated areas report higher willingness to pay for environmental quality, all else equal.

Overall, individual level-characteristics, such as gender, age, income level, educational attainment, and size of town inhabited, are correlated with an individual's environmental preferences. Our findings on these relationships are consistent with those in the literature.

CHAPTER SIX

Conclusions

This study has two primary findings. First, it provides evidence that refutes the international criticism that the majority of Americans are not as environmentally conscious as their Western European and Canadian counterparts. While Americans are significantly less likely than Canadians and Western Europeans to be willing to trade-off economic growth for environmental protection and be concerned for the global environment, they are significantly more likely to be concerned about their local environment and are more willing to pay for environmental quality. These findings, along with the observations of the summary statistics, which reveal that the majority of Americans agree they are concerned for the environment and are willing to trade-off economic growth for environmental protections, are inconsistent with the criticism that the majority of Americans are not concerned for the environment.

Second, we gain further insight into how respondent characteristics can impact an individual's environmental preferences. We find that female, younger, college-educated, employed individuals from more heavily populated areas are significantly more likely to have pro-environmental attitudes. Overall, while these individual-level characteristics can help predict individuals' environmental preferences, there are significant country level effects that are also capturing the differences in environmental preferences between Americans and Canadians and Western Europeans.

This study is important because it informs policy at the international level. We find that there are significant differences in individual-level environmental preferences across

nations. This is important because between-country interactions heavily impact international negotiations. For instance, Western Europe and Canada criticized the US because the US did not agree to the legislation developed in Western Europe (e.g. Kyoto Protocol and REACH legislation). This does not mean that the US is adverse to all environmental policy; it means that Americans have different environmental preferences that make them approach environmental problem-solving in a way that does not coincide with the preferences of members of Western Europe. Understanding that these differences in environmental preferences exist is especially important when more countries are involved in negotiations. Currently, the US and Western Europe are trying to negotiate environmental regulations with China and India. However, we have found in this present study that the US and Western Europe have environmental preferences that are significantly different from each other. It will be difficult to get India and China onboard with environmental protection policies if there is no unity in the US-Western Europe camp. Western Europe and the US need to understand and reconcile their own differences in environmental preferences (and stop criticizing each other) in order to provide a united front that will more likely motivate India and China to agree to environmental negotiations.

This study also provides evidence that individual-level characteristics significantly influence environmental attitudes, which can be useful for informing policy at the national and local level. Understanding what individual characteristics are correlated with pro-environmental attitudes can help individual nations to develop environmental regulations that protect the environment by utilizing the characteristics of the individuals affected. For example, if a local (or national) government wishes to increase

environmental awareness and general willingness to pay for environmental quality, they can increase opportunities for education because we have found that higher levels of education are significantly correlated with higher levels of pro-environmental attitudes. In addition, we found that individuals in urbanized areas are more likely to be willing to give part of their income or bear higher taxes for the sake of the environment. Therefore, governments can try new environmental protection strategies in urbanized areas where individuals will be more amenable to environmental policy and tax changes.

Overall, this study is important because it helps us to understand the environmental preferences of the individuals that make up a population. Ultimately, the success of environmental policy is dependent on the preferences of the individual. Research in this field needs to be continued because understanding the attitudes of a population is crucial to understanding where environmental policy will be most effective.

APPENDICES

APPENDIX A

Dependent Variables from WVS

The following list provides the questions and response choices as they appear in the WVS. The coding that we use is provided beneath the question if we made changes.

Level of agreement to give part of income for environmental protection:
I would give part of my income if I were certain that the money would be used to prevent environmental pollution

1 Strongly Disagree
2 Disagree
3 Agree
4 Strongly Agree

Level of agreement to increase taxes for environmental protection:
I would agree to an increase in taxes if the extra money were used to prevent environmental pollution

1 Strongly Disagree
2 Disagree
3 Agree
4 Strongly Agree

Level of agreement that government should protect environment without costing me money :
The government should reduce environmental pollution, but it should not cost me any money

1 Strongly Disagree
2 Disagree
3 Agree
4 Strongly Agree

We coded this question differently to be consistent with the responses to the other questions in this section:

1 Strongly Agree
2 Agree
3 Disagree
4 Strongly Disagree

Environmental protection should be favored over economic growth:
Here are two statement people sometimes make when discussing the environment and economic growth. Which of them comes closer to your point of view?
A. Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs.
B. Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent.

0 Economic growth first
1 Protect Environment first

I am going to read out a list of environmental problems facing many communities. Please, tell me how serious you consider each one to be here in your own community.

Level of concern for local water quality:
Environmental problems in your community: Poor water quality
1 Not serious at all
2 Not very serious
3 Somewhat serious
4 Very Serious
Level of concern for local air quality:
Environmental problems in your community: Poor air quality
1 Not serious at all
2 Not very serious
3 Somewhat serious
4 Very Serious
Level of concern for local sewage/sanitation :
Environmental problems in your community: Poor sewage and sanitation
1 Not serious at all
2 Not very serious
3 Somewhat serious
4 Very Serious

Now let's consider environmental problems in the world as a whole. Please, tell me how serious you consider each of the following to be for the world as a whole.

Level of concern for global warming:
Environmental problems in the world: global warming or the greenhouse effect
1 Not serious at all
2 Not very serious
3 Somewhat serious
4 Very Serious
Level of concern for global biodiversity:
Environmental problems in the world: Loss of plant or animal species or biodiversity
1 Not serious at all
2 Not very serious
3 Somewhat serious
4 Very Serious
Level of concern for global water quality:
Environmental problems in the world: Pollution of rivers, lakes and oceans
1 Not serious at all
2 Not very serious
3 Somewhat serious
4 Very Serious

APPENDIX B

Independent Variables in WVS

The following list provides the questions and response choices as they appear in the WVS. The coding that we use is provided beneath the question if we made changes.

Relative Income Level
Scale of incomes

1 Lower Step
2 Second Step
3 Third Step
4 Fourth Step
5 Fifth Step
6 Sixth Step
7 Eighth Step
8 Eighth Step
9 Ninth Step
10 Tenth Step

We combine these groups for interpretation purposes:

0 steps 1-5
1 steps 6-10

Male

1 Male
0 Female

Age

A continuous variable

Employed:

Are you employed now or not?
1 Full time
2 Part time
3 Self-employed
4 Retired
5 Housewife
6 Students
7 Unemployed
8 Other

We combine these groups in order to see the effects of unemployment:

1 Unemployed
0 All other groups

Education Level:
What is the highest educational level that you have attained?

1 Inadequately completed elementary education
2 Completed (compulsory) elementary education
3 Incomplete secondary school: technical/vocational type/(compulsory) elementary education and basic vocational qualification
4 Complete secondary school: technical/vocational type/secondary, intermediate vocational qualification
5 Incomplete secondary : university-preparatory type/secondary, intermediate general qualification
6 Complete secondary: university-preparatory type/full secondary, maturity level certificate
7 Some university without degree/higher education-lower level tertiary certificate
8 University with degree/higher education-upper level tertiary certificate

We combine these groups to look at the effects of a college and college preparatory experience:
1 levels 7-8
0 levels 1-6

Size of town:
1 2000 and less
2 2000-5000
3 5000-10000
4 10000-20000/10000-25000
5 20000-50000
6 50000-100000
7 100000-500000
8 500000 and more

We combine these groups to look at the effects of a town with a large population (urbanized area):
1 levels 6-8
0 levels 1-5

Countries in This Study
Canada
US
Western Europe: Finland, France, Germany, Great Britain, Italy, Netherlands, Norway, Spain, Sweden, and Switzerland

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