PRO-ENVIRONMENTAL BEHAVIOR AND ENVIRONMENTAL PROTECTION ATTITUDES: A CROSS-NATIONAL ANALYSIS, ISSP 2010

The Influence of PEB and Other Factors upon Individuals' Willingness to Protect the Environment

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Abstract

This research examined the extent to which various factors influenced citizens' attitudes towards protecting the environment in the Western democratic nations of Germany, Norway, Great Britain, and the United States. In particular, I assessed whether pro-environmental behavior (PEB) and perceived danger from modern technological consequences (PDE, Cronbach's alpha of .82) affected people's willingness to make financial sacrifices for the environment (WPE, Cronbach's alpha of .84). Dimensional factor analysis led to separating the ten PEB items into the two subscales of daily behaviors and activism behaviors (respective Cronbach's alphas of .79 and .60). Data for 2763 respondents from the International Social Survey Program 2010 revealed that for all four nations assessed individually, the PEB subscales and PDE, as well as years of education and levels of trusting people in government to do what is right, were all significant positive predictors of WPE. Split by nation, the adjusted R-squared values from the OLS regression model ranged from .241 to .375. Legislators in such nations may consider these findings when trying to enact environmental policies that rely on public spending.

Introduction

The environment is a resilient yet fragile resource. Global participation in efforts to improve its condition hinges upon individuals' behaviors as well as national capacities to fund pro-environmental policies. Certainly, when many people partake in individual behaviors, it can add up to make a difference. Nonetheless, it is also worthwhile that collective programs and policies are in place in order to improve circumstances on a larger scale. Since such programs and national efforts require funding, reallocation of resources, and consideration of the externalities brought upon by current, it is prudent to learn how much further pro-environmental individuals are willing to go. How willing are they to accept financial sacrifices to protect the environment beyond their independent pro-environmental efforts?

Review of the Literature

A good portion of this study builds off work by Hayes (2001). Using ISSP: Environment I from 1993, Hayes (2001) explored how gender differences in scientific knowledge interact to provide an effect on environmental attitudes in seven different Western democratic nations. The present study tangentially replicates Hayes' model, instead using the latest Environmental module from the ISSP (2010), and considering pro-environmental behavior and perceived danger to the environment as focal independent variables rather than gender and science knowledge. Assessing only four of the same countries, it sets the same items incorporated by Hayes into her designated orientation of attitudes towards protection of the environment for dependent testing.

Fairbrother (2016) found that the gap between populations' general concern for the environment and their rejection of suggested policy solutions may be attributed to general lack of political trust. This provides motivation to test trust in government employees as a focal independent variable. Aoyagi-Usui et al. (2003) compared pro-environmental attitudes and behaviors across different countries and discovered that for Western nations, environmental values are considered contrary to traditional values. This may imply that for the Western countries such as those examined in this study, there are different sources of motivations and influence behind participating in pro-environmental behavior and, subsequently, in expressing willingness to protect the environment further. Examining many studies that attempted to quantify and scale pro-environmental behavior, Markle (2013) proposed and constructed the Pro-Environmental Behavior Scale (PEBS) out of 19 items, some of which are akin to the ones available through the ISSP and used in constructing this study's PEB Scales.

There has been much research investigating the influences upon PEB. Gifford and Nilsson (2015) provide a good review from various disciplines of the assortment of influential

factors, some of which have been of interest to sociologists and can be studied using data from the International Social Survey Program (ISSP). The researchers split the factors into two categories – personal factors and social factors. The personal factors include childhood experience, knowledge and education, personality and self-construal sense of control, values, political and worldviews, goals, felt responsibility, cognitive biases, place attachment, age, gender and chosen activities. The social factors include religion, urban– rural differences, norms, social class, proximity to problematic environmental sites and cultural and ethnic variations. The researchers noted that the pro-environmental behavior could also be a result of other non-environmental goals, such as saving money or improving health. This is important, as all it may take to persuade someone to participate in PEB or support environmental legislature is to prove to them that they will save money in the end.

The large quantity of influential factors shows that there needs to be more research done on how the variables moderate and mediate one another in determining PEB. The researchers commented that "Some factors overwhelm others in their impact, but those others may appear to have effects if they are considered in isolation (2015:11). Carmi et al. (2015) discussed the mediating role of environmental emotions in transforming environmental knowledge into behavior. Their research presumed that environmental knowledge only drives environmental behavior if it arouses environmental emotions. They found that environmental knowledge has some effect upon PEB. However, when mediated by variables relating to environmental emotions, the influence is much greater. Noteworthy is that they found objective and subjective knowledge both differently affected environmental emotions. When considering awareness of environmental issues, "knowledge" is distinct from "understanding," the latter of which invokes

more emotional concern and therefore motivation to act. Knowledge of an issue, on the contrary, may be relatively null as a motivator.

It is important to note that PEB has been found very often to be associated with individuals having a concern for the environment. In terms of research primarily dealing with environmental concern, a few pieces of literature had unique findings. Brehm et al (2006) found that local environmental concern had its roots in community attachments. In this case, the distinct dimensions of community attachment under consideration are socially-based attachment and attachment to a community's natural environment. Social attachment is statistically significant for attitudes on local issues "representative of community culture and identity or health." On the other hand, local environment attachment is statistically significant as a predictor of attitude regarding issues involving resource protection. Brehm et al. mentioned that "…community-focused factors may be more useful variables for understanding attitudes toward environmental issues than sociodemographic ones."

Theoretical Development

Previous literature applied various theoretical frameworks to explaining variation in PEB.

Human Exemptionalism Paradigm (HEP) & New Ecological Paradigm (NEP)

Those who have views similar to the New Ecological Paradigm (NEP) recognize that humans are a part of the global ecological web, and are liable and not exempt from the consequences brought upon them by nature. On the other hand, those who subscribe to the Human Exemptionalism Paradigm (HEP) may feel that humans are beyond natural forces. Should such endanger humans, ingenuity can resolve all issues. Therefore, environmental concerns or behaviors are simply portray as an entrepreneurial or experimental reaction to the supposed "external" natural forces. With HEP, people may still be concerned about the environment but not as much as those who align with NEP. It would be of interest to compare

how individuals, when assessed for having attitudes leaning them either towards HEP or NEP, comparatively measure up on environmental concern and pro-environmental behavior.

Schwartz' Norm Activation Model (NAM), and Extensions

Schwartz proposed the Norm Activation Model (NAM) in 1977 to explain prosocial behaviors as a reflection of personal norms (PN). "The Schwartz-derived model treats [PEB] as a special case within social-psychological theory of altruism" (Stern et al. 1993). "PN are activated by four key situational variables. First, problem awareness (PA), defined as the extent to which someone is aware of the adverse consequences of not acting prosocially for others or for other things one values. Schwartz (1977) labeled this variable as awareness of need. Second, ascription of responsibility (AR) reflecting feelings of responsibility for the negative consequences of not acting pro-socially. Third, outcome efficacy (OE) defined as the identification of actions to relieve the needs of others or things one values. Fourth, one should recognize own ability to provide relief." (Steg & Groot, 2010)

For the extended NAM model proposed by Stern et al. (2013), beliefs in adverse consequences (AC) provide the motivation to engage in PEB and come from different spheres of influence, such as socio-altruistic, biospheric, and egoistic. Motivation to act is measured by the sum of "the products of beliefs about consequences for a valued object (AC) and the weight or importance of the value orientation toward that object (V)." The greater the perceived consequences and weight placed upon a value orientation, the greater the motivation to act.

Joireman et al. (2001) proposed extending the NAM with the concepts of Social Value Orientation (SVO) and Consideration of Future Consequences (CFC). Based on the SVO model, individuals can be categorized into being considered "prosocials," "individualists," and "competitors" (these two comprise "proself"). In the context of interdependent social dilemmas,

prosocials are more likely than proselfs to consider cooperating and practicing self-restraint. This applies to situations simulating the use of natural resources and other ecological questions. In addition to differences in social value orientation, CFC affects people's consideration of PEB. Joireman et al. noted, "those scoring high on the consideration of future consequences scale are (1) more persuaded by the long-term benefits of environmental interventions; (2) more likely to engage in consumer behaviour promoting the environment… and (3) more likely to be involved in social activism, generally defined" (2001). Their research showed that higher CFC led to higher levels of concern and PEB.

Stern-Oskamp Framework

This conceptual framework, applied in a simplified form by Dietz et al. (1998), looks at the connections between attitudes and active environmentalism. It provides a causal ordering for relationships between variables: "(a) contextual factors, including variables that reflect position in the social structure and socialization experiences; (b) general worldview and ideology about the humanity and environment; (c) specific attitudes, beliefs, and cognitions about environmental issues; and (d) behavioral indicators, including intentions and actual behavior" (1998:454).

Hypotheses

Examining the extent to which pro-environmental behavior, perceived danger to the environment from particular technologies, and trust in government employees to do what is right have an influence upon reported willingness to accept financial sacrifices for the sake of the environment, this article tests the following hypotheses. H1 – PEB, PDE, Trust, Education, Non-Manual Labor, Living in an Urban Area, Working, and Age are statistically significant positive predictors of WPE; H2 – Being Male, Politically Right-Leaning, Married, or Catholic are statistically significant negative predictors of WPE.

Data & Methods

The data used for this paper's analysis are from the International Social Survey Program's (ISSP) 2010 Environment survey. Data was of 45,199 respondents from 32 nations. The respondents were of randomly selected samples of non-institutionalized people age 18 and older, representative of their respective general populations. Nations used for this analysis were the four developed Western democratic nations of Germany, Norway, Great Britain, and the United States. They were chosen from the group of nations studied by Hayes (2001), which had used East and West Germany, as well as the Netherlands and Japan. There was the opportunity to analyze Germany by its politically split counterparts; however, since over twenty years had passed since the dissolution of the GDR and the 28-year-old Berlin Wall, it did not seem prudent to maintain that separation in the present analysis. The ISSP 2010 did not include the Netherlands, and Japan's marital data was missing. The demographic control variables used by Hayes inspired most of the ones chosen for this analysis: sex (coded 1 for Male), age (capped at 89), marital status (coded 1 for Married), years of education (capped at 20), religion (coded 1 for Catholic), political leaning (coded 1 for Right), occupation (coded 1 for Non-Manual Labor),

Respondents from Norway and Germany have similar rates of marriage, respectively at 55% and 56%, significantly different from that of Great Britain's 47% and the United States' 42%. Respondents from Germany and the United States have similar rates of leaning politically right (respectively 26% and 23%), yet are statistically significantly different from that of Norway and Great Britain, which are similar to one another - respectively 33% and 34%. Norway's means for respondents who are active in the labor force, as well as for those in non-manual occupations are statistically significantly different and higher than the means of the other nations.

Hayes (2001) used six questions in assessing attitudes about the environment. This study applies the three survey questions used by Hayes to assess for attitudes towards protection of the

environment. The creation of a summated index of willingness called the Willingness to Protect the Environment Scale (WPE) consisted of the following items: (1) How willing would you be to pay much higher prices in order to protect the environment? (2) How willing would you be to pay much higher taxes in order to protect the environment? (3) How willing would you be to accept cuts in your standard of living in order to protect the environment? The response categories for these items were very willing, fairly willing, neither willing nor unwilling, fairly unwilling, and very unwilling. The WPE scale is summated index of these variables, which were reverse coded to have higher values reflect increasing willingness.

Ten items were used to quantify and scale Pro-Environmental Behavior (PEB): (1) How often do you make a special effort to sort glass or tins or plastic or newspapers and so on for recycling? (2) How often do you make a special effort to buy fruit and vegetables grown without pesticides or chemicals? (3) How often do you cut back on driving a car for environmental reasons? (4) How often do you reduce the energy or fuel you use at home for environmental reasons? (5) How often do you choose to save or re-use water for environmental reasons? (6) How often do you avoid buying certain products for environmental reasons? (7) Are you a member of any group whose main aim is to preserve or protect the environment? (8) In the last five years, have you signed a petition about an environmental issue? (9) In the last five years, have you given money to an environmental group? (10) In the last five years, have you taken part in a protest or demonstration about an environmental issue? The response categories for the PEB items (1) through (6) are always, often, sometimes, and never. Item (7) had response categories of yes and no, and items (8) through (10) had yes I have and no I have not. The Cronbach's alpha for these ten items together is .74. A dimensional factor analysis for these ten items revealed that PEB items (1) – (6) loaded strongly on Factor I, whereas (7) – (10) loaded strongly on Factor II.

Thus, the resulting separate subscales were respectively the Daily PEB Scale (Cronbach's alphas of .79) and the Activism PEB Scale (Cronbach's alphas of .60). The PEB Scales consist of factor-analysis-weighted z-score standardized versions of the original variables reverse-coded to signify greater environmentalism in the positive direction.

Seven items were used to quantified and assess Perceived Danger to the Environment (PDE). The items were offered in the form of questions that asked the respondent to describe, in regards to the environment, how generally dangerous they think is a particular action or consequence of modern technology. The dangers were as follows: (1) air pollution caused by cars; (2) air pollution caused by industry; (3) pesticides and chemicals used in farming; (4) pollution of their country's rivers, lakes and streams; (5) a rise in the world's temperature caused by climate change; (6) modifying the genes of certain crops; and (7) nuclear power stations. The response options for these items were extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, and not dangerous at all for the environment. The PDE Scale consists of z-score standardized versions of the original variables reverse-coded to signify greater perceived danger in the positive direction. The Cronbach's alpha for the PDE Scale was .82.

Great Britain's means for respondents' WPE (.385 on a scale of 0 to 1) are statistically significantly different and lower than the means of the other three countries (which range from .453 to .461). The means for Daily PEB of Norway and the United States are not significantly different, both approximately 2.40 on a scale from 0 to 6. Great Britain follows with nearly 2.78, and Germany has the highest at 3.42. The means for Activism PEB of all four countries are not significantly different, ranging from .427 to .468 on a scale from 0 to 1. The means for PDE of Norway and Great Britain are not significantly different, respectively 2.33 and 2.37 on a scale

from 0 to 4. However, they are statistically significantly different from the means of the United States (nearly 2.58) and Germany (nearly 2.86). The means for trust in government employees are all significantly different from one another. On a scale from 1 to 5, Germany is the lowest at 2.37 and Norway is the highest at 3.12

Results

Running OLS regression split by nation, results supported both hypotheses to some extent (see Table 2). Most importantly, all four of the study's focal independent variables – Daily PEB, Activism PEB, PDE, and Trust – had a statistically significant positive predicted effect upon WPE for all countries. The standardized betas of these four predictors were very similar between Norway and the United States. The standardized betas of PDE and Trust were relatively similar for Germany (respectively 0.117 and 0.192) and Great Britain (respectively 0.115 and 0.186). However, between their two remaining focal variables, the standardized beta of Activism PEB was larger for Germany, while for Great Britain that of Daily PEB was larger. Not only that, but comparing across all four nations, Great Britain's standardized beta for Daily PEB was the largest, while Germany's standardized beta for Activism PEB was largest.

As predicted, Education is also positive and statistically significant across all nations. The standardized betas of Education were similar between Norway and the United States (respectively 0.074 and 0.086), and between Germany and Great Britain (respectively 0.145 and 0.156). Non-Manual Labor was a statistically significant positive predictor only in Germany, as was being Male, contrary to hypothesis. Hayes (2001) found Male to be significant and negative only for Norway. Age was a statistically significant positive predictor and similar in magnitude only in Norway and Great Britain. In Hayes' regression results, Age was only statistically significant for Germany, and was negative. While Leaning Politically Right did have a statistically significant negative effect upon WPE, as also discovered by Hayes (2001), this was

only the case for Norway and the United States, and nearly at twice the standardized magnitude in strength for the former than the latter (-0.185 vs -0.097, respectively). Working, Living in an Urban Area, being Married, or being Catholic were all statistically insignificant predictors of WPE across all nations. In Hayes' model, working was also insignificant in these four nations; however, being Catholic was indeed significant and negative, in Norway and the United States.

Split between nations, this predictive regression model explained 24.1% of the variance in WPE for Germany, 26.1% for that of the United States, 30.5% for that of Great Britain, and 37.5% % for that of Norway. These are much higher levels of explanation than those found by Hayes (2001) using her focal independent variables for the same dependent variable.

Conclusion

Higher levels of Pro-Environmental Behavior, Perceived Danger to the Environment, Trust in Government, and Education are significant predictive factors of increased Willingness to Protect the Environment for individuals in Western democratic nations. If it is in the interest of legislators and scientists to engage greater public financial participation in environmental issues, they may consider proving themselves to the public as being trustworthy, and investing in increasing peoples' access to and participation in pro-environmental activities. Simply scaring them into thinking effects from modern technologies are detrimental is also an effective strategy. Although, it would require nuance for the sake of spreading accurate information rather than half-truths and propaganda. Since the WPE questions mostly relate to economic characteristics, and the ISSP lacked financial data, further research is necessary to assess the influence of respondents' income or wealth upon WPE. Perhaps this will substantially increase the proportion of explained variance in the data.

Table 1. Descriptive Statistics for Variables in the Analysis of Willingness to Protect the Environment: ISSP 2010 - Environment.

Variable	Description	Mean	S.D.
Focal Dependent Variable			
Willingness to Protect the Environment	How willing R is to accept ___ for the sake of the environment (Higher Taxes / Higher Prices / Lower Living Standards) (*0=Not at all willing, 1=Very willing for all three*) *n=4724*	.44	.25
Focal Independent Variables			
Pro-Environmental Behavior (PEB)	Quantity of pro-environmental behaviors R participates in		
Activism PEB Scale	*(0 = None, 4 = All Listed) n=4942*	.45	.83
Day to Day PEB Scale	*(0 = None, 6 = All Listed) n=4347*	2.73	1.26
Perceived Danger to Environment	R perceives a concept as dangerous to the environment (*0 = Not at all dangerous, 4 = Very dangerous*) *n=4113*	2.55	.66
Control Variables			
Trust Government	How strongly R's trusts people in government positions (*1 = Not at all, 5 = Very much so*)	2.68	1.07
Male	Whether R is a man (*1 = yes*)	.46	.50
Age	R's age in years at time of survey	49.03	17.19
Married	Whether R is married (*1 = yes*)	.50	.50
Education	Years of schooling completed by R	12.78	3.51
Catholic	Whether R is Catholic (*1 = yes*)	.17	.38
Politically Right	R's political orientation (*1 = Right-Leaning*)	.28	.45
Working	Whether R is active in the labor force (*1 = yes*)	.57	.50
Non-Manual	Whether R is in a non-manual occupation (*1 = yes*)	.46	.50
Urban	Whether R lives in an urban environment (*1 = yes*)	.29	.45

Valid N (listwise) = 2763

Table 2. The Effect of Pro-Environmental Behavior on Willingness to Protect the Environment (OLS Results)

	Nation							
	Germany		**Norway**		**Great Britain / UK**		**United States**	
PEB Activism	0.021***	(0.210)	0.015***	(0.126)	0.016**	(0.129)	0.017***	(0.132)
PEB Daily	0.017***	(0.175)	0.026***	(0.244)	0.028***	(0.293)	0.021***	(0.220)
PDE Scale	0.006**	(0.117)	0.013***	(0.240)	0.007**	(0.115)	0.013***	(0.243)
Trust Government	0.043***	(0.192)	0.037***	(0.147)	0.050***	(0.186)	0.036***	(0.144)
Male	0.045**	(0.098)	-0.003	(-0.006)	0.039	(0.073)	0.015	(0.028)
Age, years	-0.001	(-0.047)	0.002**	(0.120)	0.002**	(0.138)	0.000	(0.003)
Married	0.009	(0.019)	0.013	(0.026)	0.004	(0.007)	-0.018	(-0.034)
Education	0.009**	(0.145)	0.005*	(0.074)	0.014**	(0.156)	0.008*	(0.086)
Catholic	0.017	(0.035)	-0.047	(-0.012)	-0.046	(-0.046)	-0.011	(-0.018)
Politically Right	-0.010	(-0.018)	-0.095***	(-0.185)	-0.031	(-0.057)	-0.059**	(-0.097)
Non-Manual	0.064**	(0.141)	0.026	(0.052)	0.040	(0.075)	0.003	(0.007)
Working	0.001	(0.002)	0.026	(0.047)	0.032	(0.057)	0.025	(0.044)
Urban	-0.042	(-0.068)	0.012	(0.021)	-0.064	(-0.063)	0.016	(0.030)
Constant	0.217***		0.214***		-0.058		0.294***	
Adj R-squared	0.241		0.375		0.305		0.261	
(N)	(648)		(732)		(516)		(867)	

* p<.05, ** p<.01, *** p<.001
Standardized regression coefficients are parenthesized.

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