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Comparing Individual- and National- Level explanations of Environmental Attitudes

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COMPARING INDIVIDUAL-LEVEL AND NATIONAL-LEVEL EXPLANATIONS
OF ENVIRONMENTAL ATTITUDES

By

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Data from the 1999-2001 World Values Survey (WVS), the Environmental Sustainability Index (ESI), and the Central Intelligence Agency (CIA) World Factbook are used to assess individual and national level explanations of environmental attitudes among 34,555 respondents from 27 countries. Three analyses are presented: an individual-level analysis that examines the previously assessed correlates of environmental attitudes; a national-level analysis of the relationship between a variety of national-level characteristics and aggregate environmental attitudes; and a multilevel (HLM) model assessing these effects simultaneously. Guided by the New Ecological Paradigm (NEP), the post-materialist thesis and the World-Systems Perspective national-level characteristics are assessed in the context of the core-periphery hierarchy of the modern world-system. The findings indicate overall that most of the variation in environmental attitudes can be accounted for by individual-level characteristics, with only about 3% being accounted for between countries. The interaction between the two levels suggests that accounting for national-level variation may be a necessity in contemporary environmental research.

DEDICATION

For Mom and Dad

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TABLE OF CONTENTS

LIST OF TABLES, FIGURES, AND GRAPHS

CHAPTER 1: INTRODUCTION

CHAPTER 1: INTRODUCTION

Human behaviors have had a devastating impact on the condition of the natural environment. Pollution has led to a decline in the health of humans as well as for a variety of flora and fauna. The continued devastation of the land through over harvesting of natural resources, poor mining practices, and a host of other means has led to a decline in the potential quality of life for current and future generations. Many individuals, groups, nations, and larger inter-governmental organizations have made efforts to end such shortsighted practices. Some of these efforts have been relatively successful, while others have not. Unfortunately, even the best efforts of individuals, groups, or nations are often ineffective if other individuals, groups, or nations fail to make positive effort to reduce the human footprint on the planet.

Of the major environmental problems, those related to air pollution seem to get most of the attention. There may be a good reason for the attention, as the World Health Organization (2006) estimates that about 2 million deaths occur worldwide on an annual basis due directly to air pollution. Some of these pollutants, called "greenhouse gases" allow sunlight to pass through, but prevent infrared radiation (heat) from escaping the earth's atmosphere. The result is typically called the "greenhouse effect" in that it operates in much the same way as a greenhouse, by causing the temperature of the earth to increase. The outcome of the "greenhouse effect" is an increase in the average surface temperature of the earth. There exists some controversy about whether the greenhouse effect is actually causing the changes in temperature it has been reported to, but

according to the Intergovernmental Panel on Climate Change (2002; 2007) the evidence is clear.

Other types of environmental problems are important as well, though many of them are given much less attention than global warming. One example is water pollution. Freshwater scarcity is already a big problem in many parts of the world, and is likely to become one of the most pressing issues of the 21st century (World Resources Institute 1998). Estimates indicate that in the mid-1990s, about 40% of the world's population was already suffering from severe water shortages (United Nations Environment Programme 2002). The primary causes of such shortages are population growth, increases in irrigated agriculture, and industrial development.

In addition to pollution in the water and air, even our soil is experiencing degradation. By 1990 agricultural practices had degraded 562 million hectares of the world's cropland (Oldeman 1994). This represents about 38% of the earths original 1.5 billion hectares of cropland. The major causes of land degradation include poor agricultural practices (overgrazing, over cultivation, water logging, and salinization), mining, fire, development, and deforestation. Approximately half of the forests that existed on earth when humans first began to practice agriculture are gone. Between 1980 and 1995, an area the size of Mexico was lost to logging, fire, and development (Food and Agriculture Organization of the United Nations 1997).

There are many causes of these environmental problems, but most of them are of concern specifically because of the human component of the problems. Population growth plays an important role in the causes of these problems, and even more

importantly on the intensity with which they affect us. Technology can be important for solving many of these problems, though it can surely be implicated in causing some of them as well. Fossil fuel that is burned to power automobiles, trucks, and buses contributes to air pollution. In fact, the pollution from cars in Austria, France, and Switzerland caused more deaths than those resulting from automobile accidents (Reaney 1999). Another problem that comes with technology has to do with the disposal of the components of that technology. Besides the problem of disposing of car tires, toxic fluids, and plastics, many technological devices contain hazardous waste like mercury and lead, which can be deadly if disposed of improperly.

The evidence is clear that environmental degradation continues to have severe negative effects on the planet and its inhabitants. Though attitudes and behaviors are rarely perfectly correlated with each other, having an understanding of these problems, and being concerned about them are essential in promoting efforts to change them. There has been much research focused on the conditions in which people develop concern for the environment, and a desire to behave in an environmentally responsible manner. Thus far, much of this research has focused on the individual, primarily through social surveys. The knowledge gained from this research has been useful in developing a better understanding of the demographic, social, and cultural conditions related to concern and environmental attitudes. Other studies have focused instead on the structure of nations in order to discover how the social structures of a nation impact the environment. This suggests that there are structural variations between societies when we compare them from a macro-perspective. The purpose of the present study is to examine the combined

roles of the factors operating at both the individual level and the national level in the formation of environmental concern and environmental attitudes.

In order to understand the reasons for more social change in some areas compared to others, we must examine both the individual and national-level factors that contribute to environmental attitudes. Environmental sociologists have developed a large and wide-ranging body of literature on the topic of environmental concern (Dunlap et al. 2000). In much of this research, concern for the environment has been treated as a significant predictor of environmental behaviors.

Unfortunately, tests of theories to explain variation in environmental attitudes have not been very successful at explaining where and when positive change in the human-environment relationship will occur. My argument is that this failure is primarily because past studies have not simultaneously included both individual-level and national-level factors in the analyses. Researchers have examined specific demographic and cultural factors such as: age (Jones and Dunlap 1992), race (Mohai 1980; Mohai and Bryant 1998), political orientations—whether one is politically liberal or conservative (Van Liere and Dunlap 1980), religious beliefs (Sherkat and Ellison 2007; Greeley 1993), gender (Mohai 1992), education (Jones and Dunlap 1992), and income (Van Liere and Dunlap 1980) , while others have examined more structural types of factors such as political structure, economic system, and the availability of certain types of infrastructure—recycling centers, for instance (Schultz and Oskamp 1996). These strategies have both had limited success in the understanding of human attitudes about the environment.

While researchers have, to varying degrees, noted the value of examining individual or structural factors influencing environmental attitudes, they have not attempted to combine both types of factors into their analyses in any meaningful way. In the following chapters, I examine the confluence of individual and national-level factors which influence both national- and individual-level environmental attitudes. I will use several statistical techniques in order to examine both individual-level and national-level characteristics separately as well as combined.

Many researchers have examined the relationship between attitudes and behaviors. This body of research is important in that we often assume that by attempting to understand attitudes we are implicitly somehow able to understand corresponding behaviors. While in some instances this may be true, the literature on the attitude-behavior relationship makes no attempt to claim that this is true in all instances. Some research of note in this area has suggested that attitudes do not predict behavior, but they can predict the intention to behave in a certain way (Ajzen 1985; Ajzen and Fishbein 1980; Fishbein and Ajzen 1975; Fishbein 1967). Intentions may not always predict behaviors, however, due to a variety of structural constraints that may exist in a given situation (Stets and Biga 2003). For example, even when we would like to recycle in an effort to reduce household waste, if the infrastructure, opportunity, or financial resources required to recycle are not available, we are not likely to do so (Oskamp and Schultz 1996).

It is therefore important to study both individual and national levels of pro-environmental attitudes, but it is also necessary to examine individual and structural

factors that may influence these attitudes. In other words, individual-level characteristics have more of an effect on the attitudes of individuals, and structural factors have more of an effect on the attitudes of aggregate levels of these individuals. For example, some research has noted that people with certain political affiliations often have higher levels of environmental concern (Dunlap 1975). While this may be helpful when we look at the individual, many of the challenges we face with regards to the environment require not only a change in the attitudes of individuals, but also changes at the national level. With the exception of several world-systems researchers (Chase-Dunn and Hall 1997; Chew 1997; Burns, Davis, and Kick 1997; Bartley and Bergesen 1997), it seems that many environmental social scientists have not come to terms with this reality.

By simultaneously assessing individual and national-level predictors of environmental attitudes—whether one has a generally positive or negative view of the human-environment relationship—we not only gain a more complete understanding of the human-environment relationship, but also a more complete understanding of the sources of influence and their impacts on both individual and aggregate levels of environmental attitudes. Building on past studies that focus only on individuals or only on structures, my goal is to provide an integrated individual *and* national-level model of environmental attitudes.

To accomplish such a task, I use a variety of techniques. Indeed these tools will be specific to each of three tasks necessary for this undertaking. While each particular analysis will be useful on its own, only by examining the results of all three analyses in context can the bigger questions be properly answered.

In Chapter 2, I review the theoretical and substantive literature on environmental attitudes, post-materialism, and the world-systems perspective. In examining environmental attitudes at the individual level, I review the literature on the New Ecological Paradigm and post-materialism. In examining environmental attitudes at the national level, I incorporate the world-systems perspective and examine the literature both broadly and in greater detail by examining its origins and applications, as well as its specific application to the issue of environmental degradation. Lastly, I frame the three studies in Chapters 3-5 in the context of post-materialism and the world-systems perspective.

In Chapter 3, I examine individual environmental attitudes in a cross-national context. The examination of individuals in this context allows for a clearer picture of the variety of factors associated with environmental attitudes. Also, the nature of cross-national analyses allows one to gain a more complete understanding of the undoubtedly complex relationships between the many individual-level characteristics that contribute to pro-environmental attitudes. Another advantage of this technique is that it gives us a picture of the variation between different nations. In order to accomplish this, I use Ordinary Least Squares (OLS) and logistic regression techniques, as well as other uni- and multi-variate statistical methods. The data comes from the 1999-2001 World Values Survey.

In Chapter 4, I focus on assessing the national-level factors that affect aggregate environmental attitudes. This analysis is necessary in order to complete the analysis in Chapter 5. However because there are a variety of different factors that have been

examined in previous research, it is also required in order to examine the variety of potential variables involved. Understanding the structural factors that may influence pro-environmental attitudes is important because it allows for a more complete picture of various aspects of life in a given nation that may help or hinder the development of pro-environmental behaviors. In order to accomplish this, I use aggregated data from the 1999-2001 World Values Survey, as well as national-level data from the Central Intelligence Agency (CIA) and the Environmental Sustainability Index (ESI). I use a variety of uni- and multi-variate statistical techniques to examine the national differences in environmental attitudes. This allows me to more easily discern how structural constraints and national-level characteristics influence aggregate levels of environmental attitudes.

In Chapter 5, I examine the dual influences of individual characteristics and national-level factors on individual environmental attitudes. This third analysis combines the analyses from the individual-level analysis (Chapter 3) and the national-level analysis (Chapter 4) by combining the separate individual and national-level factors into a multilevel model. In order to accomplish this, I have created Hierarchical Linear Models in which the level 1 (individual-level) variables are the individual factors as examined in Chapter 3, and the level 2 (national-level) variables are the national-level characteristics examined in Chapter 4. The most significant contribution that comes from this analysis is a formalized model of the individual and national-level factors that are necessary for understanding environmental attitudes within and between countries. Put differently, I assess whether national-level differences in environmental attitudes stem from the

characteristics of the nation and its relationship to other nations, or from the characteristics of individuals within the nation.

In Chapter 6, I conclude by reviewing and discussing the findings of each study, as well as placing them in the context of the world-systems perspective, post-materialism, and the New Ecological Paradigm. I also discuss the strengths and weaknesses of this research and assess potential future directions for this research.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL ORIENTATION

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL ORIENTATION

The world-systems perspective (Chase-Dunn 1989; Wallerstein 2000) has been widely used in environmental sociology. Past research, however, has tended to focus solely on macro-level characteristics of nations. While environmental sociologists have looked at environmental problems in both macro- and micro- contexts, they have not attempted to examine environmental issues from both levels simultaneously.

The research presented here examines environmental attitudes at both macro- and micro- levels. In an individual-level approach, such as Dunlap et al.'s (2000) New Ecological Paradigm (NEP), researchers have found that pro-environmental attitudes have become more common across the social spectrum in recent decades. While the originators of the NEP concept make no concrete claims about the reasoning behind such a trend, it has been suggested by others that the trend is due to the availability of information regarding the types of environmental problems we face both in the local context, but also in the global context (Vining and Ebreo 1990). Additionally, the post-materialist perspective, shares many similarities with the NEP. First, both view the increase in environmentalism as a response to a generational shift in social attitudes. Finally, both generally focus on individual attitudes, though post-materialism research often incorporates national level attributes. The NEP suggests that environmental attitudes should be relatively consistent across social classes, whereas the post-materialist thesis suggests that environmental attitudes should be stronger among the higher social classes.

Building on these approaches, the world-systems perspective (WSP), views the condition of the natural environment as an unfortunate casualty of the development, growth, and spread of the singular capitalist world-system, and the various structural factors that are dependent upon such an arrangement. As such, individual level environmental attitudes are formed not only by the social and demographic characteristics of the individual, but also by the contextual environment in which they live.

In this chapter, I describe these perspectives with respect to their relationship to one another and to the environment. Additionally, the research objectives of the present study are explained within the context of the world-systems perspective, post-materialism and the NEP.

ENVIRONMENTAL CONCERN

Concern for the environment and public knowledge of environmental problems are necessary to begin to solve environmental challenges. Because many environmental problems were caused by human activities, human behavior is required to solve them. Researchers studying environmental behavior have rarely examined the relationship between attitudes and behavior in any direct context. Instead, they have examined various aspects of the behaviors themselves, such as examining recycling as a function of the effort required by individuals (Schultz and Oskamp 1996), or by examining the outcomes of elections in terms of the similarity between the voters and the candidates' views regarding the environment (Gill, Crosby, and Taylor 1986). Others have adopted various

mostly psychologically focused theoretical frameworks to explain human behavior that contributes to environmental problems, rarely identifying the social components of environmental problems. My goal is to understand both individual and national-level characteristics associated with environmental attitudes. I assume that environmental attitudes should, at least indirectly be associated with environmentally friendly behavior.

In the last few decades there has been a significant increase in interest among Americans on the state of the natural environment (Bell 2004; Kalafatis, Pollard, East and Tsogas 1999; Krause 1993; Ottoman, Stafford, and Hartman 2006). Especially in recent years, even advertisers have exhibited some change towards greener tactics (Pujari and Wright 1995). This change does not necessarily reflect a higher level of environmental awareness, as suggested by Peattie and Crane (2005), though it does play an important role in the level of exposure of certain populations to this issue. Yet the relationship between awareness of the problem and acting on potential solutions has not been sufficiently examined. In other words, even though there appears to be a steady upward trend in environmental consciousness (Kalafatis et al. 1999) and an overall increase in awareness of the potential solutions to these problems, little is known about why some people are acting "green" while others are not. Because macro- and micro- approaches to this question have only been marginally useful, a new approach is required.

The New Environmental Paradigm (also referred to as the "paradigm shift thesis," the "alternative environmental paradigm," or the "ecological social paradigm") is, put simply, a theory about paradigm change. The NEP proposes, in contrast to the post-

materialist view that only the wealthy are concerned about the environment (Inglehart

1995). According to Bell, the NEP can be explained as follows (2009:173):

> *Rather than seeing environmentalism as an affectation of the comfortable, this theory suggests that in response to discrepancies between evidence of environmental threats and ideologies that do not consider environmental implications, people are slowly but steadily adopting a more environmentally aware view of the world.*

In other words, people, regardless of background no longer see themselves as exempt

from the environmental implications of their behaviors. This represents an important

change from the previous belief that human behavior was not directly responsible for

environmental problems. Researchers using the NEP have argued that what the theory is

intended to examine is the process in which people's values about the environment catch

up with their beliefs about it (Bell 2009). From this, one can assume no differences in

environmental attitudes among social classes or income levels.

This view should be seen in contrast to competing perspectives regarding the

nature of environmental concern. The Human Exemptionalism Paradigm (HEP)

(alternatively, the "dominant social paradigm," or the "technological social paradigm"),

suggests that humans are "exceptional creatures who are able to overcome environmental

limits," and are therefore exempt from the rules which apply to all other beings on earth

(Bell 2009: 174). Additionally, because humans are capable of developing such high

levels of technology, they are able to master nature. An example of this view is apparent

when one considers the use of dams in order to store, re-route, or stop water in order to

benefit human societies, regardless of the consequences to wildlife and ecosystems.

Another useful perspective is the post-materialism thesis. This thesis applies much more broadly than just the environment and attitudes towards it, and is intended to suggest that a shift has taken place between materialist and post-materialist values. Inglehart (1995; among others) argues that newer generations are less concerned with "economic and physical security" issues (material values) and are more concerned with "freedom, self-expression, and the quality of life" (post-material values). Specifically, those with more wealth, or higher social class should have higher pro-environmental attitudes.

Ingelhart (1981) describes the concept of post-materialism as a shift in values with two central hypotheses. First, "a scarcity hypothesis," proposes that people are most concerned about those things which are in short supply. For instance, as in economics, people generally value those things which they see as the most central to their immediate survival, particularly when those things are in short supply. This includes food, clothing, shelter, and water. Second, "a socialization hypothesis," which proposes that a shift in values from materialist (concerned mainly with survival) to post-materialist (concerned with higher-order values) is a process of socialization and as such, it responds slowly to changes. Based on this perspective, one should expect to observe higher pro-environmental attitudes among wealthier and more educated people, and also, relatively consistent findings among populations who have shared in this process of socialization.

International survey responses suggest that according to respondents, the goals of various countries have shifted from "maintaining order in the nation," and "fighting rising prices" (materialist responses) to "giving people more say in important government

decisions," and "protection of freedom of speech," (post-materialist responses) suggesting that such a shift has some empirical support (Bell 2009:172). Ingelhart argues that concern for the environment is another post-materialist value, and as such, we should expect to see that only wealthier respondents would be concerned about it. Other studies have also found correlations as high as r = .79 between income (GDP per capita) and environmental concern, suggesting that the wealth of a nation is extremely important in explaining pro-environmental attitudes (Franzen 2003). One possible explanation could be the "top-down" spread of values from wealthier nations to poorer nations in which they exert great influence. This may be especially true in former colonies.

Though the NEP is seen as a response to the post-materialist thesis, the major difference between the two seems to be that the post-materialist shift seems to focus more on differences *between* countries, while the NEP focuses more on differences *within* countries (though it is noted that the shift has occurred elsewhere—suggesting more evidence in favor of the shift). Neither perspective has carefully considered the possibility that shifts in thinking about human impacts on the environment happen unevenly among countries based on the characteristics of those countries, and their relative positions to each other internationally. Regardless of these differences, the post-materialist thesis is of great utility in the present study. Though the NEP is useful for understanding environmental concern—something that the post-materialism literature does a good job of as well—it is less useful for forming testable hypotheses. Additionally, post-materialist values, while not in contrast to the research stemming from the NEP, are generally much easier to categorize. In other words, the NEP is not tested in

this research, but is used as a basis for understanding environmental attitudes more thoroughly.

THE NECESSITY OF MULTIPLE PERSPECTIVES

Environmental attitudes are complex and therefore require a variety of perspectives to truly understand. What the NEP and the post-materialism thesis have in common is that they are useful at the micro-level. No perspective explicitly attempts to look at environmental values at both an individual and national level of analysis. But another perspective exists that focuses on the structural level. The world-systems perspective has been used in only a few empirical studies of human-environment interaction, though it has been used extensively in other areas of social inquiry. In the following, I will describe the world-systems perspective and some of its main ideas in order to help situate the present research within this theoretical perspective.

THE WORLD-SYSTEMS PERSPECTIVE

The world-systems perspective posits that nations can be divided into three main categories based upon their position in the capitalist world-economy: (1) the core—those nations with the highest levels of technological advancement and highly industrialized (or even post-industrial) economies, such as the United States and many western European nations; (2) the periphery—those less-developed nations which base their economy on the extraction of raw natural resources, such as many sub-Saharan African nations; and (3) the semi-periphery—those nations that fall somewhere between the core and

periphery in the hierarchy, such as China, Mexico, and many of the former Soviet republics (Wallerstein 1990).

Proponents of the world-systems perspective argue that the world is not a set of distinct nation-states that operate without the influence of other nation-states and non-state actors. Wallerstein (1972[2000]) posits that the failure of Marx's predictions of a socialist revolution is due to his focus on the "stages" of capitalist development and his insistence on their "coexistence." In response, Wallerstein (1972[2000]:74) on the other hand, proposes that during the nineteenth and twentieth centuries "there has been only one world-system in existence, the capitalist world-economy." In other words, there was no *global* socialist or communist revolution because every nation-state was a part of a single global economic system based on capitalism. In contrast to the work of past sociologists, this capitalist world-system contains the necessary division of labor required to ensure its continued functioning. Wallerstein (1972[2000]: 75) defines a world-system as "a unit with a single division of labor and multiple cultural systems." This distinction is important, as is the discussion of the failures of Marxism in that this perspective is capable of explaining not only that a single capitalist world-economy exists, but how it operates across international boundaries.

When applied to the environmental debate, the logic of the world-systems perspective suggests that by being a beneficiary of this single capitalist world-system, core nations are able to export the negative consequences of their environmentally destructive and resource intensive practices to peripheral and semi-peripheral states. For example, the United States imports many raw materials from Africa, leaving the people

of Africa to deal with the consequences of profit-enhancing resource extraction methods

while the people of the U.S. enjoy lower prices and greater ease of availability of

products made with these resources. At the same time, the U.S. exports hazardous

materials to other poorer (periphery) nations who often have no choice but to accept

them. These are two different ways in which the core is able to exploit the periphery via

the environment.

Wallerstein's (2000) world-systems perspective has been used and tested in a

variety of sociological areas, including environmental sociology. Wallerstein (2000)

posits that much of the change that has occurred in the capitalist world-system follow the

Kondratieff wave (also called the "K-wave" or the "long wave," see Figure 2.1) pattern,

each about 60 years in length, which help to explain the fluctuations that are easily

observable to any analysis of social change on a global scale. While environmental

degradation has occurred for much of human history, there was very little by way of

effect or visibility of such degradation until much more recently, at least on the scale that

we observe it today.

Another significant contribution to the discussion of the world capitalist economy

or the world-system from Wallerstein (2000) comes from his explanation of hegemony

within the system. Wallerstein suggests that this capitalist economy began in the

sixteenth century in Europe, and "Iberian America," which is essentially the colonies of

Spain and Portugal in South and Central America. Shortly after it began, this capitalist

world-system expanded to cover the entire globe through both trade and war. Since the

sixteenth century, the world has only known three instances of Hegemony (Wallerstein

2000: 253). For Wallerstein,

> *Hegemony in the interstate system refers to that situation in which the ongoing rivalry between the so-called "great powers" is so unbalanced that one power can largely impose its rules and its wishes (at the very least by effective veto power) in the economic, political, military, diplomatic, and even cultural arenas. The material base of such power lies in the ability of enterprises domiciled in that power to operate more efficiently in all three major economic arenas—agro-industrial production, commerce, and finance* (Wallerstein 2000: 255).

This status has only been reached in three instances, according to Wallerstein (2000:

256): (1) the United Provinces, essentially the Dutch Provinces [1625-1672]; (2) the

United Kingdom [1815-1873]; and the United States [1945-1967][1].

This recognition is important in any so-called world-system analysis in that the

recognition of the explicit existence of three hegemonic powers highlights the fact that

the capitalist world-economy is a singular entity that is dynamic. But in the example of

the environment, it is significant because, as Wallerstein notes, hegemony, by its very

definition requires that these powers are able to more efficiently operate in the three

major economic arenas, of which, the agricultural-industrial arena is of great importance,

if we are to understand the influences of this capitalist world-system on the condition of

the natural environment. In other words, hegemonic powers must be relatively efficient in

all three major economic arenas which ensures their position above semi-peripheral and

peripheral nations.

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[1] Though Wallerstein specifically cites 1967 as the end date for the U.S. as hegemonic power, when calculating world-system positions for the analysis in Chapter 5, the U.S. was a significant outlier on all three measures used to compute world-system position. The U.S. GDP in 2000 was $925,500,000,000. The GDP per-capita was $33,900. Military expenditures were $276,700,000,000. One could argue that the U.S. may still hold the title of hegemonic power.

The contributions of Wallerstein to the world-system perspective cannot be overstated. While much of his work is only peripherally related to the environment and environmental degradation, it was carefully researched in a fashion that made later discussion possible and useful for the field of environmental sociology. Wallerstein was not alone in this endeavor, however, and others have followed intellectually from the fundamentals of world-system analysis.

Similar to Wallerstein and other world-system scholars such as Giovanni Arrighi, and Terence Hopkins, in *Global Formation: Structures of the World-Economy* (1989) Christopher Chase-Dunn proposes that the use of the world-system perspective is currently the most productive method for studying the modern world-system. What differentiates Chase-Dunn (1989) from other world-system theorists is his advocacy for a return to structural models of a dynamic world-system. While he acknowledges that a return to structuralism, in a world of post-structuralism may seem odd, and indeed that it goes against the position of many other scholars who prefer to use theoretical ideas as "heuristic devices," Chase-Dunn (1989:1) believes that "theory construction is a valuable activity in its own right, and is a necessary part of the effort to build social science."

Chase-Dunn (1989) explains the key concepts of the world-system perspective by comparing them specifically to the work of Marx. While the research conducted in the following chapters might have also been useful if framed under general Marxist ideas, the specific claims laid out by Chase-Dunn quickly make it apparent that Marx, and the Marxist scholars who followed him made a few oversights, some of which are specific to relationships in the global economy. Chase-Dunn (1989:21-22) describes what he

believes to be the basic characteristics of capitalism in Marx's theory (in its fully

developed state) as follows:

1. Generalized commodity production: *The production of commodities for profitable sale on a price-setting (competitive) market.*
2. Private ownership of the major means of production: *Private capitalists accumulate capital by making investment decisions within a logic of profit maximization. This implies that the capitalist state does not directly interfere in investment decisions or in the market, but rather provides legitimation and order, using its power primarily to guarantee external defense and internal peace consistent with the institutions of private property.*
3. The wage system: *Labor power is a commodity sold by proletarians (who do not own means of production) to capitalist owners of the means of production in a competitive labor market.*

In contrast, however, Chase-Dunn (1989: 43) defines[2] "real capitalism" as:

1. Generalized commodity production *in which **land**, labor, and wealth are substantially commodified.*
2. Private ownership and/or control of the means of production, *which may be exercised by individuals or organizations, including single states, which are themselves players in the larger competitive arena of commodity production and geopolitics. This allows for "state capitalism."*
3. Accumulation of capital *based on a mix of both competitive production of commodities and political-military power, in which **commodity production has the greater weight in the determination of outcomes in the system as a whole.***
4. Exploitation of commodified labor *which is, however, **not always paid a wage**.*
5. The combination of class exploitation *with core/periphery exploitation such that the former is more important quantitatively in the accumulation of capital, but the latter is nevertheless essential because of its political effects on the mobility of capital and in reducing class conflict and weakening anti-capitalist movements in the core.*

According to Chase-Dunn (1989), this reformulation of Marx's core definition of

capitalism allows for more explicit assumption testing in research. Also, by incorporating

the role of the state (mainly in the form of political and military power), within the core-

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[2] Emphases in bold added by Author.

periphery hierarchy, Chase-Dunn differs from Wallerstein in that he does not assume the totality of the capitalist world-system, providing him with more explanatory power and the ability to analyze separately the boundaries of the world-system and those of the modes of production. This makes it easier for us to discuss the phenomenon as it is directly related to both the modes of production, as well as positions within the world-system.

Another contribution to the world-system perspective by Chase-Dunn (1989) is his formulation of the structural features of the capitalist world-system: (1) the interstate system – a system in which disproportionately powerful states compete for resources through commodity production and geopolitical and military competition; (2) a core/periphery hierarchy; (3) a more complex formulation of capitalism (see above); and (4) commodity production is the central form of competition. These concepts allow us to place the nation-states into the core-periphery hierarchy (see Kentor 2000).

A third contribution to the world-system perspective regards the cyclical nature of the world-system. Though others working in this tradition have posited a cyclical understanding of capitalist development, Chase-Dunn (1989) dismisses outright the notion of stages within capitalism. For him, a single capitalist system that has seen several periods of time differs from the view that capitalism itself undergoes a series of transformations. The idea of a single capitalist world-system that has transitioned over time is not supported empirically because of the degree to which we see coercion towards workers and the gap between the pay earned by workers in core states when compared to

peripheral states. In other words, "immiseration has tended to be relative rather than absolute, while exploitation has everywhere increased" (Chase-Dunn 1989: 66-67).

Lastly, Chase-Dunn notes several more recent trends in the world-system. Primarily, there have been increases in population and urbanization in peripheral and semi-peripheral countries, especially the "increasing primacy of the largest cities within developing countries" (Chase-Dunn 1989: 256). In other words, the empirical base supporting the world-systems perspective includes the recognition of two factors which both have been posited to be related to environmental degradation specifically (e.g. urbanization and population growth) (Chase-Dunn and Hall 1997).

Chase-Dunn and Wallerstein are not the only scholars (Jorgenson forthcoming; Rothman 1998) working in the development and testing of the world-system perspective and several have made significant contributions to the perspective, and to the empirical analysis of the perspective. Scholars from a variety of fields have attempted to explain in other ways exactly how the position of one nation in the capitalist world-economy can have an unequal impact on other nations in lower positions (Rothman 1998). This proposition closely follows the findings made by world-systems scholars that nations in the core have not only consumed materials imported from the periphery and semi-periphery, but have exported the waste from the use of these materials back to the periphery and semi-periphery as well (Jorgenson forthcoming). For this reason, the world-systems perspective is useful in that it requires researchers to focus on its "total impacts, those generated within and beyond national borders" (York, Rosa, and Dietz 2003: 288). Jorgenson (forthcoming) finds that historically, more powerful societies

have used their relative position of power to engage in unequal ecological exchanges with other (typically) less-developed and less-powerful societies. He also notes that we must "treat the world as a system of stratified countries in which the affluence and material consumption of one country usually comes at the social and environmental expenses of other countries" (Jorgenson forthcoming:17).

ENVIRONMENTAL RESEARCH AND THE WORLD-SYSTEMS PERSPECTIVE

Many scholars have addressed a variety of environmental issues within the framework of the world-systems perspective. Deforestation, for instance has been shown to occur in its most intense forms in semiperipheral nations (Bartley and Bergesen 1997; Kick, Burns, Davis, Murray, and Murray 1996). This is explained by the long history of exploitation of peripheral and semiperipheral forests by core countries. Additionally, though population growth causes deforestation at all levels within the world-system, its effects are much more pronounced in the semiperiphery (Bartley and Bergesen 1997). While these particular studies do not address environmental attitudes specifically, they make a compelling case about the differential exposure to negative environmental problems that are caused by core states, while disproportionately affecting the non-core. Following from this, research on international data should show some significant differences in concern about the environment stemming directly from the exposure of their citizens to environmental problems (Brechin and Kempton 1994).

Another environmental problem, global warming, has been examined as well using the world-systems perspective. The overall findings from these analyses suggest a

curvilinear relationship between relative position in the core-periphery hierarchy and greenhouse gas (carbon dioxide and methane) emissions (Bartley and Bergesen 1997). Burns, Davis, and Kick (1997) find that the two greenhouse gases are associated with different levels of development. In other words, carbon dioxide is produced more in highly developed countries, while methane is produced more in less developed countries. This pattern does not reflect the relationship between position in the world-system and economic development (Bartley and Bergesen 1997). This curvilinear relationship, which has the shape of an inverted letter "U," shows us that greenhouse gas emissions are the most intense in moderately developed (semiperiphery) countries when compared to more developed (core) and less developed (periphery) countries. Though the more highly developed nations still contribute the most to overall carbon dioxide emissions, they pollute less intensely, likely due to the efficiency with which they operate, compared to the less developed nations who pollute more intensely, with less regulation, as they attempt to "catch up" with core nations (Grimes and Roberts 1995)[3].

Chase-Dunn and Hall (1997) examine the changes in the world-system during the last 12,000 years and propose the Iteration Model of World-System development (Figure 2.2). This model explains the formations of the world-system hierarchy in the following manner: population growth causes an increase in the intensity of environmental degradation. The type and degree of degradation depends on the production technology, and the degree of exploitation of natural resources required to meet demand. This increased population exerting higher levels of environmental degradation leads to a

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[3] It should be noted that as of this writing, China has surpassed the United States in Carbon emissions.

variety of population pressures. The population pressures increase the amount of effort required to meet one's needs, often leading to emigration to regions where resources are more readily available[4], if such regions exist and are not already inhabited. Otherwise, circumscription occurs, leading to competition between groups over resources. Conflict is a likely outcome from circumscription, often leading to the formation of new hierarchies (systems of stratification) to regulate the use of various new technologies and resources. The formation of hierarchies and the processes of technological change are said to be iterative because "population growth continues so that the same problems re-emerge on a larger scale, and so similar problems need to be solved once again" (Chase-Dunn and Hall 1997:410). These iterations lead directly to more population growth and the subsequent environmental degradation.

This view of the relationship between the world-system and ecological degradation is useful in that it puts environmental degradation at the center of the major factors that lead to the formation of various hierarchies and technological changes necessary to situate a society within the world-system. According to Bartley and Bergesen (1997), in more complex societies, several new paths may potentially emerge in the iteration model allowing for a society to bypass circumscription or conflict with population pressures leading directly to new hierarchies and technological change.

Andrew Jorgenson (2003) has found that a country's position in the core-periphery hierarchy helps to explain per-capita ecological footprints. Ecological

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[4] According to Myers (2002) there are an estimated 25 million environmental refugees in the world, alongside the approximately 26 million traditional refugees. These numbers were estimated to approach 100 million by 2010, based on many estimates. Current figures were unavailable.

footprints act as a proxy measure of consumption, indicating that populations residing in core nations exhibit higher levels of consumptive behavior than those living in the periphery or semiperiphery. This effect occurs both directly and indirectly via the influence of world-system position on urbanization, domestic income inequality, and literacy rates.

Because per-capita ecological footprints are usually considered to be correlates of negative environmental practices like deforestation and water pollution, Jorgenson (2003) also makes a note that he finds these correlations to be negative (higher position in the world-economy is associated with lower levels of both deforestation and water pollution), a finding which is consistent with other researcher's findings (for example, see Bergesen and Bartley 2000).

Though it appears that researchers using the world-system perspective have made significant headway in the environmental arena, the use of this perspective is a relatively recent development within the discipline. Indeed, in the near future much growth in this area should be expected; however, at this point we are just beginning to explore the environment in the context of the world-system. One particular shortcoming of the world-systems research is that it has not yet incorporated the attitudes of the individuals living within the countries included in its samples. This limits our ability to understand the best ways to influence attitudes that we expect to directly relate to the behaviors of these individuals.

ASSESSING POST-MATERIALISM, THE NEW ECOLOGICAL PARADIGM, AND THE WORLD-SYSTEMS PERSPECTIVE

Now that I have elaborated on the theoretical perspectives I believe are necessary to understand the following analyses, and discussed some of the relevant literature stemming from all three approaches, I hope to make clear exactly how these theoretical perspectives will help to explain the research goals.

Chapter 3 provides findings from the analysis of individual-level characteristics associated with attitudes towards the environment. As is consistent with other research guided by the post-materialist thesis and the New Ecological Paradigm, I expect that internationally there will be relatively high levels of concern among the citizens of various nations. Where I differ from the NEP perspective is that I will argue that the social bases of this environmental concern will have a variety of sources that have only been assessed in a haphazard fashion in the past. In other words, the standard correlates of environmental concern may have found support in research on U.S. and other Western nations, but these correlates may not be as useful in understanding environmental attitudes elsewhere. Additionally, I expect that wealthier nations—where the population is more likely to have enjoyed access to more wealth—will have higher degrees of pro-environmental attitudes, as is consistent with the post-materialism thesis. The main research questions for Chapter 3 are: Which characteristics best explain environmental attitudes at the individual level? Secondly, How well do previous explanations of environmental attitudes apply across nations?

In preliminary analyses, these previously accepted correlates do not appear to operate in the same way cross-nationally, and what is even more intriguing, is that there does not appear to be an obvious pattern. For example, the religious affiliation of respondents in Spain demonstrates a relatively strong correlation with environmental attitudes, but religious affiliation is not associated with environmental attitudes in other European nations. The NEP is often seen as the antithesis of the view that environmentalism is a concern only for the wealthy (e.g. post-materialism). If this is an accurate characterization of the NEP, we should expect to see no difference based on socioeconomic status. That is, if environmental concern exists among the poor as well as the rich, it should follow this pattern cross-nationally. Testing this, however, requires the use of national level characteristics more than individual level characteristics. The results of this analysis are presented in Chapter 3.

Next, I examine the extent to which world-system position is associated with environmental attitudes. In order to test for these effects, I will use national level characteristics to compute world-system positions (for these details see the methods section in Chapter 4—based on the work of Kentor 2000 and Jorgenson 2003), and to examine the relationship between world-system position (core, periphery, semi-periphery) and environmental attitudes.

Past research in the world-systems tradition suggests that higher levels of consumption and degradation of the environment can both be explained, at least partially, by the relative position of a nation in the core-periphery hierarchy. Others have suggested that exposure to environmental problems, which should be more pronounced in the

periphery and semi-periphery than in the core, may help to predict levels of environmental concern (Brechin and Kempton 1994). Also, it has been suggested that those with higher degrees of knowledge of environmental problems are more likely to be concerned (Vining and Ebreo 1990). The main research questions for Chapter 5 are: How does the location of a country in the core-periphery hierarchy impact environmental attitudes? Additionally, does access to outside information (such as telephones, internet access, etc.) contribute to a nation's environmental attitudes?

While each of the analyses conducted in chapters 3 and 4 contribute uniquely to the field of environmental sociology generally, and more specifically to the literature on environmental attitudes and the world-systems perspective, I believe that the most useful findings will come from a combination of individual and aggregate level characteristics.

Therefore, in Chapter 5 I use a Hierarchical Linear Modeling approach to combine these two levels of analysis into a single and cohesive model. This model tests all theoretical perspectives simultaneously in order to help develop a better understanding of the importance of individual and national characteristics for understanding pro-environmental attitudes. While I make no claims about the explanatory power or heuristic utility of either perspective over the others, this final analysis should help to clarify where and how each perspective contributes to understanding environmental attitudes. The main research questions for Chapter 5 are: Do individual- or national- level characteristics better explain aggregate levels of environmental concern? Do these differences apply across all levels of the core-periphery hierarchy? Last, if there are differences between

individuals in different nations in terms of environmental attitudes, on which

characteristics do they vary?

       In short, I examine environmental attitudes cross-nationally at both the individual

and national levels. The three analyses each contribute uniquely by allowing for a more

explicit test of the main hypotheses. Post-materialism is used in comparison to the New

Ecological Paradigm (NEP) in order to assess whether environmental attitudes appear to

vary by social class, or other characteristics of individuals. The world-systems

perspective is used to guide the national-level analyses in which I compare nations.

Overall, I expect to see that wealthy nations and individuals have the highest pro-

environmental attitudes.

CHAPTER 3: MEASUREMENT OF INDIVIDUAL ENVIRONMENTAL ATTITUDES

CHAPTER 3: MEASUREMENT OF INDIVIDUAL ENVIRONMENTAL ATTITUDES

Many solutions to environmental problems are proposed under the assumption that changing people's attitudes about their impact on the environment and environmental degradation as a whole will lead people to change their corresponding behaviors (Jones and Dunlap 1992). There is no consensus regarding how accurate this thinking is, and many public campaigns attempting to educate the public seem to focus on individual attitudes and behaviors (Vining and Ebreo 1990). Some governments, however, have enacted sweeping legislation in order to deal with environmental problems, such as curbing greenhouse gas emissions, increasing the availability of recycling programs, and preventing deforestation (Bell 2004; Kalafatis, Pollard, East and Tsogas 1999; Krause 1993; Ottoman, Stafford, and Hartman 2006). It is unclear, however, whether national level policy changes reflect individual attitudes, or if individual attitudes are affected by public policy.

The social psychological examination of the attitude-behavior split has been popular in recent decades, but has been relatively ineffective for measuring the attitude-behavior relationship in the environmental context largely because suitable measures of environmental attitudes have yet to be tested in the context of the attitude-behavior split (Ajzen 1985; Ajzen and Fishbein 1980; Fishbein and Ajzen 1975; Fishbein 1967; Kaiser et al. 1999). While scholars have sought to measure environmental attitudes, rarely have they done so cross-nationally (Dunlap et al. 2000; Evans 2007; Tarrant and Cordell 1997; Vining and Ebreo 1992). Additionally, the different methods of measuring environmental

attitudes have led to inconsistencies in making cross-national comparisons using separate studies. As difficult as these types of analyses are within one particular nation, such problems are exacerbated when conducting research on international samples, particularly when the data were collected by different organizations in each county. The incompatibilities of these data have meant that very few cross-national studies have been conducted, with even fewer that have included non-industrialized nations.

The data used in the following analyses include a number of core, peripheral and semi-peripheral nations, making it one of the largest international datasets available that includes items dealing with the environment. Having such a diverse sample creates problems, however, particularly with respect to the applicability of concepts and measures across various cultures with different structural facilities in place for informing the citizens of a nation.

In this chapter I examine the factors that have been previously shown to be related to environmental attitudes. These analyses focus on two main research questions: (1) which characteristics of individual's best explain environmental attitudes at the individual level; and (2) how well do previous explanations of environmental attitudes apply across nations. While it is clear that there is considerable variation among counties, this analysis helps to focus future analyses by confirming and quantifying these variations based on the most often cited correlates of environmental attitudes.

LITERATURE ON ENVIRONMENTAL ATTITUDES

The central issue in environmental sociology is the relationship between society and the natural environment. Environmental concern is an important concept in this line of inquiry. It is conceptualized as an attitude toward the environment and environmental issues (Dunlap and Van Liere 1978). One of the more common associations that researchers make is the relationship between various characteristics of the respondents and their levels of environmental concern. Several different correlates have been identified in these studies with varying degrees of support in the findings. Of these studies, perhaps the most compelling is the work of Tarrant and Cordell (1997) who examine several different environmental concern scales and compare them to the most commonly cited correlates of environmental concern. The findings of past work have suggested that gender (Mohai 1992), residence – whether one lives in a rural versus urban area (Van Liere and Dunlap 1980), education (Jones and Dunlap 1992), income (Van Liere and Dunlap 1980), age (Jones and Dunlap 1992), race (Mohai 1980; Mohai and Bryant 1998), and political orientation – whether one is conservative or liberal (Van Liere and Dunlap 1980), are all associated with environmental concern. Tarrant and Cordell (1997) found that the environmental concern has significant associations with residence, education, and age. This suggests that there are several socio-demographic characteristics that should be controlled for when assessing environmental attitudes.

The post-materialist thesis posits that once basic human needs (food, clothing, and shelter) have been met, people often shift the values that they consider to be important from those which focus on meeting needs to those that focus on quality of life. For

instance, according to Inglehart (1995), after the post-materialist shift people focus on values like protecting freedom of speech, where before such a shift, people would have valued maintaining order in the nation. Though these values are not tested here, the post-materialist perspective provides insight into a potential reason for the prominence of environmental attitudes. Support for the post-materialist thesis should demonstrate that wealth or socioeconomic status is significantly related to environmental attitudes.

At the center of the following analyses lies the importance of individual attitudes. Beyond these attitudes, however, lies the significance of structural and cultural boundaries imposed on individuals by the nation in which they live. While believing that the environment is in danger, and recognizing the types of behavioral change necessary to minimize our individual impact on the natural world is an undeniable part of the puzzle, some behavioral changes require things of us that are beyond most of our individual means, such as recycling where facilities for recycling do not exist (Schultz and Oskamp 1996).

The world-systems perspective provides a much different picture of international relations than many other perspectives. It has been useful for studying the environment in the past; however it has not been used to examine environmental attitudes. In this particular analysis, I focus on characteristics of individuals, however with an international sample, differences between respondents from different countries become interesting. In this analysis, I seek to examine the correlates of environmental attitudes as they apply to respondents from different places. The world-system perspective suggests that differences between countries should stem from position within the core-periphery

hierarchy. That is, differences are due to the socio-historical, economic, and military histories of the development of the modern world-system, rather than from differences in the individuals within nations. This will be examined in later chapters in greater detail.

THE NEW ECOLOGICAL PARADIGM SCALE

The NEP is the basis for the NEP scale. The NEP scale is included in many surveys of environmental attitudes and to examine five underlying dimensions of environmental concern: (1) the balance of nature, (2) limits to growth, (3) human domination over nature, (4) human exemptionalism, and (5) ecocrisis (Dunlap et al. 2000). The balance of nature dimension contained in the NEP scale is intended to measure the degree to which one feels that the balance of nature is being threatened by human activities. The limits to growth dimension seeks to provide an understanding of the degree to which people accept the idea that there is a certain point at which the size of the population and its impact on the environment can no longer be sustained. That is, the point at which the current consumption of natural resources by people will diminish the earth's ability to recover. The human domination over nature dimension is intended to measure the presence and strength of beliefs regarding the relationship between humans and the natural environment, in which humans are viewed as dominant. The human exemptionalism dimension is intended to examine the degree to which people believe that humans are exempt from the forces and laws of nature (Dunlap et al. 2000). The final dimension has been characterized as a measure of concern for the occurrence or likelihood of catastrophic environmental changes (Dunlap et al. 2000; Evans et al. 2007).

While the original scale is not available for the present research, many of these characteristics were taken into consideration in the development and interpretation of the research models presented here.

The majority of researchers of "environmental concern" (EC) appear to have reached agreement on the importance of EC as a subject worthy of scholarly investigation. Unfortunately, the major scholars doing research in this area have not reached consensus on (1) the best definition of the concept of environmental concern (Dunlap and Van Liere 1978; Dunlap et al. 2000; Weigel and Weigel 1978; among others), (2) the best way to measure such a concept (Franzen 2003), and (3) most importantly, how such a concept is useful in understanding human-environment interaction. Even without agreement on these core issues, the literature on environmental concern appears to be one of the more active sub-areas within environmental sociology.

Past research has focused on measuring the reliability and validity of the NEP scale, and has found that the scale continues to be reliable and valid for the various populations on which it has been tested (Evans 2007). After revising the scale, Dunlap et al. (2000) suggest that previous work using the scale has underscored several types of criterion validity; known-group validity (Dunlap and Van Liere 1978) and predictive validity (Tarrant and Cordell 1997; Vining and Ebreo 1992). Other studies using different methods (particularly qualitative) have supported the content validity and construct validity of the NEP scale (Dunlap et al. 2000).

The findings of this work have suggested that gender (Mohai 1992), residence – whether one lives in a rural versus urban area (Van Liere and Dunlap 1980), education

(Jones and Dunlap 1992), income (Van Liere and Dunlap 1980), age (Jones and Dunlap 1992), race (Mohai 1980; Mohai and Bryant 1998), and political orientation – whether one is conservative or liberal (Van Liere and Dunlap 1980), have all had significant associations with environmental concern. Tarrant and Cordell (1997) found that the NEP scale had significant associations with residence, education, and age. This suggests that there are several socio-demographic characteristics that should be controlled for when examining environmental attitudes.

Other research has focused less on the measurement of environmental concern, and more on its usefulness as a concept. One of the biggest shortcomings of large national or international surveys on the topic of the environment is that rarely, if ever, do they include all 15 of the NEP scales items. In fact, very few studies have done this, often making the findings of past studies difficult to replicate. In other words, while the specific items on the NEP scale may have undergone a rigorous battery of tests, because it is so rarely included on large nationally (or internationally) representative datasets, it may not be as useful to scholars seeking to study nations or, indeed, "world-systems." In other words, the NEP scale was not used in any survey appropriate for cross-national analysis. For this reason, I use the NEP as a conceptual idea regarding the necessity for testing factors which influence environmental attitudes, and do not explicitly assess the NEP scale.

One issue with the NEP world view is that it proposes that people have been steadily (however slowly) adopting a more eco-friendly world view. While there is nothing inherently problematic with such a claim, it appears to be based more on a

specific trend in environmentalism, than an actual change in human values or preferences. That is, we see increased rates of responses identified as pro-environmental, but it may be an artifact of social desirability, rather than actual changes in attitudes. In other words, the NEP does not specify the reasons for such a change. In fact, others have suggested that such measures are actually more concerned with the outcomes and consequences of human behaviors than they are with environmental values (Dutcher 2007; Stern et al. 1995).

While the measures of environmental attitudes used in this study do not precisely reflect the work of either Dunlap et al. (2000) or Weigel and Weigel (1978), it is clear that the available measures of environmental concern do comprise at least one component of what these two scales propose to measure. More specifically, both scales attempt to measure how big of a problem people consider environmental degradation, while the Environmental Concern scale also assesses willingness to contribute to solving these problems. For this reason, it is reasonable to conclude that the measure of environmental concern, while not ideal, used in the following analyses is sufficient to test any claims of difference cross-nationally, and to use as the focus of measuring international attitudes about the environment. Additionally, as Franzen (2003) notes, it is preferable to use measures of attitudes which focus on the environment-economy trade-off when global (rather than local) environmental concern is the focus of the study.

HYPOTHESES

Previous research in the area suggests several important hypotheses about individual-level factors influencing environmental attitudes. There exist many factors which may influence environmental attitudes, but based on the availability of measures, and previously significant findings about the relationship, I propose the following hypotheses for these analyses:

Hypothesis 3.1: Higher social class standing will be associated with more positive environmental attitudes.

Van Liere and Dunlap (1980; Inglehart 1995) have suggested that social class maybe related to environmental attitudes. It is hypothesized that those with higher relative social class will be more concerned with the preservation of the natural environment than those who have lower social class, because they will be more educated and wealthier, and will be less concerned with the economic trade-offs necessary in order to protect the environment. The post-materialist thesis also suggests that those with less trouble ensuring their needs are met are more likely to value environmental protection.

Hypothesis 3.2: Higher age will be associated with more positive environmental attitudes.

Jones and Dunlap (1992; among others) have found support for the age hypothesis, which indicates that the elderly are typically more concerned about the environment than the young. One possible explanation is that the elderly will be interested in preserving the environment for their children and grandchildren, while younger people will not. According to the post-materialist perspective (Ingelhart 1995), the age effect is likely a

generational effect in which older people are more likely to have belonged to a generation in which material values were more important during their youth (i.e. baby boomers, the depression generation, etc.—at least in the U.S.). Additionally, these generations are more likely to have shifted their values from materialist to post-materialist.

Hypothesis 3.3: Political conservatism (the "right") will be negatively related to positive environmental attitudes.

Van Liere and Dunlap (1980) propose that political conservatism is associated with lower levels of pro-environmental attitudes. Politically conservative attitudes tend to favor the economic, social, and political institutions that are typically at odds with preservation of nature.

Hypothesis 3.4: Confidence in social/governmental institutions will be positively related to positive environmental attitudes.

Bernauer (1995) suggests that international issues, like many environmental problems are less-likely to be solved when there are lower levels of confidence in social and governmental institutions. This relationship is likely because having confidence in these institutions and organizations means that one is more likely to believe what they tell you with respects to the condition of the natural environment.

Hypothesis 3.5: Non Judeo-Christian religious traditions will be more positively related to positive environmental attitudes.

White (1967) argues that the Judeo-Christian religious traditions have a worldview which is inconsistent with a pro-environmental worldview. Several places in Judeo-Christian

texts specify the divinely inspired relationship between man and nature. In most of these cases, man is specified as the ruler or master of the natural world.

Hypothesis 3.6: *Gender will have no significant relationship with positive environmental attitudes.*

While Kanagy and Nelsen (1995), Mohai (1992), Blocker and Eckberg (1997), and Tarrant and Cordell (1997) have found relationships between environmental attitudes and gender, the results have generally suggested that while women may be more concerned about specific issues, the method of measurement of environmental concern appears to be the biggest predictor of any differences here.

Hypothesis 3.7: *Rural respondents will have more environmental concern than urban respondents.*

Samdahl and Robertson (1989) suggest that community size is positively related to one's perception of environmental problems and their support for change.

DATA AND METHODS

The data used for the current study come from the 1999-2001 collection of the World Values Survey. This is an international study conducted by different entities in each of the nations in which data was collected. Each nation had their own specific methods of data collection with some using simple random samples of the population, and with others using more complex proportionally stratified sampling procedures. The specific analyses conducted in this paper are based on data from 27 countries during 1999-2000.

Sample sizes for these 27 countries ranged from 720 to 3,000 persons, making up from 2.1% to 8.5% of the total sample, with a total sample size of N = 34,555. For a complete list of the countries and the sample sizes for each country see Table 3.1. Due to the complexities of international data collection, and in the interest of space, I will not describe the data collection procedures in greater detail. Information is available from the World Values Survey website (http://www.worldvaluessurvey.org/).

The WVS is an ongoing international survey that is conducted by a variety of organizations and institutions in participating countries. The mode of data collection used is survey questionnaires conducted using face-to-face interviews whenever possible. Due to the complexities of international data collection efforts, the sampling procedures vary widely, depending on the nation in question. Another important difference between nations is the age at which respondents were allowed to participate.

In the United States, 100 zip codes were randomly selected, and an interview facility near these data points was selected in which to conduct the interviews. Telephone numbers were randomly selected from a list of telephone numbers within a 15-mile radius of the facility, and respondents were offered a cash incentive to participate in the face-to-face interview. In several instances, the facility for interviewing included respondents from two different sampling points (zip codes), and in other instances, no suitable facility was found, so the data point was moved to the nearest location with a suitable facility.

In China, a 40 county/city sample was used. The sample was selected using a stratified multi-stage probability proportionate to size (PPS) technique in order to obtain a

sufficient sample based on the past work of the Research Center of Contemporary China (RCCC). After selecting the 40 counties and county-level cities, and several degrees of further differentiation based upon the population size, number of townships and streets contained therein, 25 households in each sampling unit were selected. After each household was selected, the member of the household aged 18 or over who participated was selected at random.

These descriptions help to illustrate the differences used in the sampling techniques in various countries. While these techniques varied greatly, we can be confident that the data was collected with strict scientific standards which make cross-national comparisons possible.

Though missing data was only moderate (i.e. < 10% on any particular variable), I used multiple imputation in the interest of having the most complete data possible. To accomplish this, I used the *ice* module in *Stata*. I created five imputed datasets on which to conduct the analyses in this section. More information about the *ice* module can be found at the *Stata* website (http://www.statajournal.com/article.html?article=st0067_2 or http://www.stata.com). Once the imputed dataset is created, the *mim* module is used in *Stata* in order to allow me to analyze the five imputed datasets while reporting a single set of results. In order to test for the inflation of significance values, I ran the analyses several times on each imputed dataset, as well as 5% samples of each, and then finally on the whole dataset using the *mim* module. The results of these preliminary analyses indicate that the large sample size does not artificially inflate the significance of these findings.

DEPENDENT VARIABLES

The dependent variables for the individual- level analyses are two-fold: first, a scale intended to measure environmental attitudes which relate to willingness to make economic sacrifice in favor of the environment. The scale is created by using the sum of two items yielding a Chronbach's Alpha of .81. The two items contained in the scale ask the respondents: "how strongly do you agree or disagree with the following statement: I would give part of my income if I were certain that the money would be used to prevent environmental pollution" and; "How strongly do you agree or disagree with the following statement: I would agree to an increase in taxes if the extra money were used to prevent environmental pollution." The two items used to construct the scale are coded such that a response more favorable to the environment yields a higher score.

For the second dependent variable, a third question asked respondents: "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?" (1) "Protecting the environment should be given priority; even if it causes slower economic growth and some loss of jobs" or (2) "Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent." This variable measures environmental attitudes differently, by comparing economic tradeoffs often required in favor of environmental protection.

INDEPENDENT VARIABLES

Inglehart (1995) has suggested that social class may play a role in the development of environmental attitudes. For this analysis, I use several measures of social class: First, I use a measure of subjective social class, which asked respondents: "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: (1) upper class, (2) upper middle class, (3) lower middle class, (4) working class, or (5) lower class." Their responses were coded such that a higher subjective social class was given a higher score. In other words, if they chose "upper class" they were coded as a 5, and conversely, if they chose "lower class," they were coded as a 1. The average subjective social class score was 2.66 with a standard deviation of 1.0, indicating that most respondents identified as being somewhere between "working class" and "lower middle class." Figure 3.1 illustrates the distribution on this variable.

Next, I included a measure of income to account for a more objective measurement of social class. The income variable was created from an item which asked respondents to choose the income that most closely matches their own from a list of values. In most countries, the list included 10 possible choices, while several had 11 and one had 15. In the case of a nation having more than 10 choices, additional categories were collapsed into the highest income category (i.e. 10). Unfortunately, this measure is of the individual income, and not the household income of the respondent.

Finally, social class measures should account for education as well. I assess education by using a categorical variable which assigns respondents to one of six

categories for the highest level of education achieved. Respondents were asked what the highest year of schooling they completed was. Their responses were coded into: (1) "no formal education," (2) "some primary school," (3) "some secondary school," (4) "completed secondary school," (5) "some college," or (6) "college degree or higher." The "no formal education" category was used as the reference. Figure 3.2 illustrates the distribution of the sample by education.

Previous research has also proposed an age hypothesis that suggests that the elderly will be less concerned about the environment than the youth will be (Jones and Dunlap 1992). Other research has found support for such a hypothesis (Tarrant and Cordell 1997; Kanagy and Nelsen 1995). In order to account for this pattern, I use an age variable computed by subtracting the date of birth of the respondent from the date of the interview. This results in an age range from 15 to 97 years old (imputed values ignored). The average age for the full sample was 40.12 years with a standard deviation of 15.9 years[5].

It has also been hypothesized that politically conservative values are associated with lower levels of pro-environmental attitudes (Van Liere and Dunlap 1980). In order to assess this effect, I used an item which asked respondents the following: "In political matters, people talk of 'the left,' and 'the right.' How would you place your views on this scale, generally speaking?" The responses were coded as a score from 1 to 10 with 1 being left and 10 being right. The more right-wing the respondent, the higher their score

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[5] In preliminary analyses I checked logged and squared age distributions, which were not significantly different than using the normal age variable. I left the age variable in its original form in order to more easily interpret the results.

on the measure. The sample mean was 5.8, indicating a slightly right-wing average among respondents. I refer to those who are politically right-wing as "conservative[6]".

Thomas Bernauer (1995) suggests that it is important in international analyses to assess confidence in social institutions because with lower levels of confidence in institutions, international collaboration is less likely to be successful. In order to control for this effect I include a scale which measures the degree of confidence an individual has in several governmental institutions. The institutions included are the armed forces, police, government in Washington, political parties, Parliament, and the Civil Service. These variables were combined into a mean scale with high alpha reliability ($\alpha = .86$). Additionally, I include a measure of confidence in the environmental movement.

Next, I assess the affect of religious affiliation on environmental attitudes. Lynn White Jr. (1967) proposed that a Judeo-Christian theological view was inherently inconsistent with pro-environmental attitudes. Respondents were asked "do you belong to a religious denomination?" if yes, the respondents were able to choose from: "Roman Catholic," "Protestant," "Orthodox (Russian/Greek/etc.)," "Jewish," "Muslim," "Hindu," or "Buddhist." The respondents were also able to choose "no, not a member," "no answer" or they were able to write in a specific denomination. In this analysis, I use the seven categories, plus a category "Evangelical" (the largest "other"), a category for "no" religious preference, and a category for "other religious denomination." The "Evangelical" label can lead to some confusion, however, so I collapsed "Protestant" and

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[6] I fully recognize that political conservatism is not necessarily the equivalent of being politically right-wing, however in an effort to simplify the language, I choose to use the term conservative instead of "politically right-wing."

"Evangelical" into a single group. Because the Evangelical group is self-identified, and is written-in, many Evangelicals might have reported being "Protestant." Similarly, many who identified as Protestant might have better been categorized as Evangelical. It has been suggested that even within the Christian faith; there are differences between traditions with respect to the environment (Sherkat and Ellison 2007). This goes counter to the argument provided by White (1967). Unfortunately, by collapsing the Evangelical and Protestant groups into a single group, I lose the ability to assess specific differences between traditions. Figure 3.3 shows the frequencies of each religious tradition. In the following models, I use the "no religious preference" group as the referent.

Gender norms may also play a role in helping to determine attitudes towards the environment (Kanagy and Nelsen 1995). Mohai (1992) and others have found support for a gender hypothesis which recognizes the importance of cultural definitions of masculinity and femininity. These norms are likely to vary considerably by both national origin, and religious preferences. Respondents were asked their sex and those responses were coded into a dichotomous measure in which men were coded as zero, and women were coded as one. The sample had a gender breakdown of 48.5% men, and 51.5% women in the full sample, though these proportions varied by country. Blocker and Eckberg (1997) find that women tend to exhibit somewhat more environmental concern, though they are no more likely to engage in environmental action than men. They note that both men and women with higher social status and with more knowledge of environmental issues, and greater degrees of trust in science are more likely to engage in pro-environmental action. Similarly, Tarrant and Cordell (1997) find that women had a

stronger relationship with environmental concern than did men, though it was noted that the method of measuring environmental concern made a difference.

Tarrant and Cordell (1997; among others) have suggested that urban and rural residents of a country may have differing opinions on the issue of the environment. Rural or urban residence has not been shown to be statistically significantly related to environmental attitudes. Samdahl and Robertson (1989) find that the size of the community in which one lives is positively related to ones perception of environmental problems and support for change. Generally, it appears that the research on the relationship between residence and environmental concern has gone both ways, making it difficult to determine how important it actually is (Van Liere and Dunlap 1980). These relationships have rarely been examined with international samples, however. In order to best capture this with the World Values Survey data, I created a dichotomous measure of urban versus rural. Due to the difficulties inherent to international data, there were some countries that used different population sizes for a variable asking the respondents the population of their town of residence. So I created a dummy variable using approximately 50,000 residents as the cut off for urban, with towns of 50,000+ residents being considered urban. For countries which did not have a clear 50,000 person population cut off, I used the middle category which was usually within 20,000 of this 50,000 person cutoff. This yields a variable in which 53.5% are considered rural and 46.5% are considered urban.

Table 3.2 shows the bivariate correlations for all of the variables used in the following models. With such a large sample it is not surprising that most of the

relationships are significant at the $p \leq .05$ level or higher. Many of the correlations are quite small, even for variables that seem to be intuitively related to each other. This suggests to me that there are a lot of factors that influence environmental attitudes, beyond what have been suggested in previous research.

FINDINGS

These analyses required the use of Ordinary Least Squares (OLS) regression and logistic regression techniques. OLS regression allows one to assess the additive effects of a series of variables on the variance of another variable. In this case, the independent variables are regressed on the willingness to sacrifice scale. The results of this analysis are shown below in Table 3.3. The *mim* module in *Stata* is used to run analyses on multiply imputed datasets. One of the downfalls of this method is that it does not compute the R-squared coefficient for the proposed regression model. I ran the a regression on each of the imputed data sets individually, to overcome this issue, and the results below represent a model with an adjusted R-squared coefficient of about .06. In other words, the combination of independent variables explains about 6% of the variance in this measure of environmental attitudes. Though this is relatively low, it is similar to the findings of other studies on environmental attitudes, and a high R-squared value is not necessary to find support for the proposed hypotheses.

Many of the regression coefficient effects are statistically significant. Confidence in Government Institutions is statistically significant ($p \leq .001$). This effect is positive, and is consistent with hypothesis 3.4. In other words, as expected, respondents with more

confidence in government institutions have more positive environmental attitudes. Specifically, a one unit change in confidence in government institutions is associated with a .158 unit change in environmental attitudes. Similarly, confidence in the environmental movement has a statistically significant ($p \leq .001$) positive effect on environmental attitudes. The B coefficient of .231 represents a 23% increase in environmental attitudes for each one unit change in confidence in the environmental movement.

The results for social class standing are mixed. Education and subjective social class are significantly ($p \leq .001$) and positively associated with environmental attitudes. For the education variables, each level of education is associated with a respectively increasing effect on environmental attitudes. For example, those with some primary education are significantly different from those with no education, and are associated with a .170 unit change in environmental attitudes. Furthermore, those who have completed college are associated with a .551 unit change in environmental attitudes when compared to those with no education. A smaller effect ($\beta = .090$) is found between subjective social class and environmental attitudes. The income measure is not statistically associated with environmental attitudes. These findings support hypothesis 3.1 and are consistent with the post-materialist thesis.

Urban residence is not statistically associated with environmental attitudes, but age is. A one year increase in age is associated with a -.001 unit change in environmental attitudes. These results refute hypotheses 3.2 and 3.7. Additionally, sex is negatively associated ($p \leq .001$) with environmental attitudes. Sex is coded as a dummy variable

with women coded as one, and men coded as zero. This suggests that or a one unit increase in sex, there is -.068 unit change in environmental attitudes. In other words, men tend to have slightly more positive environmental attitudes than women. This is not supportive of hypothesis 3.6. Similarly, political conservatism (politically right wing) was hypothesized (hypothesis 3.3) to be negatively related to environmental attitudes. The analysis suggests otherwise; in this case, a one unit increase in political conservatism is associated with a .032 ($p \leq .001$) unit increase in environmental attitudes. In other words, respondents who identified as more politically "right," also have higher environmental attitudes.

Lastly, the results suggest mixed results for hypothesis 3.5. More specifically, it was hypothesized that non Judeo-Christian religious traditions would be associated with more positive environmental attitudes. The results tend to show that even though most of the Christian traditions have a negative relationship with environmental attitudes (when compared to the reference category "no religious preference"), Jews, Buddhists, and Muslims are not significantly different from those with no religious preference. While this demonstrates partial support for the hypothesis, Hindu respondents exhibit a similar effect as the Christian traditions, which is counter to the hypothesis. In other words, with the exception of Orthodox Christians, all religious groups are associated with negative environmental attitudes.

The second analysis uses logistic regression techniques to test the effects of the independent variables on the dichotomous outcome variables. The logistic regression results are presented in table 3.4. The odds-ratios are reported in the first column. The

odds ratio represents the change in odds that are expected for a person with a certain score on the independent variable will fall into the 1 category of the dichotomous outcome (dependent) variable. While confidence in government institutions is not statistically associated with one outcome over the other, confidence in the environmental movement is. Specifically, for each one unit increase in confidence in the environmental movement, a respondent is 1.29 times, or 29% more likely to have given the environment priority over the economy. This indicates mixed results for hypothesis 3.4.

Hypothesis 3.1 suggests a similar pattern. Income is not significantly associated with choosing the environment over the economy, but subjective social class is. The effect is minimal; those with a higher subjective social class are about 6% more likely to give the environment priority over the economy. The education variables were dummy coded for the logistic regression models, and respondents identifying as having "no formal education" used as the reference category. The results show that while having some primary or secondary education is not statistically different from having no formal education when it comes to the likelihood of preferring environmental protection over economic growth. Completing secondary education is statistically significant, indicating that those who complete secondary education are about 1.3 times more likely to favor environmental protection. The effect is similar but larger for those with some college education and those who completed college with an 81% and 96% increase in the likelihood of favoring environmental protection over economic growth. Together, these findings indicate support for hypothesis 3.1.

Hypothesis 3.7 is not supported, as urban respondents and rural respondents are not significantly different in their support for the environment over the economy. According to hypothesis 3.3; political conservatism is expected to be related to decreased odds of favoring the environment over the economy. The results indicate that for a one-unit increase in political conservatism, respondents are about 1% more likely to favor environmental protection over economic growth. This finding does not support the hypothesis. The age hypothesis (hypothesis 3.2) is supported, as age is a significant predictor of support for environmental protection. Specifically, for each one year increase in age, respondents are .2% more likely to favor environmental protection over economic growth. Hypothesis 3.6, however is supported, as gender is not statistically related to the likelihood of favoring environmental protection over environmental growth.

The findings for religion are interesting. Hypothesis 3.5 states that Non Judeo-Christian respondents will have more positive environmental attitudes. When compared to those with no religious preference, it appears that of those with statistically significant associations the Judeo-Christian traditions have lower odds ratios. Protestants, for example are about 32% less likely to favor the protection of the environment over economic growth. Muslims are about 29% less likely, and Orthodox Christians are about 20% less likely. A similar relationship appears for Buddhists and those who listed "some other religion." While the "other" category included a variety of Christian traditions, it included non-Christian respondents as well[7]. This indicates that the findings for

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[7] Though the "other" category included a variety of smaller Christian traditions, it contained mainly non-Christians. Additionally, most of these groups would be difficult, if not impossible to re-categorize into other groups.

hypothesis 3.5 are at the very best, mixed. Hindu's and Catholic's are not significantly different from those with no religious preference.

While the hypotheses have found mixed support in the analyses, the overall goal of assessing cross-national environmental attitudes and the factors associated with them appears to point out a number of other issues. Perhaps the largest issue at hand is how applicable these findings are cross-nationally. Preliminary analyses suggest that there are some significant differences between nations when considering the applicability of these hypothesized relationships. For instance, the adjusted R-squared values for the OLS model ranged from -.0007 (none of the predictors are significant) in Puerto Rico. to .1531 (about 15% of the variance in environmental attitudes) in Vietnam. With differences this large, it is clear that accounting for other sources of variance is necessary, particularly when conducting international analyses. The country-specific adjusted R-squared coefficients are listed in Table 3.5.

DISCUSSION AND CONCLUSIONS

The previous explanations of environmental attitudes appear to cover only a small portion of the variance in the actual measurement of these attitudes. One way of interpreting this is that the issue is so complex and multifaceted that it is difficult to accurately formulate how to assess attitudes and which characteristics of people influence environmental attitudes. While many studies have addressed this particular issue within a single nation, or a subset of similar nations, rarely has anyone attempted to address this

issue internationally (Dunlap et al. 2000; Evans 2007; Tarrant and Cordell 1997; Vining and Ebreo 1992).

The overall result of these analyses suggests three important things about explaining environmental attitudes with individual characteristics: (1) Social class appears to have an impact on environmental attitudes, though how social class is measured appears to be an important determinant of exactly how this relationship operates; (2) confidence in social and/or governmental institutions seems to influence environmental attitudes, but in some instances, not in the way one should expect; and (3) there is evidence that religious beliefs play a role in the development of these attitudes as well, though the role religion plays may be difficult to accurately capture.

The concept of social class has been operationalized in a variety of ways (Bollen et al. 2001). Unfortunately, there is little agreement on how to measure it. While asking people which social class category they belong to might be an easy way to overcome the difficulty in accurately measuring something as complex as social class, it may be prone to bias introduced by the assumption that one belongs to a group, for instance, the working class, when in reality they would better be categorized as middle class, particularly when a person lives in a social setting that values hard work or a working class identity. Additionally, some social classes have stigma associated with them, reducing the likelihood of respondents choosing that category. On the other hand, measures of income can become very convoluted, particularly when conducting cross-national analyses, as even splitting income into 10 categories does not really tell the researcher about what it means to have one category over another except that one

category means a person earns more money than someone in a different category. Additionally, with this data, respondents were asked their own income, and not their household income, which can mask the true effect of income on environmental attitudes. Education appeared to also be an important component of social class, and a relatively clear one for at least the first analysis. According to the post-materialist thesis, we should not be surprised by this finding, as education, social class and income are all associated with the formation of post-materialist values.

As Bernauer (1995) suggests, confidence in government and social institutions can be important with issues that have international effects. The findings clearly show that confidence in government institutions can have a positive impact on environmental attitudes, though confidence in the environmental movement seems to point to other issues. It is undeniable that the effects of environmental degradation are far-reaching, and we would likely expect international collaboration, yet there are still some hold-outs among nations. Is it that the citizens of these nations are unsure of the severity of the problem? Or could it be related to how much confidence they have in their governments?

Religion can often be a significant driving force for social change as well as for maintaining the status quo, and the findings here suggest the same. While religious beliefs can be overwhelmingly complex and detailed, White's (1967) thesis seems to be a drastic oversimplification of the reality of the religion-environmental attitude relationship. To date, researchers have not reached an agreement about the direction of the religion environment relationship; however, some have suggested that these mostly inconsistent findings can be attributed to the measurement of some concepts used in past

analyses (Sherkat and Ellison 2007). The more traditional view is that those with more literal interpretations of religious texts (specifically, the Christian bible) typically have lower levels of pro-environmental attitudes (Greeley 1993; Hand and Van Liere 1984; Lowry 1995 with some exceptions). Others have suggested that any relationship between pro-environmental attitudes and religious beliefs or religiosity can be explained with the addition of other structural factors, such as social class, age, gender, and region (Kanagy and Nelsen 1995), or that measures of religiosity are simply poor predictors of pro-environmental orientations (Boyd 1999). This suggests that perhaps the way in which religion is measured is equally as important as its actual effect on environmental attitudes. Nevertheless, it endures as a variable which should, at the very minimum, be included in such analyses.

Additionally, differences between nations appear to be significant, though not in any clear sense at this point. In the following chapter, I will examine the importance of differences in the countries themselves. It appears, at least at this point, that social class, religious identification, and confidence in government institutions are the most significant predictors of environmental attitudes. Further analyses are necessary to understand how these factors (and others) impact environmental attitudes when compared to structural constraints within specific countries, like those imposed by the world-system hierarchy.

The two main research questions guiding this analysis suggests the following conclusions: (1) religious beliefs, social class, and confidence in social and governmental institutions are the strongest predictors of environmental attitudes at the individual level;

and (2) many of the previously hypothesized models of explaining environmental attitudes are less successful with an international sample. While other factors are certainly useful for explaining environmental attitudes, few operated consistently across dependent variables, others are not significant predictors. This suggests that previous research models are not as useful in international analyses because there are national-level differences between nations that are unable to be assessed with individual level data.

CHAPTER 4: MEASUREMENT OF NATIONAL-LEVEL ENVIRONMENTAL

ATTITUDES

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ATTITUDES

Environmental attitudes and their associated behaviors depend not only upon the
characteristics of individuals, but also on the policies, both national and international, of
various national governments. Actual change, however, could require more than pro-
environmental attitudes. Additionally, the infrastructure of a society could be associated
with the likelihood of pro-environmental change. For example, it would be hard for
individual attitudes about recycling to influence the actual rates of recycling if the
infrastructure necessary to facilitate recycling was unavailable.

The world-systems perspective has been useful in other fields in order to
understand how the core-periphery hierarchy has been instrumental in impacting the lives
of people. World-systems researchers have been able to demonstrate the powerful effects
of the modern world-system on the natural world (Bartley and Bergesen 1997; Kick,
Burns, Davis, Murray, and Murray 1996). Other factors related to world-system position,
such as access to information, may also be important structural constraints that should be
considered when examining influences on environmental attitudes.

I assess two research questions about the relationship between national-level
characteristics and aggregate environmental attitudes: (1) How is the location of countries
in the core-periphery hierarchy of the modern world-system associated with aggregate
environmental attitudes? and, (2) Does access to outside information through telephones,
and the internet contribute to the development of average national environmental
attitudes? Do these associations persist when other characteristics are included in the

model, such as Environmental Sustainability Index (ESI) scores, the proportions of the Gross Domestic Product (GDP) made up of the agricultural, service, and industry sector, and the type of government (e.g. Republic, Monarchy, etc).

LITERATURE ON ENVIRONMENTAL ATTITUDES

Most of the literature on environmental attitudes focuses on the characteristics of individuals that influence their environmental attitudes. While this is useful for understanding differences in groups of people within a single nation, it is less useful for cross-national comparisons because it ignores the importance of structural constraints imposed by governments, economic systems, and access to information. Put differently, understanding the characteristics of individuals that influence environmental attitudes is only useful within a nation, as there is significant variation of these characteristics across nations.

Previous research has rarely examined both individuals within nations and between nation differences in environmental attitudes and correlates of environmental attitudes. In the few studies that have done both, there have been serious methodological limitations: first, the cross-national examples tend to focus on peer countries, that is, nations which are similarly developed and/or are economically and politically similar in other ways. Second, they assess environmental attitudes in very different ways, making comparisons difficult.

One of the more frequently cited examples of a cross-national study of environmental attitudes is Arbuthnot and Lingg's (1975) comparison of American and

French environmental behaviors, knowledge, and attitudes. Their study's findings suggested two main things: (1) knowledge of environmental issues may act as a mediator between attitudes and behaviors, and (2) that the difference between the American and French samples with regards to the status of environmental awareness depends heavily on the developmental status of the nation. Overall, however, the study is handicapped mainly by small samples and by similarities between France and the U.S.

A more recent study examines "cross-cultural" rather than "cross-national" differences in environmental attitudes compared Asian New Zealanders to European New Zealanders (Milfont, Duckitt, and Cameron 2006). The authors examine the concept of environmental attitudes psychologically by dividing it into three distinct conceptions of environmental concern: (1) egoistic (me, my lifestyle, my health, and my future), (2) altruistic (people in my county, all people, children, and future generations), and (3) biospheric (plants, marine life, birds, and animals). The findings suggested some differences between Asian New Zealanders and European New Zealanders with respects to the motivations behind their environmental concern.

Olofsson and Öhman (2006) provide several compelling findings from their cross-national analysis. First, general beliefs about the environment are consistent predictors of environmental concern. Second, education and political identification are also stable predictors of environmental concern. Unfortunately, the sample is based on North American and Scandinavian respondents to the 2000 International Social Science Programme (ISSP) survey. These findings are important, but they are not applicable to a more diverse sample of nations than the ISSP provides.

Others have focused more on the determination of environmental behaviors than the formation of attitudes. Oreg and Katz-Gerro (2006), for instance, find that post-materialist values affect environmental concern, a finding which is not consistent with the New Ecological Paradigm (Dunlap et al. 2000), which in turn affects pro-environmental behaviors. Similar to the Olofsson and Öhman (2006) study, the sample comes from the ISSP's 2000 data, which only includes a sample of peer-nations.

Similarly, Hayes' (2001) study focuses on a cross-national comparison of gender, scientific knowledge, and attitudes toward the environment. Her results suggest that "even though men and women do differ in terms of their knowledge of scientific matters, this has little or no effect on their attitudes toward the environment" (2001:657). Additionally, even when controlling for scientific knowledge, there are few gender differences with respects to environmental attitudes.

Though the contributions of past research are important in many regards, they only provide a limited picture of the differences between nations. Each of these examples shares one of two flaws: they either use a limited and culturally homogenous sampling of nations, or they conceptualize environmental attitudes in an unconventional manner, limiting the comparability of their findings to the findings of others.

THE WORLD-SYSTEMS PERSPECTIVE AND THE ENVIRONMENT

Past research guided by the world-systems perspective has been relatively clear and consistent on the relationship between world-system position and environmental degradation of varying types (Bartley and Bergesen 1997; Kick, Burns, Davis, Murray,

and Murray 1996). Generally, that is, the core is associated with lower degrees of degradation than the periphery, while the semi-periphery engages in the highest degree of environmental degradation. Though this past research does not assess environmental attitudes in a world-systems perspective context, it continues to carry the connotation of a relationship between behaviors and attitudes (Brechin and Kempton 1994).

The general argument is that developing nations (i.e. non-core) attempt to play catch-up to the developed world and are much more likely to favor economic growth over environmental protection. Additionally, the problem is confounded by the exportation of environmental "bads" by core nations, and the exportation of environmental "goods" by peripheral and semi-peripheral nations. In other words, wealthy nations are able to effectively export undesirable outputs of industry and pollution to nations who need the revenue, while poorer nations simultaneously degrade their own environment in an effort to produce raw resources for sale to wealthier nations.

Past research suggests that the characteristics of nations are important as well. The type of government, for example can be an important factor in assessing a nation's environmental performance (Scruggs 1999). Similarly, access that individuals have to outside information through various forms of media, such as television, the internet, and telephones should increase pro-environmental attitudes by helping them become informed about global issues regarding the environment. Additionally, the actual conditions of the environment in local context may also play a role in the formation of attitudes about the environment.

It is clear that national-level characteristics can affect environmental outcomes, but how do national-level characteristics affect aggregate levels of environmental concern? If attitudes and behaviors are related, then one should expect to find a similar set of patterns between the characteristics of nations and the attitudes of its citizens. For example, when confidence in the government is high among a population, governmental policies are generally viewed with respect. On the other hand, even within the same country, some citizens may be suspicious of government policies if the government has inspired less confidence in them. The post-materialist thesis suggests that even among the citizens of a nation, there may be several generations, each with a different perspective on a variety of issues. If the post WWII generation in a country is suspicious of the government, this can impact the average environmental attitudes of the country. Those citizens who are poor, however, are more likely to value the means of survival over more aesthetic values like environmental quality. This means that nations with poorer, less educated citizens are likely to have a different association with aggregate environmental attitudes than nations with wealthier, more educated citizens. Therefore we should expect to see the association between characteristics of nations and the average environmental attitudes of its citizens vary by position in the core-periphery hierarchy.

HYPOTHESES

Past research has indicated several likely hypotheses at the national-level:

> **Hypothesis 4.1:** *Core nations should have higher average pro-environmental*
>
> *attitudes than periphery or semi-periphery nations.*

As suggested by Bartley and Bergesen (1997; among others), generally the core is associated with lower degrees of environmental degradation. Similarly, because core nations have higher GDP per-capita they tend to engage in more protective measures for the environment than non-core nations. Additionally, the post-materialist view of environmental attitudes suggests that the higher degrees of national wealth in core nations should be associated with higher proportions of people in core nations who have met their material needs, and would therefore be more likely to show preferences for post materialist values like environmental protection.

Hypothesis 4.2: Nations with higher average access to information will have higher aggregate pro-environmental attitudes.

Brechin and Kempton (1994) argue that experiencing environmental degradation should lead to greater concern about the environment. Similarly, more access to information about the environment should lead to higher pro-environmental attitudes. Access to information is more likely to occur in wealthier core nations than in the periphery. If greater information explains differences in attitudes by position in the world-system, then including these measures should eliminate differences by position in the world-system. Information and communication measure post-materialist rather than materialist development in nations, because information exchange comes after basic needs are met.

Hypothesis 4.3: Lower scores on the Environmental Sustainability Index (ESI) will be associated with higher aggregate pro-environmental attitudes.

Knowledge of environmental problems has been demonstrated to have influence on environmental attitudes (Vining and Ebreo 1990). Such knowledge comes from many

sources, including the various forms of media available in a country. Based on the world-systems perspective, one would expect to see that those in the periphery and to a smaller extent, the semi-periphery, are more likely to experience environmental degradation, and that seeing the degradation first-hand would increase the likelihood of developing pro-environmental attitudes. Though core nations tend to have lower levels of degradation, they also generally have governments that are more responsive to environmental problems. The ESI is a composite measure that assesses a nation's environmental well-being, as well as it's governments responsiveness to these problems.

DATA AND METHODS

The data used for this analysis come from a variety of sources. Primarily, I use data from the Central Intelligence Agency's (CIA) World Factbook (www.cia.gov). I do, however, also include measures from the Environmental Sustainability Index (ESI). The ESI is an attempt to develop a composite measure of overall environmental performance of most nations by aggregating known information on environmental degradation, policy, and participation in international treaties on the environment. It is collaboration between the World Economic Forum, the Yale Center for Environmental Law and Policy, and the Center for International Earth Science Information Network (CIESIN), at Columbia University (http://www.ciesin.columbia.edu/indicators/ESI/). These data cover the year 2000. Finally, the dependent variable comes from the aggregated individual-level environmental attitudes measures. These data come from the World Values Survey from

the 1999-2001 wave. These data contain responses from people in 27 nations on several important questions regarding the environment and their attitudes towards it.

DEPENDENT VARIABLES

The focal dependent variable for this analysis is the aggregated environmental attitudes measures from the individual analyses in Chapter 3. These variables include: (1) a scale intended to measure environmental attitudes which relate to willingness to make economic sacrifice in favor of the environment. The scale is created by using the sum of two items yielding a Chronbach's Alpha of .81. The two items contained in the scale ask the respondents: "How strongly do you agree or disagree with the following statement: I would give part of my income if I were certain that the money would be used to prevent environmental pollution" and; "How strongly do you agree or disagree with the following statement: I would agree to an increase in taxes if the extra money were used to prevent environmental pollution." The two items used to construct the scale are coded such that a response more favorable to the environment yields a higher score. In order to use this variable for the national-level analysis presented here, the mean for each country was used as the score for the outcome variable. I refer to this variable as willingness to sacrifice.

(2) A second question which asks respondents: "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?" (1) "Protecting the environment should be given priority; even if it causes slower economic growth and some loss of jobs" or (2)

"Economic growth and creating jobs should be the top priority, even if the environment

suffers to some extent." This variable measures environmental attitudes differently, by

requiring that one recognizes the tradeoffs inherent to environmental protection. In order

to use this variable for the national-level analysis presented here, the mean for each

country was used as the score for the outcome variable. It should be noted that for the

second dependent variable, the mean represents the proportion of respondents in that

nation who chose the first category, "protecting the environment should be given priority,

even if it causes slower economic growth and some loss of jobs," the more pro-

environmental response. I refer to this dependent variable as economic tradeoffs.

INDEPENDENT VARIABLES

The main independent variable is a continuous measure of world-system position.

This is based heavily on the work of Jeffery Kentor (2000). The position in the world-

system is measured by the following three items: (1) a measure of "Capital

Intensiveness," which is measured by the Gross Domestic Product Per-Capita and is

intended to measure the "ability of an actor (country) to be more competitive in the

global marketplace". (2) "Production Size [. . .] refers to the relative size of a country's

productive infrastructure," is measured by the Gross-Domestic Product (GDP). (3)

Military Expenditures in dollars, which "reflects a country's ability to assert its will both

directly and indirectly in the world-economy by use of military force."

Originally, Kentor specifies a 10-item model to measure three dimensions, but

finds that the three item version of the construct has a .98 correlation with the original

measure and should be a suitable measure for most needs. The z-scores for each of these three pieces of data are summed to arrive at the composite measure of position in the world-economy (Kentor 2000). The core is comprised of those in the top third, the periphery is comprised of those countries in the bottom third, and the semi-periphery makes up the remainder of the nations. After completing this step, I compared my list of countries at each level of the hierarchy to other work using similar techniques and found no oddities. The list of core, peripheral, and semi-peripheral nations is provided in table 4.1, as well as the original world-system position scores. I also created dummy variables of each level of the core-periphery hierarchy which are used in some of the plots in this chapter.

Additionally, in order to assess objective environmental performance, I use the Environmental Sustainability Index (ESI) score. The ESI is a composite measure of environmental sustainability that includes a variety of factors such as the amount of certain types of pollutants present in the water and air, efforts to reduce such pollution, global stewardship, and the technological capacity to debate and solve environmental problems. The scores range from 24.7 in Haiti, to 80.5 in Finland. The average ESI score for all nations is 49.4, and for the countries in the analysis the mean is 48.52 indicating that the sample used here is relatively consistent. Table 4.1 also contains the ESI scores for the nations in the sample.

Other important variables used in this analysis include the number of internet users per-capita, the number of televisions per-capita, the number of cellular telephones per-capita, and the number of landline telephones per capita. Others have argued that

knowledge of environmental problems is associated with attitudes, and by proxy, environmental behaviors (Arbuthnot and Lingg 1975; Vining and Ebreo 1990). Access to outside information should be a useful means of acquiring such knowledge, and telephones, internet and television are the three most likely venues for this to occur. In order to control for the U.S. as an extreme outlier, I have used the logged version of these variables to compute the scatterplots below. This approach minimizes the extreme influence of the U.S. on the regression line for the core nations. Additionally, I will examine the type of government, as determined by the Central Intelligence Agency's (CIA) classification system. Scruggs (1999) found that the government types vary in environmental performance specifically if governments sign, ratify, or enforce global environmental treaties. This should be especially important in democratic societies in which post-materialist values exhibit great influence on attitudes. Also, I assess associations between both dependent variables and the sector composition of the Gross Domestic Product (GDP) in terms of the Industrial, Agricultural, and Service sectors.

DISCUSSION AND FINDINGS

In order to conduct the following analyses, I use two techniques. First, I examine the directions of relationships in order to clarify which patterns exist. Due to the small sample size (N = 27) statistical significance in standard parametric statistical procedures would be difficult to achieve. Therefore, I employ nonparametric tests of the relationships between country level characteristics.

Hypothesis 4.1 states that world-system position will be positively associated with aggregate pro-environmental attitudes. Higher scores indicate closer to the core, therefore a positive association indicates that those countries closer to the core will have higher pro-environmental attitudes. Bivariate correlations between the world-systems position score and the two environmental attitudes measures produce mixed results. The first environmental attitudes measure, willingness to sacrifice, yields a Pearson's R of -.142, but the second environmental attitudes measure, economic tradeoffs, yields a correlation of .257, suggesting that the association is much stronger for economic tradeoffs than for willingness to sacrifice. The differences in the underlying concepts being measured, that is, willingness to sacrifice to support saving the environment, versus tradeoffs between environmental protection and economic growth should explain these differences. Figures 4.1 and 4.2 illustrate these relationships. It should be noted that the U.S. is the outlier in these examples, as the U.S. has such a large GDP and Military Expenditures than other nations included in the sample. In figure 4.1, world-system position is negatively associated with willingness to sacrifice for all but the core. With economic tradeoffs, however, the relationship is positive for all but the periphery. This distinct contradiction suggests that the two outcomes—willingness to sacrifice and economic tradeoffs—are assessing two different dimensions of environmental attitudes and they mean different things to nations in different positions in the core-periphery hierarchy.

Hypothesis 4.2 states that access to outside information (television, internet, and telephones) will be positively related to aggregate environmental attitudes. Bivariate correlations show a moderate negative association between landline telephones per-capita

and willingness to sacrifice (r = -.222); the association is stronger for cell phones per-capita (r = -.301), but weaker for internet users per-capita (r = -.167), and weakest for number of televisions per-capita (r = -.068). Because these correlations are all in the same direction (negative) but of different strength, I conclude that more access to knowledge from outside of a particular country does not increase pro-environmental attitudes, but also that these indicators measure more than global knowledge. Therefore there is not support for this particular hypothesis.

The economic tradeoffs measure of environmental concern illustrates mixed results as well—with some positive, some negative and different sizes of correlations. The correlations for landlines per-capita (r = -.368) and televisions per-capita (r = -.192_ with economic tradeoffs is negative, but internet users per-capita (r = .167) and cell phones per-capita (r = .029) have positive associations with economic tradeoffs. These mixed findings again suggest that there are some underlying differences between the two environmental attitude measures as should be expected. In order to see if these effects are influenced by world-system position, I constructed scatterplots to illustrate the differences in slopes and intercepts on these variables, and further indicate if the associations differ by world-system position. The results are presented in figures 4.3 through 4.10.

Assessing the patterns of association between sources of outside information and environmental attitudes, the scatterplots make several things clear. First, by controlling for world-system position, the differences in the slopes and intercepts are highlighted. This is reassuring as it illustrates the powerful effects of the position of a nation within

the core-periphery hierarchy. Second, we are able to observe the magnitude of these effects. And finally, there are several important differences between the various sources of outside information which may be useful in explaining differences in environmental attitudes cross-nationally. In order to avoid the influence of outliers, the logged versions of all of the measures of access to outside sources of information are used in these plots.

In figure 4.3, we again see that the relationship between willingness to sacrifice and the logged number of cellular telephones is negative. Though this may seem counterintuitive, it could be due to the increasing number of cellular-only households in many nations, which certainly helps to explain the much steeper slope (and the higher intercept) for semi-peripheral nations when compared to the periphery and core. Figure 4.7 illustrates a different pattern for the measure of economic tradeoffs, in which the semi-periphery exhibits a positive effect while core and peripheral nations exhibit negative effects.

Figures 4.4 and 4.8 assess the pattern of relationships between the logged number of internet user's per-capita on environmental attitudes. The results suggest a mixed pattern where one measure of environmental attitudes tends to increase with more logged internet users per capita, while the other decreases. The effect for the semi-periphery tends to follow the overall pattern better than the effects of internet access in core and peripheral nations. Overall, however, the effects of internet access on environmental attitudes are inconsistent. One potential reason for this finding is that the measure only accounts for internet user's per-capita, and does not address the frequency with which one has access to the internet. Additionally, having access to the internet can mean very

different things for different people as the ways in which this access is used vary greatly between people.

Figures 4.5 and 4.9 assess the pattern of relationship between the logged number of land line telephones per-capita and environmental attitudes. The bivariate correlations are negative, yet the scatterplots highlight several different effects which vary by position in the world-system. It appears that the negative effect does not represent the semi-periphery when compared to economic tradeoffs, suggesting that there are other factors at work. The core and the periphery, however, exhibit a clear negative trend. Again, this highlights the large impact of the core on the overall pattern. One potential effect of the core's impact on the non-core is the "trickle-down" of technology and information. If this is the case, we should expect environmental attitudes to do the same.

Figures 4.6 and 4.10 assess the degree of relationship between the logged number of televisions per-capita and environmental attitudes. Overall, these variables have a negative bivariate correlation. In the scatterplots, this is really only representative of the peripheral nations, where the effect is negative. For willingness to sacrifice, the effect is slightly negative for core and peripheral nations. For economic tradeoffs, however, the effect is positive for the core and semi-periphery and negative for the periphery. Overall, the effect of access to outside sources of information is limited to landline telephones, which appears to be the most consistent correlate of those tested here.

Hypothesis 4.2 states that ESI score and environmental attitudes will be negatively related. Though this seems counterintuitive, some scholars have suggested that the degree to which environmental degradation is experienced will influence the strength

of environmental attitudes (Brechin and Kempton 1994). The ESI contains several measures of the actual condition of the environment for each nation. Therefore, one would expect those nations with more highly degraded ecosystems to have higher pro-environmental attitudes. For the first measure of environmental attitudes (willingness to sacrifice), respondents were asked how willingly they would pay to protect the environment. This exhibits a Pearsons R of -.433, and it is statistically significant ($p \geq$ .05). The second measure of environmental attitudes (economic tradeoffs) asks whether they would choose environmental protection over economic development. This relationship exhibits a Pearsons R of .104 (not statistically significant), which suggests once more that these two measures of environmental attitudes operate differently from each other, tapping into multiple dimensions.

Scatterplots of these relationships also exhibit differences. For the economic tradeoffs measure, core nations exhibit a positive relationship, while peripheral and semi-peripheral nations exhibit negative effects. This can be explained in that residents of core nations prefer to give up some economic growth for environmental protection as the economies of these nations are relatively strong when compared to other non-core nations, but more importantly, core nations have political means for such change in place. For willingness to sacrifice, the effects are all negative, though to varying degrees. These plots also help to illustrate the apparently large differences between the slopes and intercepts for the nations when comparing scores on the ESI to environmental attitudes. These plots are shown in figures 4.11 and 4.12. For the most part, ESI score and environmental attitudes are related to one another in the hypothesized manner.

Next, I conducted the Kolmogorov-Smirnov test. The Kolmogorov test is a nonparametric test useful when one compares distributions within a single sample of data. In short, it tests the null hypothesis that all variables have similar distributions against the alternative hypothesis that at least one of the groups differs in terms of their distribution on a variable. Nonparametric tests do not assume a normally distributed variable, though the Kolmogorov-Smirnov test uses a normal distribution function to test the hypotheses. The results indicate that the distributions of logged number of landline telephones per-capita, ESI scores, logged world-system position scores, willingness to sacrifice, and economic tradeoffs are not significantly different from a hypothesized normal distribution.

DISCUSSION AND CONCLUSIONS

Perhaps the most important finding contained in this analysis is the relationship between the Environmental Sustainability Index (ESI) score and the two measures of environmental attitudes. While it is clear that the two dependent variables tap into somewhat different dimensions of environmental attitudes; personal willingness to sacrifice, and economic tradeoffs, it is less clear exactly why the patterns observed exist. More specifically, why do the core nations have a positive relationship with the economic tradeoffs measure of environmental attitudes? Though this finding in some ways mirrors past research, specifically the findings of Grimes and Roberts (1995), it only appears to apply to this one dimension of environmental attitudes, which is essentially a measure of valuing environmental protection over economic growth.

Other interesting findings regarding access to outside information suggest that virtually any effects of access to information on environmental attitudes are generally modified by position in the core-periphery hierarchy. Though these effects can be interesting on their own, the small sample size makes it difficult to come to any solid conclusions about World-system position's effects on environmental attitudes. Also, the effects of access to outside information appear to be extremely inconsistent for all measures except for logged number of landline telephones per capita. This suggests that in future analyses, using phones per capita might make the results more consistent and useful. Counter to the expectation that access to outside information would help rather than hinder environmental attitudes, I find that this relationship is negative. This is also unexpected based on the post-materialist thesis as the development of these technologies should coincide with the development of post-materialist values.

Other analyses also point to some interesting patterns, with respects to the proportion of the GDP comprised of various economic sectors. For example, a statistically significant association between degree of GDP comprised of the service sector shows a positive correlation with World-system position score (.741 Pearsons R significant at the .05 level), while the degree of GDP comprised of the agricultural sector shows a similarly sized negative correlation (-.797 Pearsons R significant at the .05 level). Though this is not surprising, this may be an important factor to assess, as it would appear that the agricultural lifestyle is less conducive to behaving in an environmentally friendly manner, while being more conducive to developing higher levels of concern about the state of the environment in the first place. Government type is not associated

with environmental attitudes, as expected. These findings do not support the post-materialist thesis, because the association between higher development and more democratic governments does not have a positive association with pro-environmental attitudes.

CHAPTER 5: MULTILEVEL MODEL OF ENVIRONMENTAL ATTITUDES

CHAPTER 5: MULTILEVEL MODEL OF ENVIRONMENTAL ATTITUDES

A variety of factors have been shown to be associated with environmental attitudes. These factors, however, have been only approached from either the individual-level, or from the national-level, and have not been assessed from both levels simultaneously. Though much past research has been guided by the assumption that in order to change people's behavior their attitudes must be changed (Jones and Dunlap 1992), scholars have assumed that efforts to change public perceptions should be focused on individual-level attitudes and behaviors (Vining and Ebreo 1990). Unfortunately, this ignores the role of social policy and the availability of required infrastructure in changing social behavior.

Dunlap et al. (2000) propose that humanity has entered a new paradigm in which the human-environment relationship is no longer operating on the belief that the natural world is unaffected by human behaviors. Moreover, environmental concern is not seen as an affectation of the wealthy, but rather that even the poor—some of the people who are most affected by environmental degradation—are concerned about the natural world as well. While this perspective has been demonstrated to be useful in understanding environmental attitudes in the wealthy industrialized nations in the West, it has generally not been applied internationally.

The post-materialist thesis holds that a fundamental shift in the values of various publics has occurred. Ingelhart (1995) finds that this change appears to have occurred mainly among certain generations, the post WWII generation for example. Such changes in values have decreased the importance of "materialist" values like national security and

economic development, and increased the importance of "post-materialist" values like environmental protection. Though this perspective has been assessed internationally, it has generally only been found to impact certain generations (Inglehart 1995). If the post-materialist thesis applies to environmental attitudes, one should expect to see significant effects of social class characteristics on environmental attitudes, with the wealthier respondents having more positive environmental attitudes.

The world-systems perspective proposes that by being a beneficiary of the single capitalist world-system, wealthy core nations are able to export the negative consequences of their environmentally destructive practices to poorer peripheral and semi-peripheral nations. Furthermore, those in the core become less concerned about the environment as they do not witness its degradation to the same extent as those in the periphery. Though this perspective has been useful in many studies, it has generally ignored environmental attitudes, and focused mainly on the characteristics of nations, rather than on the characteristics of individuals. If the world-systems perspective is useful for examining environmental attitudes, one should expect to find that the effect of world-system position remains relatively consistent, and that higher positions in the world-system are associated with higher pro-environmental attitudes.

The current analysis attempts to bridge the gap in past research by proposing a multilevel model of environmental attitudes. In order to do this, I use the insights provided by research that focuses on the individual-level and also on the national-level characteristics that influence environmental attitudes simultaneously. I ask the following research questions: Do individual- or national- level characteristics better explain levels

of environmental concern? Do these differences apply across all levels of the core-periphery hierarchy? Last, if there are differences between individuals in different nations in terms of environmental attitudes, on which characteristics do they vary?

LITERATURE ON ENVIRONMENTAL ATTITUDES

At the national level, previous research tends to have two major shortcomings: first, it has tended to focus on nations that are developmentally and economically similar; and second, it relies on different measures of environmental attitudes, limiting the ability to make comparisons between otherwise similar studies. The findings are useful nonetheless, especially considering that this level of measurement is far less common than it is for individual-level analyses of environmental attitudes.

Studies have found that knowledge of environmental issues may act as a mediator between attitudes and behaviors (Arbuthnot and Lingg 1975). Put differently, public awareness of the extent of environmental degradation can mean the difference between making behavioral changes and not making them. Additionally, research on cross-cultural samples suggests that there are some significant differences in the motivating factors behind the development of environmental concern, though other factors may exist which can partially explain these differences (Milfont et al. 2006).

Olofsson and Öhman (2006) suggest that general beliefs about the environment and political identification are consistent predictors of environmental concern. These findings have been subject to criticism due to the similarities of the nations included. A similar criticism was made by Arbuthnot and Lingg (1975) regarding their own findings.

This criticism is important because findings based on similar developed nations limit the comparability of those findings to the findings in less developed nations.

Counter to Dunlap et al.'s (2000) New Ecological Paradigm (NEP), Oreg and Katz-Gerro (2006) find that post-materialist values affect environmental concern, which then influence pro-environmental behaviors. These findings have also been criticized as they focus on developmentally and economically similar nations, but are presented as universal. Hayes (2001) examines gender in the context of knowledge of science and attitudes toward the environment. She found that men and women do differ in terms of their knowledge of scientific matters, but the difference in knowledge had little or no effect on their environmental attitudes. She also notes that even when controlling for the differences in men and women's knowledge of science, there are few gender differences in environmental attitudes.

The world-systems perspective has been used to examine national-level characteristics, but has not been used to study the environmental attitudes of the people in those nations. Yet world-systems scholars have demonstrated a relatively clear relationship between environmental degradation and world-system position. If environmental degradation and knowledge of environmental problems are associated with environmental attitudes, it can be assumed that nations with more environmental degradation will experience higher levels of environmental concern.

At the individual level, most of the literature on environmental attitudes has focused on the measurement of environmental attitudes (Dunlap et al. 2000; Weigel and Weigel 1978; among others). Other scholars have focused on the characteristics of people

that influence their environmental attitudes. Mohai (1992) suggests that gender may play an important role in environmental attitudes, though later studies have suggested that there may be no substantial differences, just different ways to measure environmental attitudes for men and women. Van Liere and Dunlap (1980) found that whether one lives in a rural versus urban area may be a significant predictor of environmental attitudes. Urban residents are more concerned about the condition of the environment than are rural residents because rural residents are more likely to depend on the land directly (i.e. through agricultural work) than urban residents.

Jones and Dunlap (1992; among others) argue that age is associated with the development of environmental attitudes, because younger citizens are less concerned, and older citizens are more concerned about the environment because the latter worry about their offspring. Additionally, they cite education as a predictor of environmental attitudes. Higher education is associated with higher concern. Income, as an indicator of social class, is also associated with environmental attitudes. Specifically, there is evidence that higher wealth is associated with higher environmental concern (Van Liere and Dunlap 1980). Additionally, Van Liere and Dunlap (1980) find that more liberal survey participants have higher environmental concern.

Though much of the past research focuses on the characteristics of individuals, the characteristics of nations may be equally useful for a more thorough examination of environmental attitudes. Past research has not examined individual-level environmental attitudes as they relate to the characteristics of the nations in which they live. The NEP is a useful perspective to examine individual-level environmental attitudes, though it does

not incorporate the characteristics of nations into the perspective. The world-systems perspective, on the other hand, generally ignores the characteristics of individuals but provides great insight into the characteristics of nations. By using both perspectives together, we get a clearer picture of these individual and contextual effects as they relate to environmental attitudes. Additionally, we can assess if associations within nations are similar or different in core and periphery nations.

HYPOTHESES

Previous research on environmental attitudes suggests several hypotheses regarding both individual- and national- level factors that influence environmental attitudes. Based on these hypotheses, and the findings in Chapter 3 and Chapter 4, I propose the following hypotheses for these analyses:

Hypothesis 5.1: Higher social class standing will be associated with more positive environmental attitudes.

Van Liere and Dunlap (1980) suggest that social class position may be an important predictor of environmental attitudes. It is hypothesized that those with higher social class will be more concerned with the preservation of the environment than those of lower social class, and will be less concerned with the economic trade-offs necessary in order to protect the environment. Additionally, post-material values are expected to be higher among those with greater wealth as they will have fewer problems satisfying their material needs (Inglehart 1995).

Hypothesis 5.2: Higher age will be associated with more positive environmental attitudes.

Jones and Dunlap (1992; among others) have found support for the age hypothesis, which indicates that the elderly are typically more concerned about the environment than the young. One possible explanation is that the elderly will be interested in preserving the environment for their children and grandchildren, while younger people will not. Additionally, older people are more likely to belong to the post-materialist group, who has fewer problems satisfying material needs.

Hypothesis 5.3: Political conservatism (the "right") will be negatively related to positive environmental attitudes.

Van Liere and Dunlap (1980) propose that political conservatism is associated with lower levels of pro-environmental attitudes. Politically conservative attitudes tend to favor the economic, social, and political institutions that are typically at odds with preservation of nature.

Hypothesis 5.4: Confidence in social/governmental institutions will be positively related to positive environmental attitudes.

Bernauer (1995) suggests that international issues, like many environmental problems are less-likely to be solved when there are lower levels of confidence in social and governmental institutions. This relationship is likely because having confidence in these institutions and organizations means that one is more likely to believe what they tell you with respects to the condition of the natural environment.

Hypothesis 5.5: *Non Judeo-Christian religious traditions will be more positively*

related to positive environmental attitudes.

White (1967) argues that the Judeo-Christian religious traditions have a worldview which

is inconsistent with a pro-environmental worldview. Several places in Judeo-Christian

texts specify the divinely inspired relationship between man and nature. In most of these

cases, man is specified as the ruler or master of the natural world.

Hypothesis 5.6: *Gender will have no significant relationship with positive*

environmental attitudes.

While Kanagy and Nelsen (1995), Mohai (1992), Blocker and Eckberg (1997), and

Tarrant and Cordell (1997) have found relationships between environmental attitudes and

gender, the results have generally suggested that while women may be more concerned

about specific issues, men tend to have higher levels of general environmental concern.

This suggests that the measure of environmental concern may also play an important role

in the assessment of this hypothesis.

Hypothesis 5.7: *Rural respondents will have more environmental concern than*

urban respondents.

Samdahl and Robertson (1989) suggest that community size is positively related to one's

perception of environmental problems and support for change.

At the national-level, several other hypotheses emerge:

Hypothesis 5.8: *Core nations should have higher average pro-environmental*

attitudes than periphery or semi-periphery nations.

As suggested by Bartley and Bergesen (1997; among others), generally the core is associated with lower degrees of environmental degradation than the periphery. Similarly, people in core nations, with their higher GDP per-capita are more likely to engage in protective measures for the environment. Core nations are more likely to have larger proportions of their populations with post-materialist values, rather than those in peripheral nations with more materialist populations.

Hypothesis 5.9: Nations with higher average access to information will have higher aggregate pro-environmental attitudes

Brechin and Kempton (1994) argue that experiencing environmental degradation will increase one's concern about it. Similarly, one should reasonably expect to develop a similar understanding about the condition of the environment with access to outside sources of information. Access to information is more likely to occur in wealthier core nations, rather than in the periphery. Additionally, in terms of values, information and communication would best be described as post-materialist rather than materialist. That is, only once a population is able to feed, clothe, and care for themselves, will they become concerned about communicating with others who they are not in direct regular contact with.

Hypothesis 5.10 Lower scores on the Environmental Sustainability Index (ESI) will be associated with higher aggregate pro-environmental attitudes.

Knowledge of environmental problems has been demonstrated to have influence on environmental attitudes (Vining and Ebreo 1990). Such knowledge comes from many sources, including the various forms of media available in a country. Based on the world-

systems perspective, one would expect to see that those in the periphery and to a smaller extent, the semi-periphery, are more likely to experience environmental degradation, and that seeing the degradation first-hand would increase the likelihood of developing pro-environmental attitudes. Though core nations tend to have lower levels of degradation, they also generally have governments that are more responsive to environmental problems. The ESI is a composite measure that assesses a nation's environmental well-being, as well as its government's responsiveness to these problems.

DATA AND METHODS

This research uses multilevel analysis techniques that examine the effects of individual- and national-level characteristics on two measures (one continuous, one dichotomous) of environmental attitudes. Previous research has indicated that individual characteristics can be useful in predicting environmental attitudes (Tarrant and Cordell 1997; Dunlap et al. 2000; Mohai 1992; Van Liere and Dunlap 1980; Jones and Dunlap 1992; Mohai 1980; Mohai and Bryant 1998; among others). Other research has suggested that national-level characteristics may also play an important role in understanding human-environment interaction (Bartley and Bergesen 1997; Kick, Burns, Davis, Murray, and Murray 1996). Due to the dynamics of the modern capitalist world-system, core nations enjoy limited environmental degradation while enjoying economic growth. Similarly, peripheral nations experience a somewhat lesser degree of environmental degradation than the semi-periphery. Semi-peripheral nations experience the highest

degrees of environmental degradation as they attempt to catch up to the core by weakening environmental regulations (Bartley and Bergesen 1997).

Because the data used in this analysis consists of individuals nested within nations, the OLS regression assumption of independent observations is violated. A multilevel modeling approach is therefore required, as the assumption of independent observations is unnecessary in multilevel models. I conduct these analyses using HLM6 (Raudenbush et al. 2005). Multilevel analyses allow one to examine separately and together, the individual and contextual effects. More specifically, HLM allows one to estimate the error terms for each level of analysis separately.

This comparison would not be possible using OLS regression techniques because the individual-level characteristics cannot be separated from the national-level contextual effects. OLS regression does not easily allow one to control for contextual effects with cross-sectional data. HLM allows one to separately analyze the individual and contextual effects, as well as their separate variance components. This ensures that standard errors and other statistics are as precise as possible (Raudenbush and Bryk 2002). Most importantly, in this analysis, HLM highlights individual-level effects, while controlling for national-level differences, and also national-level differences that account for individual-level variations.

Several other decisions must be made in the specification of multilevel models. The method of estimation can influence the results to the point of different inferences being drawn, so the decision of which method of estimation to use is important. HLM 6 provides two methods of estimation; restricted maximum likelihood and full maximum

likelihood. While this decision warrants much more space than is available here, full maximum likelihood estimation was used as it provides a useful means for comparing two models to each other via the deviance statistic (Raudenbush and Bryk 2002; ssicentral.com). Put differently, the deviance statistic and more specifically, the change in the deviance statistic between models hints at the explanatory power of subsequent models to a baseline model.

Additionally, one must make a decision regarding the centering of level-1 variables. Centering these variables eases the interpretation of results by creating a meaningful baseline (0). The centering techniques that are most often used include group-mean and grand-mean centering. In group-mean centering, the individual score is subtracted from the average of all individuals in each level-2 unit. In grand-mean centering, the individual score is subtracted from the mean of all cases, regardless of the level-2 unit (Littvay 2006). Other analyses, however, can require uncentered or raw scores.

The decision of which centering technique to use can influence the inferences made as well as how to interpret the results. Group-mean centering allows us to examine differences between individuals within a level-2 unit (in this case, countries) It does not, however, allow us to assess group differences between level-2 units. Similarly, while grand-mean centering allows us to compare level-2 units to one another, it does little for comparing level-1 units within different clusters (Enders and Tofighi 2007). In order to answer some of the research questions presented here, both forms of centering are necessary. Rather than running each model both ways, I group-mean center all level-1

variables, but include an aggregated group mean for important level-1 variables at level-2. For example, after group-mean centering, I include the average age for each country as a variable in the level-2 equation. This allows us to infer about individual-level differences (with the group-mean centered variables) as well as group-level differences (with the group-mean average variables)[8]. Raudenbush and Bryk (2002) recommend this practice even when one is not interested in both individual and group differences. This technique is referred to by a variety of different names, though in essence it is required to account for the covariance between the intercepts and slopes when group-mean centering is used, by introducing a "contextual factor" into the model (Bickel 2007:146). Kreft and de Leeuw (1998:110) suggest that adding the level-1 means into the level-2 model is simply "reintroducing the means" that are removed by group-mean centering. Hox (2002) notes that group-mean centering creates a different model than using the raw scores (uncentered data), while grand-mean centering simply shifts the intercepts. Reintroducing level-1 group means at level-2 helps to create a model much more similar to the original raw score model while also shifting the intercept for easier interpretation (Hox 2002:62). Additionally, Hox (2002), Enders and Tofighi (2007) recommend this technique any time cross-level interactions are included in the model. As recommended by Enders and

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[8] Unfortunately, with only 27 level-2 units, I am unable to include all of the aggregated level-1 variables in the level-2 model. In order to ensure the quality and accuracy of the results, I entered each of the aggregated variables one at a time to look for significance and to ensure that the variables were entered in a meaningful way. Only the significant variables with substantive import ended up making the cut in the final 2 models. Once I had decided which variables to keep, I entered them each one at a time, in order to make sure nothing changed. Ideally I would have enough degrees of freedom remaining that I would not need to make these decisions or go through this process, but this was not in the cards for me this time.

Tofighi (2007) I used grand-mean centering for all level-2 variables except for the aggregated level-1 contextual effect variables.

Additionally, in order to answer the question about whether the variables in the model operate differently at different levels of the core-periphery hierarchy, I have included cross-level interactions. These interactions tell us whether the effect of an independent variable (level-1) on the dependent variable (in this case, environmental attitudes) is different at different values of some level-2 variable. For example, if we want to know if the effect of political identification on environmental attitudes is different in core countries than it is in peripheral countries, we would need a cross-level interaction of political identification and core/periphery status.

I estimate six models to evaluate my hypotheses and research questions. First, I specify a baseline model to determine the proportion of variance in environmental attitudes that exists within countries (level-1) and between countries (level-2). I then assess the differences in environmental attitudes while controlling for individual and national-level characteristics (fixed effects models). Next, I examine the random effects at level-2 in the random effects model. Finally, I examine the differences in environmental attitudes while also controlling for cross-level interactions and random effect patterns. The full level-1 (individual-level) model is provided below.

$$EATTITUDES = \beta_0 + \beta_1(CATHOLIC) + \beta_2(ORTHODOX) + \beta_3(JEWISH) +$$
$$\beta_4(MUSLIM) + \beta_5(HINDU) + \beta_6(BUDDHIST) +$$
$$\beta_7(OTHER) + \beta_8(CONSERVATIVE) + \beta_9(WOMAN) +$$
$$\beta_{10}(AGE) + \beta_{11}(SOCIALCLASS) + \beta_{12}(URBAN) +$$
$$\beta_{13}(CONFIDENCE) + \beta_{14}(CONFENVIR) +$$
$$\beta_{15}(SOME\ PRIMARY) + \beta_{16}(SOME\ SECONDARY) +$$
$$\beta_{17}(COMPLETED\ SECONDARY) +$$
$$\beta_{18}(SOME\ COLLEGE) + \beta_{19}(COMPLETED\ COLLEGE) +$$
$$\beta_{20}(INCOME) + \beta_{21}(PROTESTANT) + r$$

Additionally, for the dichotomous dependent variable, the following level-1 equation is required:

$$Prob(PROENVIR = 1|\beta) = \varphi$$
$$Log\left[\frac{\varphi}{1-\varphi}\right] = \eta$$
$$\eta = \beta_0 + \beta_1(CATHOLIC) + \beta_2(ORTHODOX) + \beta_3(JEWISH) +$$
$$\beta_4(MUSLIM) + \beta_5(HINDU) + \beta_6(BUDDHIST) +$$
$$\beta_7(OTHER) + \beta_8(CONSERVATIVE) + \beta_9(WOMAN) +$$
$$\beta_{10}(AGE) + \beta_{11}(SOCIALCLASS) + \beta_{12}(URBAN) +$$
$$\beta_{13}(CONFIDENCE) + \beta_{14}(CONFENVIR) +$$
$$\beta_{15}(SOME\ PRIMARY) + \beta_{16}(SOME\ SECONDARY) +$$
$$\beta_{17}(COMPLETED\ SECONDARY) +$$
$$\beta_{18}(SOME\ COLLEGE) + \beta_{19}(COMPLETED\ COLLEGE) +$$
$$\beta_{20}(INCOME) + \beta_{21}(PROTESTANT) + r$$

The individual-level (e.g. level-1) data used for the current study come from the 1999-2000 wave of the World Values Survey. This is an international study conducted by different entities in each of the nations in which data was collected. Each nation had their own specific methods of data collection with some using simple random samples of the population, and with others using more complex proportionally stratified sampling design. The results are based on data from 27 countries during 1999-2000. Sample sizes for these 27 countries ranged from 720 to 3,000 persons, making up from 2.1% to 8.5% of the total sample, with a total sample size of $N = 34,555$. For a complete list of the countries and the sample sizes for each country see Table 3.1 in Chapter 3. Due to the complexities of international data collection, and in the interest of space, I will not describe the data collection procedures in greater detail. Information is available from the World Values Survey website (http://www.worldvaluessurvey.org/). For more information regarding the World Values Survey, see the Data and Methods section of Chapter 3.

Though missing data was only moderate (i.e. < 10% on any particular variable), I used multiple imputation in the interest of having the most complete data possible. To accomplish this, I used the *ice* module in *Stata*. I created five imputed datasets on which to conduct the analyses in this section. More information about the *ice* module can be found at the *Stata* website (http://www.statajournal.com/article.html?article=st0067_2 or http://www.stata.com). Once the imputed dataset is created, the *mim* module is used in *Stata* in order to allow me to analyze the five imputed datasets while reporting a single set of results. In order to test for the inflation of significance values, I ran the analyses

several times on each imputed dataset, as well as 5% samples of each, and then finally on the whole dataset using the *mim* module. The results of these preliminary analyses indicate that the large sample size does not artificially inflate the significance of these findings.

Eattitudes is the shorthand measure for willingness to sacrifice, a scale measure of environmental attitudes. The scale is created by using the sum of two items yielding a Chronbach's Alpha of .81. The two items contained in the scale ask the respondents: "how strongly do you agree or disagree with the following statement: I would give part of my income if I were certain that the money would be used to prevent environmental pollution" and; "How strongly do you agree or disagree with the following statement: I would agree to an increase in taxes if the extra money were used to prevent environmental pollution." The two items used to construct the scale are coded such that a response more favorable to the environment yields a higher score.

For the second dependent variable, economic tradeoffs, a third question asked respondents: "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?" (1) "Protecting the environment should be given priority; even if it causes slower economic growth and some loss of jobs" or (2) "Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent." This variable measures environmental attitudes differently, by comparing economic tradeoffs often required in favor of environmental protection. This variable is represented in the equations by *proenvir*.

Catholic is a dichotomous variable coded as 1 when a respondent identifies as being Catholic. Alternatively, *Jewish, Muslim, Hindu, Buddhist, Protestant* and *Other* represent respondents who identify as one of these respective religious traditions. They are compared to respondents who identify as having no religious preference. *Conservative* is an ordinal measure of political ideology. It ranges from "far left" at 0, to "far right" at 10. *Sex* is a dichotomous measure of gender, coded as 0 = man, 1 = woman. *Urban* is a dichotomous measure of urban versus rural residence, with a score of 1 representing urban residence.

Confidence is a measure of confidence in government institutions, with a higher score indicating more confidence and a lower score indicating less. *Confenvir* is an ordinal measure of confidence in the environmental movement. A higher score indicates more confidence. *Some Primary*, *Some Secondary*, *Completed Secondary*, *Some College*, and *Completed College* are dummy coded education variables. A respondent who completed college is given a score of 1 for the completed college dummy variable, and a 0 for all else. For example, a respondent who has completed college will have a score of 1 on *Completed College* and a score of 0 on all of the others. The reference category for education is "no formal education." *Income* represents a categorical measure of total income earned. A higher value indicates a higher income category.

In order to assess national-level characteristics, the required level-2 equations are summarized below:

$$\beta_0 = \gamma_{00} + \gamma_{01} (ESI) + \gamma_{02} (AGRICULT) + \gamma_{03} (INDUSTRY) + \gamma_{04} (SERVICES) +$$

$$\gamma_{05} (LANDLINE) + \gamma_{06} (MONARCHY) + \gamma_{07} (COMMUNIST) + \gamma_{08} (OTHERGOV) +$$

$$\gamma_{09} (SEMIPER) \; \gamma_{010} (PER) + \gamma_{011} (PROPORTION \; WOMEN) +$$

$$\gamma_{012} (AVERAGE \; SUBJECTIVE \; SOCIAL \; CLASS) +$$

$$\gamma_{013} (AVERAGE \; CONFIDENCE \; IN \; GOVT \; INSTITUTIONS) +$$

$$\gamma_{014} (AVERAGE \; CONFIDENCE \; IN \; THE \; ENVIRONMENTAL \; MOVEMENT) +$$

$$\gamma_{015} (AVERAGE \; SOME \; PRIMARY \; ED) + \gamma_{016} (AVERAGE \; SOME \; SECONDARY \; ED) +$$

$$\gamma_{017} (AVERAGE \; COMPLETED \; SECONDARY \; ED) + \gamma_{018} (AVERAGE \; SOME \; COLLEGE) +$$

$$\gamma_{019} (AVERAGE \; COMPLETED \; COLLEGE) + \gamma_{020} (AVERAGE \; INCOME) + u_0$$

$$\beta_1 = \gamma_{10} + \gamma_{11}(SEMIPERIPHERY) + \gamma_{12}(PERIPHERY) + u_1$$

$$\vdots$$

$$\beta_9 = \gamma_{90} + \gamma_{91}(SEMIPERIPHERY) + \gamma_{92}(PERIPHERY) + u_9$$

$$\vdots$$

$$\beta_{21} = \gamma_{210} + \gamma_{211}(SEMIPERIPHERY) + \gamma_{212}(PERIPHERY) + u_{21}$$

The national-level (e.g. level-2) data used for this analysis come from a variety of sources. Primarily, I use data from the Central Intelligence Agency's (CIA) World Factbook (cia.gov). I do, however also include measures from the Environmental Sustainability Index (ESI). The ESI is an attempt to develop a composite measure of overall environmental performance of most nations by aggregating known information on environmental degradation, policy, and participation in international treaties on the environment. It is collaboration between the World Economic Forum, the Yale Center for Environmental Law and Policy, and the Center for International Earth Science Information Network (CIESIN), at Columbia University (http://www.ciesin.columbia.edu/indicators/ESI/). These data cover the year 2000.

At level 2, *ESI* represents the nation's score on the Environmental Sustainability Index (ESI). A higher score represents a nation with a government and industry that is more responsive to environmental degradation, among other things. *Agricult* represents the proportion of the nation's Gross Domestic Product (GDP) that is made up of the agricultural sector. *Industry* represents the proportion of the nation's GDP that is made up of the industrial sector. *Services* represents the proportion of the nation's GDP that is made up of the service sector. *Landline* represents the number of landline telephones per-capita within a country. It is used as a proxy measure for the degree of contact with others both in and outside of a country. *Monarchy*, *Communist,* and *Othergov* represent dummy variables for the type of government of a country. The reference category for these variables is "republic."

Semiper represents a nation's position in the world-system core-periphery hierarchy. A score of 1 on *semiper* indicates a semiperipheral nation. *Per* indicates whether (1) or not (0) a nation is peripheral. *Proportion Woman* represents the aggregate gender makeup from level-1. *Average subjective social class* represents the average subjective social class from level-1. *Average Confidence in Govt Institutions* and *Average Confidence in the Environmental Movement* represent the aggregate levels of confidence in these two institutions at level-1. *Average Some Primary Ed* represents the proportion of respondents in a country with some primary education. Similarly, *Average Some Secondary Ed*, *Average Completed Secondary Ed*, *Average Some College*, and *Average Completed College* represent the proportion within each country that has attained each level of education. *Average Income* represents the average level-1 income.

FINDINGS

The two models examine the effects of both individual and national-level characteristics on environmental attitudes (see Tables 5.1 and 5.2) by using two different dependent variables. The first model examines the scale measurement of environmental attitudes (willingness to sacrifice), while the second model examines the dichotomous outcome variable (economic tradeoffs). This difference requires two separate statistical techniques be used, even within the context of HLM. The first model produces results similar to OLS regression techniques, assuming a normal distribution of the outcome variable. The second model requires the use of a Bernoulli distribution on the outcome variable, that is, a dichotomous outcome.

Model 1: Willingness to Sacrifice Scale

Hierarchical Linear Modeling allows coefficients to be interpreted in roughly the same manner as most OLS results. For example, with all else being held constant, for each one unit increase in education environmental attitudes are expected to decrease by -.08. This makes the results simple to interpret, though it should not belie the complexities of what this analysis is actually telling us.

At the individual level (i.e. level-1), many of the findings of main effects are similar to the findings in Chapter 3. Some findings however are quite different. As shown in Model 5 (Table 5.1), when compared to those who do not identify as belonging to a religious tradition, Catholics, Protestants, Orthodox Christians, Jews, Muslims, Buddhists, Hindus, and those identifying as some "other" religion are no different. This

indicates that even after controlling for other factors, certain religious beliefs are not associated with environmental concern. Additionally, there are some significant cross-level interactions (Model 6 – Table 5.1). Muslims in the semi-periphery have lower levels of environmental concern as illustrated in Figure 5.3. In other words, Muslims in semi-peripheral nations have lower levels of environmental concern than Muslims in core nations. Similarly, Hindu's in the semi-periphery have lower environmental attitudes than those in other world-system positions, as illustrated in figure 5.3. Buddhists however have higher environmental attitudes in the periphery than in other world-system positions. Put differently, Buddhists in peripheral nations have higher environmental attitudes than Buddhists in the core. Additionally, the variance components (Model 5, Table 5.1) for Catholic, Orthodox Christians, Muslims, and those who identify as some other religion are statistically significant, indicating that there is significant differences between nations (level-2 units) in the effects of these variables. This partially explains the lack of significant main effects of religious affiliation, as the effects vary by country, essentially cancelling the effects of such affiliation.

In contrast to the findings in Chapter 3, however, political conservatism is not associated with environmental attitudes (Table 5.1). On the other hand, women have lower environmental attitudes than did men (-.075). Age is not a significant predictor of environmental attitudes. Unlike the finding in Chapter 3, urban residents are no different from rural residents with regards to environmental attitudes. There is a significant interaction between women and peripheral and semi-peripheral world-system positions, indicating that women in the periphery and semi-periphery have lower environmental

attitudes than women in the core. A plot of these interaction effects is provided in figures 5.4. The variance in the effects of political ideology, sex, age, and urban residence are significant, indicating that the effects of these factors on environmental attitudes varied by the national level context.

A one unit increase in subjective social class corresponds to a .11 unit increase in environmental attitudes (Model 5). Also, the different dummy variables for education indicated that higher levels of education are associated with more pro-environmental attitudes than lower levels of education. Having some primary education only is associated with a .131 unit change in environmental attitudes when compared to having no formal education. Having some secondary education only is associated with a .260 unit increase in environmental attitudes. Completing secondary education only is associated with a .317 unit increase in environmental attitudes, while attending some college only is associated with a .364 unit increase in environmental attitudes. Lastly, completing college is associated with a .457 unit increase in environmental attitudes. Income is not associated with any difference in environmental attitudes. These findings mirror the results of the analysis in Chapter 3.

Cross-level interactions between some primary education, some secondary education, and some college with peripheral world-system position are significant as well. Some primary education has a negative -.420 unit effect on environmental attitudes in peripheral nations, Some secondary education has a negative -.408 unit effect on environmental attitudes in the periphery, and some college education has a negative .333 unit effect in the periphery. The effects of these interactions are illustrated in Figure 5.5.

Put differently, respondents in the periphery with some primary education, some secondary education, or some college education are less concerned about the environment than those with similar levels of education in the core. The variance components of completed college education, completed secondary education, and some primary education are significant indicating that the effects of these variables on environmental attitudes vary between countries. The same is true of subjective social class.

Confidence in government institutions has a positive effect on environmental attitudes. For a one unit change in confidence in government institutions, environmental attitudes are expected to increase by .09 units. Similarly, confidence in the environmental movement has a stronger positive effect on environmental attitudes. For a one unit change in confidence in the environmental movement, holding all else constant, environmental attitudes is expected to increase by .24 units. The variance components in Model 5 indicate that the effect of confidence in both government institutions and the environmental movement varied significantly among the countries in the sample.

There are some important main effects at the national level (i.e. level-2) as well. National scores on the Environmental Sustainability Index (ESI) are not associated with changes in environmental attitudes. Additionally, the type of government of a nation has an impact on the environmental attitudes of its citizens. When compared to republics, monarchies have lower environmental attitudes. Monarchist governments are associated with a -.73 unit decrease in environmental attitudes. Communist governments and other types of governments are associated with higher environmental attitudes. Communist governments, holding all else equal, are associated with a .79 unit increase in

environmental attitudes. Other forms of government, holding all else equal, are associated with a .44 unit increase in environmental attitudes.

The percent of the nation's GDP comprised of the service sector is positively associated with environmental attitudes. That is, a one unit change in the percent GDP comprised of the service sector is associated with a .02 unit increase in average environmental attitudes in a nation. Additionally, the number of landline telephones per-capita is negatively associated with environmental attitudes (-.05).

Finally, the results for world-system position suggest mixed results. When compared to core nations, semi-peripheral nations have lower environmental attitudes. Specifically, semi-peripheral nations are associated with a -.43 unit decrease in willingness to sacrifice. Peripheral nations are significantly more likely to have higher degrees of willingness to sacrifice than core nations[9]. Specifically, peripheral nations are associated with a .28 unit increase in environmental attitudes. This finding is indicative of the inverted "U" shape of environmental concern with the semi-periphery having the lowest levels of concern as suggested by Bartley and Bergesen (1997).

Group differences between countries are assessed by examining the aggregated level-1 variables for some characteristics. The proportion of a population that is comprised of women is associated with a -5.8 unit decrease in environmental attitudes on average within countries. This indicates that there are significant differences among countries with regards to the effect of gender on environmental attitudes. Similarly,

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[9] Additional analyses indicate that peripheral nations are significantly different than semi-peripheral nations as well. The DV is a scale measure of environmental attitudes ranging from 0 to 10, with 10 being the most concerned about the environment.

average subjective social class, average income, and the proportions of the population with each level of education indicate some significant variation between countries (with the exception of the proportion of respondents who have completed some college). Subjective social class is associated with a -1.6 unit decrease in average environmental attitudes, while average income is associated with a -.26 unit decrease in environmental attitudes. The proportion with some primary education only is associated with a 3.6 unit increase in environmental attitudes, while the proportion completing college is associated with a 9.6 unit increase in environmental attitudes. Lastly, the average confidence in government institutions and the average confidence in the environmental movement are associated with a .77 and -0.9 unit change in average environmental attitudes respectively.

An examination of the variance components of Models 5 and 6 indicate some interesting effects. The inclusion of cross-level interactions makes all of the variance components statistically significant. In fact, where they are barely significant in Model 5, they are now more significant in Model 6. Overall, this suggests that there is something about the country (level-2 unit), rather than the individual that contributes to environmental attitudes. While the ICC suggests that only about 3% of the variation in environmental attitudes is at level-2, this finding perhaps points to the variables for which this effect exists.

Overall, these results are relatively consistent with the findings in Chapter 3 and Chapter 4. About 97% of the variation in individual environmental attitudes is found within countries, with about 3% of the variation in individual environmental attitudes is

due to national level variation. This is computed by calculating the Intraclass correlation coefficient (ICC), which is summarized as follows:

$$\rho = \frac{\tau_{00}}{\sigma^2 + \tau_{00}}$$

In short, the ICC represents the variance within level-2 units divided by the total variance (level-1 plus level-2). The full results of Model 1 are presented in Table 5.1.

The deviance statistics of each of the six models indicate that the final model (Model 6, Table 5.1) is the best fit to the data, though it is not significantly better than Model 5. The statistical significance of most level-2 variables and most of the variance components indicate that much of the model fit is improved by accounting for national-level variation in environmental attitudes.

Additional calculations are required to compare the multilevel model to the individual-level model (Chapter 3) in terms of the proportions of variance explained. Though HLM6 does not provide any of these statistics, many can be calculated by hand. In order to compare the approximate r-squared of the individual model to the multilevel model, I computed the proportion of variance explained in each model. The overall changes are indicative of a better model.

Compared to the baseline (null) model, model 2—the model with no interactions and no socioeconomic status variables—explains about 5.5% of the level-1 variance, about 58% of the level-2 variance and about 9.2% of the overall variance. Model 3—the model with cross-level interactions but no SES variables—these proportions change and provide about 5.6% of the variance at level-1, 63.5% of the level-2 variance, and about 9.6% of the overall variance. Model 4—the fixed effects model, with no interactions and

no variance components—about 4.8% of the level-1 variance is explained, about 77.4% of the level-2 variance, and about 10% of the overall variance explained. In Model 5, the main effects model, about 7.3% of the variance at level-1 is explained, while about 61.5% of the variance at level-2 is explained with about 11.1% of the overall variance being explained. The final model explains about 7.3% of the level-1 variance, about 64.7% of the level-2 variance, and about 11.4% of the overall variance is explained. Overall, this indicates that the multilevel model explains more of the variation in environmental attitudes than the individual-level model does, and that the final model (Model 6) explains more variance than previous models.

The results indicate many significant effects of social class. An additional set of models were developed to assess these effects specifically. When used alone, subjective social class, education, and income accounts for about 1.8% of the variance in level-1 willingness to sacrifice. While small, this still amounts for a relatively large portion of the level-1 variance. These results indicate, above all else, the impact of social class. This finding is consistent with the post-materialist thesis in that those with higher socio-economic statuses have higher pro-environmental attitudes.

Model 2: Economic Tradeoffs

The second analysis uses a dichotomous measure of environmental attitudes. Dichotomous outcomes violate the assumption of normality in OLS approaches to data analysis. In order to overcome this limitation, logistic regression is generally the appropriate analytic procedure. If we are to understand how both individual- and

national-level characteristics are associated with environmental attitudes, however, a multilevel approach is necessary. With HLM, this comes in the form of the Bernoulli outcome. In addition to the usual output, HLM also provides odds-ratios, which are useful for comparing the change in the likelihood of one outcome over another for respondents with a certain characteristic.

When conducting analyses with HLM and using Bernoulli outcomes, one must also choose between *unit-specific* and *population-average* model results. According to Raudenbush and Bryk (2002:303-304), the unit-specific model "describes a process that is occurring in each level-2 unit [i.e. countries] [. . .] of central interest is the question of how these processes differ over a population of level-2 units;" whereas the population-average "results can be deduced as one characteristic of the distribution of the unit-specific results." For the results present here, I use the unit-specific model output, as I am more interested in the differences between nations, than the average effects of level-1 units (e.g. individuals) across level-2 units (e.g. nations). The results of this analysis are provided in Table 5.2.

Similar to the individual-level analysis conducted in Chapter 3, confidence in the environmental movement remains a statistically significant predictor of environmental attitudes. Respondents with higher degrees of confidence in the environmental movement are 1.3 times more likely to have more pro-environmental attitudes than those who have less confidence in the environmental movement. Confidence in government institutions is not a significant predictor of environmental attitudes, as it was not in Chapter 3.

Respondents with higher incomes are no more likely to favor environmental protection over economic growth than those with lower incomes. Unlike in Chapter 3, however, subjective social class is not a significant predictor of environmental attitudes. The effect for education is similar in the multilevel model; respondents who have completed secondary education, some college, or completed college are progressively more likely to favor the environment over economic growth than those with no education[10]. Specifically, those who have completed secondary education are 1.28 times more likely than those with no formal education to favor the environment; those who have some college education are 46% more likely to favor the environment over economic growth; while those who have completed college are almost 1.7 times more likely to favor environmental protection over economic growth.

Age is not a significant predictor of environmental attitudes in this model. Women are about 6% less likely to favor the environment over economic growth than men, and urban residents are no different from rural residents in their environmental attitudes. Politically right wing respondents are slightly less likely than left wing respondents to favor the environment over the economy. Hindu, Muslim, Catholic, Protestant, Orthodox Christian, and Buddhist respondents are no more likely to favor environmental protection over economic growth than those with no religious preference, while Jews are about 32% less likely than those with no religious preference. Those who

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[10] Additional analyses indicate that respondents who had completed secondary education, some college, or completed college are significantly different from those who had no formal education, as well as those who had not completed secondary education.

identify as some other religion are about 1% less likely to favor environmental protection over economic growth.

At the national-level (e.g. level-2), having access to a landline telephone is a significant predictor of environmental attitudes. More specifically, respondents from nations with a more landline telephones per-capita are about 7% less likely to favor the environment over economic growth on average. World-system position is also negatively related to environmental attitudes. Respondents in semi-peripheral nations are about 38% less likely to favor the environment over economic growth than core nations, while respondents in peripheral nations are about 45% less likely to favor the environment on average. Additionally, respondents with higher incomes are about 24% less likely to favor the environment over economic growth than are respondents with lower incomes. The composition of the various sectors of the economy also has an important effect on environmental attitudes. Nations with a higher percent of their GDP comprised of the agricultural sector are about 2% more likely to favor the environment over economic growth, while nations with a higher percent of their GDP comprised of the service sector are about 1.5% more likely to favor the environment.

The type of government of a country is also a significant predictor of environmental attitudes. Countries with Monarchist governments are about 31% less likely to favor the environment over economic growth. Communist governments, on the other hand, are about 46% more likely to favor the environment over economic growth. Additionally, the average subjective social class of a nation is related to the average level of environmental concern of its respondents. Specifically, higher average subjective

social class is associated with a 52% lower likelihood of favoring environmental protection over economic growth.

Several interesting cross-level interactions are also observed (Model 4 -Table 5.2). The effects of religion on environmental attitudes appear to have considerable variation between nations. Catholics in the semi-periphery are about 21% more likely to favor environmental protection over economic development than Catholics in core countries (see Figure 5.6). Orthodox Christians in the semi-periphery are about 44% less likely to favor environmental protection than Orthodox Christians in the core. Muslims in the periphery are 180% more likely to favor the environment than Muslims in core countries. Additionally, Muslims in the semi-periphery are about 73% more likely to favor the environment over economic growth than Muslims in the core. Respondents who identified as some "Other" religion in the semi-periphery are 1.5 times more likely to favor the environment than their counterparts in the core while their peripheral counterparts are twice as likely as those in the core to favor the environment over the economy. Finally, those with higher degrees of confidence in government institutions in the periphery are about 18% more likely to favor the environment than their core counterparts (see Figure 5.7), while those with more confidence in the environmental movement in the semi-periphery are about 7% less-likely to favor the environment over the economy than their core counterparts.

Additionally, the variance components (Model 3 - Table 5.2) highlight some important differences in the effects of certain variables in different countries. Among the effects of religious affiliation, Muslims, Catholics, Hindus, and those with some other

affiliation have significant variance components, suggesting that the effects of these variables may have differing effects on environmental attitudes between countries. Political ideology, age, subjective social class, and income also have significant variation in their effects in different countries. Overall, this explains why some of these variables are non-significant in the models presented above. In particular, this is potentially because the differences in these effects may cancel one another out when comparing countries.

When using Bernoulli outcomes certain statistics are unavailable. A proportion of variance explained is only available for the level-2 effects. As noted in Raudenbush and Bryk (2002:309) this can be computed by taking the variance components at level-2 from the null model and subtracting the other model variance components from it. This number is then divided by the null model variance once more. The results show that 84% of the level-2 variance in Model 1, 81% of the level-2 variance in Model 3, and 82% of the level-2 variance in Model 4 is explained. This indicates that the cross-level interactions were necessary to include.

Overall, the results of the second analysis indicate that social class is a significant correlate of environmental attitudes, though the effects are in some cases different than they are in the first analysis. This again supports the post-materialist perspective, and highlights the importance of the two different measures of environmental attitudes.

DISCUSSION AND CONCLUSION

The results suggest several important conclusions about the factors which influence environmental attitudes. Hypothesis 5.1 proposes that higher social class standing will be positively related to pro-environmental attitudes. In the first model, subjective social class and education are both significant predictors of environmental attitudes, however income is not. This may be due to the way in which income is coded, or the fact that it is really only the income of the respondent, and not the total family income. In the second model, however, only education is a significant predictor of environmental attitudes. Overall this indicates that social class is related to environmental attitudes, though some measures of social class, such as subjective social class and education may be more useful. Additionally, the variance components of the first model indicates that, at least at some levels of education, variance in the effect of country-level education may be more important than the actual level of education at the individual level.

Hypothesis 5.2 proposes that age will be positively related to pro-environmental attitudes. Both multilevel analyses have failed to confirm this hypothesis. In other words, environmental attitudes appear to be similar, regardless of the age of the respondent. The significant variance components of age in both models suggest that the variance in age is likely related to national-level characteristics, rather than individual-level characteristics. In other words, the effect of age could be different in two countries. In preliminary analyses, the effects of age on environmental attitudes varied greatly. Where some countries have strong and obvious negative associations between attitudes and age, others

have relatively strong positive associations. This supports the post-materialist thesis in that post-material values are said to exhibit a generational effect, though I do not assess differences in generations, only actual age.

Hypothesis 5.3 claims that political conservatism (i.e. politically right wing) is negatively related to pro-environmental attitudes. In the first analysis, this hypothesis is not supported, but in the second it is. This indicates that the way we measure environmental attitudes may play an important role in whether or not political conservatism has an impact on the formation of environmental attitudes. Additionally the variance components of both models indicate that the variance in the effect of political ideology on environmental attitudes may be related to differences in the conceptions of political ideology in each country. Preliminary analyses show the different slopes of political ideologies' effect on environmental attitudes. Again, it is clear that there is considerable variation among nations. For example, in some nations being right wing is associated with lower environmental attitudes, while in some countries the opposite is true. Again, this finding is consistent with the post-materialist thesis in that political attitudes may reflect a generational pattern differently among the populations of various nations.

Hypothesis 5.4 proposes that confidence in social/governmental institutions will be positively related to pro-environmental attitudes. The first analysis confirms this hypothesis, while the second fails to do so, at least for confidence in government institutions. For confidence in the environmental movement, both models indicate support for this hypothesis (Figures 5.1 and 5.2). Overall this suggests that confidence in

government institutions and in the environmental movement are significant predictors of environmental attitudes.

Hypothesis 5.5 suggests that non Judeo-Christian religious traditions will be more positively related to pro-environmental attitudes. While there are some differences by religious tradition, it is difficult to confirm this hypothesis based on these findings. It appears that the measure used to assess environmental attitudes might matter even more than the religious affiliation of the respondent as religion is much less significant in the first model than the second. The cross-level interactions by religious group indicate that world-system position may have different effects on environmental attitudes in different countries. For example, in the first model, semi-peripheral Muslims appear to have lower environmental attitudes than Muslims in the core (as illustrated in Figures 5.3 and 5.6). In the second model, however, they are more likely to favor environmental protection over economic growth than Muslims in the core. This suggests the underlying difference in these two distinct measures of environmental attitudes. The variance components of both models indicate that this variance may be more related to national-level characteristics than individual-level characteristics.

Hypothesis 5.6 proposes that gender will not be a significant predictor of environmental attitudes. This hypothesis is not supported as there are differences in environmental attitudes between women and men. Both models indicate that women are less concerned about the environment than men. Preliminary analyses indicate this pattern by showing the environmental attitudes of all countries as they are modified by gender. Cross-level interactions indicate that women in semi-peripheral and peripheral

countries have lower levels of environmental concern than their counterparts in core nations (Figure 5.4).

Hypothesis 5.7 suggests that rural respondents will have a positive association with pro-environmental attitudes. The analyses indicate that rural and urban respondents are no different from one another. The models did not support this hypothesis because there is no association between rural/urban and pro-environmental attitudes. The variance components of both models, however, indicate that the variance in environmental attitudes associated with urban-rural residence can be attributed to national-level characteristics rather than individual-level characteristics.

Among the results for national-level characteristics, hypothesis 5.8 proposes that a higher world-system position will be related to more pro-environmental attitudes. Even though there is some evidence to suggest that this may be partially supported, there do not appear to be any consistent differences between the different measures of environmental attitudes. With that said, peripheral nations tend to have lower environmental attitudes than do core countries in Model 2, and semi-peripheral countries have lower environmental attitudes in both models. Where this hypothesis finds its best support is in the cross-level interactions. Overall, these findings appear to offer limited support for the post-materialist thesis in that the measure of environmental attitudes appears to affect the relationship between attitudes and world-system position.

Hypothesis 5.9 suggests that access to outside sources of information will be negatively related to pro-environmental attitudes. The results for this hypothesis indicate that this effect is as expected. In the scaled measure of environmental attitudes, the

proportion of respondents with a landline telephone is a significant predictor of environmental attitudes, indicating that as the number of landline telephones per-capita in a country increased, environmental attitudes decreased. Specifically, a one unit change in the number of landline telephones per-capita is associated with a .05 unit decrease in the willingness to sacrifice. In the dichotomous measure of environmental attitudes the same is true. Specifically, countries with a higher number of landline phones per-capita are about 7% less likely to favor environmental protection over economic growth. This finding is inconsistent with the post-materialist thesis in that one should expect that access to outside information should be related to higher environmental attitudes scores, rather than lower.

Hypothesis 5.10 proposes that the ESI score will be negatively associated with pro-environmental attitudes. The results do not indicate support for this hypothesis. In both analyses, ESI score is not a significant predictor of environmental attitudes. In other words, the degree of degradation and government responsiveness to degradation in a nation is not associated with the attitudes of the population of that nation.

Overall, these findings show support or partial support for six of the ten hypotheses. More specifically, they indicate that political conservatism, confidence in social and governmental institutions, social class, access to outside information, gender, world-system position, and education are significant predictors of environmental attitudes. Furthermore, age, religion, and rural/urban residence have little or no consistent effect on environmental attitudes. This may be due to significant variations between countries on these variables, though other explanations may exist as well.

Additionally, with regards to the specific research questions posed for these analyses, several important findings can be pointed out. *Do individual- or national- level characteristics better explain aggregate levels of environmental concern?* An examination of the variance components of these models indicates that individual-level characteristics account for more of the variance (about 97%) in environmental attitudes, the national-level characteristics account for about 3% of the variance. While the 3% between-country variance is a relatively small portion of the overall variance, it is 3% of the variance that is relatively easily explained by the characteristics of the nation being studied. In fact, the final model for willingness to sacrifice explains about 65% of the level-2 variance. This same model explains about 7.3% of the level-1 variance and an overall 11.4% of the variance. When compared to the individual-level model in Chapter 3, this is a significant improvement.

Second, *do these differences apply across all levels of the core-periphery hierarchy?* It appears that yes, they do apply across all levels of the core-periphery hierarchy. However, there are several important differences in certain variables such as religion, and education. This is important to note, as it appears that the effect of the position of a country in the modern world-system is likely to impact specific characteristics like religious beliefs but not the overall differences between respondents' attitudes. In additional models, world-system position did not significantly explain environmental attitudes by itself. It does, however, explain a significant portion of the variance in environmental attitudes once you include individual (level-1) characteristics. Overall this is substantial support for the world-systems perspective in that environmental

attitudes have not been shown to be significantly related to world-system position in previous research.

Finally, *if there are differences between individuals in different nations in terms of environmental attitudes, on which characteristics do they vary?* Though cross-level interactions only significantly predicted core-periphery hierarchy differences among countries for a handful of variables, these variables could have a significant impact on our understanding of environmental attitudes. First, Muslim respondents exhibited some variation in attitudes depending upon where their country fell in the core-periphery hierarchy. Second, Hindus and Buddhists exhibited a similar pattern, as did Jewish respondents in the second analysis. Women have lower environmental attitudes than men overall, but women in non-core countries have increasingly lower environmental attitudes than women in the core. Confidence in government institutions is modified by world-system position in the second model. Specifically, those with more confidence in the government in peripheral nations have an 18% higher chance of choosing to protect the environment over economic growth. Lastly, education, particularly for the education categories that did not mark completion of a certain level (i.e. "some primary," "some secondary," and "some college" are impacted by world-system position. Specifically, they are associated negatively with environmental attitudes when compared to their counterparts in the core.

CHAPTER 6: CONCLUSIONS

CHAPTER 6: CONCLUSIONS

In the previous chapters I have presented three analyses designed to shed some light on both individual-level and national-level characteristics that influence environmental attitudes internationally. While each of the analyses allows some important conclusions to be drawn, I believe that the biggest impact of this research is in the combined results. In this chapter, I will first reiterate the most important findings from the three analyses, while situating these results into the theoretical frameworks discussed in Chapter 2. Second, I will discuss these findings and their theoretical implications in an effort to situate this research within the field of environmental sociology. Finally, I will discuss the limitations of each of the analyses and discuss future directions for research on the topic of international environmental attitudes.

KEY FINDINGS

The preceding analyses have highlighted several important findings. At the individual-level, the previously observed correlates of environmental concern explain a significant portion of its variation. At the national-level, the importance of measurement of environmental attitudes is highlighted. The multilevel models demonstrate how these individual-level and national-level differences interact with one another to help highlight some factors influencing environmental attitudes, while minimizing others. Here, I will restate the important conclusions from each analysis, while framing the results in the theoretical contexts used to develop the analysis, the world-systems perspective and the New Ecological Paradigm (NEP).

Individual-Level

The individual-level analysis conducted in Chapter 3 helps to demonstrate the small effects of previously hypothesized correlates of environmental attitudes. While these effects may be indicative of weak theoretical guidance, it is more likely that they reflect the unapparent complexity of environmental attitude formation. Specifically, the findings suggest three important things about explaining environmental attitudes by individual characteristics: (1) social class appears to have an important impact on environmental attitudes, though how social class is measured appears to be an important determinant of exactly how this relationship operates; (2) confidence in social and/or governmental institutions seems to influence environmental attitudes, but in some instances, not in the way one might expect; and (3) there is evidence that religious beliefs play a role in the development of these attitudes as well, though the role religion plays may be difficult to precisely capture.

In order to accurately characterize the nature of the social class—attitude relationship, it must be discussed in its component parts. In these analyses, the measures of social class included income, education, and subjective social class. Income proved not to be a correlate of environmental attitudes regardless of how environmental attitudes were conceptualized. Subjective social class proved to have a significant effect on environmental attitudes, indicating that the higher the subjective social class, the more positive the environmental attitudes. In the OLS model (DV = Willingness to Sacrifice), education is significantly related to environmental attitudes, as hypothesized, indicating that more education is associated with pro-environmental attitudes. In the Logistic

regression model, the impact of education on environmental attitudes is progressively

stronger as education increases, after one finishes secondary school. For respondents with

less than a secondary school education, there is no significant difference when compared

to respondents with no formal education.

It appears that the impact of social class may have several possible explanations.

First, the manner in which social class is conceptualized cannot be understated (Bollen et

al. 2001). In fact, often times conceptualizing social class in one way or another can

create problems when it comes to the comparability of findings in two or more studies.

Though I attempted to overcome this difficulty by including three distinct measures of

social class (subjective social class, income, and education), one of the most common

measures of social class (income) had no significant effect in any of the final models.

Education and subjective social class however were important correlates of

environmental attitudes. Second, we turn to the hypothesized relationship between social

class and environmental attitudes. That is, social class position is positively related to

environmental attitudes. The results of this analysis indicate support for such a pattern,

but they are unable to explain this relationship. Van Liere and Dunlap (1980:183)

propose that this relationship exists because upper and middle classes have "solved their

basic material needs and thus are free to focus on the more aesthetic aspects of human

existence." Additionally, they note that this pattern may reflect "relative," rather than

"absolute" deprivation in that the wealthy tend to live in nicer places, with less personal

interaction with environmental degradation, and so when they see it they recognize it for

what it is. Conversely, the poor live, work, and participate in recreational activities in

poorer, dirtier areas, and so they see this as a norm. Post-materialism posits that this relationship is what is expected as well.

Having confidence in social and government institutions appears to have at least a moderate effect on environmental attitudes. As Bernauer (1995) suggests, international problems are less likely to be solved when there are lower levels of confidence in social and governmental institutions. Though the effects are moderate, the results of this analysis appear to support this hypothesis, with higher levels of confidence in government and the environmental movement being positively related to environmental attitudes. The logistic regression model for economic tradeoffs indicates that confidence in government institutions has no significant impact on environmental attitudes.

An explanation of this pattern is that by having confidence in governmental institutions or the environmental movement, one is more likely to trust them when they point to problems with the environment. Likewise, when one lives in a nation with a corrupt government, or a less-than-credible environmental movement, they are less likely to take the word of these institutions. This is especially important today during the era of "climate-gate," during which the computers of the University of East Anglia's (UEA) Climatic Research Unit (CRU) were hacked. The aftermath has led to allegations by climate change skeptics that the hacked emails pointed to scientific and academic misconduct within the climate science community. Media outlets failed to report on the inaccurate sensationalism originally presented, even though several independent committees revealed the claim of misconduct to be untrue through subsequent examinations of the materials. The effect of this particular example remains to be seen,

though if the results of the present study hold true, the decline in confidence in the environmental movement and even the government, should the government choose to take a global warming standpoint, could negatively impact environmental attitudes.

Religious beliefs appear to be significant predictors of environmental attitudes, though the means of assessing these attitudes determines the effect. In the OLS model, Catholics, Hindus, Protestants, and those of some other religion are less likely than those who do not identify with a religious tradition to have pro-environmental attitudes. Conversely, Orthodox Christians are more likely than those with no religious tradition to have pro-environmental attitudes. In the Logistic regression model, all religious traditions but Catholics and Hindus are significantly less likely to favor environmental protection over economic growth than those with no religious tradition. Catholics and Hindus are no different from those with no religious tradition. This difference in results between models suggests that how environmental attitudes are conceptualized and measured can have an important effect on the findings. A similar effect was noted on the effect of gender, with women being less concerned than men.

Though more recent studies have noted gender differences (McCright 2010; Blocker and Eckberg 1997) in environmental concern, they generally measure environmental concern differently from one another. For example, Aaron McCright (2010) examines gender differences in scientific knowledge and concern over global climate change. The findings indicate that women express slightly greater concern about climate change than do men, while also having a higher level of scientific knowledge regarding climate change than do men. Unfortunately, these results may reflect the

author's assessment of climate change attitudes, rather than environmental attitudes overall. Similarly, Tarrant and Cordell (1997) find that women have a stronger relationship with environmental concern, though they note that the method of measuring environmental concern made a difference. It has been suggested that the difference lies in the perception of individual vulnerability to the risks associated with environmental problems (Bord and O'Connor 1997). That is, women recognize the risk associated with not acting about specific environmental issues more than men, and so they are more easily concerned about it. Therefore, when the measure of environmental attitudes is more vague and does not point to a specific problem, men are likely to show more concern.

National-Level

The national-level analysis conducted in Chapter 4 highlights some interesting patterns as well. The results suggest several important findings: (1) the Environmental Sustainability Index (ESI) score is negatively related to willingness to sacrifice for core, periphery, and semi-peripheral nations, though ESI is positively associated to the economic tradeoffs measure only for core nations; (2) access to outside sources of information is impacted by position in the core-periphery hierarchy, however the pattern exists to such an extent that few of the conclusions regarding these findings are useful; and (3) the makeup of the economy in a nation has an impact on the environmental attitudes, and even more specifically, with the position of a nation in the core-peripheral hierarchy.

While the ESI is negatively associated with willingness to sacrifice, this pattern is not true of economic tradeoffs. Specifically, this pattern is only true for core nations; all non-core nations are negatively associated with both measures of environmental attitudes. Primarily this begs a question regarding the consistency of the two measures of environmental attitudes, though this question appears to be a relatively obvious one. Less obvious, however is a question about why this pattern exists for core nations? One potential answer is that core nations share some important features that non-core nations generally do not.

First, core nations are characterized as being the nations with the highest levels of technological advancement and highly industrialized (or post-industrial) economies (Wallerstein 1990). Additionally, they often share the characterization of being exploitative of the non-core. Why then, would wealthy nations with high levels of technical advancement exhibit a difference between their ESI score and their environmental attitudes that did not exist among less wealthy countries? One explanation is that the level of technological advancement allows a more efficient degradation of the environment, minimizing the overall impact of such degradation. Additionally, as suggested by Jorgenson (Forthcoming), core nations often export the consequences of such degradation to the non-core[11]. This is done by providing an international market with a ready consumer of resource and pollution intensive practices like mining, logging, and agriculture.

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[11] Note that I am not making the claim that environmental degradation is not obvious in the core.

Another explanation of this pattern is that the governments are so much more responsive to environmental degradation that these problems are generally less serious than they would be in a country in the periphery with a less-responsive government who participates in fewer international environmental treaties, etc[12]. As Brechin and Kempton (1994) note, environmental attitudes should be influenced by the visibility of environmental issues to a certain population. We should, therefore, expect to see less concern among core nations who would be more likely to have implemented measures to minimize the impacts of environmental degradation or at the very least, to ensure that they happen in less visible places (including other countries).

Access to outside sources of information was expected to be related to environmental attitudes because it was assumed, based on Brechin and Kempton (1994), that access to outside information would increase the visibility of such environmental degradation, thereby increasing the concern among people. Though there was certainly some evidence to suggest that this pattern exists, the differences between nations in the core-periphery hierarchy overshadow any overall trends. This pattern reflects on all of the measures of access to outside sources of information: (1) cellular telephones per-capita, (2) internet users per-capita, (3) television sets per-capita, and (4) landline telephones per-capita, though the number of landline phones per-capita was the only variable that had a consistent effect across measures.

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[12] I write this with full knowledge of the continuing oil leak in the Gulf of Mexico. However, I do not think that this instance necessarily negates the argument, as one can imagine how much worse this leak might have been if it had happened in the gulf of Mexico to a peripheral nation's oil company, which would not have had the resources necessary to minimize the effects to the extent American companies have been able to do at this point.

In the U.S., methodologists have recognized the effect of using landline telephones in studies, as the number of cellular-only households grows. But this effect is likely nonexistent in the periphery and semi-periphery, as access to a landline telephone can be difficult enough. Television is no longer relied upon for information in the core (where it is generally for entertainment), it may be more difficult to find consistent access to a television in most of the periphery and semi-periphery, minimizing its impact as a source of information. Landline telephones, however, remain a necessary medium of communication internationally. It has been demonstrated that even though access to a variety of newer means of communication has grown overall, the gap between wealthy and poor countries has grown (Rodriguez and Wilson 2000). Though a relationship has been demonstrated between economic performance and access to information and communication technologies (ITCs), it is generally held that the effects of such technologies will be observed in the long run (Rodriguez and Wilson 2000). Put differently, poorer nations are just now beginning to see the effects of such ICTs, so an analysis of more recent data would be required to observe any effects.

Finally, the composition of the economy effects a country's position in the world-economy (e.g. world-system position), while the position in the core-periphery hierarchy is negatively related to willingness to sacrifice in all but core nations. World-system position is positively related to economic tradeoffs in all countries but the periphery. One potential explanation for this pattern is that core nations have experienced the negative environmental consequences of economic development. Specifically, after WWII, many of the people in countries that are considered to be members of the core saw a rapid

industrialization of their country. Such rapid industrialization came at great costs to the environment. In the 1970s, when environmental consciousness shifted towards sustainability, the costs of economic development became more apparent. This reflects quite clearly the "socialization" hypothesis of the post-materialist perspective. That is, historical changes in the social interaction of a population can remain relatively unchanged even several decades later.

A second explanation of the effect of why peripheral nations appear to favor economic development over environmental protection is that poor nations are attempting to play "catch up" to wealthy nations (Bartley and Bergesen 1997). Though the results here only pointed to the periphery, past research has generally pointed to the semi-periphery as the level of the core-periphery hierarchy that attempts to play catch up most dramatically. Additional evidence to support this explanation points to the composition of the economy, indicating that the proportion of the economy comprised of the service, agricultural, and industrial sectors may be important. While a larger proportion of the economy should be agricultural in the periphery, a larger portion of industrial in the semi-periphery, and a larger portion service in the core, these results are not always consistent.

Multilevel Model

In the third analysis, a multilevel model allows one to assess individual and national level effects on environmental concern simultaneously. Of the ten hypotheses proposed in Chapter 5, six exhibited support or partial support. The results indicate that political conservatism, confidence in social and governmental institutions, subjective

social class, access to outside information, gender, world-system position, and education are significant predictors of environmental attitudes. Furthermore, age, religion, and rural/urban residence have little or no consistent effect on environmental attitudes. This may be due to significant variations between countries on these variables.

Overall, individual-level characteristics account for about 97% of the variance in willingness to sacrifice, while national-level characteristics account for about 3%. These differences appear to apply at all three levels of the core-periphery hierarchy, though some cross-level interactions were significant. Differences between the results in each of the two models tested suggest that there may be an important difference in findings depending on exactly how environmental attitudes are conceptualized.

I asked three research questions that could only be assessed with a multilevel model. First, I asked whether *individual- or national- level characteristics better explain aggregate levels of environmental concern?* The short answer is that individual characteristics potentially explain *more* of the variance in environmental attitudes. The long answer is much more complicated. Though a larger proportion of the variation in environmental attitudes is accounted for at the individual level, only about 7% of this potential 97% of the variance is actually explained by the level-1 variables. About 3% of the variance in environmental attitudes is accounted for at the national level. Of this three percent, about 65% is explained by the final model. In order to better understand environmental attitudes, it is necessary to account for variation at both levels. As the results have shown, accounting for one level (individual, or national) provides a much different and less-accurate picture of what is really happening.

Next, I asked *do these differences apply across all levels of the core-periphery hierarchy?* It appears that yes, these differences *do* apply at all three levels of the core-periphery hierarchy. It is important to note, however, that there were several characteristics which varied in their effect between countries. For example, religion and educational levels have significantly different effects in some instances. Put differently, the effect of world-system position appears to have strong effects on certain characteristics, while having no effect on others. World-system position has no significant effect on its own. From a purely theoretical standpoint, this may have the implication of an overly simplistic conceptualization of world-system position. From a practical standpoint, however, many of these differences still illustrated the expected relationships between variables (Bartley and Bergesen 1997). Overall, however, some of the limitations (discussed below) of this study may be the real cause of this finding.

Finally, I asked *if there are differences between individuals in different nations in terms of environmental attitudes, on which characteristics do they vary?* In short, religion, gender, and education exhibit the most consistent differences between countries in their respective impacts on environmental attitudes. While certain religious groups exhibit differences between levels of the core-periphery hierarchy and between countries, others were no different. Specifically, Muslims, Hindus, and Buddhists exhibit the largest differences between levels of the core-periphery hierarchy. It is reasonable to conclude from this that the effect of religion varies because of the conceptualization of a certain set of religious beliefs and doctrine. That is, if wealthy Americans become Buddhists, why

should they be similar to poor Chinese Buddhists? This is unlikely and potentially explains most of these cross-level interactions.

The effect of education appears to have considerable variation between core and non-core countries as well. While this may be due to variation in the average level of education within a country, it may also be due to the impact that education has on an individual's opportunities within a country. For example, in a core nation, a relatively high proportion of the population is likely to have a college degree, whereas in the periphery this proportion is much smaller. In the core, many opportunities require a college degree as a qualification, where in peripheral nations, the proportion of jobs requiring a college education is much smaller.

Gender is also a particularly interesting facet of this finding. Why do women in peripheral and semi-peripheral countries have lower environmental attitudes? The results are unclear in how best to interpret this finding. One explanation is that women have fewer opportunities than men to get an education, or to earn a higher income, which may explain why they generally have lower levels of environmental concern. This effect should be more pronounced in non-core countries. Another possible explanation must draw on the notion that women are simply more concerned with the risks associated with environmental degradation, rather than with having a higher willingness to sacrifice or sense of economic trade-offs (McCright 2010; Blocker and Eckberg 1997). That is, women are more concerned about how the actual degradation may impact their families, and not so much with actually preserving the environment for the environments sake. If

this is the case, additional analyses with other measures to assess environmental attitudes are necessary.

Another question to ask about this finding is about what it means to be a woman in the core versus the periphery. If women in the core are given basically the same rights as men, we should see fewer differences among women in the core. Similarly, if women in the periphery are given fewer rights than men, this difference should be highlighted. Put differently, where the roles of men and women come closer to convergence (relatively speaking), fewer differences should exist.

Model 1: Willingness to Sacrifice. In the first model, I assessed environmental attitudes via a scale of two items designed to assess the willingness to sacrifice for environmental protection. Many of the findings mirrored those from both the individual-level and national-level analyses discussed above (and in Chapters 3 and 4). Overall, The results indicate that political conservatism, confidence in social and governmental institutions, subjective social class, access to outside information, gender, world-system position, and education are significant predictors of environmental attitudes.

Model 2: Economic Tradeoffs. In the second model, I assessed environmental attitudes via a dichotomous variable designed to assess the economic tradeoffs inherent in many of the environmental protection debates. Again, many of the findings were similar to those from both the individual and national-level analyses discussed above. The differences between Model 1 and Model 2 highlight the importance of how exactly environmental attitudes are conceptualized. For more discussion on this issue, see the limitations section below.

THEORETICAL IMPLICATIONS OF FINDINGS

In the preceding chapters, I have relied upon two theoretical frameworks in order to develop and interpret the results in the previous analyses. The post-materialist thesis is useful in the development of the individual-level and level-1 of the multilevel model analyses. In brief, the post-materialist thesis posits that those with higher social class, exhibit more concern for post-material values like environmental protection, particularly when those people have been a part of a generation that experienced difficulty meeting its material needs.

Based on this theoretical assumption, the post-material thesis is a useful framework for assessing the individual-level characteristics of people that influence their environmental attitudes. Another perspective, the NEP assumes that due to a paradigm shift, people have become more environmentally aware, and eventually this awareness has become environmental concern. In other words, because people have accepted their responsibility for much environmental degradation, and because they have had time to witness such effects, people have subsequently become more concerned about the condition of the environment, and the severity of its degradation. But this begs the question: what are the characteristics of those who are the most concerned? Past research has suggested many characteristics like social class, political orientation, and even race, religion and whether one lives in a rural or urban setting.

The results of the previous analyses indicate that political ideology, confidence in social and governmental institutions, subjective social class, gender, and education are

the most important individual-level predictors of environmental attitudes. Unfortunately, neither the post-materialist thesis or the NEP is as useful for assessing national-level characteristics of environmental attitudes. In order to understand differences between countries, rather than differences within countries, I turn to the world-system perspective. Proponents of the world-system perspective argue that the interaction between nations is bounded by a single economic (capitalist) system, rather than a multitude of distinct and independent nation-states. As such, nations are placed in a hierarchy of world-system position, which contains three main categories: the core, the semi-periphery, and the periphery. Core nations, like the U.S. and Western Europe, are the wealthiest nations, which generally benefit the most from the world-system. Peripheral nations, like those in sub-Saharan Africa, generally benefit the least, and experience persistent exploitation from Core nations. The Semi-Periphery is the nations that fall somewhere in-between the core and periphery, like Mexico and the former Soviet Republics. These nations benefit marginally from the world-system by exploiting peripheral nations, but are also exploited by core nations. Additionally, the middle position generally encourages economic development in an effort to catch-up to nations in the core.

As a macro-theoretical perspective, the world-system approach allows one to clearly and easily compare nations to one another based on the metric of the core-periphery hierarchy. The findings of the preceding analyses indicate that national-level characteristics like world-system position and access to outside information are important predictors of the environmental attitudes of the residents of various nations. Access to outside sources of information appear to have a negative association with environmental

attitudes, suggesting that the process might not operate as one might expect. The influence of world-system position on environmental attitudes is not absolutely clear, as it appears to have its biggest effects via its interaction with other variables like gender and religious affiliation.

Overall, however the findings presented here contribute significantly to the literature on environmental attitudes in three ways. First, I applied two theoretical approaches, the world-systems perspective, and the New Ecological Paradigm to a cross-national and international sample of respondents. Second, I highlight the importance of assessing both individual and national-level characteristics when examining environmental attitudes cross-nationally. Third, I highlight the importance of measuring environmental attitudes by using two different measures of environmental attitudes, willingness to sacrifice, and economic tradeoffs in order to illustrate how the means of assessing environmental attitudes can impact the results.

In previous research, the world-systems perspective has not been used to assess environmental attitudes. It has, however, been used to assess environmental degradation. This new application of the world-systems perspective provides an important link between two substantive areas of environmental research: environmental degradation, and environmental attitudes. Also, using the world-systems perspective brings an alternative perspective to the environmental sociological literature which has generally ignored it.

The New Ecological Paradigm has generally been used in studies conducted with samples from a single nation, or a small subset of peer nations (the U.S. and Canada for

example). Unfortunately this hides differences between nations, making it easier to assume that there are no differences. By overcoming this problem, this study highlights what should have been obvious; the correlates of environmental attitudes are very different between nations. Additionally, when examining the predictors of environmental attitudes, one must examine each sample differently, as cross-national variation can affect findings significantly.

Post-materialism is the perspective which has generally found the most support in the findings. Specifically, it appears that social class is related to environmental attitudes in both individual-level and multilevel models. Though I do not examine the values of the populations of the nations in the data, this consistency is important nonetheless in that it allowed for a useful means of incorporating individual-level and national-level theories in an effort to better explain environmental attitudes.

Next, I found that examining individual-level characteristics does explain a larger portion of variance than do national-level characteristics, making it a necessity when conducting international or cross-national research. National-level characteristics, however, remain an important set of factors to account for, particularly when one is attempting to find all potential predictors of a particular outcome. In other words, though it is important to account for individual-level characteristics, national-level characteristics can be especially fruitful in international or cross-national research. My findings in the multilevel analysis (Chapter 5) were much more interesting than my findings in the individual-level analysis (Chapter 3) because of this.

Finally, as others have noted (Franzen 2003), how exactly one measures environmental attitudes can have an inescapable impact on their findings. In order to overcome this obstacle, particularly with secondary data (see limitations below), I used two measures of environmental attitudes. The first measure, "willingness to sacrifice" was created from a scale of two items and assesses to what extent people are willing to make personal economic sacrifices in order to protect the environment. The second measure, "economic tradeoffs" was created using a dichotomous measure to assess whether or not people would rather protect the environment or promote economic growth. Though similar, the findings point to some important differences between the two measures of environmental attitudes. First, they do not produce the same results, which suggest that people assess their relationship with the environment differently, when they see it from their own personal perspective, or from the society to which they belongs perspective. Second, using two measures of environmental attitudes improves reliability, by highlighting the observed but unintended differences between how one expects the relationship between two variables to be, and how it actually is.

LIMITATIONS AND FUTURE DIRECTIONS FOR RESEARCH

As with all research, there were several limitations to this study: the concept of environmental attitudes was assessed in a different way than in other studies; and the small sample of countries used in the national-level analysis (Chapter 4) and the multilevel analysis (Chapter 5) impacts statistical power.

By using different measures of environmental attitudes, I have limited the comparability of these findings to the findings of others. In many cases, this is not problematic, but I believe that it may be here, especially as I see environmental attitudes to be a global idea, rather than a national one. Often times, however, this is simply a side-effect of using secondary data.

The relatively small sample size of countries (N = 27) limited the availability of degrees of freedom in the multilevel analysis and the national-level analysis. This limits the reliability of the estimates presented. In the national-level analysis this prevented almost anything from obtaining statistical significance, while in the multilevel analysis I used $p \geq .1$ as the critical value to assess statistical significance, and still found few statistically significant level-2 (country-level) associations. Unfortunately, even a dataset containing all nations may not have the statistical power required to test some of these hypotheses using multilevel models. With this important caveat established, the other limitation has to do with the range of variation on some of these characteristics. Government type was not significantly associated with environmental attitudes, but it was a skewed measure, as there were 17 "republics" and two "communist states," a few "monarchies," and a handful of "other" types of governments.

Directions for Future Research

Beyond these two main issues, the study points to several important directions for future research. First, the role of confidence in institutions, I have rarely come across research focusing on this idea specifically for environmental attitudes. Future research

should examine specific institutions and their association with environmental attitudes. Second, the religion effect on environmental attitudes appears to be specific, yet unclear. Future research should examine this relationship more closely, and using a variety of means to clarify how this relationship operates. Lastly, the concept of environmental attitudes continues to need refinement. While some scales have remained popular, most of them are complicated and have a large number of survey questions in order to measure them. While this is useful for constructing a scale, it is costly and prohibitive to those collecting such data. Future research should continue to examine how to best measure the concept of environmental attitudes. Additionally, future research should be conducted on national level characteristics using other measures of environmental attitudes. Such analyses could inform the literature by attempting to standardize the measurement of environmental attitudes, and also by clarifying exactly which countries belong at which level of the core-periphery hierarchy.

APPENDIX A: CHAPTER 2 TABLES AND FIGURES

Figure 2.1 Kondratieff Wave Cycle

| Elec. Engineering and Chemicals | Petrochemicals Automobiles | Information Technology |

1900   **1950**   **2000**

P   R   D   E

P = Prosperity

R = Recession

D = Depression

E = Improvement

Figure 2.2: The Basic Iteration Model of World-System Development Adapted from

Chase-Dunn and Hall 1997.
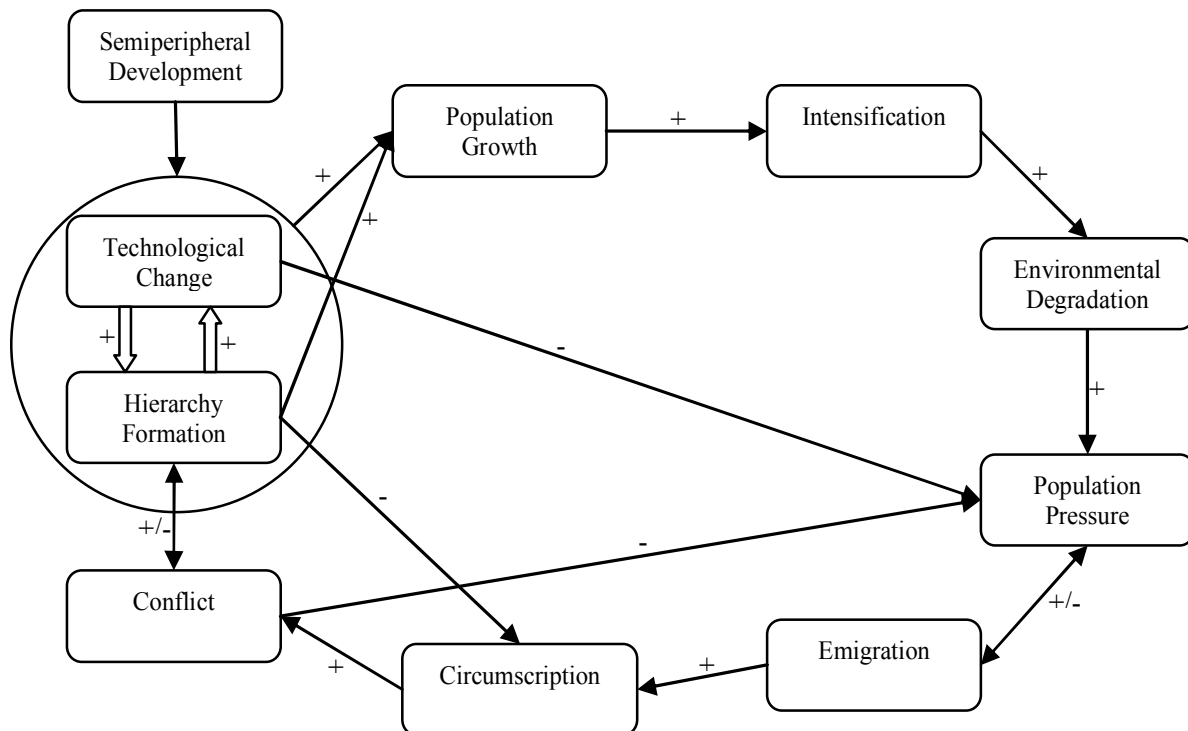
APPENDIX B: CHAPTER 3 TABLES AND FIGURES

Table 3.1 Country List and Proportions of Sample

Country	Frequency	Percent
Albania	1000	2.8
Argentina	1280	3.6
Bangladesh	1500	4.3
Bosnia	1200	3.4
Canada	1931	5.5
Chile	1200	3.4
China	1000	2.8
India	2002	5.7
Japan	1362	3.9
Kyrgyzstan	1043	3.0
Macedonia	1055	3.0
Mexico	1535	4.4
Moldova	1008	2.9
Montenegro	1060	3.0
Peru	1501	4.3
Philippines	1200	3.4
Puerto Rico	720	2.1
Serbia	1200	3.4
Singapore	1512	4.3
South Africa	3000	8.5
South Korea	1200	3.4
Spain	1209	3.4
Tanzania	1171	3.3
Uganda	1002	2.9
United States of America	1200	3.4
Vietnam	1000	2.8
Zimbabwe	1002	2.9
Total	**35093**	**100.0**

Figure 3.1: Subjective Social Class Distribution
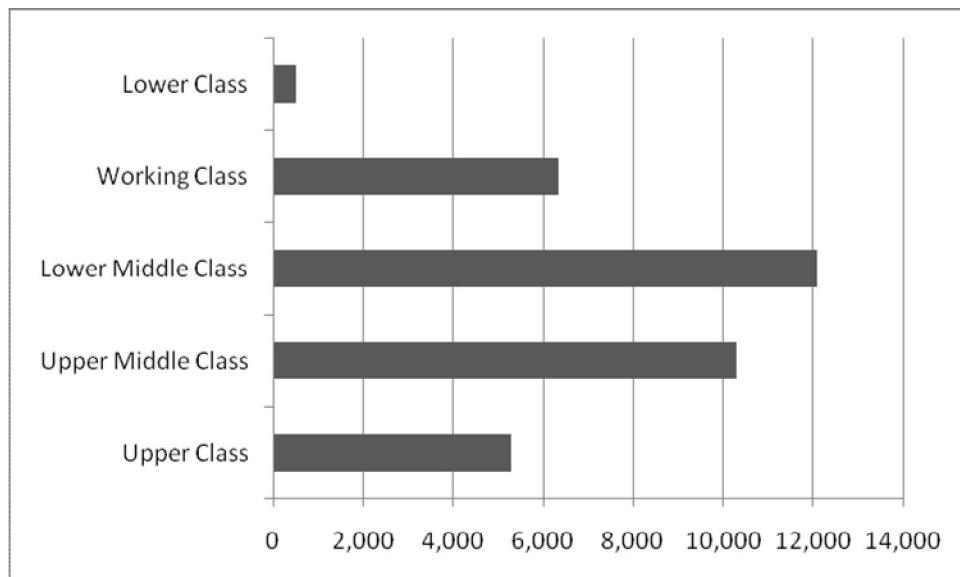
Figure 3.2: Distribution of Education
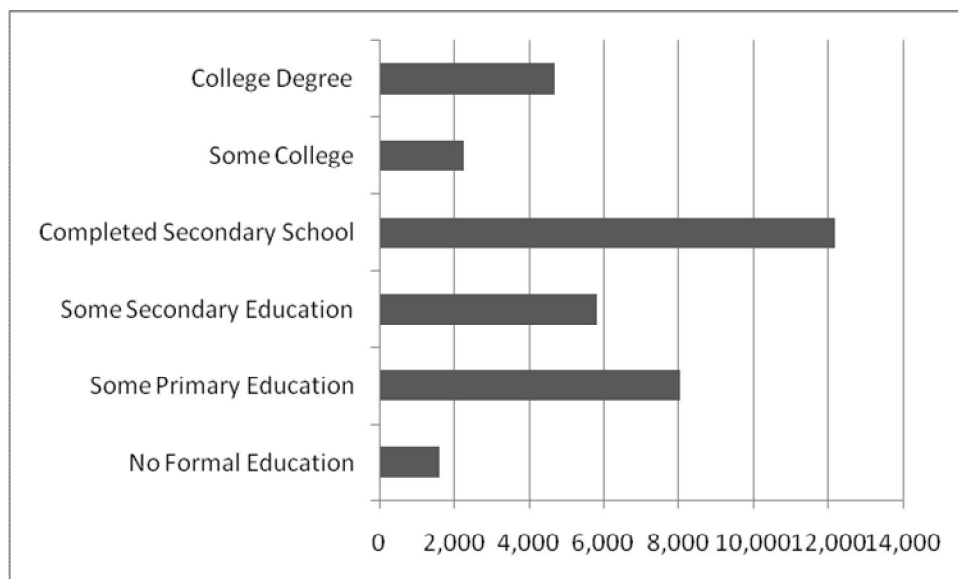
Figure 3.3: Frequencies of Religious Traditions
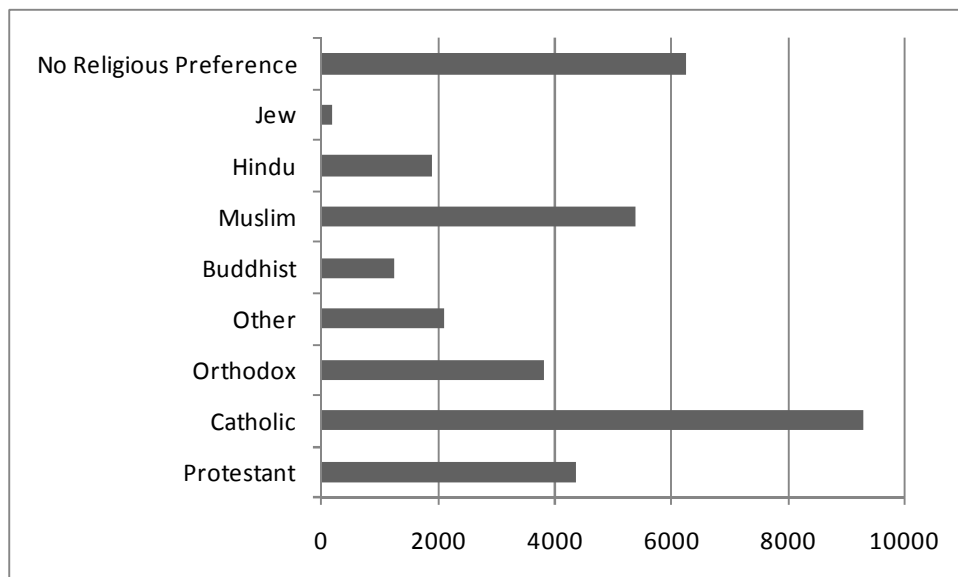
Table 3.2: Bivariate Correlations for Individual Characteristics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1 Willingness to Sacrifice Scale	1																							
2 Economic Tradeoffs	.22	1																						
3 Confidence in Government Institutions	.12	.02	1																					
4 Confidence in the Environmental Movement	.16	.11	.40	1																				
5 Income	.06	.04	-.03	.03	1																			
6 Urban	-.01	.03	-.18	.01	.09	1																		
7 Subjective Social Class	.09	.06	-.06	.03	.33	.14	1																	
8 Age	-.03	-.01	.03	-.05	-.09	.00	-.06	1																
9 Sex	-.03	-.01	-.02	.00	-.04	.03	.00	.00	1															
10 Conservative	.07	.01	.15	.04	-.02	-.05	.03	.02	-.02	1														
11 Protestant	-.08	-.05	.03	.02	.01	.08	.00	-.01	.02	-.05	1													
12 Other Religion	-.02	-.01	.09	.03	-.01	.00	-.06	-.01	.03	-.03	-.10	1												
13 Buddhist	.02	.00	.03	.02	-.01	.00	.02	.06	.01	.05	-.07	-.05	1											
14 Hindu	-.03	.01	.05	-.04	-.09	-.11	.03	-.02	.03	.00	-.09	-.06	-.05	1										
15 Muslim	.03	-.05	.08	.00	-.07	-.17	.03	-.09	-.03	.08	-.16	-.11	-.08	-.10	1									
16 Jew	.01	.00	.00	.00	.01	.03	.03	.01	.00	-.01	-.03	-.02	-.01	-.02	-.03	1								
17 Orthodox	.03	-.02	-.11	-.14	.01	-.08	-.01	.09	.01	-.07	-.13	-.09	-.07	-.09	-.15	-.02	1							
18 No Religious Preference	.04	.04	.02	.04	.10	.01	.01	-.03	-.05	-.02	-.18	-.12	-.09	-.11	-.20	-.03	-.17	1						
19 Catholic	-.01	.05	-.11	.04	.00	.18	-.01	.03	.04	.00	-.23	-.15	-.12	-.15	-.26	-.04	-.21	-.29	1					
20 Some Primary Education	-.06	-.07	.09	-.03	-.18	-.09	-.23	.21	.05	.03	.09	.04	-.02	-.01	.04	-.02	.01	-.04	.01	1				
21 Some Secondary Education	-.04	-.04	.04	.04	-.04	.03	-.04	-.09	-.01	.03	-.05	.04	-.04	-.01	.02	-.01	-.09	-.04	.03	-.25	1			
22 Completed Secondary Education	.03	.01	-.08	-.01	.07	.02	.07	-.11	-.02	-.05	.02	-.05	.05	-.09	-.04	-.01	.08	.07	-.04	-.41	-.33	1		
23 Some College Education	.04	.05	-.03	.01	.06	.04	.09	-.08	-.02	-.01	-.01	-.01	-.02	.02	-.04	.02	-.02	.00	.05	-.15	-.12	-.19	1	
24 Completed College Education	.08	.09	-.07	.02	.21	.11	.25	-.03	-.04	-.01	-.03	-.02	.00	-.01	-.02	.03	.04	.02	.00	-.22	-.18	-.29	-.10	1

Correlations significant at the .05 level or higher in bold

Table 3.3: ORDINARY LEAST SQUARES REGRESSION
RESULTS OF THE EFFECTS OF INDIVIDUAL-LEVEL
CHARACTERISTICS ON WILLINGNESS TO SACRIFICE

Variable	Coefficient	Standard Error	Significance
Constant	3.909	0.065	***
Confidence in Government Institutions	0.158	0.013	***
Conf. in the Environmental Movement	0.231	0.010	***
Some Primary Education	0.170	0.041	***
Some Secondary Education	0.207	0.043	***
Completed Secondary Education	0.359	0.042	***
Some College Education	0.495	0.050	***
Completed College Education	0.551	0.046	***
Income	0.004	0.004	
Social Class	0.090	0.009	***
Urban	-0.007	0.017	
Age	-0.001	0.001	*
Sex	-0.068	0.016	***
Conservative	0.032	0.003	***
Protestant	-0.425	0.029	***
Other Religion	-0.232	0.037	***
Buddhist	-0.010	0.045	
Hindu	-0.268	0.040	***
Muslim	-0.008	0.028	
Jew	-0.048	0.114	
Orthodox	0.133	0.030	***
Catholic	-0.118	0.024	***

*** $p < .001$
**$p < .01$
* $p < .05$
Religion Reference = "no religious preference"
Education Reference = "no formal education"
N = 34,555

Table 3.4: LOGISTIC REGRESSION RESULTS OF THE EFFECTS
OF INDIVIDUAL-LEVEL CHARACTERISTICS ON ECONOMIC
TRADEOFFS

	Odds Ratio	Standard Error	Significance
Confidence in Government Institutions	0.988	0.017	
Conf. in the Environmental Movement	1.287	0.018	***
Some Primary Education	1.028	0.059	
Some Secondary Education	1.084	0.065	
Completed Secondary Education	1.299	0.075	***
Some College Education	1.808	0.129	***
Completed College Education	1.962	0.127	***
Income	0.995	0.005	
Social Class	1.061	0.013	***
Urban	1.006	0.024	
Age	1.002	0.001	**
Sex	0.965	0.021	
Conservative	1.011	0.004	**
Protestant	0.682	0.028	***
Other Religion	0.836	0.043	**
Buddhist	0.856	0.054	**
Hindu	0.964	0.054	
Muslim	0.712	0.028	***
Jew	0.724	0.115	*
Orthodox	0.798	0.034	***
Catholic	1.021	0.035	

*** $p < .001$
**$p < .01$
* $p < .05$
Religion Reference = "no religious preference"
Education Reference = "no formal education"
N = 34,555

Table 3.5 R-Squared by Country

Country	Adjusted R-Squared	
Albania	0.1109	
Argentina	0.0508	
Bangladesh	0.0557	
Bosnia	0.0905	
Canada	0.0866	
Chile	0.0209	
China	0.0553	
India	0.1524	
Japan	0.0760	
Kyrgyzstan	0.0744	
Macedonia	0.0299	
Mexico	0.0512	
Moldova	0.0470	
Montenegro	0.1193	
Peru	0.0097	
Philippines	0.0384	
Puerto Rico	-0.0007	*
Serbia	0.1092	
Singapore	0.0711	
South Africa	0.0468	
South Korea	0.0321	
Spain	0.0748	
Tanzania	0.0326	
Uganda	0.0641	
United States of America	0.0894	
Vietnam	0.1531	
Zimbabwe	0.0919	
Average	0.0679	

*None of the predictors were significant

APPENDIX C: CHAPTER 4 TABLES AND FIGURES

Table 4.1: Nations by Core, Semi-Peripheral, or Peripheral Status, ESI Scores and World System Position Scores		
	ESI Score	**World System Position Score**
Core Nations		
Argentina	62.49	-0.26
Canada	78.14	1.42
Chile	56.58	-0.12
China	37.56	1.46
Japan	60.56	3.22
Mexico	45.28	-0.17
Singapore	46.80	1.54
South Korea	40.30	0.34
Spain	59.51	0.72
United States	66.10	11.93
Semi-Peripheral Nations		
India	40.87	-0.31
Macedonia	39.21	-1.19
Peru	54.32	-1.04
Philippines	35.68	-1.05
Puerto Rico	*	-0.52
South Africa	*	-1.38
Vietnam	34.19	-1.32
Zimbabwe	52.01	-1.33
Peripheral Nations		
Albania	44.17	-1.42
Bangladesh	39.45	-1.34
Bosnia	*	-1.40
Kyrgyzstan	39.63	-1.35
Moldova	47.44	-1.36
Montenegro	*	-1.38
Serbia	*	-1.38
Tanzania	40.33	-1.53
Uganda	44.03	-1.48
*ESI Score not available		

Figure 4.1: Linear Relationship Between Willingness to Sacrifice Scale and Logged[13]

World-System Position Score

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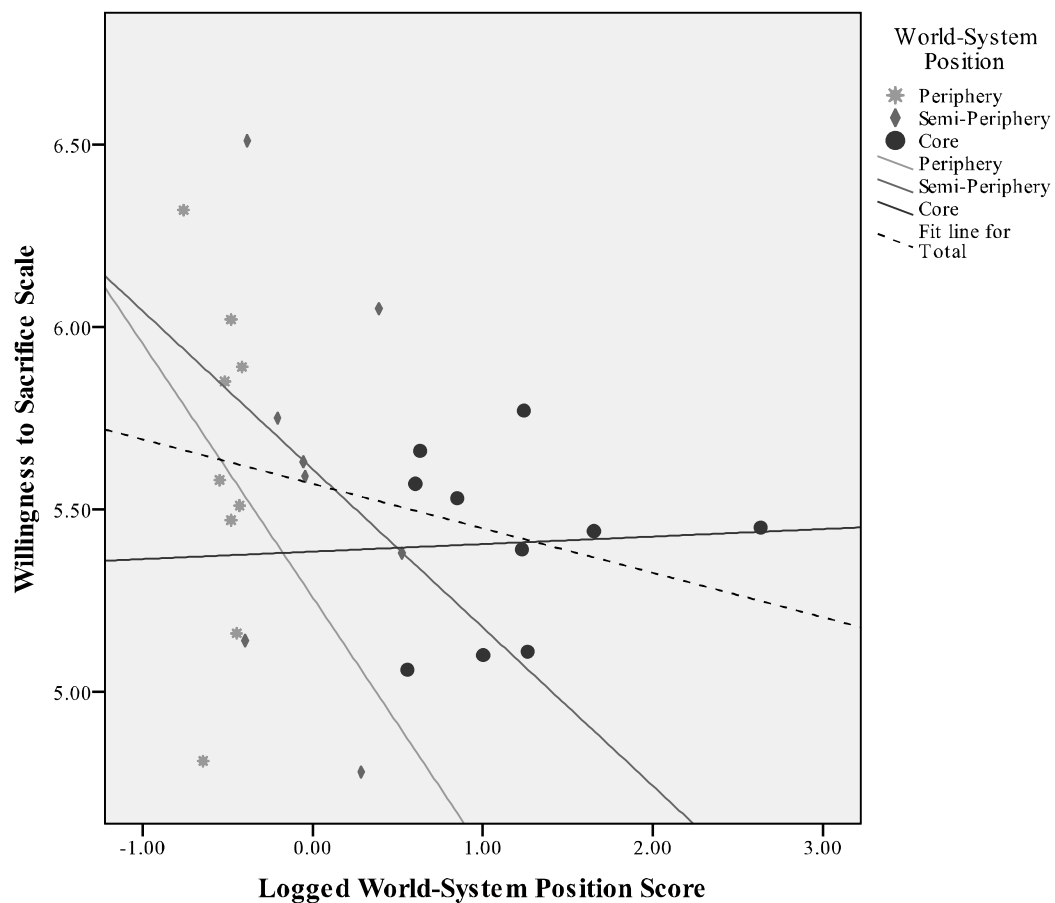
[13] The World-System Position variable was transformed by using the log of the original score plus two as the data included negative values.

Figure 4.2: Linear Relationship Between Economic Tradeoffs and Logged[14] World-

System Position Score

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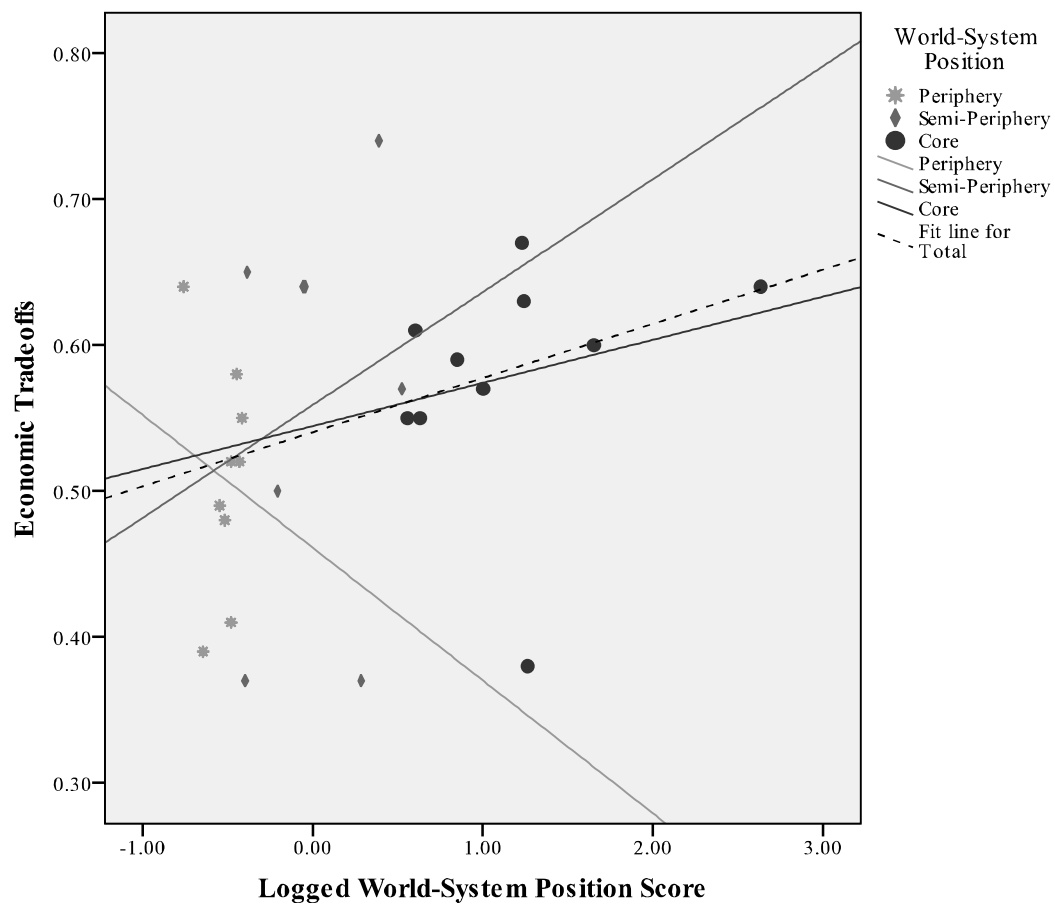
[14] The World-System Position variable was transformed by using the log of the original score plus two as the data included negative values.

Figure 4.3: Scatterplot of Logged Number of Cellular Telephones Per-Capita by Willingness to Sacrifice Scale
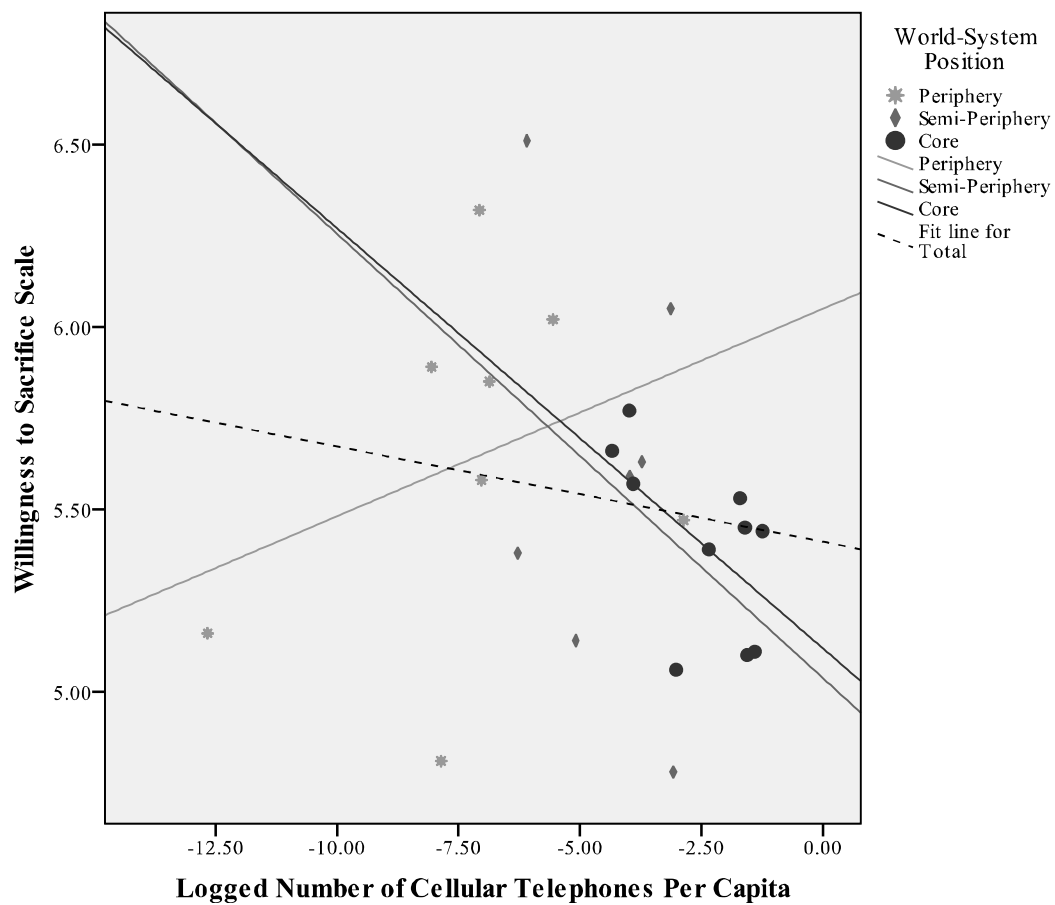
Figure 4.4: Scatterplot of Logged Number of Internet Users Per-Capita by Willingness to
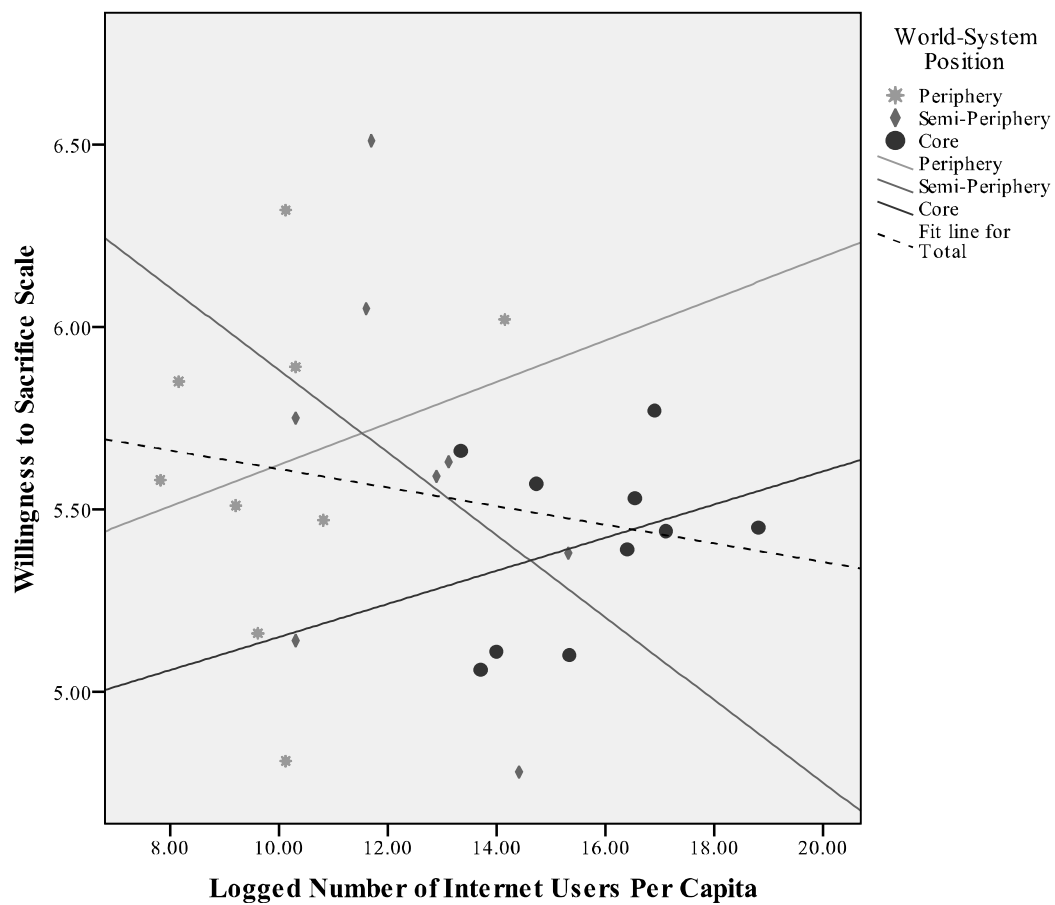
Sacrifice Scale

Figure 4.5: Scatterplot of Logged Number of Land Line Telephones Per-Capita by

Willingness to Sacrifice Scale
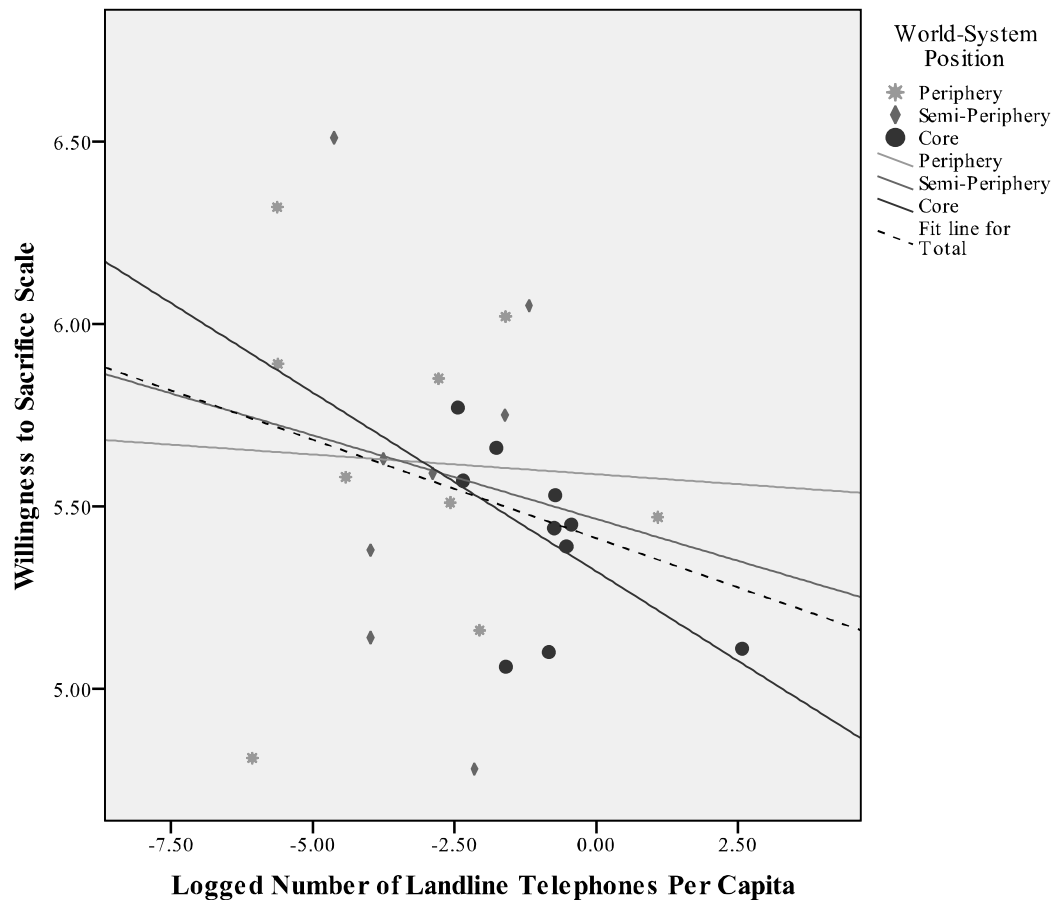
Figure 4.6: Scatterplot of Logged Number of Televisions Per-Capita by Willingness to

Sacrifice Scale
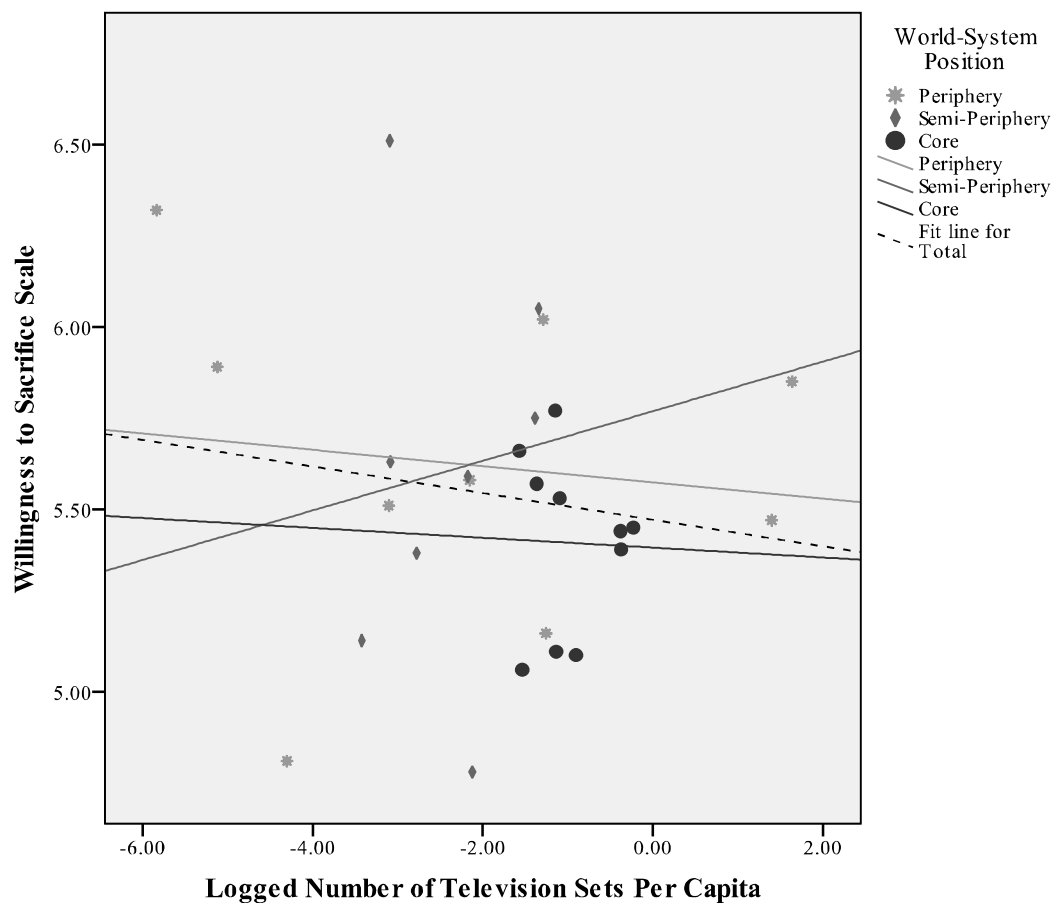
Figure 4.7: Scatterplot of Logged Number of Cellular Telephones Per-Capita by

Economic Tradeoffs
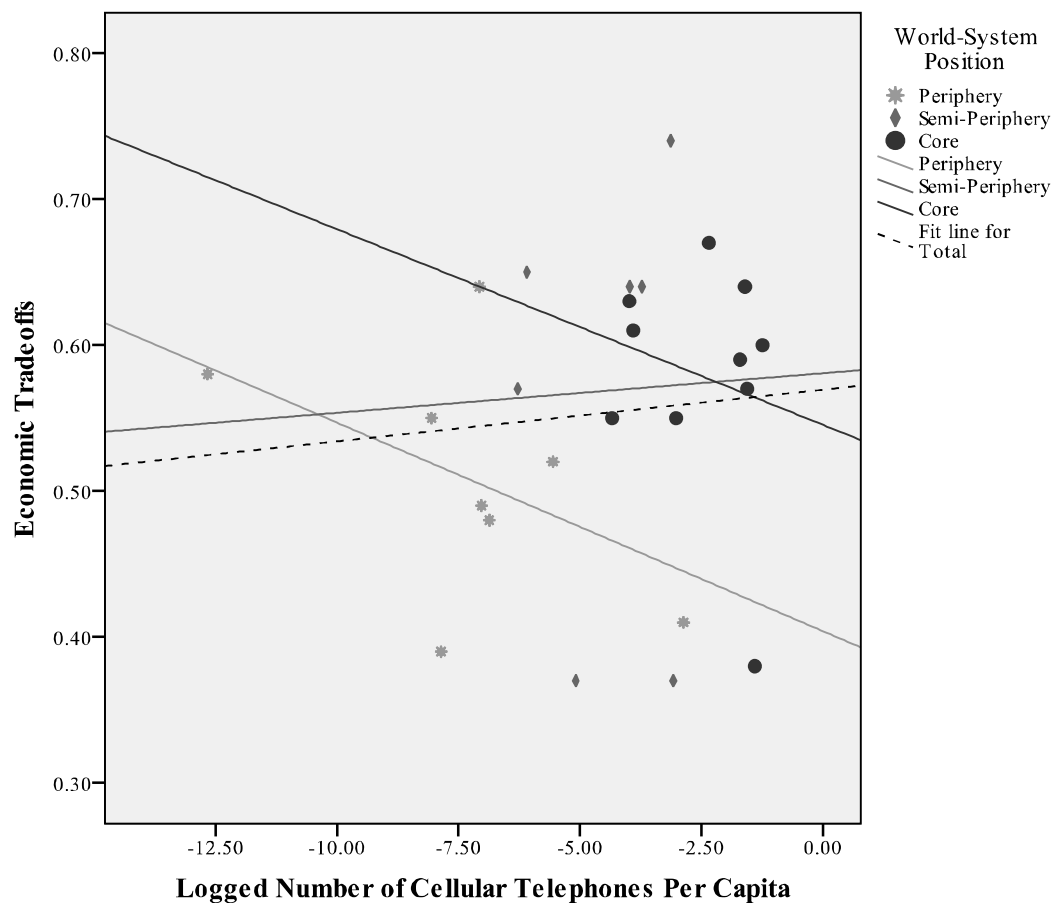
Figure 4.8: Scatterplot of Logged Number of Internet Users Per-Capita by Economic
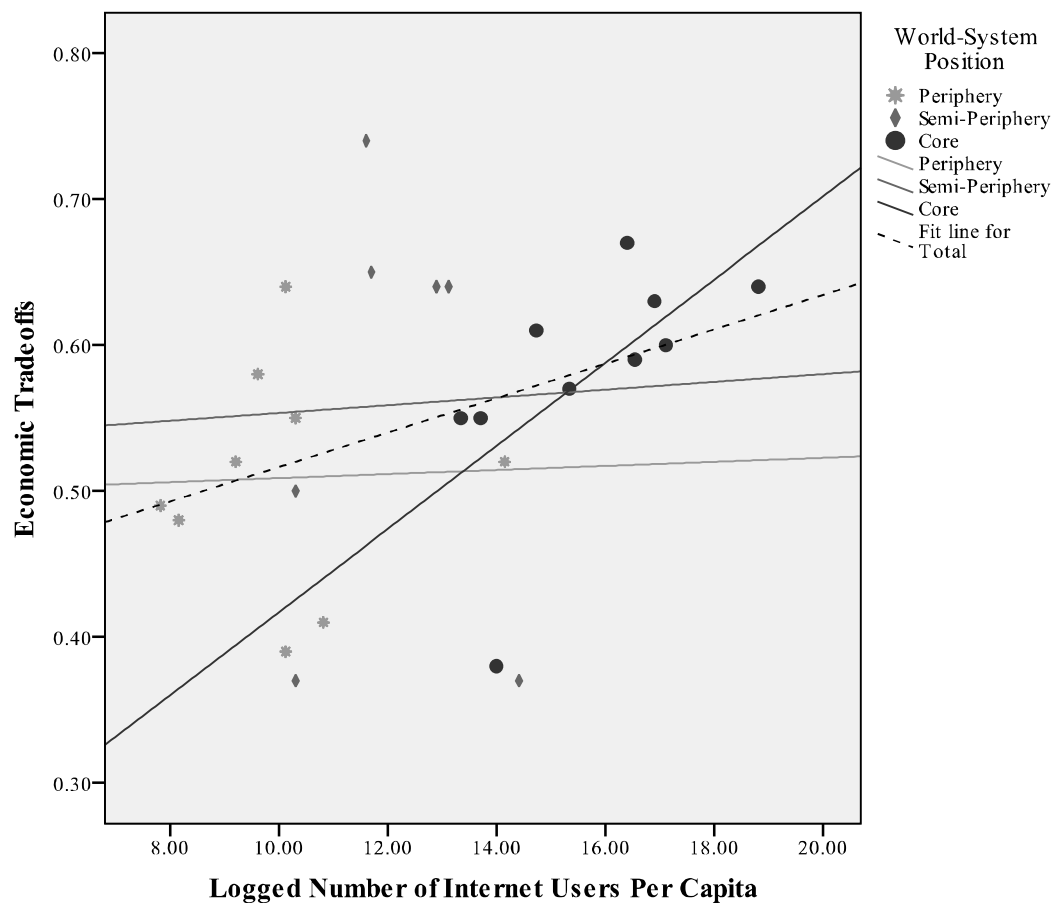
Tradeoffs

Figure 4.9: Scatterplot of Logged Number of Land Line Telephones Per-Capita by

Economic Tradeoffs
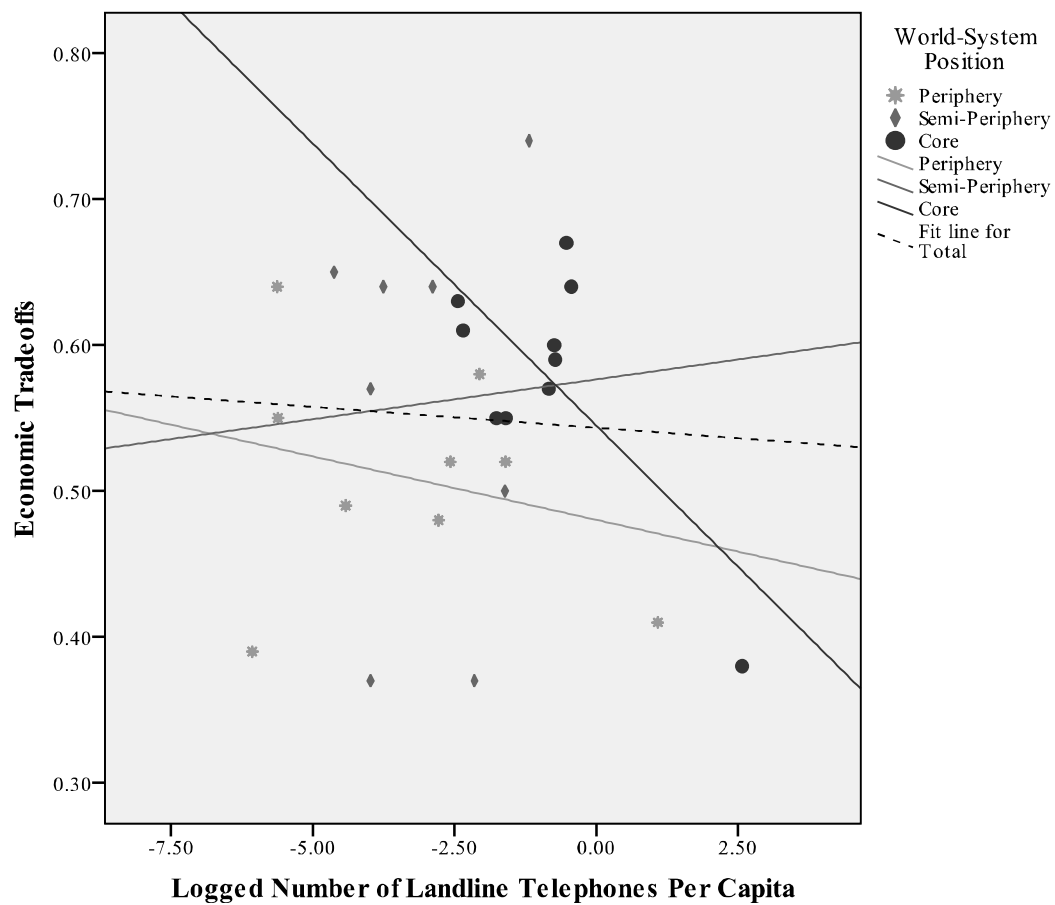
Figure 4.10: Scatterplot of Logged Number of Televisions Per-Capita by Economic
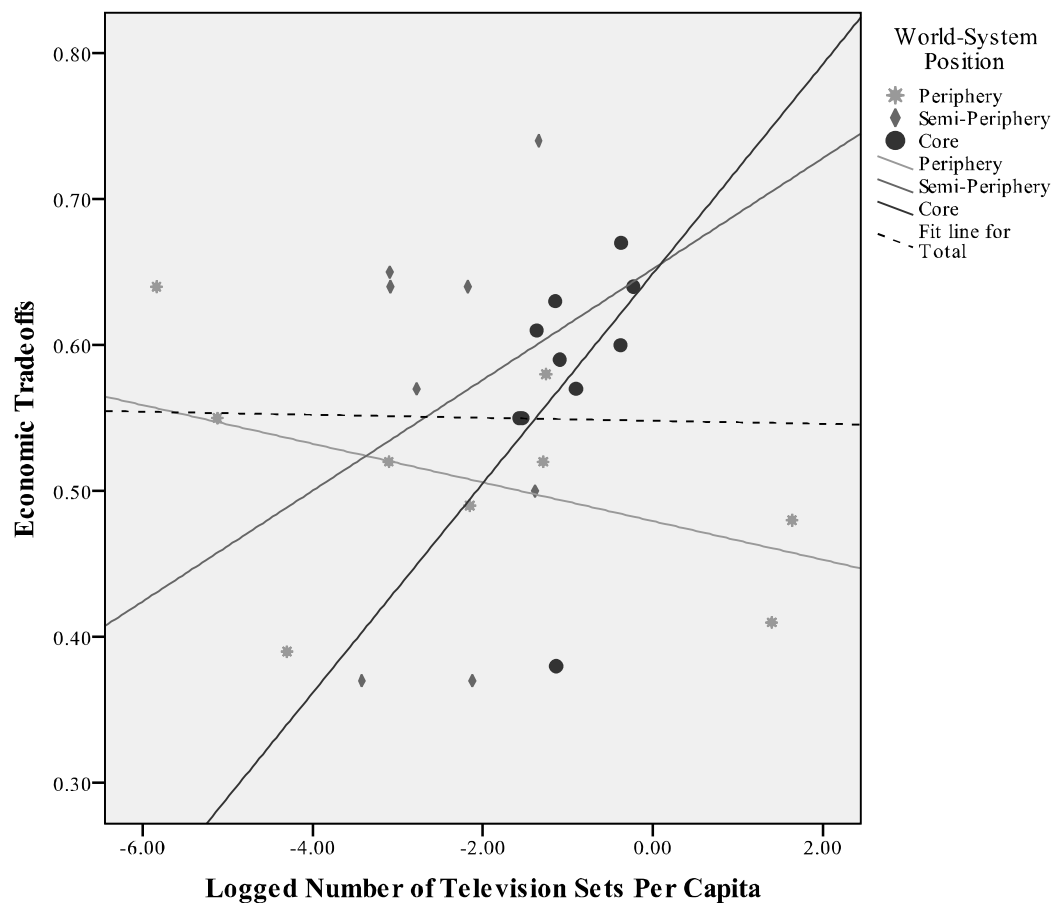
Tradeoffs

Figure 4.11: Scatterplot of Environmental Sustainability Index (ESI) Score by

Willingness to Sacrifice Scale
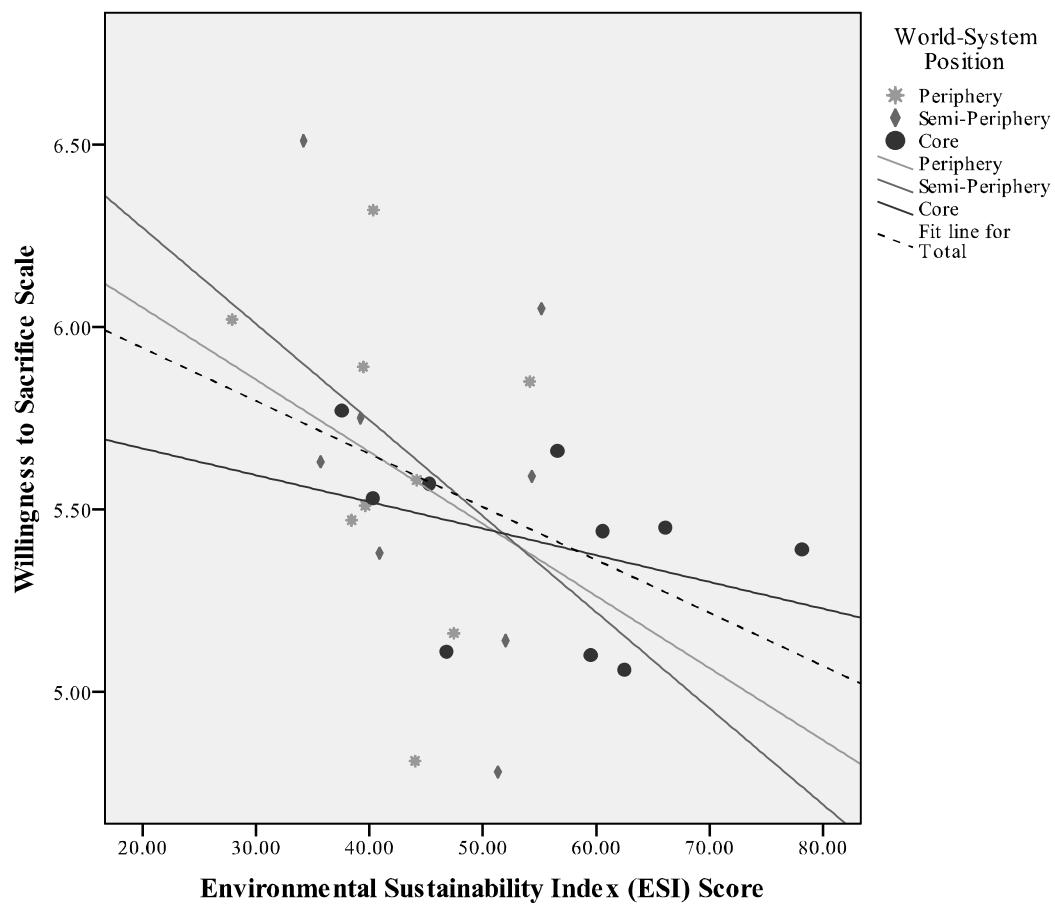
Figure 4.12: Scatterplot of Environmental Sustainability Index (ESI) Score by Economic

Tradeoffs
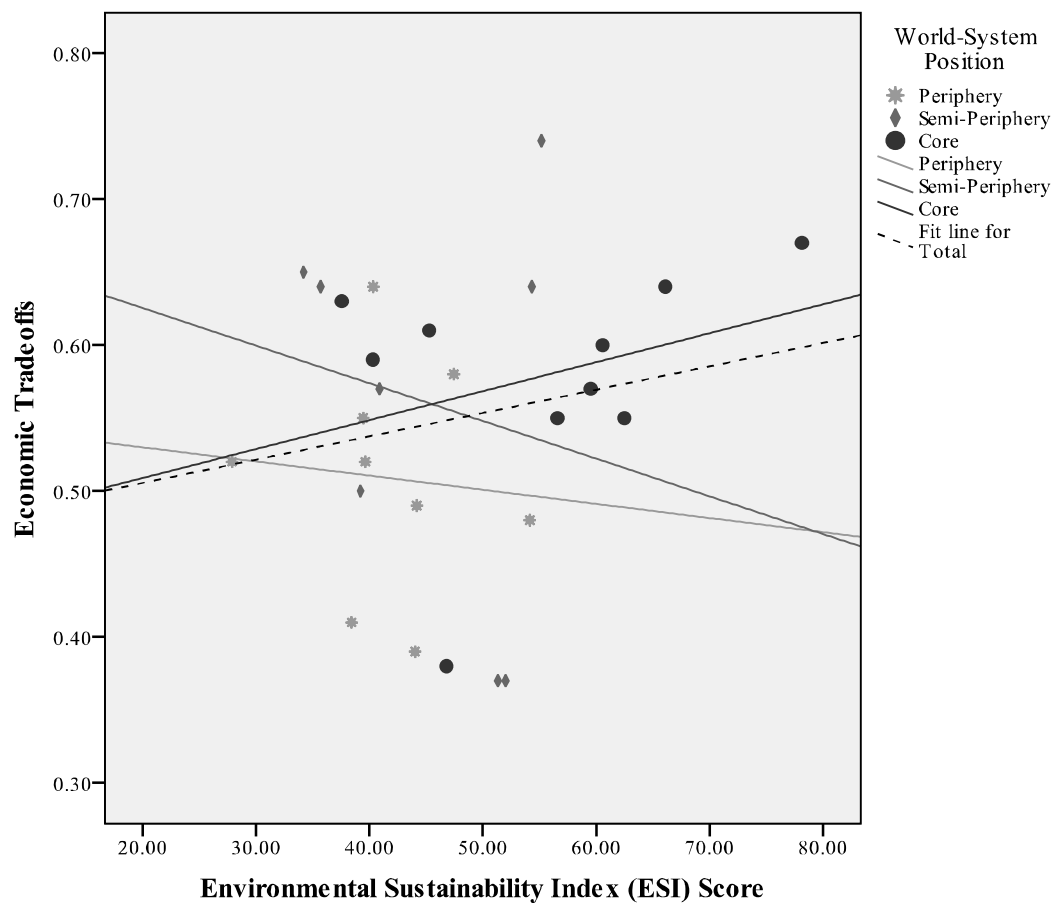
APPENDIX D: CHAPTER 5 TABLES AND FIGURES

Table 5.1: Six Multilevel Models Examining the Impacts of Individual-Level and National-Level Characteristics on Willingness to Sacrifice

Variable	Model 1: World-System Position Effects			Model 2: No Interactions and No Social Class Measures			Model 3: No Social Class Measures with Interactions			Model 4: Main Effects Model With No Interactions or Variance Components			Model 5: Full Model with No Interactions			Model 6: Full Model with Interactions		
	Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.		Coef.	S.E.	
Level-1																		
Constant	5.53	.08	***	11.9	1.38	***	12.22	1.38	***	9.74	2.32	**	11.27	1.33	***	11.9	1.36	***
Confidence in Government Institutions				.08	.03	**	.08	.02	**	.1	.01	***	.09	.03	**	.09	.03	**
Confidence in the Environmental Movement				.25	.02	***	.25	.02	***	.24	.01	***	.24	.02	***	.24	.02	***
Some Primary Education				--	--		--	--		.12	.04	**	.13	.07	+	.12	.06	+
Some Secondary Education				--	--		--	--		.28	.04	***	.26	.08	**	.25	.07	**
Completed Secondary Education				--	--		--	--		.33	.04	***	.32	.07	***	.31	.06	***
Some College Education				--	--		--	--		.35	.05	***	.36	.08	***	.35	.07	***
Completed College Education				--	--		--	--		.46	.05	***	.46	.08	***	.44	.07	***
Income				--	--		--	--		.	.		.01	.01		.01	.01	
Subjective Social Class				--	--		--	--		.1	.01	***	.11	.02	***	.11	.02	***
Urban				.08	.04	+	.08	.04	+	.06	.02	**	.03	.04		.03	.04	
Age				.	.	***	.	.	***	.	.	***	.	.		.	.	
Women				-.1	.03	**	-.11	.02	***	-.07	.02	***	-.08	.03	**	-.08	.02	**
Conservative				.01	.01		.01	.01		.01	.	***	.01	.01		.01	.01	

	(1)			(2)			(3)			(4)			(5)			(6)		
Protestant				.02	.04		.05	.05		-.07	.03	*	.01	.04		.04	.06	
Other Religion				-.18	.07	*	-.13	.08		-.13	.04	**	-.11	.07		-.09	.09	
Buddhist				-.02	.07		.31	.17	+	.09	.05	*	.02	.07		.33	.16	+
Hindu				-.12	.08		-.08	.12		-.12	.05	*	-.08	.08		-.02	.1	
Muslim				.03	.11		.16	.13		-.12	.04	**	.08	.11		.2	.11	+
Jewish				.04	.15		.03	.16		-.14	.11	*	-.01	.14		.02	.14	
Orthodox				-.05	.12		-.09	.14		-.13	.05	**	.04	.11		-.01	.13	
Catholic				.04	.05		.04	.05		-.06	.03	*	.05	.05		.05	.05	
Level-2																		
Semiperipheral World System Position	.18	.18		-.37	.11	*	-.31	.15	+	-.31	.22		-.43	.11	**	-.36	.15	+
Peripheral World System Position	.21	.18		.34	.12	*	.23	.16		.	.24		.28	.12	+	.19	.15	
Environmental Sustainability Index (ESI) Score				.01	.		.01	.		.	.01		.01	.		.01	.	
Percent GDP Agriculture				-.01	.01		-.01	.01	+	-.01	.01		-.01	.01		-.01	.01	+
Percent GDP Industry				.	.01		-.01	.01		-.01	.01		.	.01		.	.01	
Percent GDP Services				.02	.	**	.02	.	**	.02	.01	+	.02	.	**	.02	.	**
Proportion with Landline Telephone				-.05	.01	**	-.06	.01	**	-.07	.03	*	-.05	.01	**	-.06	.01	**
Monarchist Government				-.78	.19	**	-.82	.19	**	-1.08	.35	*	-.73	.19	*	-.77	.19	**
Communist Government				.8	.18	**	.78	.18	**	.8	.31	*	.79	.17	**	.82	.18	**
Other Government				.45	.09	**	.42	.09	**	.33	.18		.44	.09	**	.43	.09	**
Proportion Women (L1)				-5.3	1.39	*	-5.82	1.41	**	-4.1	2.37		-5.8	1.38	**	-6.26	1.41	**
Average Subjective Social Class (L1)				-1.56	.32	**	-1.73	.32	***	-1.39	.54	*	-1.55	.31	**	-1.73	.31	***

	Est.	SE	Sig.	Est.	SE	Sig.	Est.	SE	Sig.	Est.	SE	Sig.	Est.	SE	Sig.
Average Confidence in Gov't Institutions (L1)	.75	.15	**	.79	.14	***	.5	.29		.76	.14	**	.84	.14	***
Average Confidence in Environmental Movement (L1)	-.94	.22	**	-.91	.23	**	-.33	.41		-.94	.22	**	-.99	.22	**
Proportion Some Primary Education (L1)	2.86	.57	**	2.99	.55	***	3.51	1.16	*	3.6	.55	***	3.67	.56	***
Proportion Some Secondary Education (L1)	.89	.68		1.02	.68		1.14	1.28		1.96	.67	*	2.03	.68	*
Proportion Completed Secondary Education (L1)	1.18	.44	*	1.37	.44	*	1.86	.95	+	1.96	.44	**	2.06	.45	**
Proportion Some College Education (L1)	-3.	1.37	+	-3.09	1.37	+	-3.74	2.41		-1.43	1.33		-1.78	1.37	
Proportion Completed College Education (L1)	8.95	1.41	***	9.65	1.42	***	9.81	2.44	**	9.61	1.36	***	10.27	1.4	***
Average Income (L1)	-.25	.06	***	-.26	.05	***	-.35	.1	*	-.26	.05	**	-.28	.05	**
Cross-Level Interactions															
Catholic by Semiperiphery				-.15	.12								-.16	.12	
Catholic by Periphery				.04	.14								.09	.13	
Orthodox by Semiperiphery				.21	.36								.12	.34	
Orthodox by Periphery				.37	.33								.31	.3	
Jewish by Semiperiphery				-.1	.4								-.11	.37	
Jewish by Periphery				-.16	.36								-.04	.32	
Muslim by				-.64	.32	+							-.63	.28	*

Semiperiphery						
Muslim by Periphery	-.51	.31		-.44	.27	
Hindu by Semiperiphery	-.39	.18	*	-.39	.19	*
Hindu by Periphery	-.16	.33		-.1	.28	
Buddhist by Semiperiphery	.18	.15		.21	.14	
Buddhist by Periphery	.84	.5		.85	.48	+
Other Religion by Semiperiphery	-.15	.15		-.19	.16	
Other Religion by Periphery	.02	.23		.05	.23	
Protestant by Semiperiphery	-.11	.1		-.11	.11	
Protestant by Periphery	.13	.15		.14	.15	
Conservative by Semiperiphery	.	.02		.	.02	
Conservative by Periphery	.01	.02		.	.02	
Women by Semiperiphery	-.11	.06	+	-.11	.06	+
Women by Periphery	-.18	.06	**	-.16	.06	**
Age by Semiperiphery	.	.		.	.	
Age by Periphery	.	.		.	.	
Urban by Semiperiphery	-.01	.11		-.04	.09	
Urban by Periphery	.07	.11		.05	.09	
Confidence in Government Institutions by Semiperiphery	.01	.06		.03	.06	

Confidence in Government Institutions by Periphery	-.13	.06	*		-.1	.06
Confidence in Environmental Movement by Semiperiphery	-.04	.05			-.04	.05
Confidence in Environmental Movement by Periphery	.06	.05			.04	.05
Subjective Social Class by Semiperiphery					-.02	.04
Subjective Social Class by Periphery					.02	.04
Some Primary Education by Semiperiphery					-.17	.13
Some Primary Education by Periphery					-.42	.15 **
Some Secondary Education by Semiperiphery					-.16	.15
Some Secondary Education by Periphery					-.41	.16 *
Completed Secondary Education by Semiperiphery					-.09	.15
Completed Secondary Education by Periphery					-.26	.16
Some College Education by Semiperiphery					-.19	.16
Some College Education by Periphery					-.33	.18 +

									VC	SD
Completed College Education by Semiperiphery									-.13	.16
Completed College Education by Periphery									-.27	.17
Income by Semiperiphery									-.01	.01
Income by Periphery									.	.01

Variance Components	VC	SD		VC	SD		VC	SD		VC	SD		VC	SD		VC	SD	
Between Nation Variance	.16	.4	***	.07	.26		.06	.24		.04	.19	***	.06	.25		.06	.24	
Catholic				.04	.19	***	.04	.2	***				.03	.19	***	.04	.2	***
Orthodox				.22	.47	*	.23	.48	*				.17	.41	*	.18	.42	*
Jewish				.17	.41	**	.17	.41	**				.1	.32		.11	.33	**
Muslim				.26	.5	*	.27	.52	*				.23	.48	*	.2	.45	*
Hindu				.04	.2		.05	.22					.05	.22		.05	.23	+
Buddhist				.03	.17		.03	.16					.03	.17		.02	.14	+
Other				.07	.27	**	.06	.25	**				.09	.29	**	.08	.28	***
Protestant				.01	.11		.02	.14	+				.01	.12		.02	.15	***
Conservative				.	.03	***	.03	.	***				.	.03	***	.	.03	+
Women				.01	.12	*	.09	.01	+				.01	.11	*	.01	.09	***
Age				.	.	***	.	.	***				.	.	**	.	.	***
Subjective Social Class				--	--		--	--					.	.07	***	.	.07	***
Urban				.04	.2	***	.2	.04	***				.03	.16	***	.02	.16	***
Confidence in Gov't Institutions				.01	.12	***	.11	.01	***				.02	.12	***	.01	.11	**

	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
Confidence in the Environmental Movement				.01	.1	+	.09	.01	**				.01	.09	*	.01	.09	*
Some Primary Education				--	--		--	--					.08	.28	*	.03	.16	*
Some Secondary Education				--	--		--	--					.09	.31	+	.04	.21	*
Completed Secondary Education				--	--		--	--					.07	.26	*	.04	.19	*
Some College Education				--	--		--	--					.09	.29	+	.04	.21	*
Completed College Education				--	--		--	--					.09	.3	*	.05	.22	+
Income				--	--		--	--					.	.02		.	.02	*
Within Nation Variance	2.1	1.45		1.98	1.41		1.98	1.41		2.	1.41		1.95	1.39		1.94	1.39	
Deviance	123796.35			122058.56			122019.84			122044.73			121451.2			121405.77		
Number of Estimated Parameters	3			156			184			44			296			338		
Change in Deviance	--			1737.79			38.72			-24.89			593.53			45.43		
Change in Degrees of Freedom	--			22			2			4			1			2		
Level-1 Variance Explained	.00			.06			.06			.05			.07			.07		
Level-2 Variance Explained	.06			.58			.64			.77			.62			.65		
Overall Variance Explained	.00			.09			.10			.10			.11			.11		

*** p < .001

**p < .01

* p < .05

+ p < 0.1

Religion Reference = "no religious preference"

Education Reference = "no formal education"

Level-1 N = 34,555

Level-2 N = 27

Data Sources: Level-1 data come from the 1999-2001 World Values Survey (http://www.worldvaluessurvey.org/). Level-2 data come from the 2000 Central Intelligence Agency (CIA)

World Factbook (https://www.cia.gov/library/publications/the-world-factbook/) and from the 2000 Environmental Sustainability Index (ESI) (http://sedac.ciesin.columbia.edu/es/esi/).

Additional analyses indicate that social class variables explain about 1.6% of the variance at level-1.

Table 5.2: Four Multilevel Models Examining the Impacts of Individual-Level and National-Level Characteristics on Economic Tradeoffs

Variables	Model 1: Main Effects Model without Interactions				Model 2: Main Effects Model without Social Class Measures				Model 3: Full Model without Social Class Measures				Model 4: Full Model			
	Coef.	S.E.	Odds Ratio		Coef.	S.E.	Odds Ratio		Coef.	S.E.	Odds Ratio		Coef.	S.E.	Odds Ratio	
Level-1																
Constant	.73	1.25	2.08		2.98	1.43	19.66	+	2.83	1.41	16.99	+	1.75	1.34	5.74	
Confidence in Government Institutions	-.05	.03	.95		-.07	.02		**	-.06	.02		**	-.04	.02	.96	*
Confidence in the Environmental Movement	.03	.03	1.3	***	.27	.01		***	.27	.01		***	.26	.01	1.29	***
Some Primary Education	.01	.07	1.01		--	--	--		--	--	--		-.06	.07	.94	
Some Secondary Education	.12	.08	1.13		--	--	--		--	--	--		.03	.07	1.03	
Completed Secondary Education	.25	.08	1.28	**	--	--	--		--	--	--		.16	.07	1.18	*
Some College Education	.37	.1	1.45	**	--	--	--		--	--	--		.29	.08	1.33	**
Completed College Education	.51	.1	1.66	***	--	--	--		--	--	--		.45	.07	1.57	***
Income	.01	.01	1.01		--	--	--		--	--	--		.01	.01	1.01	
Subjective Social Class	.03	.02	1.03		--	--	--		--	--	--		.04	.02	1.04	*
Urban	.01	.05	1.01		.09	.05	1.09	+	.1	.05	1.11	*	.02	.04	1.02	
Age	.	.	1.		.	.	1.	*	.	.	1.	*	.	.	1.	
Women	-.07	.03	.93	*	-.09	.03	.91	**	-.09	.03	.91	**	-.06	.03	.94	+
Conservative	-.01	.01	.99	*	-.01	.01	.99	+	-.01	.01	.99		-.01	.01	.99	
Protestant	.03	.06	1.03		.01	.05	1.01		.03	.06	1.03		.03	.06	1.03	

	b	SE	Exp	sig	b	SE	Exp	sig	b	SE	Exp	sig	b	SE	Exp	sig
Other Religion	-.01	.09	.99	*	-.05	.08	.95		.07	.11	1.07		.12	.12	1.13	*
Buddhist	.13	.1	1.14		-.08	.07	.93		.37	.25	1.45		.3	.25	1.36	
Hindu	-.34	.21	.71		-.14	.14	.87		-.09	.17	.92		-.15	.17	.86	
Muslim	-.13	.1	.87		-.18	.08	.83	*	-.25	.11	.78	*	-.29	.1	.75	*
Jewish	-.38	.19	.68	*	-.42	.16	.66	*	-.32	.18	.72	+	-.41	.18	.67	*
Orthodox	-.04	.1	.96		-.1	.07	.9		-.01	.13	.99		.01	.13	1.01	
Catholic	.02	.06	1.02		-.01	.04	.99		.03	.05	1.03		.03	.05	1.03	
Level-2																
Semiperipheral World System Position	-.45	.11	.64	**	-.45	.12	.64	*	-.46	.14	.63	*	-.46	.14	.63	*
Peripheral World System Position	-.6	.13	.55	**	-.17	.14	.85		-.31	.16	.73	+	-.4	.15	.67	*
Environmental Sustainability Index (ESI) Score	.01	.	1.01		.01	.	1.02	*	.01	.	1.01	*	.01	.	1.01	
Percent GDP Agriculture	.02	.01	1.02	*	.	.01	1.		.	.01	1.		.01	.01	1.01	
Percent GDP Industry	.01	.01	1.01		.	.01	1.		-.01	.01	.99		.	.01	1.	
Percent GDP Services	.02	.	1.02	*	.01	.	1.01		.01	.	1.01		.01	.	1.01	
Proportion with Landline Telephone	-.07	.01	.93	***	-.07	.01	.94	**	-.07	.01	.93	**	-.05	.01	.95	*
Monarchist Government	-.38	.18	.69	+	-.45	.21	.64	+	-.44	.21	.64	+	-.26	.2	.77	
Communist Government	.38	.17	1.46	+	.83	.19	2.28	**	.77	.18	2.16	**	.68	.18	1.96	*
Other Government	-.12	.09	.89		-.14	.1	.87		-.12	.11	.89		-.11	.1	.9	
Proportion Women (L1)	2.56	1.35	12.96		-1.59	1.51	.2		-.9	1.5	.41		.66	1.44	1.94	
Average Subjective Social Class (L1)	-.73	.29	.48	*	-.97	.34	.38	*	-.98	.33	.37	*	-.76	.31	.47	+
Average Confidence in Gov't Institutions (L1)	.14	.15	1.15		.17	.17	1.18		.16	.17	1.18		.16	.16	1.17	

	b	SE	Exp	sig	b	SE	Exp	sig	b	SE	Exp	sig	b	SE	Exp	sig
Average Confidence in Environmental Movement (L1)	.17	.22	1.19		.26	.25	1.29		.27	.25	1.31		.2	.24	1.22	
Proportion Some Primary Education (L1)	.84	.57	2.32		1.11	.63	3.03		1.11	.66	3.02		.5	.6	1.64	
Proportion Some Secondary Education (L1)	-1.2	.67	.3		-.6	.75	.55		-.6	.76	.55		-.92	.71	.4	
Proportion Completed Secondary Education (L1)	.13	.46	1.14		.14	.5	1.15		.08	.52	1.09		-.3	.48	.74	
Proportion Some College Education (L1)	-.59	1.29	.55		-.65	1.47	.52		-.89	1.48	.41		-.04	1.37	.96	
Proportion Completed College Education (L1)	3.52	1.32	33.76	*	5.36	1.48	212.29	*	5.12	1.5	167.65	*	3.36	1.4	28.79	+
Average Income (L1)	-.27	.05	.76	**	-.31	.06	.73	***	-.34	.06	.71	***	-.25	.05	.78	**

Cross-Level Interactions #

	b	SE	Exp	sig	b	SE	Exp	sig	b	SE	Exp	sig	b	SE	Exp	sig
Catholic by Semiperiphery									.2	.1	1.22	*	.19	.1	1.21	+
Catholic by Periphery									.17	.13	1.19		.18	.13	1.2	
Orthodox by Semiperiphery									-.52	.34	.59		-.58	.34	.56	+
Orthodox by Periphery									-.23	.32	.79		-.27	.32	.76	
Jewish by Semiperiphery									.33	.48	1.39		.42	.48	1.52	
Jewish by Periphery									-.38	.36	.68		-.2	.37	.82	
Muslim by Semiperiphery									.38	.28	1.46		.55	.27	1.73	+
Muslim by Periphery									.49	.26	1.63	+	.59	.25	1.8	*
Hindu by Semiperiphery									-.24	.41	.79		-.35	.4	.7	

Hindu by Periphery	-.05	.44	.95		-.14	.44	.87
Buddhist by Semiperiphery	.3	.18	1.34		.27	.18	1.32
Buddhist by Periphery	1.28	.73	3.61	+	.96	.74	2.62
Other Religion by Semiperiphery	.41	.17	1.5	*	.43	.19	1.54	*
Other Religion by Periphery	.67	.31	1.95	*	.69	.33	2.	*
Protestant by Semiperiphery	.04	.11	1.04		.02	.11	1.02
Protestant by Periphery	.	.16	1.		.03	.16	1.03
Conservative by Semiperiphery	.	.01	1.		.	.01	1.
Conservative by Periphery	.02	.01	1.02		.02	.01	1.02
Women by Semiperiphery	-.08	.07	.92		-.07	.07	.93
Women by Periphery	-.03	.07	.97		-.04	.07	.96
Age by Semiperiphery	.	.	1.		.	.	1.
Age by Periphery	.	.	1.		.	.	1.
Urban by Semiperiphery	-.06	.12	.94		-.09	.11	.92
Urban by Periphery	.02	.11	1.02		.04	.1	1.04
Confidence in Government Institutions by Semiperiphery	.04	.05	1.04		.08	.05	1.08
Confidence in Government Institutions by Periphery	.15	.05	1.16	**	.17	.05	1.18	**
Confidence in Environmental Movement by Semiperiphery	-.06	.03	.94	+	-.08	.03	.93	*

Confidence in Environmental Movement by Periphery	-.01	.04	.99	-.03	.04	.97
Subjective Social Class by Semiperiphery	--	--	--	-.02	.05	.98
Subjective Social Class by Periphery	--	--	--	.	.05	1.
Some Primary Education by Semiperiphery	--	--	--	.17	.15	1.19
Some Primary Education by Periphery	--	--	--	.09	.17	1.1
Some Secondary Education by Semiperiphery	--	--	--	.21	.16	1.23
Some Secondary Education by Periphery	--	--	--	.09	.18	1.1
Completed Secondary Education by Semiperiphery	--	--	--	.19	.15	1.21
Completed Secondary Education by Periphery	--	--	--	-.11	.17	.9
Some College Education by Semiperiphery	--	--	--	.18	1.15	1.24
Some College Education by Periphery	--	--	--	.21	-.89	.83
Completed College Education by Semiperiphery	--	--	--	.17	.48	1.09
Completed College Education by Periphery	--	--	--	.19	-1.62	.74
Income by Semiperiphery	--	--	--	-.02	.03	.98

Variance Components	VC	SD		VC	SD		VC	SD		VC	SD	
Income by Periphery				--	--	--				.01	.03	1.01
Intercept	.03	.16		.03	.17		.03	.16		.03	.17	
Catholic	.05	.23	+	--	--		--	--		--	--	
Orthodox	.09	.3		--	--		--	--		--	--	
Jewish	.12	.34		--	--		--	--		--	--	
Muslim	.15	.39	+	.07	.27	*	.11	.33	**	.09	.3	**
Hindu	.45	.67	*	.12	.35	**	.26	.51	**	.28	.53	***
Buddhist	.08	.29		--	--		--	--		--	--	
Other	.09	.31	*	.05	.22	*	.05	.22	**	.07	.27	**
Protestant	.02	.13		--	--		--	--		--	--	
Conservative	.	.02	+	.	.02	*	.	.02	*	.	.01	*
Women	.01	.11		.01	.1	*	.01	.1	*	.01	.09	*
Age	.	.01	**	.	.01	***	.	.	***	.	.	***
Subjective Social Class	.01	.08	+	--	--		--	--		.01	.07	**
Urban	.05	.21	*	.04	.2	*	.04	.19	**	.03	.16	**
Confidence in Gov't Institutions	.02	.14		--	--		--	--		--	--	
Confidence in the Environmental Movement	.01	.12		--	--		--	--		--	--	
Some Primary Education	.03	.16		--	--		--	--		--	--	
Some Secondary Education	.04	.19		--	--		--	--		--	--	
Completed Secondary Education	.05	.21		--	--		--	--		--	--	
Some College Education	.11	.33		--	--		--	--		--	--	

Completed College Education	.14	.37		--	--		--	--	--	--
Income	.	.05	**	--	--		--	--	.	.05	***

*** p < .001

**p < .01

* p < .05

+ p < 0.1

Religion Reference = "no religious preference"

Education Reference = "no formal education"

Level-1 N = 34,555

Level-2 N = 27

Data Sources: Level-1 data come from the 1999-2001 World Values Survey (http://www.worldvaluessurvey.org/). Level-2 data come from the 2000 Central Intelligence Agency (CIA)

World Factbook (https://www.cia.gov/library/publications/the-world-factbook/) and from the 2000 Environmental Sustainability Index (ESI) (http://sedac.ciesin.columbia.edu/es/esi/).

Level-2 variance components indicate that Model 1 explains 84% of the level-2 variance, Model 3 explains 81% of the level-2 variance, and Model 4 explains 82% of the level-2 variance.

Figure 5.3: Graph of Predicted Values of Willingness to Sacrifice for Religious

Affiliation by World-System Position Interaction
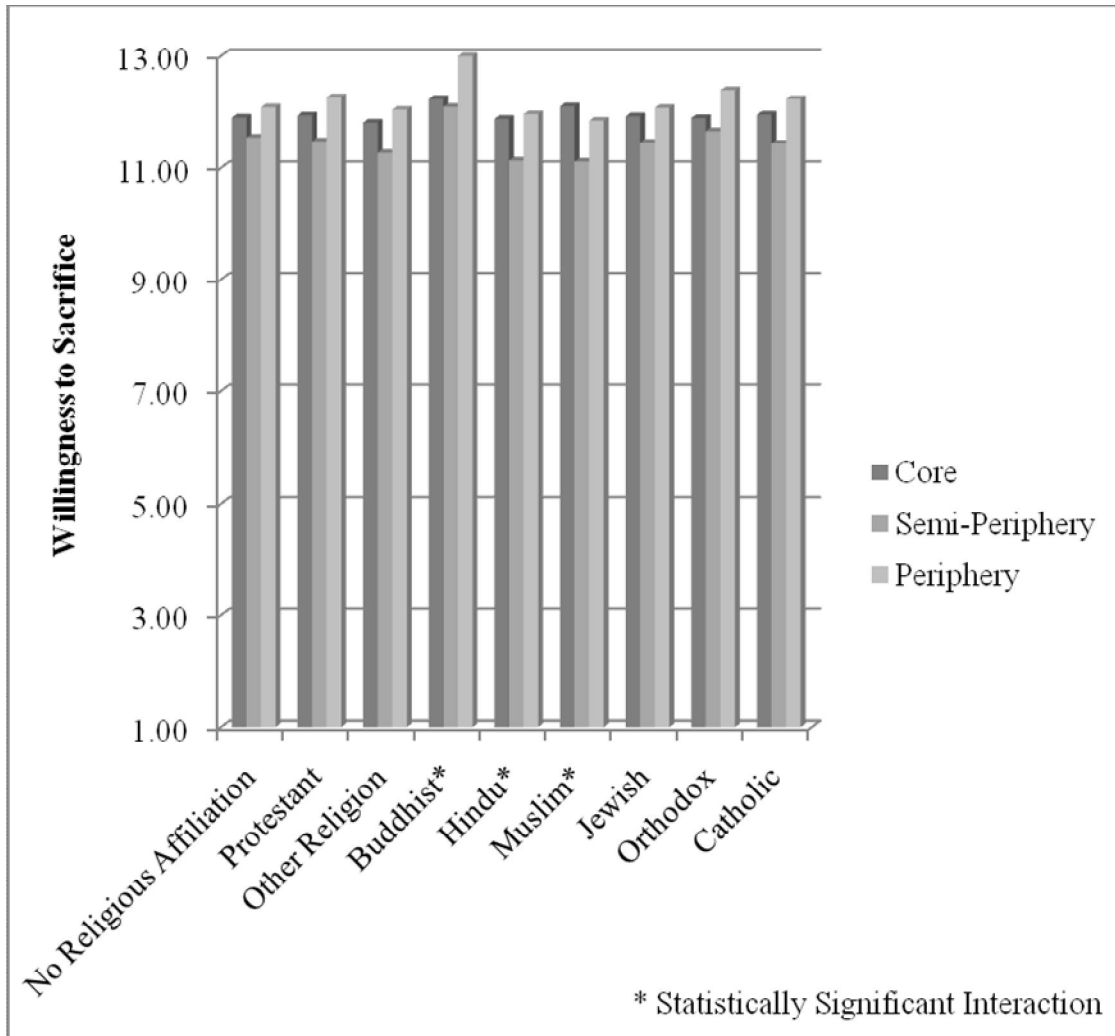
Figure 5.4: Graph of Predicted Values of Willingness to Sacrifice for Gender by World-System Position Interaction
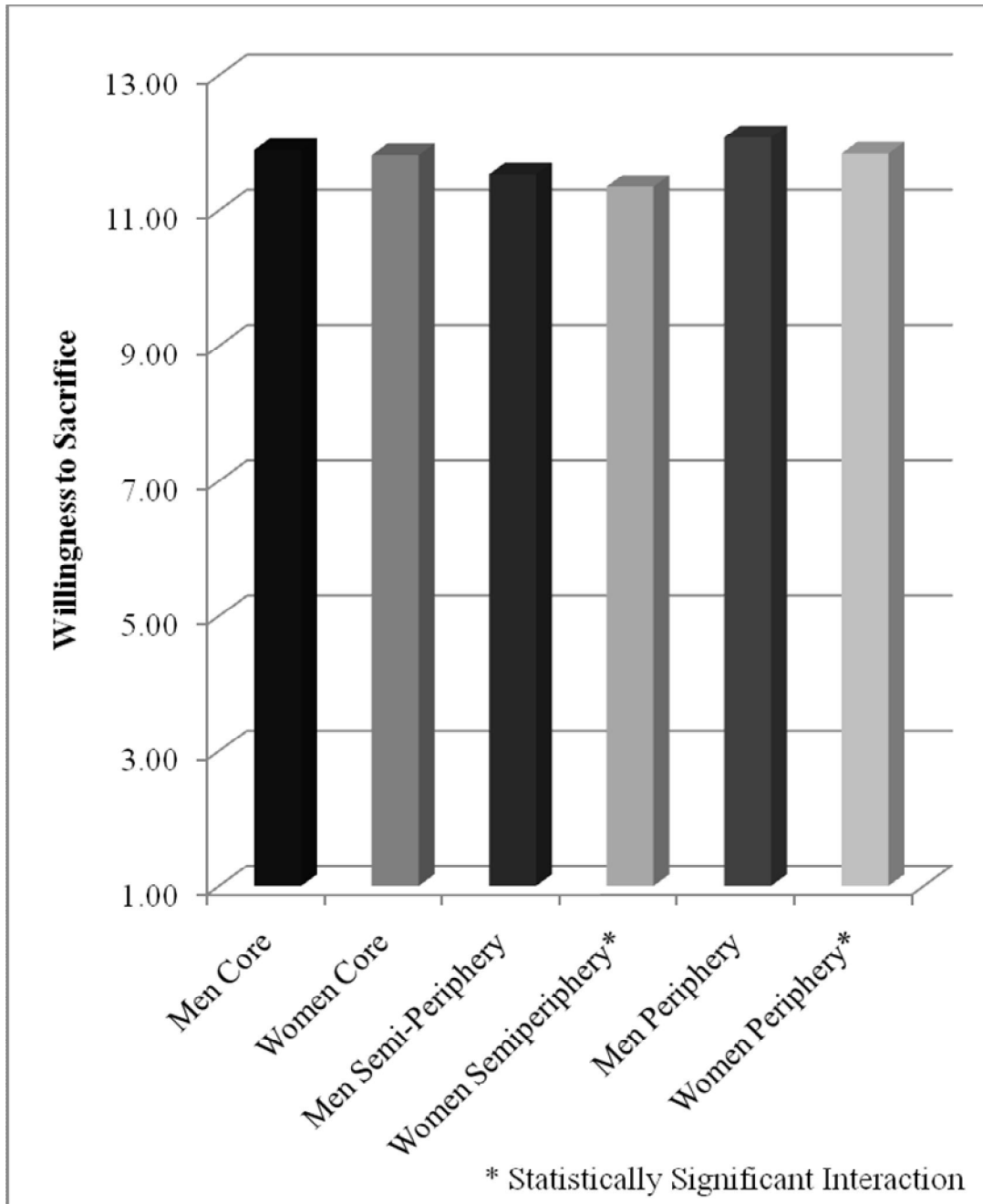
Figure 5.5: Graph of Predicted Values of Willingness to Sacrifice for Education by
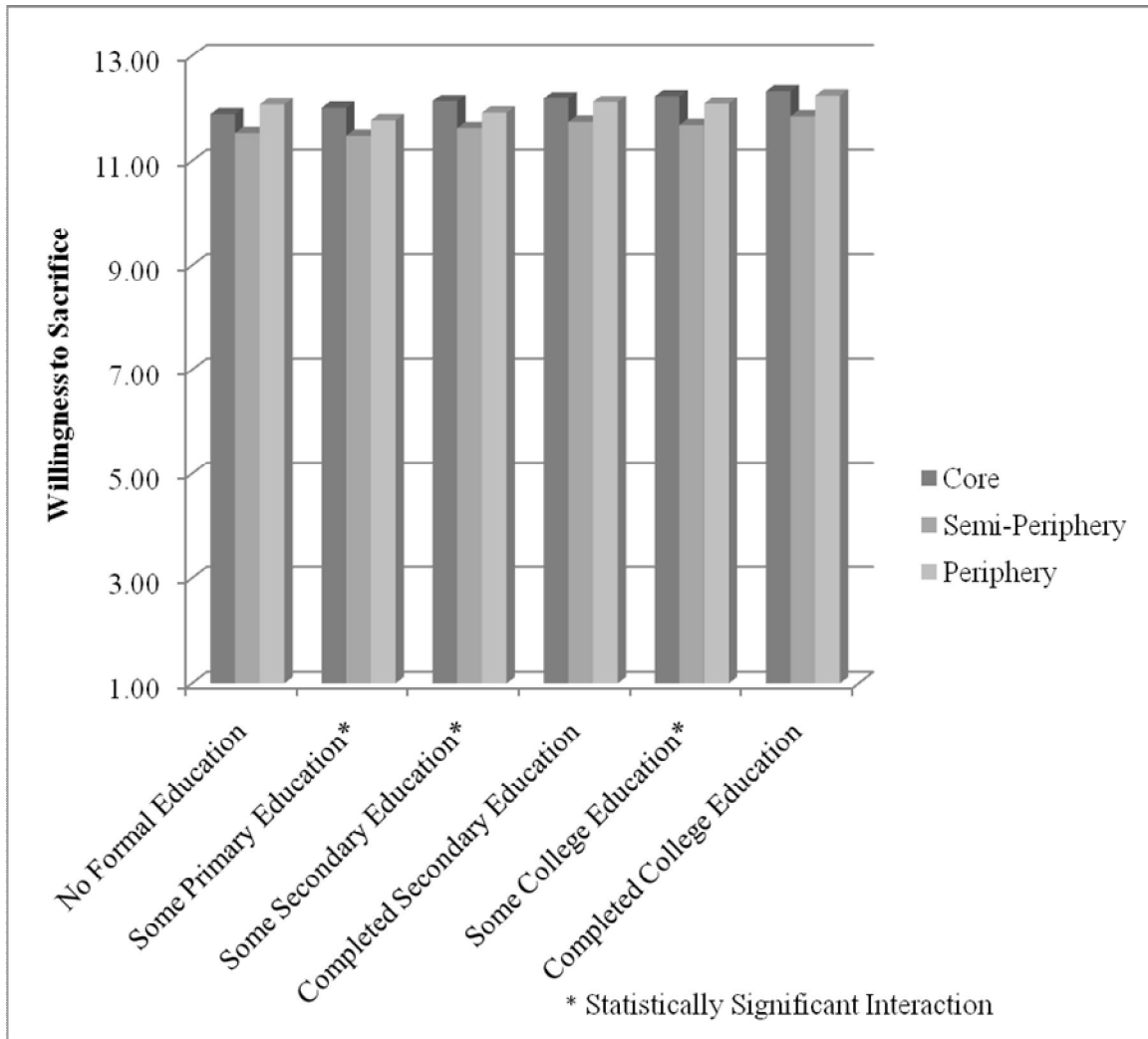
World-System Position Interaction

Figure 5.6: Graph of Predicted Values of Economic Tradeoffs for Religious Affiliation
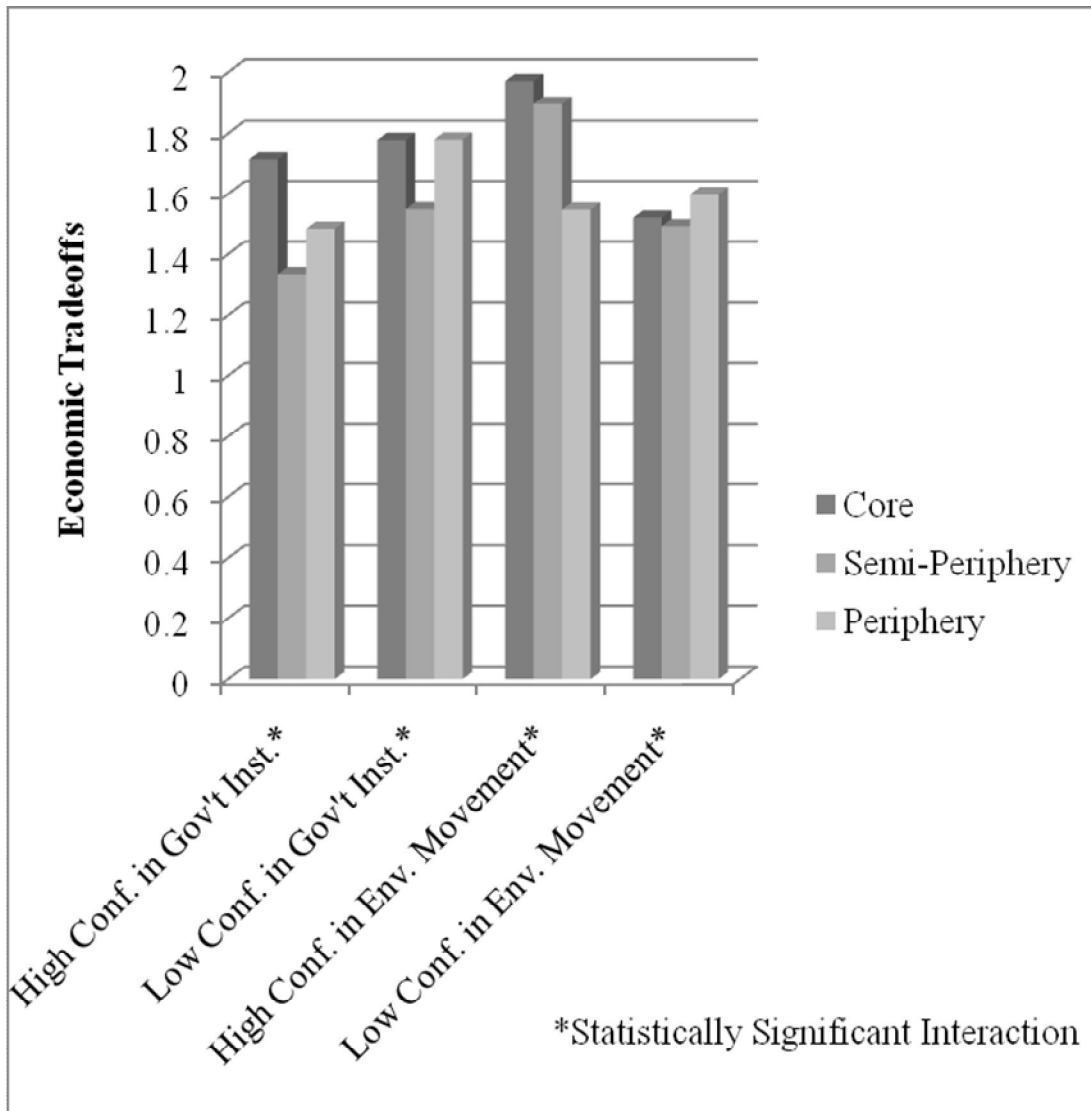
by World-System Position Interaction
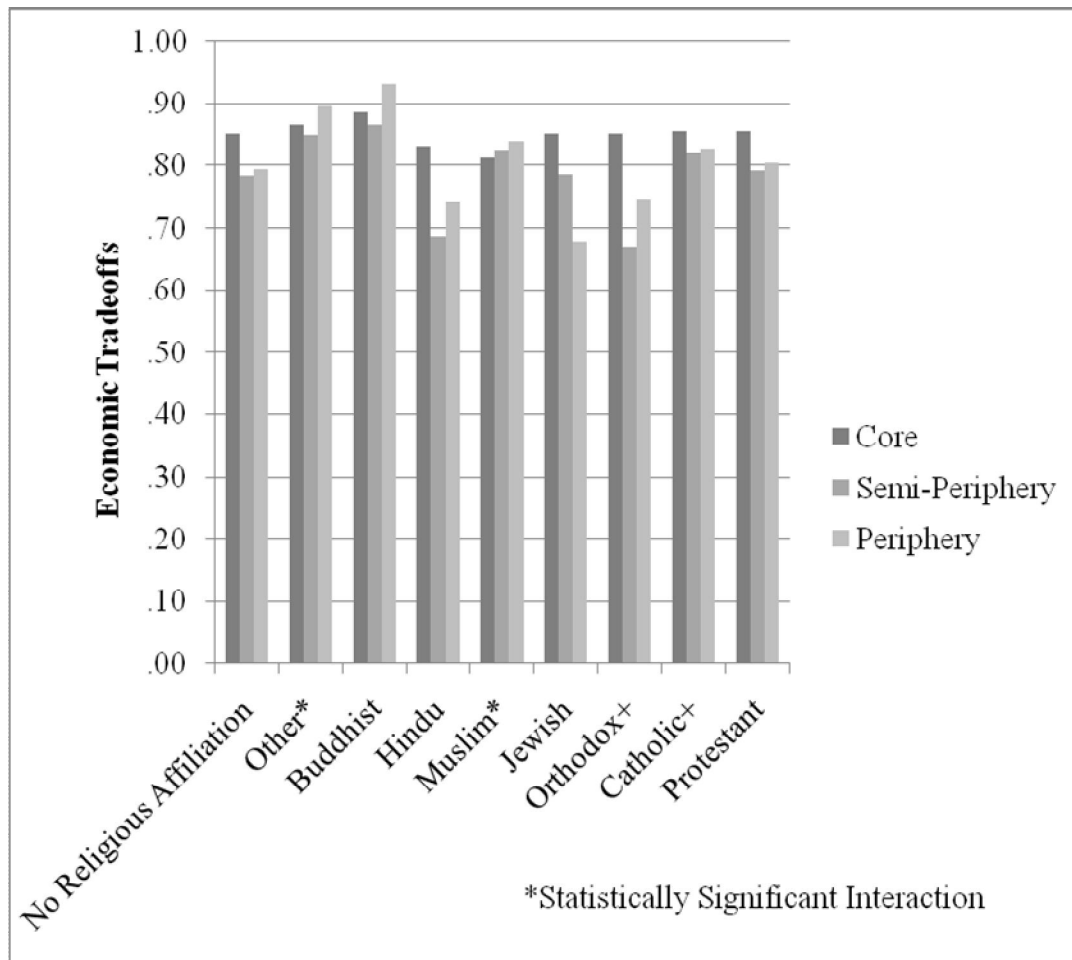
Figure 5.7: Graph of Predicted Values of Economic Tradeoffs for Confidence in Government Institutions and Confidence in the Environmental Movement by World-System Position Interaction

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