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Environmental Value Considerations in Public Attitudes about Alternative Energy Development in Oregon and Washington

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Abstract

The 2013 Pacific Coast Action Plan on Climate and Energy signed by the Governors of California, Oregon and Washington and the Premier of British Columbia, launched a broadly announced public commitment to reduce greenhouse gas emissions through multiple strategies. Those strategies include the development and increased use of renewable energy sources. The initiative recognized that citizens are both a central component in abating greenhouse gas emissions with regard to their energy use behaviors, and are important participants in the public policymaking process at both state and local levels of government. The study reported here examines whether either support or opposition to state government leadership in the development of alternative energy technologies can be explained by environmental values as measured by the New Ecological Paradigm (NEP). The research results are based on mail surveys of randomly selected households conducted throughout Oregon and Washington in late 2009 and early 2010. Findings suggest that younger and more highly educated respondents are significantly more likely than older and less educated respondents to either support or strongly support government policies to promote bioenergy, wind, geothermal, and solar energy. Those respondents with higher NEP scores are also more supportive of government promotion of wind, geothermal and solar technologies than are those with lower NEP scores. Support for wave energy does not show a statistical correlation with environmental values; maybe a reflection of this technology's nascent level of development. The paper concludes with a consideration of the implications of these findings for environmental management.

Key words: Renewable energy policy, environmental values, public acceptance of energy technology, New Ecological Paradigm (NEP)

Introduction

The growing world population and a rapidly increasing demand for energy exert great pressure on nature's finite resources (U.S. Energy Information Agency 2014). To satisfy this growing worldwide demand, governments have relied heavily on fossil fuels — principally coal, oil and gas — for electricity production (International Energy Agency 2008, 24). At the same time, carbon dioxide emissions from the combustion of fossil fuels for transportation, industrial processes and domestic use, which in combination account for 98 percent of the world's total carbon dioxide emissions, have accelerated rapidly (U.S. Energy Information Agency 2014). Environmental problems that can be linked directly to this widespread use of fossil fuels include mining runoff, oil spills, air pollution, upper atmospheric contamination, estuarial and ocean pollution, and global climate change.

As these problems have become increasingly severe and more broadly understood, numerous national policies and international agreements have been developed to address them (Chasek et al. 2006; Moan and Smith 2007, 78; Sussman and Daynes 2013, 4-10). Countries around the world are intensifying the search for alternative fuels and renewable sources of energy that are less damaging to the environment and less injurious to human health. Renewable energies have the benefit that they often can be tailored to the geographic characteristics of the area where they are produced. Thus, regions with regular sun exposure could invest in harvesting solar energy, windswept areas could take advantage of the power of the wind, coastal areas could get their electricity supplied directly from ocean tides and currents, and bioenergy could be developed from forest byproducts and a range of renewable, non-food or animal feed crops.

This study examines how environmental value orientations (as well as other factors) impact individuals' support for or opposition to government policies designed to promote various renewable energy resources such as bioenergy, wind, geothermal, solar and wave energy in the states of Oregon and Washington. Values have been defined as a general preference that individuals hold concerning appropriate courses of action or event outcomes (Heberlein 2012). Values are seen as underlying individual attitudes toward public policies (e.g., renewable energy) as well as related behaviors (e.g., installing solar panels on one's own home) (Kahle, 1983). As one receives information from surroundings, values are used to frame appropriate attitudes and behaviors (Homer and Kahle, 1988).

Our research question is stimulated by several considerations. First, in many ways alternative energy technologies may be seen as part of the "green revolution" wherein the goal is to reduce humans' carbon footprint upon the planet. The goal of sustainability implies demonstrating the capacity to substitute renewable energy sources for nonrenewable, carbon-based ones, such as coal. Therefore, one would expect to find substantial support for alternative energy technologies among those individuals who hold biocentric values and opposition to those technologies among those who hold more anthropocentric value orientations. Likewise, individuals who believe in human-caused climate change are expected to be more likely to favor the development of renewable energy sources, while those who are suspicious of this evidence are likely to view government investments in such new and relatively untried sources of energy to be wasteful and to reflect a misguided public policy (McCright and Dunlap 2011). Such environmental beliefs and values are thus likely to influence support for the promotion and implementation of alternative energy technologies.

At the same time, the movement to develop new and alternative energy technologies faces significant opposition from two distinct quarters. In one camp are those committed to familiar and apparently reliable and relatively inexpensive *status quo* energy sources and seeing no need to employ costly renewable resources (National Mining Association 2014). The development of renewable energy sources is viewed as unnecessary, either in consideration of criticisms of the data about such phenomena as global warming (Leiserowitz 2006; Poortinga et al. 2011), or growing suspicions about the assumption of a rapidly diminishing carbon-based fuel supply arising from the discovery of new sources of supply and more effective extraction technologies (Sovacool 2009).

The more interesting and less expected source of opposition are those who fear adverse consequences to local ecological systems in which renewal energy projects are ultimately sited (Devine-Wright, 2010), many of whom are environmentalists (Robinson 2004). Environmentalists who reside in or near areas where renewable energy projects are sited frequently identify harmful side effects of alternative renewable technologies such as wind power, hydropower, geothermal and wave energy. In such cases, wind farms are viewed as a danger to birds and bats (Johnson et al. 2003; Kikuchi 2008); hydro-power is seen as a cause of decline in anadromous fisheries (Lawson 1993); geothermal projects are believed by some to increase the risk of seismic activity (Ferris, 2012); and, wave energy farms are thought to pose potential impediments to migrating fish and whales (Cada et al. 2007).

The role of environmental values in the framing of citizen orientations toward issues of natural resources and environmental policy has received a great deal of attention from scholars in recent years (Heberlein 2012; McAdam and Boudet 2012; Sherman 2011). In particular, Dunlap and Catton's pioneering work on the development of the *New Environmental Paradigm* and Dunlap's subsequent work on the *New Ecological Paradigm* is critical for this discussion as the work captures the essence and centrality of value-based sets of orientations to the relationships between humans and the natural world (Dunlap 2008; Dunlap et al. 2000). Dunlap and his associates sought to capture the increasing contemporary commitment to environmental values with their survey-based measure of attitudes. These values were broadly seen as growing out of the postindustrial society of the 1960s and beyond; a period of cultural change produced by Western societies enjoying a prolonged period of general peace and prosperity (Inglehart 1977, 1990). The impact of the New Ecological Paradigm (NEP) on citizens' attitudes toward environmental/natural resource issues has been broadly examined, including in the context of contrasting countries with distinct political and social histories/cultures such as the U.S., Japan, Russia and Canada (e.g., Dalton et al. 1999; Pierce et al. 1989; Pierce et al. 1992).

In addition, several studies using selected items from the New Ecological Paradigm 12-item scale have suggested their relevance for the study of support for renewable energy sources. Shwon et al.'s (2010) study of randomly selected households in Michigan and Virginia demonstrated a connection between a subscale of five NEP items to "moralistic" reasons (e.g., environmental protection, concern for future generations, quality of life) for favoring national governmental action to address global climate change through renewable energy source development. Michigan and Virginia were selected for study because Michigan is an automobile production-centered state, and Virginia is closely connected to coal production. Their findings found that state of residence likewise had a strong influence on the nature of arguments made in support of or in opposition to government renewable energy initiatives along with the NEP-derived items. In another study, David Bidwell investigated the structure of attitudes toward commercial wind farms among a random sample of residents of "coastal Michigan" communities (2013). Bidwell's research found that a scale composed of six NEP items showed a positive correlation with support for commercial wind farm development.

As shown in the research just reviewed, state residence plays a role in shaping attitudes about the appropriate use of renewable energy. One possible reason for this variation across geographic regions is the history of state policy and economic development. Oregon and Washington have a markedly progressive history of leadership in environmental protection and in the global climate change arena compared to states in other regions of the country (Konisky and Woods 2012). The present study, using data from a pair of statewide random household surveys, focuses on how environmental value framing through the NEP lens impacts levels of support for a range of renewable energy technologies that have clear potential for government support and development in the Pacific Northwest.

State Renewable Energy Policy: Oregon and Washington in National Context

Table 1 provides a general energy profile for our two case study states of Oregon and Washington. Washington has a significantly larger population than Oregon, including a much larger civilian labor force, which means its energy consumption is much higher. In terms of per capita consumption of energy Oregon is 262 Btu annually, which is 39th in the nation while Washington is 305 Btu annually, which is 29th in the nation. When looking at the sources of electricity production, both states rely heavily on hydroelectric generation from the many dams located on the Columbia River that separates the two states, along with additional dams on other rivers such as the Snake River. Secondary sources of electricity in Oregon include natural gas (19%) followed by renewable energy (11%). For Washington, the second largest source of electricity comes from nuclear (8%) followed closely by renewable energy sources (7%).

--Table 1 about here--

While renewables are not a primary source of electricity, both Oregon and Washington have received high rankings by nongovernmental organizations (NGOs) and media organizations for promoting their development and adoption. One example is *Greenopia* (2011), an online consumer's directory for "green, sustainability and socially conscious, daily purchase decisions." Employing data from a number of federal and state government agencies and other environmental NGOs, *Greenopia* compiled an index of sustainability in 2011 based on air quality, water quality, recycling rate, number of green businesses, LEED buildings, and per capita rates for greenhouse gases emissions, energy use and water consumption, and waste generation. The top ten "greenest" states in this ranking were: California, Maine, Massachusetts, Minnesota, Nevada, New Hampshire, New York, Oregon, Vermont and Washington.

Additionally, Forbes Magazine has ranked states in terms of "greenness" using six equally weighted indicators that included air quality, carbon footprint, hazardous waste management, energy consumption, policy initiatives, and water quality (Forbes 2007). According to Forbes, the top-ranked states include Vermont, Oregon and Washington because: "All have low carbon dioxide emissions per capita, strong policies to promote energy efficiency and air quality" and also have the highest number of LEED- certified buildings per capita (Forbes 2007, 1). It is particularly important to carry out this type of research in state settings where the most active state-level renewable energy policies are in force and where the pro- and anti-green energy forces are most likely to become mobilized to influence public policy, thereby potentially crystallizing distinctive sets of environmental value orientations.

Over the last decade state governments have actually taken the lead in adopting and implementing sustainability-promoting policies in areas of renewable energy and climate change when compared to the federal government (Sussman and Daynes 2013, Chapter 7). As Delmas and Mones-Sancho (2011, 273) argue in this regard:

> While there are current debates about the implementation of federal renewable policy, U.S. states have taken the leading role in establishing renewable energy policies since the 1990s. These include Renewable Portfolio Standards, the requirement to sell green products, disclosure policies, and subsidies.

Many states have adopted renewable energy portfolio standards (RPS), the targeted portion of electricity sales and megawatts in the state's energy portfolio, and the year targeted, to achieve the portfolio goal. According to data from the U.S. Department of Energy, currently 24 states – including Oregon and Washington – plus the District of Columbia have adopted a formal RPS (2014). Seventeen of these states have RPS at 20 percent or higher, with Maine having the highest at 40 percent. Oregon has targeted RPS at 25 percent by 2015, and Washington has targeted RPS at 15 percent by 2020 (U.S. Department of Energy 2014).

Another policy at the state level is Mandatory Green Power Options (MGPO). This policy requires electrical utilities to offer customers electricity from renewable energy resources or through the purchase of renewable energy credits from a renewable energy provider. Six states have adopted MGPOs, including Colorado, Delaware, Iowa, Montana, New Mexico, Oregon and Washington. In addition to RPS and MGPO, states may also implement tax policies that incentivize individuals and businesses to use renewable energy sources, which is the case in both Oregon and Washington.

Delmas and Montes-Sancho (2011) and Aljets (2010) suggest that both consumer tax rebates and the adoption of a state MGPO are directly related to increased renewable energy use. However, findings regarding the impact of renewable energy portfolio standards (RPS) policies on renewable energy production and use are mixed at best, with some studies showing evidence of positive outcomes and others showing little impact (Carley 2009; Lyon and Yin 2010). Delmas and Montes-Sancho also found that (2011, 282): "…the variable for green residential customers provided positive and significant results. Essentially, the more the customers are willing to pay a premium for green electricity, the greater the installed renewable capacity." This finding is consistent with previous research reported by Matisoff (2008), Pierce et al. (2009), Simon (2009), White et al. (2009), and Koch (2011) that the state environmental value context has much influence over whether these policies will be adopted.

Another trend visible among states is the development of regional climate action strategies. For example, the signing of the 2003 Global Warming Initiative by the governors of California, Oregon, and Washington committed those three states to reducing greenhouse gas emissions in order to combat global warming. A follow-up 2004 staff report to the governors involved (Arnold Schwarzenegger, Christine Gregoire and John Kitzhaber) stated the following (West Coast Governors 2004, 1):

> Global warming will have serious adverse consequences on the economy, health and environment of the West Coast states. These impacts will grow significantly in coming years if we do nothing to reduce greenhouse gas pollution. Fortunately, addressing global warming carries substantial economic benefits. The West Coast is rich in renewable energy resources and advanced energy-efficient technologies. We can capitalize on these strengths and invest in the clean energy resources of our region.

States on the east coast also have seen the development of regional climate initiatives (Center for Climate and Energy Solutions, 2012). Ten mid-Atlantic and Northeastern states have agreed to form a Regional Greenhouse Gas Initiative, which "is the first market-based regulatory program in the United States to reduce greenhouse gas emissions…and will reduce CO_2 emissions from the power sector 10 percent by 2018" (Regional Greenhouse Gas Initiative 2011). The states participating in this initiative include: Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Rhode Island and Vermont.

Energy-efficient building standards, supported by the regional actions just described, are another way in which states have taken initiative. According to the U.S. Department of Energy, twenty-four states (including Oregon and Washington) have adopted rather stringent energy standards for existing public buildings and for newly constructed commercial buildings. Sustainability-promoting guidelines are in place in most of the nation's population centers for the "greening" of government buildings; this action qualifies as a timely innovation as state and local governments seek to address global climate change and promote sustainability (Simon, Steel and Lovrich 2010).

A national study examining state adoption of climate change policies in the context of limited federal government action found that:

> States have embraced sustainable energy development for many reasons, including efforts to reduce vulnerability to energy imports and to improve economic development opportunities (e.g., renewables create in-state jobs), as well as to contribute to climate change mitigation. (Byrne et al. 2007, 4559)

Byrne et al., reported finding that many states adopt sustainable policies because of the presence of electric power customers (residential and commercial alike) wishing to purchase green power *even if it is more expensive* because it aligns with their environmental values. At the same time, many large volume customers (e.g., commercial enterprises) wish to use green power "...to improve public image, reduce regulatory risks, meet corporate environmental goals, and differentiate their products" (Byrne et al. 2007, 4563; see also, Bird and Swezey 2006; Opinion Research Corporation 2006; Uchitelle and Thee 2006; Hanson and Van Sol 2003; Holt and Bird 2005).

Other factors found to correlate with adoption of state climate policy include: a well-developed civil society wherein citizens have the ability to engage in direct democracy — such as initiatives and referenda — and pass climate change policies directly (Selin and VanDeveer 2007); living in states that are not economically dependent on the automobile, chemical and fossil fuel industries (Brody et al. 2008); perceived credible threats from climate change such as sea level rise for coastal areas or increasing drought conditions for agriculture (Brody et al. 2012; Rabe 2001); and, the development and dissemination of renewable energy technologies that lead to substantial employment opportunities and economic development (Byrne et al. 2007).

In the first systematic quantitative analysis of comparative state environmental policy, Hays et al. (1996) identified many of the same variables cited above as showing evidence of contributing to state commitment to protecting the environment. The Hays study found that states with "liberal public opinion, strong environmental interest groups, liberal legislatures, and professionalized legislatures are the most committed to environmental protection" (Hays et al. 1996, 41). Similarly, Steel et al. (2003), Matisoff (2008), Nelson (2010), and Simon et al. (2011) found these same predictors of environmental protective policies in U.S. state and local contexts. However, there has been little to no literature that compares support for, or opposition to, governmental efforts specifically designed to promote multiple *renewable energy technologies*. This study fills this gap in the literature by examining public support for state efforts in regard to five renewable technologies: geothermal, solar, wind, bioenergy, and wave technologies.

States are also an important focus of renewable energy policy research because "…states have long been doing more to advance renewable energy, energy efficiency, and reduced greenhouse gas emissions than the federal government" (Dernbach 2012: 83). Therefore, an understanding of the dynamics of support or opposition to renewable energy policies at the state level can help us inform how to frame public discourse and deliberation for a national level discussion (Shwom et. al. 2010). This study goes beyond previous studies, such as Shwom et. al.'s public opinion research on climate change policies, by more fully examining the connection between environmental values and support for renewable energy policies.

Methodology

Data were collected using a mailed survey sent to random samples of 1,400 households in Oregon and 1,400 households in Washington during the winter of 2009-10. The random household samples were provided by a commercial marketing research company that builds household lists using a variety of data sources including telephone directories, property ownership lists, driver license information, etc. A modified version of Dillman's *Tailored Design Method* (2007) was used in questionnaire format with multi-wave survey implementation. Each contacted household was issued the following request for participation: "If available, we would prefer the person, 18 years old or older, who most recently celebrated a birthday to complete the survey." Three waves of first class mail surveys were distributed, followed by a final telephone reminder if necessary. Each mailing contained a copy of the survey, a hand-signed letter encouraging participation in the study, and a business postage prepaid envelope. After three waves, a total of 682 surveys were returned from Oregon and 679 from Washington, for response rates of 48.7 percent and 48.5 percent, respectively. Response rates are calculated following the American Association for Public Opinion Research guidelines (2011). The rate of response for both states is close to 50 percent, which "…is considered adequate for analysis and reporting" (Groves 2006: 647). However, there is debate about the impact of response rates on representativeness given many approaches to detect nonresponse bias. Some suggest that response rate may or may not be related to non-response bias depending on the context and other complexities involved in survey implementation (Groves 2006). For this study we compare survey respondents in each state with 2010 U.S. Census data to determine demographic representativeness. According to Groves, "The strengths of this method are that estimates independent of the survey in question are compared" (e.g., demographic characteristics)(2006: 655). However, "…the weaknesses are that the key survey variables of the study do not usually exist in the external source" (e.g., specific renewable energy policy preference questions) (2006: 655). Therefore, it may be that respondents to the survey were more interested and possibly favorably disposed to renewable energy development than the general population, but without these types of questions in the survey we cannot conclude this for sure.

—Table 2 about here—

The data displayed in Table 2 compare survey respondent characteristics with 2010 U.S. Census data. Because only potential respondents eligible to vote were allowed to participate in the survey (18 years of age and older), only data for 18 years of age and older are included in the U.S. Census data. When comparing survey response data with the 2010 U.S. census data for both Oregon and Washington, we find that survey respondents are slightly older, slightly more affluent, and slightly more educated than U.S. Census estimates, which is typical of survey respondents (Messer et al. 2012). There is also a slightly higher percent of female respondents than the Census estimates as well. When comparing survey response rates with the percent voter turnout in the 2010 elections, the percent voting in each state is slightly higher than the survey response rate (3.9 % in Oregon and 4.6% in Washington). These comparisons of survey respondents with U.S. Census data suggest that both state samples are fairly representative in terms of demographic and participation characteristics.

Findings

The states of Oregon and Washington have been identified as leaders in supporting the development of renewable sources of energy. As we discussed, these states, alone and in regional alignments, have some of the more supportive policies and practices in the country. This study measures levels of support that exists in Oregon and Washington for policies that encourage the development of specific renewable energy technologies, and then asks what role environmental value orientations (as measure by the NEP) play in that support. We also control for public concerns in terms of dependence on foreign energy sources and the availability of domestic energy supplies. Concerns about both of these issues have been found to be important sources of public support for the development of alternative energy sources in a variety of countries (Council on Foreign Relations 2009).

Renewable Energy Policy Support. Survey results find that solar and wind energies have the highest level of public support in both Oregon and Washington (see Table 3). Over 60 percent of respondents in Oregon and Washington support or strongly support government policies to promote solar energy, and over 59 percent in Oregon and over 65 percent in Washington support or strongly support government policies to encourage wind energy development. The next most highly supported renewable technologies are bioenergy, followed by geothermal energy and wave energy. Chi-Square results for support of government support of each renewable energy technology were not significant, indicating similar levels of support present in both states. A caveat is in order when interpreting these findings as the question only refers to "government adopting policies." Hence, these data should not be confused with queries relating to purely market driven (or voluntary) approaches to the development of these alternative energy sources. Respondents could support the development of each technology, but not necessarily support government policies to promote that development. At the same time, depletion of non-renewable energy resources, as well as the environmental consequences of their use in energy production, is often seen as an endangerment of the "commons" problem, one for which the public sector would be argued to be an appropriate location within which to address a shared interest (Rabe 2010).

—Table 3 about here—

Next we examined whether support for one source of renewable energy technology development is correlated with support for other sources. The correlation matrix presented in Table 4 shows positive and significant relationships between all five renewable energy technologies; even so, the strength of the relationships varies greatly. The two most supported sources—wind and solar—have the strongest association. Wave energy reveals the lowest correlations with support of other sources. It appears as though supporters of wind and solar energy are less enthralled with wave energy at this point in time. To be sure, wave energy is still in the developmental stage off the Oregon coast, and even less so off of the Washington coast and Puget Sound, and this may produce less public certainty in its potential.

—Table 4 about here—

Sources of Support for Renewable Energy Development. Our next research question is whether environmental attitudes, as measured by the NEP, also contribute to levels of support for specific renewals technologies. We address this with a multivariate analysis of public support for government policies encouraging renewable energy development in Oregon and Washington. The description and summary measures of all predictor variables are presented in Table 5. The socioeconomic/ demographic variables examined include age in years, gender, and formal educational attainment.

—Table 5 about here—

The individual-level environmental value variable examined as a predictor of support for renewable energy policy is that of the New Ecological Paradigm (NEP), which is an often-cited indicator of environmental orientations (Dunlap et al. 2000). The measure of NEP utilized in this study features a subset of six of the twelve items found in the original inventory; this subset of items has been found to generate results virtually identical to those in the twelve-item version (e.g., Steel et al. 2010). The items in question are: (1) *The balance of nature is very delicate and easily upset by human activities*; (2) *Humans have the right to modify the natural environment to suit their needs*; (3) *We are approaching the limit of people the earth can support*; (4) *The so-called "ecological crisis" facing humankind has been greatly exaggerated*; (5) *Plants and animals have as much right as humans to exist*; and (6) *Humankind was created to rule over the rest of nature*. A Likert-type response format was provided for responses for each item: "strongly agree," "agree," "neutral," "disagree," and "strongly disagree." After recoding items so that higher numbers reflect a biocentric position (support for the New Ecological Paradigm) and lower numbers reflected an anthropocentric position (support for the Dominant Social Paradigm), the responses were summed to form an indicator ranging from 6 to 30. The reliability coefficient (Cronbach's alpha) for the NEP was 0.87, suggesting that respondents were highly consistent in their response patterns for the additive scale.

Lastly, the analysis examines public energy concerns in terms of domestic energy supply and dependence on foreign energy sources. Respondents were asked their level of disagreement or agreement with a Likert-type response format (1=strongly disagree to 5=strongly agree) for the two following statements: "I am concerned that our country doesn't have enough energy resources;" and "Decreasing our dependence on foreign oil and gas is important to our national security."

Separate logistic regression analyses were conducted for each renewable energy source (Table 6). For each case the dependent variables were recoded so that a '1' reflects those respondents who either "support" or "strongly support" government adopting policies to encourage the technology, and a '0' reflects the categories of "no support" or "some support." We also added a dummy variable to assess any statistically significant differences between the states (Oregon=1, Washington=0), which were not expected given the results presented in Table 3.

—Table 6 about here—

Two demographic variables were found to be important predictors of support for government promotion of renewable energy relating to bioenergy, wind, geothermal or solar technologies—namely, age and education. Specifically, the odds of supporting these policies decrease among older residents, while the odds of supporting are greater among those with higher levels of education. Age and education were not statistically correlated with support for wave energy policy.

Women were slightly less likely to support policies for any of the renewable technologies, but the gender difference was not statistically significant. And, as we expected, OR and WA residents are not statistically different in their levels of support, once controlling for other variables in the model.

When examining the models, a statistically significant effect of the NEP variable is documented for wind, geothermal, solar and wave energy. Those with higher NEP scores (more bio-centric orientations) are more supportive of active government promotion of wind, geothermal and solar technologies than those with lower NEP scores. However, in regard to wave energy technology, the likelihood of supporting government policies is slightly lower for those with higher NEP scores. Given the limitations of the research design, the reason for these differences is uncertain, but it may be that these wave energy technologies pose environmental tradeoffs that are unacceptable for highly biocentric respondents. The NEP variable had no significant impact for the bioenergy model, possibly because it has become a rather controversial issue due to the potential adverse impact on food supplies (United Nations Environment Programme 2010). The survey did not, unfortunately, distinguish between food crop replacement and other sources of feedstock for bioenergy development. When the NEP scale is divided into three levels of support, and then one examines more closely those with the highest levels of support for bioenergy, we find that 55.8 percent of the top third NEP scores supported government policies to promote biofuel technology and 45.8 percent answered "some" or "no" support.[1]

The final two variables included in each model consider concerns about energy supply and energy security. For all five models, the likelihood of supporting renewable energy is significantly greater for those who believe the U.S. has insufficient energy resources (Supply). For four of the five models the level of statistical significance is 0.001, but for wave energy it is at the 0.05 level. The variable assessing concern about dependence on foreign energy sources and its impact on national security (Security) was likewise positive and statistically significant in three models—bioenergy, wind and solar. Our model predicts that greater concerns regarding security are associated with higher likelihood of support for government policies encouraging development of these three renewable energy sources.

Chi-square results for all five models are statistically significant Chi-Square, indicating a relatively good fit overall. The largest Chi-Square results were found for wind and solar energy, with the yet nascent wave energy having the smallest coefficient. While statistically significant, the Nagelkerke R^2 for each model is relatively low, with a range of 0.167 (solar energy) to 0.059 (wave energy). Therefore, these findings suggest there is much more to explore to account for variation in levels of support.

Summary and Conclusion

This study examined the contribution of environmental values and other factors to public support of or opposition to government policies intended to promote the renewable energy technologies of bioenergy, wind, geothermal, solar and wave energy in the U.S. states of Oregon and Washington. The findings reported here suggest that certain demographic characteristics, concerns about global energy supplies and national security, and environmental values all affect public support of or opposition to government promotion of renewable energy technologies. We found that the demographic variables of age and education had a significant impact on support for such policies; specifically, younger respondents and more highly educated respondents were significantly more likely than older respondents and less educated respondents to either support or strongly support government policies to promote bioenergy, wind, geothermal, and solar energy, but not wave energy.

This study also found that respondent concerns about domestic energy supplies and energy security have an important impact on support for renewable energy promotion policies. For all five technologies, support for government policies promoting renewable energy technologies is significantly greater for those who believe that the U.S. has insufficient energy resources to meet its current and future needs. Similarly, those respondents who are concerned about dependence on foreign energy sources and the impact of that dependence on the nation’s national security are more supportive of government efforts to promote biofuel, wind, and solar energy technologies, but not wave energy nor geothermal energy.

Finally, the central focus of this paper entailed an examination of the role of environmental values in the shaping of citizen orientations toward renewable energy technology promotion public policies. In particular, the New Ecological Paradigm index (in its six-item form) was used as a way of representing value-based orientations to relationships between humans and the natural world (Dunlap et al. 2000). We found that certain shared environmental values are indeed held by individuals who either support or oppose the development of alternative energy technologies. Those respondents with higher NEP scores are more supportive of government promotion of wind, geothermal and solar technologies than are those with lower NEP scores. However, we did find that citizen support of wave energy was quite different in origin, with supporting government policies promoting this type of alternative renewable energy being lower for those with higher NEP scores.

In his recent study *Navigating Environmental Attitudes*, Thomas Heberlein warns environmental managers and planners that "technological fixes must be designed to be consistent with attitudes" (2012, 88). He documents numerous cases where managers and planners attempted to "educate the public" through advertising campaigns and public outreach efforts, only to meet disastrous results because prevailing public environmental values and attitudes were often ignored. Similarly, Yi and Feiock found that "citizen ideology comes into play when utility companies and regulatory commissions make decisions with regard to the choice of electricity generation technology" (2014, 398). The results presented here suggest that environmental managers and planners should indeed take public environmental values into account when promoting policies to develop renewable energy technologies. More specifically, framing the debate in terms of both environmental benefits for citizens with biocentric values and economic benefits for those with more anthropocentric values is warranted. As Ansolabehere and Konisky (2014, 197) caution us, "…the public's role, either as a constructive force or as an obstacle to needed policy, is undeniable."

Future research should examine in greater depth how environmental values influence the perception of renewable energy technologies through the use of more targeted surveys and more deeply penetrating qualitative research, such as can be accomplished with focus group sessions with citizens. Moreover, comparative case studies carried out within a fuzzy set analysis framework featuring a range of communities differing in their level of acceptance of, or opposition to, renewable resource technology initiatives should be undertaken (see: Ragin 2004; McAdam and Boudet, 2012). Future research should also be field-based in order to investigate how environmental value framing interacts with place-based values (Casselman 2009; Wooley 2010) and "not in my backyard" (NIMBY) and "locally unwanted land use" (LULU) situations (Ehrenhalt 2014; Heberlein 2012; Schively 2007; Van der Horst 2010). The work of Patrick Devine-Wright and his colleagues has shown the major role of place attachment in case studies of tidal energy and wind energy in European settings (Devine-Wright 2011; Devine-Wright and Howes 2010). It is likely that situational context may well lead to different conflicting values and preferences than are contemplated with more abstract tradeoffs, such as those implied in this survey research-based analysis (Sherman 2011).

Notes

[1] The top one-third scores for the NEP, indicating strongly biocentric values (scores of 24 to 30; n=466), responded to the question on bioenergy as follows: "No support" = 12.2%; "Some support" = 32.0%; "Support" = 35.8%; and "Strongly support" = 20.0%.

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References

Aljets P (2010) The power of choice: how certain policies encourage renewable energy development. Master of Public Policy Essay, Oregon State University. http://hdl.handle.net/1957/16257. Accessed 10 April 2014

American Association for Public Opinion Research (2011) Final dispositions of case codes and outcome rates for surveys. http://www.aapor.org/AM/Template.cfm?Section=Standard_Definitions2&Template=/CM/ContentDisplay.cfm&ContentID=3156. Accessed 1 September 2014

Ansolabehere S, Konisky DM (2014) Cheap and clean: how Americans think about energy in the age of global warming. The MIT Press, Cambridge, MA

Bidwell D (2013) The role of values in public and attitudes towards commercial wind energy. Energy Policy 58: 189-199

Bird L, Swezey B (2006) Green power marketing in the United States: a status report. National Renewable Energy Laboratory, Golden, CO

Bolson T, Cook FL (2008) The polls: public opinion on energy policy: 1974-2006. Public Opin Q 72: 364-388

Brody SD, Zahran S, Grover H, Vediltz A (2008) A spatial analysis of local climate change policy in the United States: risk stress, and opportunity. Landsc and Urban Plan 87: 33-41

Brody SD, Zaharan S, Vedlitz A, Grover H (2012) Examining the relationship between vulnerability and public perceptions of global climate change in the United States. Environ and Behav 40: 72-95

Byrne J, Hughes K , Rickerson W, Kurdgelashvili L (2007) American policy conflict in the greenhouse: divergent trends in federal, regional, state, and local green energy and climate change policy. Energy Policy 35: 4555-4573

Cada G, Ahlgrimm J, Bahleda M, Bigford T, Stavrakas SD, Hall D, Moursund R, Sal M. (200). Potential impacts of hydrokinetic and wave energy conversion technologies on aquatic environments. Fisheries 32 (4): 174-181

Carley S (2009) State renewable energy electricity policies: An empirical evaluation of effectiveness. Energy Policy 37: 3071-3018

Casselman B (2009) Sierra Club's pro-gas dilemma: National group's stance angers on-the-ground environmentalists in several states. Wall Street Journal, December 31

Center for Climate and Energy Solutions (2012) Multi-state climate initiatives. www.c2es.org/print/us-states-regions/rgional-climate-initiatives. Accessed 4 April 2014

Chasek P, Downie D, Brown JW (2006) Global environmental politics, 4th ed. Westview, Boulder, CO

Corner A, Randall A (2011) Selling climate change: The limitations of social marketing as a strategy for climate change public engagement. Glob Climate Change 21: 1005-1014

Council on Foreign Relations (2009) Public opinion on global issues: world opinion on energy security. http://www.cfr.org/energy-policy/world-opinion-energy-security/p20063. Accessed 1 September 2014

Dalton R, Garb P, Lovrich NP, Pierce JC, Whitely J (1999) Critical masses: citizen responses to the environmental consequences of nuclear weapons production in the United States and Russia. MIT Press, Cambridge

Delmis MA, Montes-Sanch MJ (2011) U.S. state policies for renewable energy: context and effectiveness. Energy Policy 39: 2273-2288

Dernbach, J (2012) Acting as if tomorrow matters: accelerating the transition to sustainability. Environmental Law Institute, Washington, DC

Devine-Wright P (2010) Renewable energy and the public: from NIMBY to participation. Routledge, New York

Devine-Wright P (2011) Place attachment and public acceptance of renewable energy: a tidal energy case study. Journal of Environmental Psychology 31: 336-343

Devine-Wright P, Howes Y (2010) Disruption to place attachment and the protection of restorative environments: a wind energy case study. Journal of Environmental Psychology doi:1016;j-jenvp.2010.01.008

Dillman DA (2007) Mail and internet surveys: the tailored design method, 2nd ed. John Wiley and Sons, Hoboken, NJ

Dunlap RE (2008) The new environmental paradigm scale: from marginality to worldwide use. J Environ Educ 40: 3-18.

Dunlap RE, Van Liere K, Mertig A, Jones R (2000) Measuring endorsement of the new environmental paradigm: a revised NEP scale. J Soc Issues 56: 425-442

Ehrenhalt A (2014) Down with the middleman: more problems will likely be solved by localities, not nation-states, in the future. Governing, February 16-17.

Ferris D (2012) Geothermal company drills into a volcano. http://www.forbes.com/sites/davidferris/2012/10/08/geothermal-company-drills-into-a-volcano/. Accessed 6 April 2014

Fischer A, Peters V, Vavra J, Neebe M, Megyesi B (2011) Energy use, climate change and folk psychology: does sustainability have a chance? results from a qualitative study in five European countries. Glob Climate Change 21: 1025-1034

Forbes Magazine (2007) America's greenest states. http://www.forbes.com/2007/10/16/environment-energy-vermont-biz-beltway-cx_bw_mm_1017greenstates.html. Accessed 3 April 2014

Greenopia (2011) How green is your home state? http://www.greenopia .com. Accessed 11 April 2014

Groves RM (2006) Nonresponse rates and nonresponse bias in household surveys. Public Opin Quart 70: 646-675

Hanson C, Van Son V (2003) Renewable energy certificates: an attractive means for corporate customers to purchase renewable energy. World Res Inst, Washington, D.C.

Hays SP, Esler M, Hays CE (1996) Environmental commitment among the states: integrating alternative approaches to state environmental policy. Publius 26: 41-58

Heberlein, TA (2012) Navigating environmental attitudes. Oxford University Press, New York

Holt E, Bird L (2005) Emerging markets for RECs: Opportunities and challenges. North American Windpower, July: 1-4.

Homer P, and Kahle LR (1988) A structural equation test of the value-attitude-behavior hierarchy. J Pers Soc Psychol 54: 638-646

Inglehart R (1977) The silent revolution: changing values and political styles among Western publics. Princeton University Press, Princeton, NJ

Inglehart R (1990) Culture shift in advanced industrial society. Princeton University Pres, Princeton, NJ

International Energy Agency (2008) Key world energy statistics. http://www.iea.org/publications/free_new_Desc.asp?PUBS_ID=1199. Accessed 10 August 2014

Johnson GD, Erickson WP, Strickland MD, Shepherd MF, Shepherd DA, Sarapro SA (2003) Mortality of bats at large-scale wind power development at Buffalo Ridge, Minnesota. The American Midland Naturalist 150: 332-342

Kahle LR (1983) Social values and social change: adaptation to life in America. Praeger, New York, NY

Kikuchi R (2008) Adverse impacts of wind power generation on collision behaviour of birds and anti-predator behaviour of squirrels. J for Nat Conservation 16: 44-55

Koch W (2011) States take lead in efforts to fight climate change. USA Today, January 23. http://content.usatoday.com/communities/greenhouse._ Accessed 3 April 2014

Konisky DM, Woods ND (2012) Measuring state environmental policy. Rev of Policy Res 29: 544-569

Lawson PW (1993) Cycles in ocean productivity, trends in habitat quality, and the restoration of salmon runs in Oregon. Fisheries 18: 6–10

Leiserowitz A (2006) Climate change risk perception and policy preferences: The role of affect, imagery, and values. Climatic Change 77: 45-72

Lovrich NP, Pierce JC (1984) Situation-specific and trans-situational factors affecting ‘knowledge gap’ phenomena. Communication Res 11: 415-434

Lyon TP, Yin H (2010) Why do states adopt renewable portfolio standards? an empirical investigation. The Energy J 31 (3): 133-157

Matisoff DC (2008) The adoption of state climate change policies and renewable portfolio standards: regional diffusion or internal determinants? Rev of Policy Res 25: 527-546

McAdam D, Boudet HS (2012) Putting social movements in their place: explaining opposition to energy projects in the United States, 2000-2005. Cambridge University Press, New York

McCright AM, Dunlap RE (2011) Cool dudes: The denial of climate change among conservative white males in the United States. Glob Climate Change doi:10.1016/j.gloenvcha.2011.06.003.

Messer BL, Edwards ML, Dillman DA (2012) Determinants of item nonresponse to weand mail respondents in three address-based mixed-mode surveys of the general public, Technical Report 12-001. Social and Economic Sciences Research Center, Pullman, WA: Washington State University. http://www.sesrc.wsu.edu/dillman/papersweb/2012.html Accessed 9 September 2014

Moan JL, Smith ZA (2007) Energy use world wide. ABC-CLIO, Santa Barbara, California

National Mining Association (2014) Clean coal technology. NMA, Washington, D.C.

Nelson G (2010) It's red states vs. blue in legal wars over EPA rules. Greenwire, October 12.

Opinion Research Corporation (2006) Global warning and alternative energy: a leadership survey. Civil Society Institute, Princeton, NJ

Pierce JC, Steel BS, Warner RL (2009) Knowledge, culture and public support for renewable energy technology policy in Oregon. Comparative Technology Transf and Society 7: 270-286

Pierce JC, Steger MA, Steel BS, Lovrich NP (1992) Citizens, political communication, and interest groups. Praeger Publishers, Westport, CT

Pierce JC, Lovrich NP, Tsurutani T, Abe T (1989) Public knowledge and environmental politics in Japan and the United States. Westview Press, Boulder, CO

Rabe BG (2010) Conclusion. In Rabe BG (ed) Greenhouse governance: addressing climate change in America. The Brookings Institute, Washington, D.C., pp. 353-366

Rabe BG (2001) Statehouse and greenhouse: the emerging politics of American climate change policy. The Brookings Institution, Washington, D.C.

Ragin C (2004) Turning the tables: how case-oriented research challenges variable-oriented research. In: Brady HE, Collier D (eds) Rethinking social inquiry: diverse tools, shared standards. Rowman and Littlefield, Lanham, MD, pp 125-141

Raupach MR, Marland G, Ciais P, Le Quéré C, Canadell JG, Klepper G, Field CB (2007) Global and regional drivers of accelerating CO2 emissions. Proceedings of the National Academy of Sciences 104: 10288–93

Regional Greenhouse Gas Initiative (2011) http://www.rggi.org/home. Accessed 10 April 2014

Robinson J (2004) Squaring the circle? some thoughts on the idea of sustainable development. Ecological Economics 48: 369-384

Schively C (2007) Understanding the NIMBY and LULU phenomenon: reassessing our knowledge base and informing future research. J of Plan Literature 21: 255-66

Selin H, VanDeveer SD (2007) Political science and prediction: what's next for U.S. climate change policy? Rev of Policy Res 24: 1-27

Sherman, DJ (2011) Not here, not there, not anywhere. Resources for the Future, Washington D.C.

Shwom R., Bidwell D, Dan A, Dietz T (2010) Understanding U.S. public support for domestic climate change policies. Glob Environmental Change 20: 472-482

Simon CA, Steel BS, Lovrich NP (2011) State and local government: sustainability in the 21st Century. Oxford University Press, New York

Simon CA (2009) constraints on wind and solar energy in the U.S. context. Comparative Technology Transf and Society 7: 251-269

Smith E (2002) Energy, the environment, and public opinion. Rowman and Littlefield, Oxford

Sovacool BK (2007) Rejecting renewables: the socio-technical impediments to renewable electricity in the United States. Energy Policy 37: 4500-4513

Spaargaren G (2011) Theories of practices: agency, technology, and culture – Exploring the relevance of practice theories for the governance of sustainable consumption practices in the new world order. Glob Climate Change 21: 813-822

Steel BS, Warner RL, Lach D (2010) Gender differences in support for scientific involvement in U.S. environmental policy. Science, Tech, and Hum Values 35: 147-173

Steel BS, Lovrich NP, Lach D, Fomenko V (2005) Correlates and consequences of public knowledge concerning ocean fisheries management issues. Coast Management 33: 37-51

Steel BS, Clinton R, Lovrich NP (2003) Environmental politics and policy: a comparative perspective. McGraw-Hill, Boston

Uchitelle L, Thee M (2006) Americans are cautiously open to gas tax rise. New York Times, February 28

United Nations Environment Programme (2010) Biofuel controversy explodes as new concerns emerge.

http://www.climateactionprogramme.org/news/biofuel_controversy_reaches_high_pitch_as_new_concerns_emerge Accessed 15 October 2014.

U.S. Department of Energy (2014) U.S. states: state profiles and energy estimates. http://www.eia.gov/state/?sid=US Accessed 9 September 2014

U.S. Energy Information Administration (2014) Annual Energy Outlook 2014. http://www.eia.gov/forecasts/aeo/. Accessed 10 October 2014

Van der Horst D (2010) NIMBY or not? exploring the relevance of location and the politics of voiced opinions in renewable energy siting controversies. Energy Policy 35: 2705-2714

West Coast Governors (2004) West coast governors' global warming initiative: Staff recommendations to the governors. http://www.ef.org/westcoastclimate/WCGGWI_Nov_04%20Report.pdf. Accessed 10 April 2014

White SS, Brown C, Gibson J, Hanley E, Earnhart D (2009) Planting food or fuel: developing an interdisciplinary approach to understanding the role of culture in farmers' decisions to grow second-generation, biofuel feedstock crops. Comparative Technology Transf and Society 7: 287-302.

Wooley O (2010) Trouble on the horizon? Addressing place-based values in planning for off-shore wind energy. J Environmental Law 22: 223-250

Yi H, Feiock RC (2014) Renewable energy politics: policy typologies, policy tools, and state deployment of renewables. Policy Stud J 42: 391-415

Table 1. Energy and Population Profiles for Oregon and Washington States

	Oregon	Washington
Population 2013	3.9 million	7.0 million
Civilian Labor Force	1.9 million	3.4 million
Per Capita Income 2012	$38,786	$45,413
Total Energy Consumption (trillions Btu)/U.S. State Rank	1,014/32nd	2,080/16th
Total Energy Consumption Per Capita/U.S. State Rank 2011	262 Btu/39th	305 Btu/29th
Electricity Generation by Source 2012:		
Coal	5%	3%
Natural Gas	19%	5%
Hydroelectric	65%	77%
Nuclear	0%	8%
Renewables	11%	7%

Source: U.S. Department of Energy 2014.

Table 2. Survey Response Bias

Oregon:		
	Survey Respondents:	**2010 U.S. Census:**
Mean Age (Over 18)	54.5	49.5
Household Income	$50,000 - $74,999 (Mean category: 4.97)	$49,260 (2006-2010 adjusted average)
Gender (Over 18)	46.5% Male, 54.5% Female	48.4% Male, 51.6% Female
Associates Degree or Higher (Over 18)	39.7%	35.0%
Participation Rate	Survey response rate=48.7%	2010 General Election Participation= 52.6%
Washington:		
Mean Age (Over 18)	53.8	48.5
Median Household Income	$50,000 - $74,999 (Mean category: 4.88)	$57,224 (2006-2010 adjusted average)
Gender (Over 18)	47.4% Male, 52.6% Female	48.7% Male, 51.3% Female
Associates Degree or Higher (Over 18)	38.6%	38.8%
Participation Rate	Survey response rate=48.5%	2010 General Election Participation=53.1%

Source: Data obtained from the U.S. 2010 American Community Survey Public Use Microdata Sample (http://factfinder2.census.gov/faces/help/jsf/pages/metadata.xhtml?lang=en&type=document&id=document.en.ACS_pums_csv_2010)

Table 3. Support for Government Policies Encouraging Renewable Energy Development

What is your level of support for government adopting policies to encourage the development of the following renewable energy technologies in (Oregon / Washington)?

		No Support (%)	Some Support (%)	Support (%)	Strong Support (%)
a.	**Bioenergy (e.g. ethanol, etc.)**				
	OR (n=667)	15.6	40.3	30.1	13.9
	WA (n=660)	13.0	39.4	30.2	17.4
		Chi square = 4.158, df = 3, p = .245			
b.	**Wind energy**				
	OR (n=667)	4.9	35.7	41.5	17.8
	WA (n=659)	4.7	29.9	46.9	18.5
		Chi square = 5.664, df = 3, p = .129			
c.	**Geothermal energy**				
	OR (n=667)	26.8	43.8	21.3	8.1
	WA (n=659)	26.6	41.4	22.6	9.4
		Chi square = 1.356, df = 3, p = .716			
d.	**Solar energy**				
	OR (n=666)	7.4	31.4	35.4	25.8
	WA (n=660)	5.9	28.1	40.4	25.5
		Chi square = 4.158, df = 3, p = .245			
e.	**Wave energy**				
	OR (n=666)	40.7	38.0	16.6	4.6
	WA (n=660)	37.7	37.9	18.8	5.6
		Chi square = 4.390, df = 3, p = .222			

Table 4. Correlation Coefficients for Support of Government Policies Encouraging Renewable Energy Development

	Wind	Geothermal	Solar	Wave
Bioenergy	.446[a]	.470	.453	.371
Wind		.373	.731	.265
Geothermal			.391	.490
Solar				.265

[a]All correlation coefficients (Tau-b) are significant at .001 (2-tailed tests).

Table 5. Independent Variables

Variable Name:	***Variable Description:***	**Oregon *Mean (s.d.)***	**Washington *Mean (s.d.)***
Socioeconomic/demographic:			
Age	*Respondent Age in Years.*	54.502	53.772
	[Range: 18 to 91 years]	(17.855)	(17.515)
		n=666	n=661
Gender	*Dummy Variable for Respondent Gender.*	.537	.526
	1= female, 0= male	n=668	n=661
Education	*Formal educational attainment.*	4.922	4.901
	1=Grade School to 7=Graduate School	(1.443)	(1.435)
		n=664	n=658
Environmental Values:			
NEP	*New Environmental Paradigm Index.*	21.030	21.177
	5=Low support for environmental protection to	(6.110)	(6.194)
	25=High support for environmental protection	n=656	n=650
Energy concern:			
Supply	*Country Doesn't Have Enough Energy Resources?*	3.474	3.149
	1=Strongly Disagree to 5=Strongly Agree	(1.365)	(1.380)
		n=3.474	n=659
Security	*Dependence on Foreign Oil and Gas Threatens*	3.899	3.902
	National Security?	(1.112)	(1.138)
	1=Strongly Disagree to 5=Strongly Agree	n=668	n=661

Table 6. Logistic Regression Estimates for Support of Government Policies Encouraging Renewable Energy Development[a]

	Bioenergy *Coefficient* *(Std. Error)* *Exp(B)*	**Wind** *Coefficient* *(Std. Error)* *Exp(B)*	**Geothermal** *Coefficient* *(Std. Error)* *Exp(B)*	**Solar** *Coefficient* *(Std. Error)* *Exp(B)*	**Wave** *Coefficient* *(Std. Error)* *Exp(B)*
Oregon Dummy	-.167 (.122) .847	-.143 (.138) .640	-.155 (.132) .857	-.186 (.124) .830	-.053 (.132) 1.054
Age	-.027*** (.004) .973	-.033*** (.005) .963	-.023*** (.004) .967	-.009* (.004) .997	-.004 (.004) 1.000
Gender	-.147 (.132) .993	-.146 (.132) .994	-.145 (.144) 1.004	-.157 (.150) .855	-.158 (.151) .854
Education	.142*** (.043) 1.153	.396*** (.045) 1.486	.100* (.046) 1.105	.363*** (.046) 1.438	.010 (.044) 1.010
NEP	-.003 (.013) 1.003	.031** (.011) 1.031	.026* (.011) 1.974	.044*** (.011) 1.045	-.038*** (.011) .963
Supply	.137** (.044) 1.872	.188*** (.048) 1.829	.305*** (.047) 1.737	.352*** (.051) 1.703	.104* (.046) 1.901
Security	.208** (.066) 1.232	.164* (.066) 1.178	.007 (.071) 1.003	.277*** (.069) 1.319	.081 (.067) 1.001
Constant	.494 (.412) 1.639	.496 (.424) 1.258	.495 (.440) 1.640	.493 (.423) 1.260	.945*** (.423) 2.573
Chi-Square=	120.179***	281.871***	112.637***	245.228***	55.286***
Nagelkerke R^2=	.118	.146	.118	.167	.059
N =	1,294	1,293	1,291	1,289	1,293

*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$

[a]The dependent variables are dichotomized versions of Table 1with coding: Support and Strongly Support=1, else=0.