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A multi-level approach to support to energy options across EU: The role of supra-national governance, values and trust

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Abstract

The European Union (EU) sustainability policy has in the last decades directed several efforts to promote sustainable forms of energy production. This topic brings together environmental concerns and technological innovation, two domains traditionally seen as opposite. To help understand how the publics mobilize for this debate, we examined the Science & Technology (S&T) and Public Understanding of Science (PUS) 2010 Eurobarometer resorting to a multi-level approach. We examined the role of both cultural aspects, like worldviews and institutional trust, and country-level distinctions, namely the stage of accession to EU. Results show that support for both solar and nuclear technologies are (positively) predicted mainly by institutional trust. Moreover, egalitarians and those who prefer the lifestyle change solution for climate change are the ones more supportive of solar energy and less supportive of nuclear energy. Active involvement in S&T and Environmental matters is mostly dependent on the level of awareness about environmental problems, but is also related to believing that technology will provide inexhaustible resources. At the contextual-level, we found that newer EU member-states are less supportive of solar energy, more supportive of nuclear energy and less actively engaged in civic participation than older EU member-states. The findings highlight the intricate liaison between environmental and technological matters in the public debate about energy production and bring to the fore the relevance of legal innovation as determinant of value change.

Introduction

The issue of energy production is at the core of many debates about climate change mitigation, as well as of many other discussions regarding our future. At the European Union (EU) level, governance efforts have in the last decades been directed to promoting the adoption of renewable forms of energy production (solar, wind), a trend that, to a lesser or greater extent, is mirrored at the national level. More recently, however, the importance attributed to climate change has contributed to alter discourses and positions regarding another energy technology: nuclear energy. In recent years, and due to its relatively low carbon emission, nuclear energy production has been included in the EU energy policy programme as a sustainable way of limiting the effects of climate change (EU, 2012). At this point, then, both the production of renewable (solar, wind) energy and the production of nuclear energy bring together two domains that have traditionally been seen as opposed: environmental concerns and technological innovations (Xiao, 2011). It is therefore important to have a clearer picture of how the debate about these energies is unfolding in the European Union context and how the EU publics are mobilizing for it.

This paper focuses on the European Union context, which now comprises a considerable number of countries that vary in historical and cultural traditions and forms of social organisation. Some aspects of this cultural and social heterogeneity are traditionally captured by notions such as worldviews and values, which express generic goals and priorities that individuals, groups and societies deem important (Dunlap, 2008; Lima & Castro, 2005). These broad aspects influence in turn levels of trust in governments and awareness of environmental problems (Gaskell et al., 2010, 2011). The goals of the paper are threefold. First, we investigate how such cultural aspects promote support for renewable energy production (versus nuclear energy). Second, it is examined the extent to which citizens are

involved in debating these solutions and how actively they participate in the actions that help define the relations between science and the environment.

Third, and in addition to the prior aspects, we include a supra-national perspective. Besides being characterised by cultural heterogeneity, the 27 EU member-states are also ruled by shared and homogeneous laws and regulations emanating from a supra-national level. This governance through policy-legal innovations - such as new directives dictating the appropriate forms of dealing with climate change and establishing the targets to be attained regarding the reduction of carbon emissions - is also expected to impact on the formats of public engagement with science (Wynne, 2007). Because the time frame, or longevity, of exposure to innovation is a crucial dimension of processes of social change (Castro, 2012), the potential tensions between cultural specificities and new policies and laws are better understood if we consider the phase of accession of each country to the EU. We expect that in older member-states, which have been exposed to EU directives and EU "soft laws" (Frykman & Morth, 2004) for longer periods, the public opinion would be more aligned to EU policies than in newer member-states.

The following sections detail these proposals and illustrate why besides examining the cultural trends expressed in values, trust and awareness in these matters, it is also important to see how supra-national (EU) governance efforts intervene in the positions taken by national audiences.

Public representations of new (and old) policies for tackling climate change

As mentioned, EU policies for energy production establish EU Directives, which need to be translated into national laws. These, in turn, then bind governments to attain certain goals and targets, such as the reduction of carbon emissions to tackle climate change. The EU publics are thus submitted to a type of legal innovation which emanates from supra-national

sources and is then translated to national and local spheres (Beck, 2009; Castro & Mouro, 2011). This means that different societies with different cultural traditions need to accommodate the same goals and priorities, and that very heterogeneous publics are expected to change their positions and discourses towards the similar energy options proposed by their national policies as these integrate the EU Directives. Importantly, many of these new laws also force changes in intergroup relations in the public sphere (for instance between institutions and citizens, between environmentalists and economists, etc), creating resistance and new conflicts (Castro, 2012). As climate change became a very salient issue for societies, public support for policies aimed at tackling its effects became also increasingly relevant (Lorenzoni & Pidgeon, 2006), and not always easily predictable. In our view, this is a very interesting scenario for examining the sense-making processes in which the publics engage in order to respond to complex societal demands (Castro, 2006; Kalampalikis & Haas, 2008; Moscovici, 1988), and react to change.

Moreover, what is being asked of the EU public sphere regarding sustainable energy production has controversial dimensions. Current EU policy proposals combine new forms of energy production, using solar or wind power, with re-definitions of "traditional" ones, like nuclear energy. To meet the goal of a 20% cut in carbon emissions by 2020, the EU decided to increase the share of nuclear energy beyond the current 33%. Thus, new policies and directives not only explicitly articulate two dimensions that have usually been seen as opposed in public inquiries - environmental concern and attitudes towards technologies (Xiao, 2011) – but also propose a re-frame in the evaluation of a traditionally considered high-risk technology, i.e. nuclear energy.

Gaskell et al. (2011) traced the optimism directed at different technologies across Europe from 1991 to 2010. Overall, the trends seem to reflect a widespread concern about climate change and sustainability. For wind and solar energy the optimists largely outnumber

the sceptics, and optimism has been increasing over the years. In line with the new interpretation of nuclear energy, nuclear power shows an increase in support over recent years (Gaskell et al., 2011, although it must be noted that the last round of data collection occurred before the March 2011 Fukushima Daiichi accident). In 2010 European optimists and sceptics of nuclear energy equalled in number. Studies in the UK (for a review see Spence, Pidgeon, & Uzzell, 2008) and the US (Whitfield et al., 2009) suggest considerable ambivalence – and at best 'reluctant acceptance' - of nuclear power despite the renewed enthusiasm for nuclear power in some policy circles. This suggests, on one side, that the public sphere is somehow aware of the nation-level debates and integrates, in its representations and discourses, the new possibilities issued by the policy-legal sphere. On the other side, it seems that the future development of nuclear energy represents one of the most controversial issues at present.

This is then a moment particularly relevant for comparing solar and nuclear energy and have a better understanding of the direction of public support in this debate. The tensions arising from the debate are examined by comparing the role of psychosocial predictors usually considered in this domain, such as institutional trust and values (for a review see Gupta, Fischer, & Frewer, 2011). Values are here understood as goals and priorities organized in generic worldviews. According to Cultural Theory (Douglas & Wildavsky, 1982) these worldviews result from peoples' socialization and participation in different forms of social organization; according to the social representations approach they also emerge from and are maintained through communication and debate, activities that become especially important in times of change and innovation (Castro, 2006). The four worldviews defined by Cultural theory - Egalitarian, Hierarchic, Individualistic and fatalistic – comprise and prioritize different goals. The egalitarian worldview prioritizes equality of rights, and the individualistic worldview prioritizes individual freedom of choice. Importantly, egalitarians are more likely to worry about technological risks than individualists (Wildavsky & Dake, 1990; Lima &

Castro, 2005). These worldviews were thus assessed in this study, and other predictors include variables specifically related to environmental awareness and technological optimism (Lima, Barnett & Vala, 2005; see also Gaskell et al., 2010), traditionally related to the worldviews. We also address the topic of how active engagement with technological and environmental issues is predicted by these cultural trends.

We expect that the patterns of association would, in general, be reversed for the two types of energy production: solar energy would be positively predicted by egalitarian values and environmental awareness, while nuclear energy would be negatively associated with these variables. We also expect institutional trust to play a key role on these sense-making processes, but a reverse association between trust and support for each of the examined energies might not be the case. As both energies represent supra-national and governmental initiatives, their public defence would, in each case, be positively associated with institutional trust. Egalitarianism and environmental awareness would also predict high civic engagement in S&T and environmental issues, while institutional trust and civic engagement would be negatively associated.

The contribution of supra-national regulations for change

During recent years, EU environmental policy has been strongly based not just on the establishment of EU Directives to be translated to national laws, but also on "soft law" instruments (Frykman & Morth, 2004). These "soft law" instruments require national governments to organize campaigns and educational efforts, and to produce documents aimed at promoting and advancing the EU recommendations in the country (Baker, 2007; Frykman & Morth, 2004). These instruments have been used since the early days of the European integration as a form of achieving a certain homogenisation of goals in the member-states without binding them directly (Frykman & Morth, 2004).The Directives and soft laws are

then the two legal-policy pillars on which the effort for the homogenisation of values across the EU rests. However, some countries have been members since the foundation, which happened sixty years ago, while others acceded very recently, already in the XXI century; this means that different sets of countries have been distinctively exposed to EU policies and EU "soft laws" – i.e. codes of conduct, recommendations, campaigns or declarations (Frykman & Morth, 2004) – on which much of EU governance has been based. Consequently, the publics of member-states with different accession years have been differently exposed to campaigns, recommendations and laws regarding environmental matters; this means that the internal debates in each country about these issues also have different longevities and levels of maturity, and this possibly positions their publics in different ways.

In this paper we put forward the hypothesis that different levels of exposure to EU soft laws affect the positions taken by individuals regarding energy policies. The examination of this hypothesis contributes to understanding how supra-national efforts of governance for environmental sustainability relate to public support for sustainable energy production. More precisely we expect that recent member-states are less favourable of renewable energies than those that have been governed by EU directives and soft laws for a longer time. Shared assumptions about how the world is, and should be, represent the background against which technological innovation is interpreted and evaluated. The very same information may lead to different interpretation and evaluation, depending on how it is integrated into a group or nation's network of understandings. Such cultural and historical traditions will determine whether and to what degree concerns (e.g., environmental concerns) are salient and available to the individuals in the collective. Sunstein (2006) suggests that such salience, in combination with social psychological phenomena such as cascade effects, can accrue to cultural differences, such as European nations being more concerned about climate change than the United States. A characteristic of social cascades is that people both are influenced

by a social signal and at the same time contribute to amplifying it. Similarly, in conversations with like-minded others, people tend to move toward more extreme versions of the views with which they started the conversation (see also Kronberger, Holtz, & Wagner, 2012). As a result of the duration of exposure to EU soft laws, the salience of environmental concern should differ in older and newer member-states, and aggravated by discourse dynamics, citizens should come to differ in their support of renewable energies.

Moreover, because soft laws can have different interpretations – a more instrumental *versus* a more deliberative reading (Frykman & Morth, 2004) – it is also relevant to examine whether exposure to soft laws results in more or less engagement in civic involvement activities directed to issues enmeshing technology and environmental matters. If we assume that EU soft laws work as rules for deliberation that foster debate and the involvement of citizens, then individuals in countries that entered the EU more recently would be less involved in these types of action than those who have been governed by these laws for a longer time. If EU soft laws are instead promoting an emphasis on hierarchic decision-making, made by representatives, then the phase of accession to EU as a member-state would not predict different levels of involvement in civic actions.

In sum, this paper examines the joint role of (1) cultural aspects - values, trust, awareness of environmental problems and technological optimism -, measured at the individual-level, and (2) phase of accession in EU, a country-level variable, in predicting support for both solar and nuclear energies and civic engagement regarding these issues. We will now present the methodological details of the multilevel models that will be used for testing our assumptions.

Method

Participants and procedure

The data analysed stem from two modules within the 2010 Eurobarometer Survey: Life Sciences and Biotechnology (S&T) and Public Understanding of Science (PUS). The survey was conducted in 32 European countries using national representative samples of citizens aged 15 years and over (near 1000 participants per country). Given research our objectives, only data from EU member-states were included in this study (n=27 countries). The total sample for this study is of 26671 respondents.

The participants were interviewed face-to-face, in their own homes and in appropriate national language. A detailed description of the data collection procedures is presented elsewhere (Gaskell et al., 2010).

Measures

As mentioned above, the analyses included variables from the modules S&T and PUS of the Eurobarometer. We focused mainly on variables related to environment, sustainability and climate change, the guiding interests of the paper, but also used variables related to values and institutional relations.

Independent variables

Worldview is a variable that resulted from a set of three forced-choice questions measuring goals and priorities (S&T: 1."The Government should take responsibility to ensure that new technologies benefit everyone" versus 2."It is up to people to seek out the benefits from new technologies themselves"; 3."Protecting freedom of speech and human rights" versus 4."Fighting crime and terrorism"; 5."Having strong European companies to compete in global markets" versus 6."Reducing economic inequalities among people in the European Union") and organized according to the premises of Cultural Theory (Douglas & Wildavsky, 1982).

This variable was dummy coded with "egalitarians" coded 1 and "others" coded 0. Egalitarians (30.8% of the sample) value upmost human rights and reducing economic inequalities (3. and 6.); importantly, the egalitarian worldview is most likely to involve worries about technological risks (Wildavsky & Dake, 1990). This is less likely for hierarchists (32.7% in the sample) who value state intervention (1. and 4.), and for individualists (5.3%) who value a free market (2. and 5.). In the sample 31.2% of respondents take a mixed positioning.

Institutional trust combines the evaluation of national governments and the EU regarding the preparation of laws about new technologies (S&T: "Government making laws about biotechnology"; "The European Union making laws about biotechnology for all EU Member States") into a single score (r=.51, p<.001). Higher scores reflect higher trust (1- not doing a good job for society to 2- doing a good job for society; M=1.78, SD=.37).

Awareness of environmental problems aggregates two items regarding the levels of interest in and information about environmental problems (PUS: "Feel interested in environmental problems"; "Feel informed about environmental problems") into a single score (r=.46, p<.01; M=2.09, SD=.54). Higher scores reflect higher interest (1-not at all interested/informed to 3-very interested/informed).

Climate change options regards the choice between two solutions for dealing with climate change (S&T: "To halt climate change and global warming we will have to rethink our ways of living even if it means lower economic growth in our country" versus "Technology will find a way to stop climate change and global warming so that we can maintain our way of life and have economic growth"), and is a dummy variable, with "change of lifestyle " coded 1 and "technological solution" coded 0.

Technology provides inexhaustible resources evaluates the agreement with the item "Thanks to scientific and technological advances the Earth's natural resources will be inexhaustible"

(PUS). Higher scores reflect higher agreement with this idea (1-totally disagree to 5-totally agree; *M*=2.45, *SD*=1.20).

Phase of accession to the EU is an additional predictive variable that was added to the data-base. This is a contextual-level variable that organizes different clusters of countries. This variable has five levels: 1-1952 (six countries: Germany, Italy, Belgium, Luxembourg and The Netherlands), 2-1973 (three countries: Denmark, Ireland and United Kingdom), 3-1981-86 (three countries: Greece, Portugal and Spain), 4-1995 (three countries: Austria, Finland and Sweden), 5-2004-2007 (12 countries: Cyprus, Slovakia, Slovenia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Czech Republic, Bulgaria and Romania).

Dependent variables

The main goals were to examine how this set of variables helped explaining levels of support for (1) two different types of energy – a renewable energy (solar) and nuclear energy- and (2) levels of engagement in participatory actions regarding technology and environmental matters.

Support for solar energy was measured using a three-point scale (S&T: "Do you think solar energy will have a positive, a negative or no effect on our way of life in the next 20 years?" 1-negative effect to 3-positive effect); higher scores correspond to a more optimistic perspective about the effects of using solar energy (*M*=2.85, *SD*=.47).

Support for nuclear energy was measured in the same way (S&T: "Do you think nuclear energy will have a positive, a negative or no effect on our way of life in the next 20 years?"); in this case, higher scores correspond to a more optimistic perspective about the effects of using nuclear energy (1-negative effect to 3-positive effect; *M*=2.02, *SD*=.94).

Active involvement in technology and environment issues (PUS) aggregates the frequency of engagement in attending meetings, signing petitions and participating in NGOs activities

linked with technological and environmental issues (α=.72; *mean inter-item r*=.47; *M*=1.32, *SD*=.54). Higher scores correspond to higher levels of active involvement (1-never to 4-regularly).

Results

Bridging the gap between macro- and micro-level analyses is a major task for socio-psychological research (Jagodzinski, 2004). Multilevel techniques are specially designed to analyse variables from different levels simultaneously (Hox, 2010), thus allowing to study how context affect individual level attitudes and behaviours. Four successive multilevel regression models were estimated (Hox, 2010) for each dependent variable, using PASW Statistics 18: model 1 - no explanatory variable; model 2 - individual level variables; model 3 - individual- and contextual-level variables; and model 4 - individual- and contextual-level variables with random effects. All explanatory variables were centred around the grand mean and the maximum likelihood method was used to calculate the estimates (Hox, 2010). Table 1 and 2 present the best models obtained, which include variables at the two hierarchical levels – individual and contextual – and account for random effects variance.

Support for solar and nuclear energy

First, the multilevel models of "support for solar energy" and "support for nuclear energy" are compared. As Table 1 shows, both are (positively) predicted mainly by *institutional trust*. This means that individuals who have more confidence in national and European laws concerning technology issues are also more prone to support investments in solar and nuclear energy.

For the remaining variables the relationships are, in most cases, reverted for the two types of energy production. Namely, *egalitarians* and those who prefer the *lifestyle change*

solution for climate change are more willing to support solar energy but less willing to support nuclear energy than the non-egalitarians and those who prefer the technological solution.

Additionally, support for solar energy is predicted by *higher interest in environmental problems*, while support for nuclear energy is predicted by the idea *that technology provides inexhaustible resources*.

Insert Table 1

At the contextual-level, the relationship between *phases of accession to the EU* and support for different energy solutions is also reverted for the two technological options. More specifically, newer EU member-states are less supportive of solar energy and more supportive of nuclear energy than older EU member-states. This is in line with our hypothesis stating that countries which have a longer history of debate and law-issuing regarding environmental sustainability would have higher levels of support for the type of energy the EU has been encouraging in the last years, namely renewable energies.

Active involvement

A further goal was to examine how the same variables helped explaining the adoption of participatory actions regarding technological and environmental matters. The results in Table 2 indicate that active involvement is best predicted by *awareness of environmental problems*. Endorsing *egalitarian values* and having low *trust in government and EU* also contribute to engaging in participatory actions.

However, active involvement is also related to believing that *technology will provide inexhaustible resources* and to *support for nuclear energy* (but not for solar energy). This

means that the active involvement in actions supporting/rejecting certain solutions for technology and environmental matters is to be expected more from those supporting nuclear energy and assuming that technology is able to solve environmental problems. This is coherent also with the fact that EU policy has in the last years been expressively directed to support renewable energies, which may help explain why the public does not see the need for more involvement in the advancement of these energies.

At the contextual-level, we see that the newer EU member-states are less actively involved in these actions than the older EU member-states. This leaves the question of knowing whether in time the newer member-states will also increase their level of involvement and interest in environmental information.

Insert Table 2

Phase of accession and country-level indicators

To better understand how the pressures introduced by supra-national governance interfere with the contextual or country-level debates, we constructed second order indicators to correlate with the phases of accession to the EU. For example, in the climate change question, we worked with a variable resulting from the subtraction of the percentage of those choosing the option "technological solution" from the percentage of those choosing the option "change of lifestyle". This type of variables gives an indication of the direction of the tensions and debates in the country. In other cases (questions answered in a 4 or 5 point scale) we used the aggregate mean for the country. The results are presented in table 3.

The relations found support and help understand the results found with the multilevel analysis. As shown, support for solar energy and nuclear energy have opposite relations with the phase of accession to the EU; the countries in the earlier phases of accession are more

optimistic regarding solar energy and more pessimistic regarding nuclear energy. In general, Europeans are much less divided in their view of solar energy than of nuclear energy. Despite stronger support in the eldest member-states, for solar energy there is a clear surplus of optimists in both the eldest and newest member states. For nuclear energy, in contrast, there is a surplus of critics in the eldest member states, while there is a surplus of supporters in the newest member states. Also as previously stated, active involvement in technology and environmental issues is less likely in countries that have entered the EU more recently.

Insert Table 3

Figure 1 illustrates the trend for lower support of nuclear energy in the earlier member-states compared to countries that more recently joined the EU.

Insert Figure 1

Besides confirming the results of the multilevel analysis, the correlations also show that the phase of accession affects a set of variables used as predictors in the former analysis: institutional trust, interest in environmental information and options for dealing with climate change. These results indicate that older EU member-states have slightly less trust in national and European laws regarding new technologies, are more interested in information about environmental problems and have audiences less divided regarding the solutions for climate change (the majority chooses the lifestyle solution). There seems then to be a homogenisation of values and worldviews amongst older member-states, coherent with the goals of a type of governance based not only on traditional binding laws but on supra-national soft law instruments.

Discussion

In summary, the results show that while institutional trust increases the support to all forms of energy production, worldviews determine the differential support of different technologies (solar versus nuclear energy). Moreover, the results show that the supra-national model of governance adopted by the European Union seems to influence the positions towards sustainable energies of citizens in different sets of countries, which joined the EU in different decades. The multi-level analyses presented highlight that in countries that joined the EU in later phases of its existence, citizens are less likely to support renewable energies but more likely to endorse nuclear energy. In combination with the finding that in these newer accession states citizens are less likely to report having participated in actions such as attending meetings, signing petitions or participating in NGO activities, these results lend support to our hypothesis that in these younger EU member-states awareness and support of sustainable energy are lower than in older member-states. Correlations at the country level corroborate the findings. Later accession relates to lower awareness of and interest in environmental problems, to more confidence in technological solutions to mitigate climate change and ultimately to more support for nuclear energy and less support for solar energy. The degree of trust in national and EU governing bodies is higher in these countries while the likelihood of active citizen engagement is lower.

The results highlight the role of time in value change, which must be considered a slow process. Social psychological research has hitherto paid little attention to the role legal innovation plays in stimulating value change (Castro, 2012), but these results show its importance. Exposure to EU hard and soft law over time, and in combination with collective – formal and informal – deliberation seem to heighten the salience of environmental issues, and ultimately the support of different forms of energy production. Many open questions remain

though. What factors accelerate or slow down the homogenisation of values across different countries? What is the expected time-scale of such change? Although further data and analyses are needed to address such questions, our results show that at least in European countries concerns for the environment and sustainability have become an important background for evaluating science and technology (Xiao, 2011). Of course the publics in different countries are not passive recipients of change but actively re-construct the messages suggested by supra-national soft law and translated to their country's context by national actors. On the basis of cultural and historical predispositions, collective discourse dynamics may accelerate or slow down, and downplay or highlight the awareness of particular concerns. Our data seem to suggest, for example, that while renewable energy production is widely welcomed across European member-states, citizens seem more reluctant to endorse nuclear energy, even if in policy circles the technology has experienced a 'renaissance' due to its promise of mitigating climate change. Interestingly, institutional trust is particularly relevant for taking a position towards nuclear energy, suggesting that citizens are paying special attention to what their governments and the EU are proposing in this matter to take a position. Thus, while European policy is increasingly legitimized in terms of public values such as a concern for the environment (von Schomberg, forthcoming), the values mirrored in European publics' evaluation of technologies have come to reflect such concern. The degree and nature of such influence, however, is subject to transformation processes in which the supra-national guidelines are translated and adapted to more local contexts. The result is cultural variation, constituting a major challenge to European governance.

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Table 1. Multilevel models of support for solar energy and for nuclear energy

Fixed effects	Support for solar energy		Support for nuclear energy	
	B	SE	B	SE
Individual-level predictors				
Intercept	,09*	,04	-,23*	,10
Climate change options	,02**	,01	-,11***	,01
Worldview (Egalitarian)	,03***	,01	-,09***	,01
Institutional trust	,14***	,02	,25***	,03
Awareness of environmental problems	,04***	,01	(a)	(a)
Technology provides inexhaustible resources	(a)	(a)	,07***	,01
Contextual-level predictor				
Phase of accession to the EU	-,02*	,01	,04*	,02
Random effects	Variance	Wald Z	Variance	Wald Z
Individual-level Intercept	,204***	100,945	,801***	98,046
Contextual-level Intercept	,007**	3,397	,044**	3,445
Trust slope	,013**	3,081	,013*	2,049
Deviance	26531,397		50605,229	
Estimated parameters	9		9	

* p<.05 ** p<.01 *** p<.001 (* p<.10 for contextual-level variable). (a) excluded from the model due to non-significant results.

Table 2. Multilevel model of active involvement in S&T and environmental issues

Fixed effects	Active involvement in S&T and environmental issues	
	B	SE
Individual-level predictors		
Intercept	,15**	,05
Worldview (Egalitarian)	,05***	,01
Trust Government & EU	-,08**	,03
Awareness of environmental problems	,23***	,01
Technology provides inexhaustible resources	,04***	,01
Support for solar energy	-,04	ns
Support for nuclear energy	,02***	,00
Contextual-level predictor		
Phase of entry in EU	-,03*	,01
Random effects	Variance	Wald Z
Individual-level Intercept	,276***	100,341
Contextual-level Intercept	,010**	3,381
Trust slope	,014**	2,960
Interest slope	,005**	2,683
Public involvement slope	,001**	2,462
Deviance	31674,127	
Estimated parameters	12	

* p<.05 ** p<.01 *** p<.001

Table 3. Correlations between "Phase of accession to the EU" and country-level indicators

Variables	*Country-level indicator*	*R with Phase of accession to the EU*	*Values for Phases 1 and 5*
Support for solar energy	% optimists minus % pessimists	-.36*	85% vs. 76%
Support for nuclear energy	% optimists minus % pessimists	.40*	-11% vs. 10%
Active involvement in S&T and environmental issues	aggregate mean for country	-.48**	1,39 vs. 1,23
Institutional trust	aggregate mean for country	.31†	1,77 vs. 1,80
Awareness of environmental problems	aggregate mean for country	-.36*	2,22 vs. 2,03
Climate change options	% choosing lifestyle change solution minus % choosing technological solution	-.43**	43% vs. 20%

Spearman correlations: † p<.10 * p<.05 ** p<.01 (one-tailed)

Figure 1. Levels of Support for nuclear energy in the 27 EU member-states by Phase of accession to the EU