

Article

Understanding Pro-Environmental Behavior in the US: Insights from Grid-Group Cultural Theory and Cognitive Sociology

Gail Markle

Department of Sociology and Criminal Justice, Kennesaw State University, Kennesaw, GA 30067, USA;
gmarkle@kennesaw.edu

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Abstract: For almost fifty years researchers have endeavored to identify the factors that influence individuals' performance of environmentally significant behavior, with inconsistent results. This quest has become even more urgent as newly released scientific reports provide mounting evidence of global climate change and other types of anthropogenic environmental degradation. In order to change individuals' behavior on a large scale, it is necessary to change their habits of thinking. Using insights from Grid-group cultural theory and cognitive sociology, this mixed-methods study examined the factors that influence pro-environmental behavior among a nationally representative US sample ($n = 395$). Qualitative results indicate that individuals develop culturally-specific environmental socio-cognitive schemas which they use to assign meaning to the environment and guide their environmentally significant behavior. Quantitative results indicate cultural orientation, pro-environmental orientation, environment identity, and environmental influence predict pro-environmental behavior. Applying these combined theoretical perspectives to the social problem of environmental degradation could facilitate the development of targeted strategies for bringing about impactful behavioral change.

Keywords: pro-environmental behavior; grid-group cultural theory; cognitive sociology

1. Introduction

Global climate change is an urgent environmental issue. The Intergovernmental Panel on Climate Change (IPCC) reports that warming of the climate system is unequivocal and has already significantly impacted human and natural systems [1] (p. 1). The IPCC warns that continued emission of greenhouse gases will have severe and irreversible consequences, although the risks of anthropogenic environmental degradation can be mitigated with changes in behavior patterns. Yet, Americans' response to increasing levels of environmental threat has been minimal [2–4]. Moreover, as scientific evidence of environmental degradation mounts, so too does “environmental skepticism” [5] among members of the general public, as well as outright repudiation among conservative think tanks and foundations [6–8]. Climate change has become a polarizing political issue [9].

The social problem of environmental degradation represents the ultimate “commons dilemma” [10]; an individual's personal objective (want/need satisfaction) conflicts with that of the group (resource viability). The challenge is: how to transform the performance of rational individual behavior into collectively performed socially beneficial behavior which usually entails a perceived cost to the individual? In order to bring about behavioral change on a large scale it is necessary to change habits of thinking. This article reports the results of a nationally representative mixed-methods study examining how Americans' thinking about the environment influences their performance of pro-environmental behavior.

2. Theoretical Perspectives and Relevant Research

Noting the complexity of pro-environmental behavior, Stern [11] called for the development of synthetic theoretical models to advance our understanding of it; however, three perspectives continue to dominate contemporary research into pro-environmental behavior. Norm activation theory [12] argues that awareness of consequences and ascription of responsibility activate personal norms that influence the performance of pro-environmental behavior. The theory of planned behavior [13] posits that the performance of pro-environmental behavior is predicated upon intention, which derives from a combination of attitudes, norms, and perceived behavioral control. Value–belief–norm theory [14] states that personal values and norms, beliefs about environmental conditions, and individual agency guide the performance of pro-environmental behavior. While useful, these theories focus on individual-level explanations for behavior and pay little attention to social context. Social context is important to consider since environmental attitudes and behavior result from the interplay among characteristics of the individual and the social structure [15,16]. Grid-group cultural theory and cognitive sociology share the perspective that the social structure embedded in the individual as “culture” influences the individual’s attitudes and behavior [17]. This mixed-methods study combines insights from grid-group cultural theory and cognitive sociology to examine how culture influences individuals’ thinking about the environment, and consequently, their performance of pro-environmental behavior.

2.1. Grid-Group Cultural Theory

The controversy over global warming is actually a debate about acceptable levels of risk, specifically “which kinds of risks are acceptable to what sorts of people” [18] (p. 4). Absent complete knowledge of the totality of potential dangers, individuals choose which risks to regard and which to disregard in a manner that conforms to and sustains their way of life; hence risk is socially constructed [18,19]. Grid-group cultural theory posits that conceptualizations of risk are not simply the products of individual cognition, but social cognition as well. According to grid-group cultural theory, the designation of which risks merit concern is a function of cultural biases and social relations, which interact in a mutually reinforcing manner and are referred to as ways of life or political cultures [20]. Cultural biases are defined as worldviews, or shared values and beliefs, which support different patterns of social relations. Social relations are defined as patterns of interpersonal relationships. The specific risks chosen for regard/disregard function to reinforce one way of life while undermining the others.

Grid-group cultural theory distinguishes three main ways of life, or cultures: individualist, egalitarian, and hierarchical. Each culture has its own orientation to nature and specific conceptualization of needs and resources by which its members justify their set of behavioral strategies [21]. Members of the individualist culture regard nature as a cornucopia, where abundant resources exist in a stable and global equilibrium. The individualist strategy is to manage both needs and resources upward through conspicuous consumption, believing that when one prospers everyone else benefits as well. Egalitarians view nature as existing in a delicate and precarious balance; resources are finite and depleting. The ideals of equality and fairness are of utmost importance. The egalitarian strategy is to decrease needs to ensure sustainability. For members of the hierarchical culture, nature appears to exist in an unstable equilibrium with limited resources. The hierarchical strategy is to increase resources in order to match needs. Due to their fundamentally different worldviews, or value systems, these cultures exist in competition with one another, therefore irreconcilable conflict is a central theme of grid-group cultural theory [22].

Several studies have empirically tested the principles of grid-group cultural theory. Consumption behavior reflects the biases of the cultural groups [23]. Environmentalism is positively associated with egalitarianism and negatively associated with individualism [24]. Egalitarians are more likely to recycle and purchase organically-grown food compared to other cultural groups [25]. Egalitarians favor policy measures aimed at reducing car use while individualists considered policy measures

unnecessary [26]. Individualists prefer market-oriented solutions for managing environmental risk and egalitarians preferred behavioral strategies [27].

2.2. Cognitive Sociology

Grid-group cultural theory explains variances in values but not the source of the variances. Cognitive sociology has the potential to explain the source of those variances by illuminating the relationship between cognition and culture [28]. Central to a cognitive sociological approach is the distinction among three ways of thinking: *cognitive individualism*—thinking as an individual, from a subjective position of personal experience; *cognitive universalism*—thinking as a human being, from an objective position informed by nature and logic; and *cognitive pluralism*—thinking at the level of a social being, from an inter-subjective position as part of a group whose members have developed similar cognitive structures [29]. Cognitive sociology recognizes that people group themselves into cultures with similar worldviews that provide “plausibility structures” or groups of confirming others who validate the culture’s worldview and ipso facto that of the individual [30]. Individuals are socialized into various thought communities, or cultures, via cognitive norms that specify appropriate ways of perceiving, focusing attention, and signifying [29]. In perceiving, we become aware of something. In focusing on something we make it the center of interest, relegating other things to a position of less relevance or irrelevance. In signifying we invest something with meaning through the use of signs (indicators, symbols, and icons). These cognitive norms, or rules of thinking, are a form of social control, in effect, deciding for us “what we attend to, how we reason, what we remember, and how we interpret our experiences” [31] (p. 323).

Cultural norms of focusing not only determine what is relevant and irrelevant, but also what is ignored, usually through social pressure dictating its deliberate disregard. Denial is often invoked in the face of things that virtually demand attention engendering “conspiracies of silence” [32]. For example, Norgaard [4] characterized the lack of public response among a community of rural Norwegians confronted with visible manifestations of global climate change as “collective avoidance.” Community members had information, believed it, yet put it out of mind. Similarly, many Americans consider recycling emblematic of pro-environmental behavior in general, and this singular focus precludes their performance of other more productive pro-environmental behaviors [33]. They too are aware of environmental degradation but choose not to focus on it. Neither group denied knowledge of environmental problems; rather they were just not putting that knowledge to use [4]. Members of both groups engaged in selective attention [34]: limiting their exposure to information, confining their “mental horizons” to the short term, and especially among Americans, focusing on something small that they could do.

Cognitive norms coalesce in the form of culturally specific socio-cognitive schemata, or “mindscapes” [29] through which individuals develop an understanding of the world. As knowledge structures, “[s]chemata are both representations of knowledge and information-processing mechanisms” [28] (p. 269). As mechanisms of thinking, schemata provide culturally appropriate cognitive shortcuts, simplifying individual cognition; thus, it is that culture is “manifest in people’s heads” (p. 272). The process of developing a commitment to recycling entails adopting a socio-cognitive schema associated with the role of recycler [35]. Grounded in the cultural meaning of the role of recycler, the schema guides the perception and understanding of relevant information and ultimately behavior.

2.3. Other Influences on Pro-Environmental Behavior

Other social factors have been hypothesized to influence environmental behavior. Past experiences with nature and exposure to negative environmental events [36] and environmentally-committed role models [25] influence future performance of pro-environmental behavior. Stets and Biga [37] developed a model of environment identity which situates one’s relationship with the natural environment along a continuum from anthropocentrism (viewing the environment as a resource for consumption) to ecocentrism (believing in interdependency among humans and the environment). Environment

identity positively influences pro-environmental behavior [37]. Similarly, having a self-concept of “environmentalist” positively influences pro-environmental behavior [38]. The process of becoming a recycler entails: recognition and understanding of the meaning of the role of recycler; awareness that the role can be a basis for identity; and congruence between the meaning of the role and the self [33]. Attitudes and behaviors associated with the role of recycler become associated with the self; it is thus that “culture enters the person through cognitive schema associated with social roles” [35] (p. 55).

In this study I combined grid-group cultural theory and cognitive sociology to examine the following research questions: what factors influence the performance of pro-environmental behavior?; and how do these factors differ by cultural orientation? I hypothesize that individuals develop culturally specific environmental socio-cognitive schemas which guide their performance of environmentally significant behavior. An important step toward changing individuals’ behavior toward the environment is to better understand how their thinking about the environment is influenced by cultural group membership.

3. Research Methodology

This study was a correlational mixed-method design, in which both quantitative and qualitative data were collected at the same time through an online survey instrument. A nationally representative sample was generated from the US population using Zoomerang™ (Zoomerang, San Mateo, CA, USA), an online market research company. Participants were randomly selected from this sample and invited to participate in the survey via an email invitation from Zoomerang in 2011. The response rate reported by Zoomerang was 67%. The survey consisted of 78 closed and open-ended questions which assessed participants’ beliefs, attitudes, and behaviors relative to the environment.

3.1. Sample

Of the 395 participants who completed the online survey, 57.8% were women. Ages ranged from 18 to 84, with a median age of 32. Most (77.4%) had at least some college education. Just over 75% of participants identified as white; 9.7% as black; 8.4% as Hispanic; and 4.0% as Asian. Household income levels varied: 17.1% of participants reported an annual household income of less than \$20,000; 26.5% reported between \$20,001 and \$45,000; 27.6% reported between \$45,001 and \$70,000; and 28.9% reported more than \$70,000. Most participants (79.2%) resided in an urban/suburban area, while the remainder resided in a rural area. One important difference between this sample and the US population is in the level of educational attainment; 77.4% of the sample have at least some college, compared to 59% of Americans [39]. This difference could be due to the use of an online data collection method.

3.2. Measures

Pro-environmental behavior was measured using a seven-item scale that reflects the level to which participants take positive action toward the environment [40] (See Appendix A). The scale includes such questions as: have you made any changes in your day-to-day behavior because of concerns about the environment? Would you be willing to pay higher prices so that industry could better preserve and protect the environment? Chronbach’s alpha for this scale was 0.76.

Cultural group consisted of 16 items from Rippl’s [41] instrument for assessing cultural group membership (See Appendix A). Participants were asked to indicate their level of agreement on a scale of one to five with such statements as: the freedom of the individual should not be limited for reasons for preventing crime (individualist); important questions for our society should not be decided upon by experts but by the people (egalitarian); in a family, adults and children should have the same influence in decisions (hierarchical). Chronbach’s alphas for the three subscales were: egalitarian 0.78; hierarchical 0.69; and individualist 0.76.

Pro-environmental orientation refers to individuals’ values, attitudes, and beliefs toward the environment. Pro-environmental orientation was measured by the 15-item revised New Ecological Paradigm Scale [42] (See Appendix A). Participants were asked to indicate their level of agreement on

a scale of one to five with such statements as: we are approaching the limit of the number of people the earth can support; the balance of nature is strong enough to cope with the impacts of modern industrial nations. Chronbach's alpha for this scale was 0.83, and its validity has been established by dozens of studies [42].

Environment identity was measured using Stets and Biga's [37] Environment Identity Scale (See Appendix A), in which participants indicate their relationship to the environment along eleven continua such as: independent from the environment/dependent on the environment; very concerned about the environment/indifferent about the environment. Chronbach's alpha for this scale was 0.81.

Environmental influence refers to participants' attribution of environmental influence from experiences, role models, and/or events. This measure was derived from responses to the open-ended question: what experiences, role models, or events have influenced your feelings toward the environment?

Other open-ended questions included: what comes to mind when you think about the environment? What environmental issues are you aware of? What environmental issues do you think are important? How do you think these environmental issues should be resolved?

3.3. Methods of Analysis

I used multiple regression analysis to examine the influence of cultural group, pro-environmental orientation, environment identity, and environmental influence on pro-environmental behavior. I used single factor analysis of variance (ANOVA) to determine if pro-environmental orientation, environment identity, environmental influence, and pro-environmental behavior differ according to cultural group. I analyzed the qualitative data by applying the open coding phase of grounded theory methods, examining responses line-by-line, linking concepts to indicators (words or series of words), and comparing them until the concept was well defined [43]. The qualitative analysis was guided by the categorization of thinking into the cognitive acts of perceiving, focusing, and assigning meaning [29].

4. Results

4.1. Quantitative Results

4.1.1. Descriptive Statistics

Table 1 presents the means and frequencies for the scales measuring pro-environmental behavior, pro-environmental orientation, and environment identity. Scores on these variables were relatively high. About two thirds of participants' scores were in the top half of the environmental behavior scale. More than 85% of participants' scores were in the top half of both the pro-environmental orientation scale and the environment identity scale. The most populated category of cultural group was hierarchical (44.0%, $n = 174$), followed by individualist (34.2%, $n = 135$), and egalitarian (21.8%, $n = 86$).

Almost 80% of participants reported that their feelings toward the environment were influenced by personal experiences, role models or particular events. The most frequently reported types of influence were personal observations of environmental degradation, environmental disasters such as the 2010 British Petroleum Oil Spill in the Gulf of Mexico, childhood experiences, family members, the media, and classes taken in high school or college.

Table 1. Descriptive statistics. $N = 395$.

Means and Standard Deviations	M	SD
Pro-Environmental Behavior	8.39	2.33
Pro-Environmental Orientation	58.44	10.43
Environment Identity	43.23	7.15
Frequencies	%	N
Pro-Environmental Behavior		
2–7	34.1	135
8–10	48.6	192
11–13	17.3	68
Pro-Environmental Orientation		
15–44	16.5	65
45–59	49.9	197
60–75	33.6	133
Environment Identity		
11–32	12.4	49
33–43	36.7	145
44–55	50.9	201

4.1.2. Regression Results

Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Table 2 presents the results of the regression analysis on pro-environmental behavior. Cultural orientation is a significant predictor of pro-environmental behavior; members of both the individualist and hierarchical cultures performed lower levels of pro-environmental behavior compared to the egalitarian. Pro-environmental orientation, environment identity, and environmental influence were also significant predictors of pro-environmental behavior. The adjusted R^2 of the model was 0.310, indicating that these four variables explain 31% of the variation in pro-environmental behavior. The demographic variables, gender, age, race/ethnicity, education, and household income were not significant factors predicting pro-environmental behavior and are not listed in Table 2.

Table 2. Unstandardized and standardized coefficients from regression of pro-environmental behavior.

Independent Variable:	Pro-Environmental Behavior	
	B	β
Cultural Orientation		
Hierarchist	−0.563 *	−0.120
	(0.315)	
Individualist	−0.796 **	−0.164
	(0.325)	
Pro-Environmental Orientation	0.050 ***	0.225
	(0.014)	
Environment Identity	0.124 ***	0.375
	(.020)	
Environmental Influence	0.296 **	0.129
	(0.106)	
Constant	−0.615	
N	395	
R^2	0.310	

Note: Numbers in parentheses are standard errors. Egalitarian is the omitted category for Cultural Group. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.1.3. ANOVA Results

The results of one-way between groups analyses of variance (ANOVA) indicate significant differences between cultural groups for pro-environmental behavior, pro-environmental orientation,

and environment identity (see Table 3). Effect sizes for these differences, calculated using eta squared, were large. The mean scores on the pro-environmental behavior scale for each group were: egalitarian ($M = 9.91$, $SD = 1.73$); individualist ($M = 8.48$, $SD = 2.35$), and hierarchical ($M = 7.80$, $SD = 1.90$). The mean scores on the pro-environmental orientation scale for each group were: egalitarian ($M = 64.24$, $SD = 7.66$); individualist ($M = 53.10$, $SD = 9.86$), and hierarchical ($M = 49.51$, $SD = 8.38$). The mean scores on the environment identity scale for each group were: egalitarian ($M = 48.76$, $SD = 5.90$); individualist ($M = 42.44$, $SD = 7.05$), and hierarchical ($M = 39.95$, $SD = 9.90$). Egalitarians had the highest levels of pro-environmental behavior, pro-environmental orientation, and environment identity, followed by individualists, and finally hierarchists.

Table 3. Results of one-way analyses of variance.

Variable	Culture	Culture	Mean Difference	SD
	(A)	(B)	(A–B)	Error
Pro-Environmental Behavior	Egalitarian	Hierarchist	2.10 ***	0.268
	Egalitarian	Individualist	1.43 ***	0.280
	Hierarchist	Individualist	−0.68 *	0.233
Pro-Environmental Orientation	Egalitarian	Hierarchist	14.74 ***	1.156
	Egalitarian	Individualist	11.14 ***	1.210
	Hierarchist	Individualist	−3.60 **	1.006
Environment Identity	Egalitarian	Hierarchist	8.81 ***	1.065
	Egalitarian	Individualist	6.31 ***	1.114
	Hierarchist	Individualist	−0.50 *	0.926

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.2. Qualitative Results

4.2.1. Concepts

Applying the open coding phase of GTM (grounded theory methods) to the textual data I identified the following six concepts that scaffold the environmental socio-cognitive schema. *Environmental consciousness* represents the cognitive act of perceiving, and has two dimensions, level and scope. Level of environmental consciousness refers to the amount of awareness participants have of the environment, whether the environment appears in the foreground of people's minds or if it is relegated to the background. Participants' levels of environmental consciousness varied considerably from "I never gave it a thought until I filled out this survey" to "I consciously try to keep the environment in mind." Scope of environmental consciousness refers to how far participants' awareness of the environment extends. Responses ranged from the very local to a global perspective. Many participants described a dawning of environmental consciousness, for example:

I used to not care about the environment because I lacked knowledge of what was actually going on. But then I saw a documentary on pollution and it shocked me into thinking about my part in the problem. On New Year's Eve I made a resolution not to litter and I kept that resolution and then I challenged all of my friends and family members to do the same.

The concepts *anthropocentrism*, *environmental concern*, *proximity of environmental issues*, and *importance of environmental issues* illustrate the cognitive act of focusing. Anthropocentrism reflects the level at which participants placed themselves, or humans, at the center of the universe. Levels of anthropocentrism varied from low, "the environment is like a big chain, each part affects the others and they all need to work together as one;" to high, "we need to worry about getting everything okay for ourselves before we try to worry about the animals."

Environmental concern has two dimensions. Intensity of concern about the environment varied along a spectrum: “honestly, I have never really cared all that much about environmental issues”; “I am not a tree hugger or anything, but I do care about the environment and what happens to it”; “I am genuinely concerned.” Scope of concern varied as well. Some participants’ concern was limited to one topic such as pollution, while others expressed concern about multiple issues.

Proximity of environmental issues describes the distance participants perceive themselves to be from environmental issues. It reflects the degree to which they believe they have already been affected by environmental issues and their perceptions of their risk of being affected in the future. This participant describes directly experiencing the effects of water pollution:

I am concerned about our water. As a kid we could swim all summer in the Rock River or any of the lakes and streams. Now I can’t even allow my dog to swim in them. I seriously had to take her to the vet because she kept getting a skin disorder, we finally figured out it was from swimming in the river.

In contrast, another participant considered himself far removed from environmental issues, stating “I am simply not concerned with beach erosion and marine habitats because I live three hours away from the nearest coastal area.”

Participants cited many environmental issues including climate change, pollution, deforestation, species extinction, and plastic water bottle disposal, attributing varying levels of importance to each.

Participants *assign meaning* to the environment in various ways. Their explanations of what the environment means to them encompassed five domains: (1) home; (2) resource; (3) nature; (4) spiritual symbol; and (5) ideological symbol.

4.2.2. Culturally Specific Environmental Socio-Cognitive Schemas

Members of each cultural group used the cognitive acts of perceiving, focusing, and assigning meaning similarly in the construction of their environmental schemas. For egalitarians, the environment had spiritual, or ideological meaning; they believed in “nature and humans living in harmony.” Egalitarians reported high levels of environmental consciousness. Egalitarians had a holistic perspective on the environment, viewing all elements (species and physical features) as interconnected and dependent upon one another. Egalitarians were the least anthropocentric of the three groups. They considered humans to be no more important than other species and were especially concerned about the plight of animals. Egalitarians perceived the risk of being personally affected by environmental issues as quite high. Many saw themselves as having been already personally affected by environmental issues, and argued that these issues present an impending threat to all, including the planet as a whole. Egalitarians were alarmists, convinced that the planet was dying, on the brink of ecological disaster. They viewed the future as apocalyptic. According to egalitarians, everyone is responsible for coming together to solve environmental problems, although they had little confidence that this will occur.

Individualists thought of the environment as their home, or associated the environment with nature. Individualists reported moderate levels of environmental consciousness. The scope of environmental consciousness for individualists encompassed the individual and the community as well. Individualists were moderately anthropocentric. Individualists acknowledged the existence of environmental issues but did not perceive themselves to be at risk because they believed that current environmental degradation was reversible, there was still plenty of time before conditions became serious, and scientific and technological solutions would soon be forthcoming. Individualists supported free-market solutions to environmental issues such as “[c]lean water is a crucial environmental issue for many developing countries, but there are companies that can provide pure spring water from other sources to those who need it.” Individualists also argued that those responsible for environmental issues should pay for their solution. Individualists were optimistic; they believed that future environmental conditions would be much improved.

For hierarchists, the environment represented natural resources. Hierarchists reported low levels of environmental consciousness. Hierarchists reported the highest levels of anthropocentrism, as one stated: “we need to worry about getting everything okay for ourselves before we try to worry about the animals”. Hierarchists did not perceive themselves to be at risk of being impacted by environmental issues. Hierarchists did not perceive current environmental conditions as problematic. Many could even be considered environmental skeptics [7], as they expressed the opinion that reports of environmental destruction were exaggerated or falsified for political reasons. Members of the hierarchist culture believed that government should manage the environment by implementing rules and regulations, but they did not have much confidence in the resolvability of environmental issues.

Figure 1 presents a heuristic, or hypothetical, model integrating the quantitative and qualitative results of the study, illustrating the factors that influence the performance of pro-environmental behavior. Those factors identified by qualitative analysis are italicized. Quantitative analysis indicates cultural orientation, pro-environmental orientation, environment identity, and environmental influence significantly influence the performance of pro-environmental behavior. Members of the three cultural groups think differently about the environment as the culturally specific environmental socio-cognitive schemas suggest, and differ from one another in their environmental attitudes and behavior.

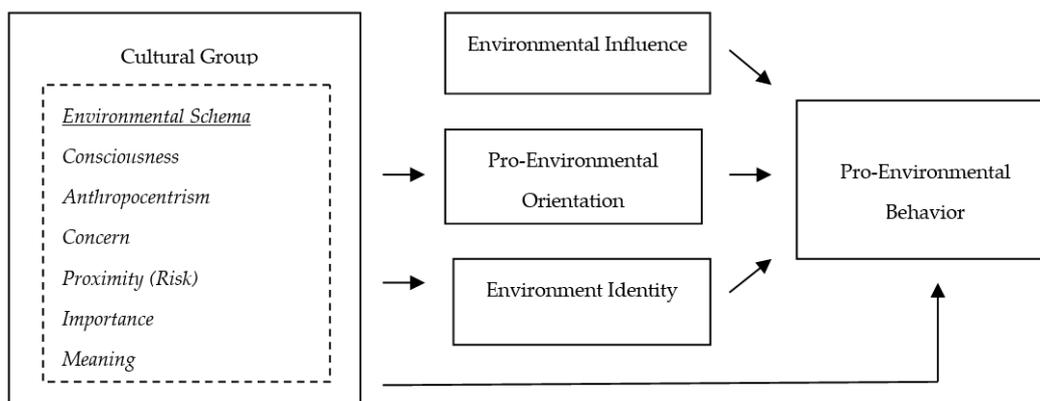


Figure 1. Heuristic model of factors that influence pro-environmental behavior.

5. Discussion and Conclusion

This mixed-methods study examines the factors that influence the performance of pro-environmental behavior, synthesizing grid-group cultural theory, and cognitive sociology to better understand the influence of culture on individuals’ thinking about the environment and performance of pro-environmental behavior. In general, participants reported relatively high levels of environment identity and pro-environmental orientation, yet only 17.3 percent reported performing high levels of pro-environmental behavior. Scores on these measures were consistent with those found in other studies [37,44]. The results of this study indicate widespread support for environmentalism, but a lack of corresponding individual or collective behavior. Many studies have documented this gap between environmental attitudes and behavior [2,3,34] but so far none has identified the reasons for it.

The results of this study indicate environmental influence, environmental orientation and environmental identity influence the performance of pro-environmental behavior. These results are consistent with other studies [25,35–38]. This study supports others’ findings that cultural orientation influences the performance of pro-environmental behavior [21,23–27]. These results are consistent with grid-group cultural theory: attitudes and beliefs about the environment and the performance of pro-environmental behavior differ according to the cultural groups identified by Douglas and Wildavsky [45,46]. In this study, members of the egalitarian cultural group had the highest levels of pro-environmental orientation and were the most likely to engage in pro-environmental behavior, followed by members of the individualist cultural group. Members of the hierarchist cultural

group had the lowest levels of pro-environmental orientation and were the least likely to engage in pro-environmental behavior.

I use cognitive sociology to argue that cultural orientation influences the performance of pro-environmental behavior via culturally specific environmental socio-cognitive schemas. Cognitive sociology explains how cultural points-of-view influence the meaning individuals' assign to the environment, their understanding of environmental issues, their perceptions of environmental risk associated with environmental issues and consequently their behavior. Individuals adopt a particular environmental orientation and engage in a particular level of pro-environmental behavior based on the worldview ascribed by their cultural group.

Conflicting assessments of environmental risk are not so much about empirical disagreements than they are about competing cultural visions [47]. Egalitarians view environmental degradation as a serious consequence of unregulated commerce and industry which they also believe generates and legitimizes inequality. Individualists do not view environmental issues as very important because doing so would lead to restrictions on commerce and industry, forms of behavior crucial to their cultural way of life. Hierarchists view claims of environmental degradation as indictments of the competence and authority of societal elites; remedies would upset the status quo supportive of traditional social roles. The culturally specific meanings associated with the environment allow members of each group to justify behavioral strategies that advance the way of life to which they are committed, whether it be conspicuous consumption, organizing to reduce inequality, or supporting increased government regulation.

There were limitations to this study. I chose the online survey method of data collection in order to examine a large, nationally representative sample of consumers. Participants' level of education in this study was somewhat higher than that of the general population, thus making the sample not truly representative. I attempted to structure the open-ended questions in such a way that would allow me to examine in detail how respondents think about the environment. However, with this method I was limited to the answers that respondents provided; I could not probe any further. Suggestions for further research include collecting similar data from a broad range of countries and comparing results among them.

Combining qualitative and quantitative methods requires a mixed process of validation [48]. Reliability was assessed by applying Cronbach's alpha to the scales measuring the quantitative variables and by maintaining an audit trail describing in detail how qualitative data were coded and interpreted. In mixed methods studies validity refers to the "ability of the researcher to draw meaningful and accurate conclusions" from the data [49] (p. 146) and is a function of data quality and researcher competence. The qualitative data came directly from the participants with minimal researcher interaction. The participants were anonymous; there is no reason to suspect insincerity. The researcher's competence and integrity can be confirmed by examining the audit trail.

This study has both theoretical and practical implications. Grid-group cultural theory and cognitive sociology are useful for explaining the relationship between environmental attitudes and behavior; they provide a much-needed social context. Together these theories suggest a method of executing two of the intervention principles proposed by Gardner and Stern [50]—understanding the situation from the actor's perspective and using multiple intervention types—by developing segmented strategies for increasing individuals' engagement in pro-environmental behavior. Environmental socio-cognitive schemas for each cultural group are not just different from one another, but frequently conflict with one another. This finding reflects an increasing tendency of Americans to self-divide along ideological lines [51].

Egalitarians perceive environmental issues as grave and in need of immediate collective attention; individualists acknowledge the existence of environmental threats but believe they will be neutralized in time by the "invisible hand" of the free market system; environmental issues remain an abstraction for hierarchists. Since egalitarians value consensus and communality, they could be encouraged to join local environmental groups to work together in solving local problems; their success in the local arena

may spur them on to larger scale activism. Individualists believe in the power of the free-market system and do not want to be confined by rules and regulations. By appealing to individualists' entrepreneurial spirit, they can be motivated by grants or other financial incentives to develop innovative technological solutions to environmental issues. Hierarchists are traditionalists whose behavior is governed by rules and regulations; they are especially susceptible to the power of subjective norms. Exert social pressure on hierarchists by demonstrating the pro-environmental behavior of valued others and the hierarchists will follow.

This study is significant because climate change presents an existential threat and time is of the essence. Synthesizing grid-group cultural theory and cognitive sociology enables us to better understand obstacles to the individual and collective performance of efficacious pro-environmental behavior. By attending to the cultural meanings inherent in the conflicts surrounding environmental issues, it may be possible for societies to re-frame these conflicts in ways that better correspond to the worldviews held by its members and to develop culturally targeted strategies to bring about behavioral change.

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Conflicts of Interest: The author declares no conflict of interest.

Appendix A

Table A1. Measures.

Pro-Environmental Behavior [40]		
1.	Would you be willing to pay higher consumer prices so that industry could better preserve and protect the environment?	yes, no
In the past several years, have you:		
2.	Made any changes in your day-to-day behavior because of concerns about the environment?	yes, no
3.	Contributed money to an environmental, conservation, or wildlife organization?	yes, no
4.	Boycotted a company's products because of its record on the environment?	yes, no
5.	Volunteered for an environmental, conservation, or wildlife protection group?	yes, no
To what extent do you agree or disagree with each of the following (SD = 1, D = 2, N = 3, A = 4, SA = 5):		
6.	I would be willing to give up convenience products and services I now enjoy if it meant helping preserve our natural environment.	1–5
7.	I would be willing to spend a few hours a week of my own time helping to reduce the pollution problem.	1–5
Cultural Group [41]		
To what extent do you agree or disagree with each of the following (SD = 1, D = 2, N = 3, A = 4, SA = 5):		
1.	A person is better off if he or she doesn't trust anyone.	1–5
2.	In a family adults and children should have the same influence in decisions.	1–5
3.	When I have problems I try to solve them on my own.	1–5
4.	There is no use in doing things for other people—you only get taken advantage of.	1–5
5.	It is important to preserve our customs and cultural heritage.	1–5
6.	Firms and institutions should be organized in a way that everybody can influence important decisions.	1–5
7.	I would not participate in civic action groups. Those in power do what they like anyway.	1–5

Table A1. Cont.

8.	I prefer clear instruction from my superiors about what to do	1–5
9.	The freedom of the individual should not be limited for reasons for preventing crime.	1–5
10.	It is important to me that in the case of important decisions at work everyone is asked.	1–5
11.	I prefer tasks where I work something out on my own.	1–5
12.	Order is probably an unpopular but important virtue.	1–5
13.	Important questions for our society should not be decided upon by experts but by the people.	1–5
14.	An intact family is the basis of a functioning society.	1–5
Environment Identity [37]		
Think about how you view yourself in relationship to the natural environment and indicate where you would place yourself between each statement (1–5):		
1.	in competition with the environment in cooperation with the environment	1–5
2.	detached from the environment connected to the environment	1–5
3.	very concerned about the environment indifferent about the environment	1–5
4.	very protective of the environment not at all protective of the environment	1–5
5.	superior to the environment inferior to the environment	1–5
6.	very passionate towards the environment not at all passionate towards the environment	1–5
7.	not respectful of the environment very respectful of the environment	1–5
8.	independent from the environment dependent on the environment	1–5
9.	an advocate of the environment disinterested in the environment	1–5
10.	wanting to preserve the environment wanting to utilize the environment	1–5
11.	nostalgic thinking about the environment emotionless thinking about the environment	1–5
Pro-Environmental Orientation [42]		
To what extent do you agree or disagree with each of the following (SD = 1, D = 2, N = 3, A = 4, SA = 5):		
1.	We are approaching the limit of the number of people the earth can support.	1–5
2.	Humans have the right to modify the natural environment to suit their needs.	1–5
3.	When humans interfere with nature it often produces disastrous results.	1–5
4.	Human ingenuity will insure that we do NOT make the earth unlivable.	1–5
5.	Humans are severely abusing the environment.	1–5
6.	The earth has plenty of natural resources if we just learn how to develop them.	1–5
7.	Plants and animals exist primarily to be used by humans.	1–5
8.	The balance of nature is strong enough to cope with the impacts of modern industrial nations.	1–5
9.	Despite our special abilities humans are still subject to the laws of nature.	1–5
10.	The so-called “ecological crisis” facing humankind has been greatly exaggerated.	1–5
11.	The earth is like a spaceship with very limited room and resources.	1–5
12.	Humans were meant to rule over the rest of nature.	1–5
13.	The balance of nature is very delicate and easily upset.	1–5
14.	Humans will eventually learn enough about how nature works to be able to control it.	1–5
15.	If things continue on their present course, we will soon experience a major ecological catastrophe.	1–5

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