NATIONAL AFFLUENCE, ECONOMIC GROWTH, AND ENVIRONMENTAL DEGRADATION: A MULTILEVEL ANALYSIS OF ENVIRONMENTAL CONCERN

by

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ABSTRACT

The study of environmental values is focused on explaining environmentalism with either the postmaterialist values hypothesis or the objective problems subjective values hypothesis. The first explains environmentalism as the result of affluence, mainly in the Global North, and the second focuses on exposure to degradation, mainly in the Global South. In this study I engage theories of ecological modernization, ecologically unequal exchange, and treadmill of production to examine the effects of national levels of affluence, economic growth, and degradation on the likelihood that individuals in different nations will consider environmental protection highly important. Results of multilevel analysis indicate that high levels of national affluence are associated with less individual environmentalism, contrary to affluence and ecological modernization theories. I also find that higher rates of economic growth are associated with higher levels of environmentalism, although as ecologically unequal exchange and treadmill of production theories suggest, this may have less to do with improving economic circumstances and more to do with the degradation that accompanies development.
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INTRODUCTION

Concern for the natural environment is a growing phenomenon. The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Intergovernmental Panel on Climate Change report have raised global political awareness of anthropogenic climate change, while numerous grass roots movements, environmental non-governmental organizations (NGOs), and books, documentaries, and news stories focus on the myriad environmental issues facing citizens around the world. Within the field of sociology, environmental sociology has been gaining force since the 1970s (Dunlap and Catton 1979). In a World Values Survey question asking respondents to choose between environmental protection and economic development, the overall percentage choosing environmental protection has increased from 44% in 1995 to 47% in 2000 and to 56% in 2005.¹

There is considerable debate over the study of environmental attitudes worldwide, to which this study makes both theoretical and methodological contributions. Previous research mainly focuses on either individual level attributes that predict environmentalism or country level comparisons. Findings are explained by postmaterialist values and objective problems subjective values (OPSV) theories (Brechin 1999; Brechin and Kempton 1997; Inglehart 1995 and 1997), which can also be

framed as affluence versus exposure to degradation hypotheses. This author proposes that a more nuanced understanding of global environmentalism is needed, and this study makes two key contributions to the debate. First, I extend the understanding of attitudes by engaging three theories, ecological modernization and treadmill of production from environmental sociology and ecologically unequal exchange, from the comparative social sciences (Jorgenson and Clark 2009), to examine national level predictors of environmental attitudes and to explain findings that do not align with postmaterialist values and objective problems subjective values hypotheses. Second, in the study of value formation both individual attributes and national level context can be a source of variance, therefore, rather than focusing on individual or national determinants of attitudes, I use multilevel analysis to account and control for variance simultaneously at both levels (Raudenbush and Bryk 2002). Not accounting for the hierarchical structure of the data can increase the likelihood of spurious findings. Multilevel models also allow for testing of hypotheses at the national level (Martin and Brady 2007). A small number of other studies use multilevel models in the environmental values field (Gelissen 2007; Haller and Hadler 2008); however, they do not engage the same theoretical frameworks or they focus mainly on more affluent nations.

In this study I explore the following research questions: What individual and national levels factors contribute to an individual’s attitudes concerning the environment? Does a nation’s position of affluence in relation to other nations have a causal impact on environmental attitudes within that nation? Does a nation’s level of economic growth or environmental degradation impact environmental attitudes? Which theoretical perspectives help explain findings regarding individual and national levels of
environmentalism? To explore these questions I employ rigorous multilevel modeling techniques (Raudenbush and Bryk 2002), and I use individual level data from the 2005 wave of the World Values Survey (WVS) and national level data from the World Resources Institute (WRI) EarthTrends Database and World Bank data from the World Development Indicators and Global Development Finance databases.¹ I find, contrary to the postmaterialist values affluence hypothesis, that high levels of national affluence are actually associated with less individual environmentalism. This is also contrary to ecological modernization theory. I also find that higher rates of economic growth are associated with higher levels of environmentalism. This finding may seem to support the affluence hypothesis, however, ecologically unequal exchange and treadmill of production theories suggest this has less to do with improving economic circumstances and more to do with the degradation that accompanies development (Hornborg 1998; Jorgenson 2006; Rice 2007; Schnaiberg 2000).

I begin with a discussion of the relevant theoretical perspectives, including affluence, postmaterialist values, objective problems subjective values (OPSV), ecological modernization, ecologically unequal exchange, and treadmill of production theories. I then discuss prior studies of environmental values. Next, I discuss the multilevel modeling method used, variables and sources of data, and countries included in the analysis. After a presentation and explanation of the research findings I discuss their theoretical implications. I conclude by highlighting the most important findings of this work and directions for future research.

Citizen concern for environmental quality is an important area of study in fields such as environmental sociology, development economics, and political science. The commonsense approach regarding environmentalism is that only those who are affluent enough to care about concerns beyond immediate survival are able to engage in environmental actions (Dunlap and York 2008). These assumptions are supported by the presence of green parties and environmental group membership in affluent nations (Dalton 2005; Dunlap and York 2008), by emphasis on development aid as opposed to environmental protection assistance directed toward countries of the Global South (Broad and Cavanagh 1993), by some resistance from countries of the Global South to environmental protection policies that limit development (Roberts and Parks 2007), and by previous studies that found support for these hypotheses (Diekmann and Franzen 1999; Inglehart 1995; Kidd and Lee 1997). With the rise of (1) environmentalism in the Global South, (2) environmentalism across classes, (3) global political environmentalism, and (4) transnational environmental movements, however, the existing explanations of environmentalism as related to affluence in some instances and degradation in others need to be theorized and developed further to capture transitions in and nuances of global environmentalism.
Affluence hypotheses look at both individual and national levels of affluence as correlated with environmentalism. One of the main theories in this vein is Inglehart’s postmaterialist values theory (1997, 1995, 1990, and 1977). Inglehart is the creator of the intergenerational values change hypothesis, also termed the “silent revolution in Europe,” and is a leading figure in the creation and management of the World Values Surveys, which are vital in providing data for the testing of this hypothesis and assessment of global environmental attitudes in general. The postmaterialist values thesis explains that in the past societies and individuals had to remain focused on survival, or material concerns, however, with the rise of the welfare state and the economic growth of advanced industrial societies, survival needs no longer have to be a top priority, giving rise to postmaterialist values including issues of belonging, freedom of expression, freedom of choice, and environmental concerns (Inglehart 1997, 1995, 1990, and 1977).

If the postmaterialist values hypothesis requires affluence to lead to environmentalism, it follows that environmentalism in the Global South cannot be explained by postmaterialist values because many of these societies have not undergone the transformation Inglehart identifies. Dunlap and Mertig find,

The emergence of widespread concern for environmental quality in nonindustrialized nations poses an anomaly for the theory of postmaterialist value change because those nations have yet to experience the economic security needed to generate the postmaterialist values that presumably spawn environmentalism (1997:24).

Dunlap and York also find evidence against the affluence hypothesis at the national level and the affluence-based postmaterialist values at the individual level. In research that compares three waves of the World Values Surveys (WVS) and the 1992 Health of the
Planet survey (HOP) Dunlap and York (2008) find that national affluence correlates inconsistently with environmental concern.

In response to the growing environmentalism in the Global South among members of all classes, rather than rescind his earlier hypothesis, Inglehart created what Brechin coined the objective problems subjective values (OPSV) hypothesis (Brechin 1999; Inglehart 1995), to describe environmentalism in less developed countries. This theory states that people who have more direct exposure to environmental problems will have more environmental concerns and will be more willing to act for environmental causes. Inglehart posits that this explains the situation in countries of the Global South, while the postmaterialist values shift continues to explain the situation in countries of the Global North, claiming that:

Public support for environmental protection policies is stimulated by two completely different types of factors. The result is that, in global perspective, neither high pollution levels nor high levels of postmaterialism appear to have a significant impact on support for environmental protection. It is only by analytically disentangling their joint effects, that the importance of either factor becomes manifest (1995:66).

By this statement Inglehart is implying that when data for countries of varying levels of affluence are combined, one does not see significant results for affluence or degradation, but only by stratifying the sample can one see these results. The criticism of this theory is that it is difficult to test because it is not falsifiable; it claims to explain the same thing differently in different locations, with affluence explanations limited to the Global North and exposure to degradation explanations limited to the Global South. Not only is this a problem with the structure of the theory, but it is a problem because in reality, despite examples such as improvements in air quality in many affluent societies that Inglehart
(1995) notes, environmental degradation is not limited to less affluent societies, nor are the values that lead one to value environmental protection without direct exposure to degradation necessarily limited to affluent societies. For example, Brechin (1999) finds that citizens in the Global South express concern for global environmental problems, not only for local environmental degradation to which they have direct exposure. Work is needed to test theories of affluence and degradation at both the individual and national levels in both the Global North and Global South.
ECOLOGICAL MODERNIZATION, TREADMILL OF PRODUCTION, AND ECOLOGICALLY UNEQUAL EXCHANGE

Another of the major assumptions about environmentalism is that citizens of the Global South care more about development than about protection of the environment, or that development must come before environmental protection (Beckerman 1974; Brechin and Kempton 1994; Hobsbawm 1994;). Inglehart’s affluence based postmaterialist values thesis places emphasis on increasing affluence as a means to bring about a values shift (1995) and is thus in line with Maslow’s hierarchy of needs, with neoclassical and neoliberal understandings of concern for a quality environment as a luxury, and with ecological modernization theory. Drawing from W. W. Rostow’s (1964) modernization theory, which views societies as traversing a linear process of development modeled on the path of Western nations, some of the major voices of ecological modernization theory see this form of modernization as a necessary path to social change (Huber 2000; Spaargaren and Mol 1992). Ecological modernization proponents view development and modernization as necessary steps in providing the governments and citizens of less developed nations the funds and resources to have concern for and take action to protect the environment (Zahran et al. 2007). Along with such modernization, the theory suggests that citizens and nongovernmental groups will put pressure on the government and businesses to engage in more sustainable practices. The result is predicted to be an environmental Kuznets curve, where efficiency will increase and impacts will decline.
with modernization (York, Rosa, and Dietz 2003). While ecological modernization theory adherents acknowledge that previous development has added to environmental problems, they see reformed economic development as a means to solve the problems. Ecological modernization theory places positive emphasis on economic development as the means to environmental protection (Dunlap and York 2008; Duroy 2008).

Furthermore, proponents of ecological modernization theory view reform of the current system as possible and focus their efforts to reform the current capitalist system through economic, political, and cultural avenues. The idea is that economic restructuring will make the production system more efficient and ecological, governments will institute policies that support such progress, and citizens will call for such action and modify their own behaviors to become more sustainable (Zahran et al. 2007). Thus ecological modernization theorists and supporters of the postmaterialist values shift hypothesis are similar in that they see development following a path of increasing affluence that should coincide with ecological modernization, which reduces impacts on the environment and increases environmentalism. Via this path, this family of theorists envisions capitalism proceeding down a more sustainable path without the need for radically altering the capitalist economic system.

Ecological modernization theory is hotly contested by many, especially by proponents of treadmill of production theory. First proposed by Schnaiberg (1980), treadmill of production theory frames capitalism as inherently in conflict with environmental sustainability (Gould, Pellow, and Schnaiberg 2004). In the ongoing struggle against competition for increasing profits, capitalists must increase worker productivity and increase environmental extraction; profits increase, but environmental
quality and worker stability decrease (Gould et al. 2004). Despite the detrimental outcomes for workers and for the environment, there is a false consciousness that this is progress that is necessary for societal advancement. Schnaiberg (1980) also focuses on the importance of inequalities in the debate over environmental protection and draws attention to the matter of whose interests are served by the specific forms environmental protection and treadmill environmental degradation take. Broad and Cavanagh (1993) also contest ecological modernization theory and detail what they see as three myths based in ecological modernization theory that came out of the 1992 Rio Earth Summit: that the poor are the problem because they engage in environmentally destructive behaviors as a means to survival such as the cutting and burning of rainforests, that growth and development will resolve environmental problems, and that development aid from the wealthier nations is a key part of the solution. York (2004) refutes ecological modernization theory by contending that theorists see evidence of ecological modernization when they look at specific case studies, even as overall environmental performance is getting worse, which is in line with treadmill of production theories. Finally, Gould et al. (2004) write that, “more of human activities all throughout the world fall under the influence of the treadmill institutions and logic” (pp. 305-306, emphasis theirs).

Buttel (2000) maintains that ecological modernization theory maintains its prominence because it aligns well with other agendas and places importance on political processes, despite the fact that much research has shown that development leads to more environmental degradation. York, Rosa, and Dietz (2003) test the ability of three groups of theories, human ecology, ecological modernization, and political-economy, to predict
environmental impacts. They find that factors derived from modernization theory, political freedom, civil liberties, and state environmentalism, are not significant predictors of environmental impacts but that material conditions such population and economic production are good predictors of impacts. Shandra et al. (2008) find in support of dependency theory that debt and structural adjustment programs increase levels of deforestation in poor nations. York (2008), in a study of former Soviet Republics, finds that de-modernization decreases CO2 emissions. Jorgenson, Austin, and Dick (2009) find that primary sector exports correlate with deforestation. There is also evidence that FDI in the manufacturing sector and overall export intensity are positively associated with industrial water pollution, and that foreign investment dependence in the primary sector is positively correlated with pesticide and fertilizer use intensity, deforestation, and CO2 emissions (Jorgenson 2007, 2008, and 2009; Jorgenson and Kuykendall 2008). Counter to ecological modernization theory, all of these findings suggest that more development actually leads to more environmental degradation. This stands in opposition to the assumption that development must occur before people achieve adequate levels of affluence that enable them to care about the environment. If the exposure to degradation hypothesis is accurate, it may actually be that development, rather than bringing affluence that leads to environmentalism, actually brings degradation that leads to environmentalism.

Ecologically unequal exchange theory, while not suggesting that degradation hypotheses are limited to less affluent countries, draws attention to how less affluent countries often pay the environmental costs of development and global consumption (Hornborg 1998; Rice 2007). Ecologically unequal exchange theory “posits that more-
developed countries externalize their consumption-based environmental costs to less developed countries, which increase forms of environmental degradation within the latter” (Jorgenson, 2006:685). This suggests that environmental degradation may indeed be more of an immediate concern in less developed countries, especially in less affluent countries whose economies are centered on export trade to more developed countries. In support of the theory of ecologically unequal exchange Jorgenson (2006 and 2009) finds evidence that less developed countries with high levels of exports sent to more developed countries experience greater rates of deforestation. Studies also show that more affluent nations have considerably higher consumption based ecological footprints while levels of consumption, which can also serve as a proxy of well-being, are suppressed in less developed nations (Jorgenson, 2009; Jorgenson, Austin, and Dick 2009; Jorgenson and Burns 2007; Rice 2007). Furthermore, in studies of the ecological footprint, a measure of consumption based human pressure on the environment, York, Rosa, and Dietz (2009) find that even as efficiency improves, overall intensity continues to increase. Gould, Pellow, and Schnaiberg (2004) note that although there has been some decoupling of energy consumption and GNP increases in the United States in the past 20 years, much of the increase in GNP arises from production in other countries. Thus degradation is externalized and other countries pay the environmental costs of rising U.S. prosperity. The environmental Kuznets curve hypothesis, in line with ecological modernization theory, suggests a U shaped relationship where environmental pressures increase up to a certain degree of affluence at which point efficiency improves and environmental pressure decreases; however, evidence of this is not found by Dinda (2004) or by Bagliani, Bravo, Dalmazzone, Giaccaria, and Golia (2008). Ecologically unequal
exchange theory suggests that even when evidence of ecological modernization Kuznets curves and examples of efficiency are found, it is important to take into account the externalization of environmental costs and measures of total efficiency if an accurate understanding of environmental pressures is to be realized.

These arguments do not exclude degradation as a factor in environmentalism in more affluent countries or indicate that it is necessarily the causal factor of environmentalism in less affluent countries, however this structural perspective and understanding of material conditions related to global environmental inequalities is key to understanding the formation of environmental attitudes and the implications of affluence and degradation hypotheses in more and less developed nations. Brechin calls on researchers to consider the complexities of the formation of environmental attitudes including “social perceptions, local histories and environmental realities, international relationships and influences, and unique cultural and structural features of particular countries and regions” (1999:807). He sees the need for both more data and more methodologies. This study is an attempt to extend the research of environmental attitudes both theoretically and methodologically by taking global structural situations into account.
PRIOR STUDIES OF ENVIRONMENTAL VALUES

Many previous studies of environmental values focus on individual level factors that predict environmentalism (Chatterjee 2008; Torgler and Garcia-Valinas 2006). Other studies focus on affluence and degradation hypotheses (Franzen 2003; Inglehart 1995) or challenges to the North/South divide or other aspects of these hypotheses (Brechin 1999, Dunlap and Mertig 1997; Dunlap and York 2008). Some conclude that although environmentalism is increasing in LDCs, the affluence hypothesis cannot be rejected (Diekmann and Franzen 1999) while others maintain that growing global environmentalism defies easy explanation with connects to affluence (Dunlap and Mertig 1997). Here I briefly discuss several noteworthy findings as well as limitations of prior works in this area of inquiry.

Kemmelmeier, Krol, and Kim (2002) using International Social Survey Programme (ISSP) data find that the recent economic growth of a society, but not the current state of economic development, predict the extent to which individual’s environmental views are linked to their personal resources. The authors explain this by saying that changes in quality of living condition are often more important to individuals than they are to the absolute level. The authors suggest future research consider links between material concerns and attitude formation, such as beliefs about money or comparisons to peers or others.
Brechin and Kempton (1994, 1997, and 1999) identify problems with the applicability in LDCs of questions regarding willingness to pay higher prices or higher taxes for environmentalism. Many studies, especially earlier ones that focus on more developed countries because of availability of data, focus on willingness to pay questions (Diekmann and Franzen 1999; Franzen 2003; Inglehart 1995; Kemmelmeier et al. 2002). While some analyses that use these questions lend support to the affluence hypothesis, the results are flawed because of the inapplicability of the questions to poor individuals and in LDCs (Brechin and Kempton 1997). Gelissen (2007) in a multilevel study of respondents from 50 nations also problematically uses one willingness-to-pay question as the dependent variable. Gelissen also finds that higher levels of national wealth are linked to lower levels of environmentalism, thus his findings indicate that affluence matters but in the opposite direction suggested by Inglehart. Gelissen’s findings are also in line with Dunlap and Mertig (1997) the latter of which, using several different measures of environmentalism from the Gallup survey, find that three of their measures of environmentalism are negatively correlated with national affluence and that value orientation measures are of little use in explaining environmentalism. They identify a need for more investigation into the complex sources of environmental concern.

A second problem with previous research is that the use of national level measures of environmental harms has been limited due to the limited availability of data and the nature of environmental degradation in that it does not adhere to national boundaries. These measurement issues, also linked to the way environmental degradation is a tragedy of the commons (Hardin 1968), has allowed for the under-emphasis of exposure to harms in the Global North. Gelissen (2007) uses indicators from
the Environmental Sustainability Index (ESI) which include measures of air and water pollution to indicate environmental problems at the national level. After finding only moderate or inconclusive support for the objective problems subjective values hypothesis, however, he questions this environmental measure. Jahn (1998) attempts to tackle the problem by creating an index of environmental pollution changes in the 1980s and 1990s across 18 OECD (Organization for Economic Cooperation and Development) nations. Inglehart (1995) also tries to include environmental conditions in his analysis but is limited to studying more developed nations because of a lack of data for national levels of environmental degradation for less developed countries.

Other researchers point to a third problem, issues of what survey questions, and measures developed from these questions, are actually measuring. Xiao and Dunlap (2007) use factor analysis and employ indicators that are composites of survey answers in an attempt to address these issues, however questions of measurement of environmentalism and of perceptions of environmental degradation, especially in less affluent countries, is a concern to keep in mind. Case studies and ethnographies provide insight into cultural differences that impact survey interpretation and environmentalism in general. In a review of three cases of environmental grassroots organizations in India, Nigeria, and Bolivia, Lewis (2009) finds there are fundamental differences between environmentalists and environmental movements in the Global North and Global South, including differences in organizational structure and tactics, origins, and understandings of how humans fit into nature along the lines of the HEP-NEP debate\(^3\) (Catton and Dunlap 1978; Dunlap et al. 1993). Environmentalism in the Global South is often not

\(^3\) Catton and Dunlap (1978) claimed that sociology was dominated by a Human Exemptionalism Paradigm that focused on humans and society as separate from nature, and instead proposed a radical New Ecological Paradigm (HEP-NEP) that took into account the place of humans and society as inseparably part of nature.
exclusively related to environmental concerns, but is also often linked to related economic issues. Lewis describes environmentalism in less developed countries as often consisting of small groups of volunteers who join together to protect the environment in conjunction with their economic livelihood and notes that the activists often work in a more holistic tradition, less single-mindedly devoted to environmentalism. Membership in groups whose sole purpose is environmental may be less common in the Global South, however, this should not be seen as an indicator of less involvement in environmental causes.

These examples of cultural differences further illustrate the point that many questions written in the Western context will be problematic in the context of LDCs and must be considered and using single questions as outcomes may provide more transparency than creating indices whose multiple measures may be interpreted differently in different circumstances. Chatterjee (2008), writing on environmental concern in India, sheds light on the issues of question design and differences in environmentalism in more and less developed countries. Chatterjee writes “the much exercised HEP-NEP distinction developed in the West seems inappropriate in the Indian context due to wide differences in traditions and the dominant worldviews” (2008:5). Guha and Martinez-Allier’s (1997) findings are that in India caste, a variable specific to India, is significant. One of Chatterjee’s most significant contributions is an eight point cultural explanation of why it is difficult to use a Western designed model to study environmentalism in India, including that dominant belief systems differ and the question of conquering nature is less significant than coexistence with nature, relative economic disadvantage makes Indians more dependent on nature, poverty makes environmentally
friendly practices such as recycling a necessity for economic reasons, that frugality is viewed positively over consumerism, and ultimately there are issues of language and entire concepts, such as ‘environmentalism,’ not translating, especially to rural Indians. Both Lewis and Chatterjee also refer to Guha’s conception of “the ‘ecology of affluence’ and ‘environmentalism of the poor’” (Lewis 2009:244). In an ethnographic study of environmental degradation in an Argentine shantytown, Auyero and Swistun (2009) find that while environmental degradation directly impacts the health and lives of the inhabitants, their understandings of environmental threats and where to place blame or how to receive restitution are confused by a process they term the “production of uncertainty;” this is an example counter to the objective problems subjective values hypothesis.

These case studies of environmentalism in the Global South highlight the need to take into consideration both individual contexts and national level situations. Two studies by Gelissen (2007) and Haller and Hadler (2008) use multilevel models in the exploration of environmental values. These studies provide exemplary models, but differ from this study in several ways. Gelissen uses as the dependent variable one willingness-to-pay survey question. He also uses membership in environmental organizations to predict willingness to pay for environmental protection or improvement. Gelissen is exploring different questions within the field of environmentalism. Haller and Hadler use International Social Survey Programme data and focus on environmentalism in more affluent countries. Haller and Hadler also create multiple indices and focuses on a complex interplay of knowledge, emotion, interests and values, along with multiple political variables and contexts.
Further research utilizing multilevel analysis but moving beyond the postmaterialist values and objective problems subjective values dichotomy is needed. The objective problems subjective values hypothesis too narrowly assumes that exposure to degradation acts as a catalyst for environmentalism only in less affluent settings and that exposure to degradation is the only or even the main cause of environmentalism in such settings. Dunlap and Mertig (1997) state that exposure to degradation, as a cause of environmentalism, if it applies, may also apply in more affluent nations. Brechin (1999:802) tests the objective problems subjective values hypothesis and does not find support for it because respondents in less developed countries also have concern for global, not only local problems. Finally, theoretical explanations of postmaterialist values and degradation fail to offer adequate explanations for the rising environmentalism in the Global South and the different forms it may take compared to environmentalism of the Global North (Chatterjee 2008; Guha and Martinez-Alter 1997; Lewis 2009). Environmental concern is now a global concern, and examining both individual and national level factors impacting environmentalism is needed for both theory testing and policy implications.
DATA AND METHODS

I estimate hierarchical generalized linear logit models (HGLM) using HLM 6.0 (Raudenbush and Bryk 2002; Raudenbush et al. 2004). Individual and national level factors combine to impact an individual’s level of environmentalism. Multilevel analysis, synonymous with hierarchical linear modeling, enables taking into account both individual characteristics and social contexts; individuals are nested within nations, and both levels offer a potential source of unexplained variability. Such grouped data violate OLS assumptions because error terms may be correlated. Employing OLS in such circumstances leads to underestimated error terms, increasing the chances of type one errors. HLM accounts for correlated error terms. Country level effects can also moderate the impact of individual characteristics. Multilevel analysis allows for a more accurate understanding of the causal factors impacting the formation of attitudes that reflect concern for the natural environment. This method also enables testing the theories of affluence and exposure to degradation at the national level.

The individual level data are from the fifth wave of the World Values Surveys (WVS)⁴; here I am using representative samples from 38 countries (see Table 1). The 2005 wave of the World Values Survey provide an opportunity to examine environmental attitudes across a range of individuals in a variety of national situations because the 2005 wave conducts surveys in a greater number of less affluent countries than in years past, because respondents were asked a number of questions regarding their levels of

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⁴ World Values Surveys available at www.worldvaluessurveys.org.
### Table 1: List of 38 Countries and Sample Sizes

<table>
<thead>
<tr>
<th>Countries</th>
<th>Number of Individuals</th>
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<tbody>
<tr>
<td>Argentina</td>
<td>976</td>
</tr>
<tr>
<td>Australia</td>
<td>1395</td>
</tr>
<tr>
<td>Brazil</td>
<td>1499</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>944</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>1439</td>
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<tr>
<td>Chile</td>
<td>968</td>
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<tr>
<td>China</td>
<td>1930</td>
</tr>
<tr>
<td>Cyprus</td>
<td>1047</td>
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<tr>
<td>Egypt, Arab Rep.</td>
<td>3044</td>
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<td>Ethiopia</td>
<td>1478</td>
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<tr>
<td>Finland</td>
<td>1012</td>
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<td>Germany</td>
<td>2019</td>
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<td>Ghana</td>
<td>1524</td>
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<tr>
<td>India</td>
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</tr>
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<td>Ukraine</td>
<td>972</td>
</tr>
<tr>
<td>United States</td>
<td>1216</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1473</td>
</tr>
<tr>
<td>Zambia</td>
<td>1438</td>
</tr>
</tbody>
</table>
environmentalism, and because representative samples of individuals from different countries all answer the same comparable questions. Also, the early World Values Surveys only capture information on pollution; in the fifth wave Inglehart has continued to respond to his critics and improve his surveys by creating questions regarding environmental concern that are more applicable to both more and less developed countries, and he includes measures of individual exposure to environmental degradation in addition to questions about concern for global environmental problems. The country-level data are compiled from the World Resource Institute (WRI) Earth Trends database\(^5\) and World Bank World Development Indicators (WDI).\(^6\)

I estimate HGLM models with one individual-level World Values Survey question as the dependent variable. The question asks respondents to read some brief descriptions of people and indicate whether the person is like them or not like them on a six point scale. The pertinent description reads: “looking after the environment is important to this person; to care for nature.” I recoded this question to be a binary outcome of the two highest categories versus the four lowest. This split the total number of respondents approximately in half for this question. Splitting the respondents in this way also allows for examination of those who responded in the top two, most environmental categories, versus the other respondents. Since my outcome is binary, I use the Bernoulli outcome option in HLM 6 and thus the HLM logit model predicts the likelihood that a respondent is more environmental based on individual and country level variables.
INDIVIDUAL LEVEL INDEPENDENT VARIABLES

Individual-level variables of specific interest are those representing an individual’s class and exposure to degradation (Gelissen 2007; Inglehart 1995; Jahn 1998; Kidd and Lee 1997). According to the affluence hypothesis, higher class should be associated with higher levels of environmentalism. Class is included in separate models as a five category variable to test the linear effect of class and as a categorical dummy variable with five categories based on a survey question in which respondents described themselves as upper, upper middle, lower middle, working, or lower class. According to theories of exposure to degradation, exposure should also increase environmentalism. Individual exposure to degradation is based on two questions asking respondents how serious the environmental problems of poor water quality and poor air quality are in their own communities. These are recoded as binary comparing the bottom three categories to the top, most serious category, this way the top category for most serious problem contains 45% of the respondents for water and 41% of the respondents for air.

Another individual level variable controlled for is sex. Women are often found to be more environmentally concerned; however, this is based on studies that tend to focus on one country (Blocker and Eckberg 1997; Dietz, Kalof, and Stern 2002) or cross-nationally on very specific environmental actions (Hunter, Hatch and Johnson 2004). Age and level of formal education have also been found to be important individual level determinants of environmental attitudes, although the direction of the relationship is
somewhat disputed (Torgler and Garcia-Valinas 2007). I control for age as a categorical
dummy variable with four fairly evenly distributed age categories, 15-29, 30-45, 46-60,
and older than 60. I also control for education in four fairly evenly distributed categories:
less than complete primary schooling, complete primary schooling and less than complete
secondary schooling, complete secondary schooling, and some university or more.
Although class and education tend to be highly correlated, in this sample they are only
correlated at .4 (see Table 2). Fewer studies on environmental attitudes control for
health, however, the case study of the severely environmentally degraded slum in
Argentina demonstrates the importance of this at the individual level (Auyero and
Swistun 2009) and clearly there are environmental impacts on individual and national
health that might logically spur environmentalism, or these might deter environmentalism
if the health conditions were too severe (Auyero and Swistun 2009; Davis 2002;
Jorgenson 2009). I control for health based on a self reported survey question answer
recoded to binary where 69% of respondents are in the good category versus the fair to
very poor range.
### Table 2: Correlation Matrix

<table>
<thead>
<tr>
<th>Level 1 Variables N=49,328</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dependent variable</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Exposure to air pollution</td>
<td>0.097</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Class</td>
<td>0.027</td>
<td>-0.020</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Education</td>
<td>-0.029</td>
<td>-0.049</td>
<td>0.389</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Female</td>
<td>0.003</td>
<td>0.014</td>
<td>-0.003</td>
<td>-0.063</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Age</td>
<td>0.044</td>
<td>-0.069</td>
<td>-0.010</td>
<td>-0.158</td>
<td>-0.023</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>7. Health</td>
<td>0.021</td>
<td>-0.013</td>
<td>0.182</td>
<td>0.174</td>
<td>-0.046</td>
<td>-0.243</td>
<td>1.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 2 Variables N=38</th>
<th>8.000</th>
<th>9.000</th>
<th>10.000</th>
<th>11.000</th>
<th>12.000</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8. GDP pc (ln)</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. CO2 pc (ln)</td>
<td>0.751</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Water pollution pc (ln)</td>
<td>0.646</td>
<td>0.643</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Deforestation % change</td>
<td>-0.085</td>
<td>-0.065</td>
<td>-0.142</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. GDP growth annual %</td>
<td>-0.687</td>
<td>-0.430</td>
<td>-0.457</td>
<td>0.080</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
COUNTRY LEVEL INDEPENDENT VARIABLES

As a measure of affluence I use gross domestic product (GDP) per capita in current 2005 US dollars, logged to address positive skew. GDP per capita data are obtained from the World Bank. The figure is calculated by dividing GDP by the midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products (World Bank). The World Bank also notes that it is calculated without making deductions for depreciation of fabricated assets or for the depletion and degradation of natural resources. GDP per capita is a standard measure for national level of affluence.

The affluence hypothesis tested herein is as follows: $H_1$: Citizens in affluent nations are more likely to consider themselves environmentalists, or, more affluent nations are more likely to have citizens who consider themselves environmentalists. If national level affluence measured by GDP per capita is significant and positive, increasing the odds of environmentalism, then it supports the affluence hypothesis at the national level. If I do not find support for this hypothesis it calls into question the idea that people in more affluent nations are more environmentally concerned, and conversely causes us to question the assumption that less affluent nations are less environmentally concerned or that people in the Global South desire development more than environmental protection.
I also estimate models that control for GDP growth as an annual percent to get at issues of development. Data are for 2005 from the World Bank and according to the notes for annual percentage growth rate of GDP per capita based on constant local currency, “GDP at purchaser’s prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources” (www.worldbank.org). It is important to note that these two national level measures of affluence are negatively correlated at -.69 (see Table 2).

Environmental degradation poses more challenges for measurement. Environmental problems are both local and at the same time global, but they do not adhere to nation-state boundaries. In fact, as ecologically unequal exchange theory and research on ecological footprints notes, more affluent nations are able to externalize their consumption based degradation to less affluent nations by capitalizing on their position of affluence and power in the global hierarchy (Hornborg 1998; Jorgenson 2006; Rice 2007). Furthermore, some measures of degradation that are used are also highly correlated with GDP per capita, which causes problems of collinearity when they are included in the same model. For example, here the GDP and CO2 per capita variables are correlated at .75 (see Table 2). Finally, there are issues of availability of data across countries. This makes measurement of environmental degradation at the national level challenging. National-level measures used in other studies cited above and selected here to represent environmental degradation include carbon dioxide emissions per capita.
(CO2), organic water pollution emissions per capita, and measurements of deforestation, here represented by total forest area annual percent change.

The first measure of environmental degradation, CO2 emissions per capita is also logged to normalize its positively skewed distribution. CO2 emissions per capita data from 2005, in metric tons per capita, come from the World Bank website, which explains that “carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring.” The World Bank data on CO2 emissions come from the Carbon Dioxide Information Analysis Center, Environmental Sciences Division, Oak Ridge National Laboratory in Tennessee.

Data on the second national-level measure of degradation, industrial water pollution, organic water pollutant (BOD) emissions, kilograms per day, come from the World Resources Institute EarthTrends database, which adapts its data from the World Bank’s World Development Indicators. The per capita measure was obtained by dividing by total population and the variable is logged to deal with skewness. The EarthTrends technical notes state that organic water pollutant emissions are measured in terms of biochemical oxygen demand (BOD), a standard water-treatment test for the presence of organic pollutants. BOD refers to the amount of oxygen that bacteria in water will consume in breaking down waste. The notes give the example of how an overload of sewage in natural waters exhausts the water’s dissolved oxygen content. Low levels of dissolved oxygen in water can impact the health of aquatic resources and ecosystems. More details on this measure taken directly from the EarthTrends website are provided.
below⁷ and additional information is available on the website (earthtrends.wri.org). Since missing country-level data are not permissible in multilevel models using HLM 6, the most recent data available were used for the organic water pollution variable. Data for this measure come from the years 2002-1995, Rwanda uses the 1986 figure, and Mali and Vietnam were assigned the dataset average for this variable.

The third measure of environmental degradation considered is a measure of deforestation, the total forest area, average annual percent change. Data in this case are not a per capita measure but a country’s measure of change. Data are obtained from the EarthTrends database, which obtains its data from the Food and Agriculture Organization of the United Nations. Data provided are the average for the years 2000-2005. According to the EarthTrends website, forest area is determined both by the presence of trees and the absence of other predominant land uses. Land being used for agriculture or

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⁷The biochemical oxygen demand (BOD) of a water sample is usually measured by monitoring the change in dissolved oxygen concentration, in a laboratory environment, over a fixed period of time and at a fixed temperature. The difference between the final dissolved oxygen concentration and the initial dissolved oxygen concentration represents the oxygen consumed (or BOD) in breaking down the organic materials in the sample. A 1998 World Bank study carried out by Hettige, Mani, and Wheeler used plant and sector-level information on organic emissions (measured by BOD) and employment from 13 national environmental protection agencies and sector-level information on output and employment from the United Nations Industrial Development Organization (UNIDO). Their economic analysis found that the ratio of BOD to employment in each industrial sector is about the same across countries. This finding allowed the authors to estimate BOD intensities per unit of employment across countries and over time. Multiplying these estimates by sectoral employment numbers from UNIDO’s industry database for 1980 to 1998 provides sectoral emissions, which were then used to calculate daily emissions of organic water pollutants (BOD). These data were later updated through 2002 using the same methodology. This dataset focuses on organic water pollution resulting from industrial activities measured by biochemical oxygen demand (BOD). Organic matter can also come from sources that are not as easily identifiable as those associated with industrial activities. Such sources are known as nonpoint sources and some examples include agricultural runoff and livestock operations. These nonpoint sources can contribute significantly to the oxygen demand in water and are not represented by the data displayed here. Since water pollution tends to be sensitive to local conditions, the national level data may not reflect the quality of water in specific locations. Since BOD is typically measured in a laboratory environment, where it is difficult to reproduce ambient conditions like temperature, sunlight, and water movement, the measurement should be considered an estimate. The data, however, are fairly reliable because sampling techniques for measuring water pollution are more widely understood and much less expensive than those for air pollution (taken directly from the World Resources Institute EarthTrends technical notes for this variable.)
urban use does not count as part of this measure. Reductions in forest areas can be caused by humans or natural disasters and increases can occur naturally on abandoned land or by planting of trees on land that did not previously contain forestland. If a forest is cut down but replanted or comes back on its own relatively quickly, it is not considered part of this measure. This information is obtained from reports filled out by national governments. Further detail on this variable taken directly from the EarthTrends technical notes is available below.

Using the three national level measure of degradation I test the exposure to degradation hypothesis. $H_2$: Higher levels of environmental degradation should be correlated with higher levels of individual concern for the environment. If I find support for this hypothesis it supports degradation theories, however, whether or not this applies only in the less affluent nations, as the objective problems subjective values hypothesis claims, needs to be explored further and suggests a need for more theories regarding environmentalism and exposure to environmental harms across nations.

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8 Forest area is relatively easy to measure, and has therefore been selected as one of the 48 indicators for monitoring progress towards the United Nations Millennium Development Goals (particularly Goal 7 – Ensuring environmental sustainability). The ultimate aim of monitoring the extent and characteristics of forest resources is to reduce unplanned deforestation, restore and rehabilitate degraded forest landscapes, manage forests sustainably and evaluate the important function of carbon sequestration by forests, other wooded land and trees outside forests – thereby contributing to moderating the global climate. Forest area is an easily understood baseline variable, which provides a first indication of the relative importance of forests in a country or region. Estimates of change in forest area over time provide an indication of the demand for land for forestry and other land uses, as well as of the impact of significant environmental disasters and disturbances on forest ecosystems. However, the significance of forest area as a single indicator of forest development has often been overemphasized, particularly in the public debate, where other aspects of forest resources feature less prominently. Growing stock and carbon storage may be considered equally important parameters, as they indicate whether forests are degraded and to what extent they mitigate climate change. Further, the net loss of forest area is not in itself sufficient to describe land-use dynamics that include both loss of forests due to deforestation and natural disasters and gains in forest area from planting or natural expansion (taken directly from the World Resources Institute EarthTrends technical notes for this variable.).
RESULTS

Before we can add country level predictors we must first add the level one, or individual level variables to the model. I control for exposure to air pollution, class, education, age, health, and sex. Concern for local air and water pollution are correlated at .7 and yield similar results, therefore I control for individual exposure to air pollution across the models. I display the results for each of the models in Table 3.

Another decision that must be made before adding level-two variables is whether to specify the level-one coefficients as fixed or random. The program default is that only the intercept is random, and the error terms at the end of each equation is grayed out and constrained to zero specifying the level one coefficient as fixed (Raudenbush et al. 2004). However, according to Kircher, if level one coefficients are designated as fixed when they are actually random, it is a serious problem, and the default should actually be random (personal communication, May 8, 2010). Fixing variables frees up degrees of freedom because we are able to use the individual number of cases rather than the level-two number of cases, but therefore is also less conservative because with more degrees of freedom we are more likely to find significance, making a type one error more likely.

There are also substantive reasons to consider when choosing between fixed versus randomly varying level-one coefficients. With fixed effects inferences are limited to only those levels of the independent variable that are included in the design, while with random effects inferences can be made about the populations from which the samples are
## Table 3: HGLM Logit Models: Highly Environmental Attitudes in 38 Countries

<table>
<thead>
<tr>
<th>Country Level</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
<th>Model 8</th>
<th>Model 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP Per Capita (ln)</td>
<td>-.234542***</td>
<td>0.790933***</td>
<td>-4.282</td>
<td>-0.061906</td>
<td>-1.42746( )</td>
<td>0.939971</td>
<td>0.866974( )</td>
<td>-0.596</td>
<td>-1.992</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>0.12973**</td>
<td>1.138521**</td>
<td>3.711</td>
<td>0.790933***</td>
<td>0.939971</td>
<td>0.866974( )</td>
<td>2.012</td>
<td>1.915</td>
<td></td>
</tr>
<tr>
<td>Annual Percent</td>
<td>0.061906</td>
<td>1.01138(*)</td>
<td>1.092292(*)</td>
<td>0.061525</td>
<td>-0.076009</td>
<td>0.940329</td>
<td>0.749</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO2 Emissions</td>
<td>-0.152580**</td>
<td>-0.061525</td>
<td>0.85849**</td>
<td>-2.963</td>
<td>-0.749</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Capita (ln)</td>
<td>-4.282</td>
<td>-1.992</td>
<td>0.790933***</td>
<td>0.939971</td>
<td>0.866974( )</td>
<td>2.012</td>
<td>1.915</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organic Water Pollution</td>
<td>0.088279(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
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</tr>
<tr>
<td>Emission Per Capita (ln)</td>
<td>0.088279(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
<td>0.05085(*)</td>
</tr>
<tr>
<td>Deforestation</td>
<td>-0.175973*</td>
<td>-0.076009</td>
<td>0.940329</td>
<td>0.749</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% change</td>
<td>1.03309</td>
<td>0.031117</td>
<td>0.969362</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Individual Level</td>
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<td></td>
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<td></td>
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<tr>
<td>Air Pollution a Problem</td>
<td>0.362364***</td>
<td>0.374583***</td>
<td>0.372667***</td>
<td>0.373596***</td>
<td>0.374324***</td>
<td>0.374156***</td>
<td>0.374734***</td>
<td>0.373030***</td>
<td>0.373212***</td>
</tr>
<tr>
<td>Class</td>
<td>1.436772***</td>
<td>1.454384***</td>
<td>1.451601***</td>
<td>1.454008***</td>
<td>1.452950***</td>
<td>1.453764***</td>
<td>1.454605***</td>
<td>1.452128***</td>
<td>1.452392***</td>
</tr>
<tr>
<td>Education</td>
<td>1.138521**</td>
<td>1.101138(*)</td>
<td>1.092292(*)</td>
<td>1.101138(*)</td>
<td>1.092292(*)</td>
<td>1.092292(*)</td>
<td>1.092292(*)</td>
<td>1.092292(*)</td>
<td>1.092292(*)</td>
</tr>
<tr>
<td>Age</td>
<td>0.052345**</td>
<td>0.052318**</td>
<td>0.05268**</td>
<td>0.052723**</td>
<td>0.052723**</td>
<td>0.052723**</td>
<td>0.052723**</td>
<td>0.052723**</td>
<td>0.052723**</td>
</tr>
<tr>
<td>Health</td>
<td>0.117376***</td>
<td>0.092845*</td>
<td>0.092845*</td>
<td>0.092845*</td>
<td>0.092845*</td>
<td>0.092845*</td>
<td>0.092845*</td>
<td>0.092845*</td>
<td>0.092845*</td>
</tr>
<tr>
<td>Female</td>
<td>0.052345**</td>
<td>0.052345**</td>
<td>0.052345**</td>
<td>0.052345**</td>
<td>0.052345**</td>
<td>0.052345**</td>
<td>0.052345**</td>
<td>0.052345**</td>
<td>0.052345**</td>
</tr>
<tr>
<td>Intercept</td>
<td>-5.03250***</td>
<td>-0.44771**</td>
<td>-1.41804***</td>
<td>-2.84892**</td>
<td>-1.41196**</td>
<td>-2.84892**</td>
<td>-1.41196**</td>
<td>-2.84892**</td>
<td>-1.41196**</td>
</tr>
<tr>
<td></td>
<td>0.604563***</td>
<td>0.639086**</td>
<td>4.494438**</td>
<td>3.172690**</td>
<td>7.52096**</td>
<td>2.43913**</td>
<td>6.34253**</td>
<td>0.449807</td>
<td>1.29349</td>
</tr>
</tbody>
</table>

NOTES: *p<.05, **p<.01, ***p<.001 2-tailed test and (*)denotes significant 1-tailed .05 test; unit-specific model; line 1: coefficients; line 2: odds ratio; line 3: t-score
drawn. In the case of multilevel models, the decision between fixed and random is related to the study design. For means of comparison, Model 1 displays the individual level effects without any level two variables where the individual effects are all fixed and Model 2 also displays only level one effects, however, here all are allowed to vary randomly except for female, which is fixed. We choose to fix sex for several reasons; substantive reasons to fix sex are that we have all levels of sex represented in our design and sex is likely measured without error. There are also statistical tests to consider. Chi-square tests indicating level-one variables should remain random are significant for all other level-one variables. Sex is the closest to nonsignificant in the model and also has the lowest rate of explained variance, thus the guidelines for multilevel modeling tell us to still control for gender but to fix it (Kircher, personal communication). Another reason we fix gender is because when all slopes and intercepts are allowed to vary randomly the model will not converge and, according to Raudenbush and Bryk, rate of convergence is diagnostic (2002:257). Once gender is fixed the model converges efficiently. Model 2, with coefficients for exposure to degradation, class, education, age, and health varying randomly and controlling for sex with the coefficient fixed is the base model that level two variables are added to. Model 1 is included simply to show the results are substantively similar but yield higher levels of significance when all coefficients are fixed.

At the individual level, or level-one, saying air pollution was a serious problem in the community, ranking oneself as higher class, having more education, being older, being healthier, and being female all predict higher odds of responding as more environmental. Saying that air pollution was a significant problem in the community
increased an individual’s log odds of responding in the most environmental categories by 45%. Being in a higher class and of a higher educational category both increased the log odds by about 5%, a higher age category increased the log odds by about 14%, ranking oneself as healthy by 10% and women had about 5% higher log odds than men of being in the more environmental group. These results are very stable across all of the models. While including each of the categorical variables in the model would yield more detailed results, multilevel models are robust to ordinal variables, and are better specified when parsimonious (Kircher, personal communication April 19, 2010). Furthermore, we are more interested in controlling for individual level variables in the model while testing country level hypotheses. Including level one variables as ordinal variables meets these needs.

Once the level one model has been specified, each successive model continues to control the individual level effects and one of the country level predictors. I focus on the random intercept model, which gives us the country level coefficients. Furthermore, results reported are from the unit-specific model as opposed to the population average model. The population average model averages over the distribution of level 2 effects, while the unit-specific model provides the country specific estimates, holding all else constant (Raudenbush and Bryk 2002:303). Regardless, the results are generally substantively similar (Raudenbush and Bryk 2002:303); this is also the case here.

Model 3 controls for GDP per capita logged. Model 4 controls for GDP growth. Model 5 for CO2 per capita logged, Model 6 organic water pollution per capita logged, and Model 7 the percent change in forest area. I also show Model 8, the saturated model,
despite collinearity problems. Model 9 drops level two variables except for predictors found to have statistical significance when combined in one model.

In this series of models GDP per capita is significant and as affluence rises, the odds of being in the more environmental category decrease by approximately 20%. This is in direct contradiction to the affluence hypothesis that links more affluent countries with more environmentalism and is in line with the findings of Gelissen (2007) and Dunlap and Mertig (1997). So, while there is evidence that at the individual level as class increases environmentalism increases, at the national level levels of affluence may work in the opposite direction. In Model 4 GDP growth is also significant and as percent growth of GDP of the respondent’s country increases, it contributes to a 14% increase in the odds of a respondent being in the environmental category. It makes sense that these results go in opposite directions since these two variables are negatively correlated; in the sample of nations high rates of growth are among lesser developed but developing countries. CO2 emissions per capita and organic water pollution emissions per capita are also both significant and contribute to a decrease in the likelihood of environmentalism, while the variable representing deforestation is not significant. It may be difficult to determine if these variables are accurately representing environmental degradation, due to their high correlation (.75 and .65, respectively) with GDP per capita and because of the idea of externalization of environmental degradation from ecologically unequal exchange theory. The results from these proxies suggest high levels of degradation may actually correlate with a decrease in environmentalism. On the other hand, GDP growth may actually be a proxy for environmental degradation if it comes with industrialization, as treadmill of production theorists and others who find evidence against ecological
modernization theory claim. Thus, it seems our results at the national level for degradation are informative but somewhat inconclusive; however, we do have significant results at the individual level linking direct exposure to environmental degradation with environmentalism regardless of level of national affluence.
CONCLUSIONS

The key findings of this study are the opposite effects of GDP per capita and GDP growth on environmental values; high GDP per capita is correlated with lower rates of environmentalism while high rates of GDP growth are associated with higher rates of environmentalism. These findings do not support Inglehart’s affluence based postmaterialist values hypothesis that affluence at both the individual and national levels is correlated with environmentalism. I find, counter to Inglehart, that national affluence is negatively correlated with environmental concern, in line with the findings of Gelissen (2007) and some of the findings of Dunlap and Mertig (1997). In terms of exposure to degradation, my findings partially align with Inglehart’s objective problems subjective values hypotheses, however rather than only applying this hypothesis to less affluent nations, I propose exposure to degradation hypothesis should be applied more broadly to both more and less affluent countries. At the individual level exposure to degradation is a significant predictor of environmental concern across countries of differing levels of affluence. Also, in terms of the literature reviewed on the ecological footprint, it is clear that development is a key driver of environmental degradation. More affluent countries have larger consumption based ecological footprints, thus, environmentalism in these countries is likely also related to exposure to degradation, as my results at the individual level illustrate. Also, lower levels of environmentalism in more affluent countries may be related to a type of ceiling effect of affluence. Countries at a certain level of affluence
in the world system are more able to externalize their environmental costs to less
developed nations, as is suggested by the theory of ecologically unequal exchange.

The key finding in terms of GDP growth is that it is positively correlated with
environmentalism. If one interprets this as increasing affluence, then it would be in
support of the affluence hypothesis, however, based on the literature review of the links
between development and degradation and the application of the theoretical perspectives
of ecologically unequal exchange and treadmill of production, I suggest tentatively that
these findings on environmental values are also findings in support of the links between
exposure to degradation and environmental concern. Development leads to degradation.
Thus, I do not find support for affluence based environmentalism at the national level, but
I do find support for the importance of the exposure to degradation, especially
consumption and development based degradation, by interpreting GDP growth as a proxy
for increasing degradation. These findings suggest a need for more research into the
material realities of exposure to degradation and the link to environmental concern at
both the local and global levels in more and less affluent countries.

This study aims to make methodological and theoretical contributions. The key
methodological contribution is to employ the use of multilevel models to the study of
environmental attitudes. Previous studies that have aggregated environmental values up
to the national level have found support for the postmaterialist hypothesis that national
affluence correlates with environmentalism. While statistically sound, this method
ignores rather than controls for individual level variation, and in the review of prior
studies we see how, because of aggregation bias and the focus on countries as the unit of
analysis, this has led to findings in support of the affluence hypothesis, however, this is in
contradiction to what multilevel analysis reveals. Similarly, but more egregiously, studies that analyze data at the individual level but do not take into account the grouped nature of the data violate the independence assumption and greatly increase the risk of type one errors. By taking the hierarchical nature of data into account, and by understanding that because this is grouped data, people within countries, errors are correlated, and thus there is a need to account for variance at both the individual and country level in order to obtain the most accurate findings.

This study contributes theoretically by both testing old theories within the study of values and by applying other theories not commonly engaged in this area: ecological modernization, treadmill of production, and ecologically unequal exchange. The study of environmental values must move beyond facile explanations of affluence in developed countries and exposure to degradation in less developed countries. At the individual level, both affluence and degradation are found to be significant across countries of all levels of affluence and at the national level there is evidence of importance of both affluence and degradation that are different than what has currently been theorized in the field. Applying new theoretical frameworks to the study of attitudes advances both our understanding of environmental values and contributes to the development of the theories by applying them in new areas. Directions for future research include taking into account other national level variables such as economic dependence on the primary sector, foreign trade dependence, presence of environmental INGOs, the presence of environmental ministries, and other measures of global integration to both extend the discussion of environmental values and to extend theoretical perspectives in areas such as
world polity, foreign investment dependence, and globalization. The study of environmental values offers much potential for fruitful study.

Both support for environmental protection and environmental activism are now global realities across nations, and understanding this phenomenon has implications for both social science theory and policy (Dunlap and York 2008). As stated above, in the past three waves of the World Values Surveys (1995, 2000, and 2005), increasing percentages of respondents across nations of varying levels of affluence respond that they value environmental protection even at the expense of development. Policy makers should reconsider the easy assumptions that economic development of the standard variety is what people desire and that this type of economic development will ultimately help the planet. We must both continue to consider the changing state of environmental concern globally and use this field to test and extend our theoretical understandings.
REFERENCES


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