Political polarization and environmental attitudes: A crossnational analysis

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Abstract: There is evidence that in the United States popular attitudes about environmental problems have been shaped by elite polarization on environmental issues. Yet there has been little systematic analysis of the impact of elite polarization on environmental attitudes in other parts of the world. Here I develop and test a general theory of the role of elite polarization in conditioning popular support for environmental protection. Evidence is drawn from multilevel analysis of World Values Survey data from 92 surveys carried out in 42 countries across the world, together with party polarization data derived from the Manifesto Project Database. The main finding is that elite polarization is associated with the amplification of mass-level left-right divides on environmental issues, consonant with the expectation that elite polarization should lead citizens to sort along ideological or partisan lines, but that this effect only holds in contexts where left-wing views are associated with support for environmental protection.

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Much of the literature on popular beliefs on, and attitudes about, the environment has been based on US data: studies of American public opinion on the environment indicate that the issue has become highly politicized since the 1990s, first at the elite level, and subsequently at citizen level (Dunlap and McCright, 2008)**.** The US experience suggests that elite political polarization may affect popular concern for protecting the environment in other contexts as well. At the same time, environmental attitudes in the US may also be unusual in various ways (Lewis, Palm and Feng 2019). There has to date been limited theoretical consideration or empirical analysis of elite polarization and popular attitudes on the environment in other national contexts, and research on this topic to date remains US-centric. I seek to fill this gap by exploring the extent to which the US experience can or cannot be generalized.

The first wave of crossnational studies of environmental attitudes mainly focused on the impact of socio-economic development, with considerable – yet inconclusive – debate as to whether the citizens of developed countries are more or less concerned about environmental problems than those of less developed countries (e.g. Dunlap, Gallup and Gallup 1993; Franzen and Vogl 2013; Inglehart 1995; Kvaløy, Finseraas and Listhaug, 2012). More recently, comparative attention has been devoted to the specifically political dynamics of opinion formation and attitude polarization on the environment (e.g. Kvaløy et al. 2012; McCright, Dunlap and Marquart-Pyatt 2015). Most such work has been confined to single case studies, particularly of the US (Guber 2013; Hamilton 2011; McCright and Dunlap 2011; Malka, Krosnik and Langer 2009; Marquart-Pyatt et al. 2014), though also of other countries including Sweden and Australia (Harring and Sohlberg 2017; Linde 2018; Unsworth and Fielding 2014). US evidence suggests that elite political polarization on the environment can shape levels of popular concern when party sorting causes citizens to align

their environmental views with those of co-partisans at elite level (Egan and Mullin, 2017; Guber, 2013; Hamilton 2011; McCright and Dunlap 2011). If this finding is generalizable to other social and political contexts, then polarization at elite level might be expected to heighten preference intensity on environmental issues by co-partisans in the electorate, leading to polarization at the mass level. Alternatively, in new democracies and hybrid regimes, weaker left-right orientations and popular ideological divides that align differently with the positions on the environment may dampen this effect. The impact of elite environmental polarization on popular support for environmental protection has not to my knowledge been studied in a comparative context, though comparative investigation is best suited to assessing such dynamics, due to the fact that including comparison over both time and space increases the overall macro-level N and hence the power of the resulting models; crossnational comparison also enables the inclusion of potentially relevant macro-level control variables that may not vary (to any great extent) over time within individual countries.

My aim here is to develop and test the role of elite polarization in a global context by undertaking a crossnational examination of the relationship between party positions on the environment and popular attitudes toward environmental protection. I analyse data from Waves 3-6 of the World Values Survey (Inglehart et al 2014) and the Manifesto Project Database. The main finding is that elite polarization is associated with the amplification of left-right divides on environmental issues, consonant with the expectation that elite polarization should lead citizens to sort along ideological or partisan lines, but that this effect is observed largely in contexts where left-wing beliefs among the electorate are aligned with more pro-environmental stances.

Elite positions, political polarization and environmental attitude formation

The relationship between existing belief systems and the processing of new information is one that has received considerable attention from political psychologists. We know that cues by partisan elites play strong roles in conditioning political views (e.g. Lupia and McCubbins 1998; Nicholson 2012), even in the presence of information that challenges partisan stereotypes (Rahn 1993). Recent work on climate change suggests that this is true for environmental issues (Carmichael and Brulle 2017; Goren, Federico and Kittilson 2009; Guber 2013; Harring and Sohlberg 2017; Unsworth and Fielding 2014). We also know that people with established ideological beliefs tend to pay most attention to information that coincides with those beliefs, and that in consequence new information tends to strengthen existing beliefs (Lodge and Taber 2013). Thus given that political elites are a major source – direct or indirect – of the information people receive on political issues, elite divisions should often be reflected in divisions at the mass level, particularly among those who already hold well-defined political beliefs.

Research on environmental attitudes confirms that increased information about environmental problems tends to divide people rather than unite them. Chaiken and Yates (1985) thinking about a topic induced greater polarization in subjects who already had more consistent and well-developed knowledge structures; such subjects were better able to refute information that did not accord with their prior views (Cf. Hart and Nisbet 2011; Hennes et al. 2016). This effect can be anticipated to be particularly pronounced where political elites are divided on the topic, and where those divisions align with other partisan cleavages. Under such circumstances, elite positions and elite polarization on the environment that coincides with partisan affiliation can be expected to cue citizens to interpret new information according to existing ideological schemata. In countries where elites are strongly in favor of or skeptical about environmental protection, we should expect to see only moderate correspondence between citizen ideological orientation and popular support for

environmental protection; in contexts where elites are polarized on the environment, we should expect popular ideology to have a strong conditioning effect on citizen environmental attitudes, as politicization of this issue should lead to greater alignment of the environment with other issues. If this is the case, polarization will increase support for environmental protection among those favorably disposed to pro-environmental elites and depress such support among those who identify with skeptical elites. The latter group will become effectively unavailable for persuasion when new information comes to light. The overall result will be a citizenry with lower consensus on environmental issues than would be the case in the absence of elite polarization. These expectations are derived largely from the findings of psychology and should therefore in theory apply to any national context, all else being equal. Yet evidence for this expectation has so far been collected mainly from the USA.

When global environmental problems were an emerging issue in the US in the 1970s and 1980s, elite opinion on the environment was not strongly politicized in many contexts; it is for this reason that the environment had been described as classic 'valence' issue on which there was overall consensus: everyone wants less pollution and fewer environmental problems. Thus support for environmental protection had historically been relatively non-partisan, with Republican and Democratic administrations both enacting key pieces of environmental legislation (Dunlap, Xiao and McCright 2010). That situation changed under Ronald Reagan in the 1980s, and there has since developed a marked partisan divide on environmental issues in the US; popular opinion has become strongly polarized since the late 1990s, especially over climate change (Guber 2013; McCright and Dunlap 2011). A negligible difference in 1989 in the extent to which Republicans and Democrats 'worry about climate change' ballooned by 2016 to a 44 percent partisan gap (Egan and Mullin 2017: 218).

Congressional voting records show partisan polarization on environmental issues starting in the 1970s and accelerating in the 1980s and 1990s (Dunlap, Xiao and McCright 2010: 29). Elite polarization thus predated mass polarization (cf. Egan and Mullin 2017). Among the general public, support for environmental protection actually converged during the 1980s, when new evidence of environmental problems such as climate change was widely publicized, before diverging sharply along party lines starting in the 1990s (Dunlap, Xiao and McCright 2010: 31-2). Considerable further popular polarization on global environmental issues such as climate change has occurred in the first decade of the 21st century (Capstick et al. 2015; McCright and Dunlap 2011). Ideological sorting on the environment has also been documented in Australia, Canada and the European Union, if not often in such pronounced fashion as in the US (Lachapelle, Borick and Rabe 2012; Linde 2018; McCright, Dunlap and Marquart-Pyatt 2016; Unsworth and Fielding 2014).

It appears that polarization might be generated by the propensity of people to accept information that coincides with their pre-existing views, and that this new information should strengthen these views. There is evidence that US citizens who are better informed and hold stronger left-right ideological beliefs are more divided on environmental issues (Guber 2013; Krosnik et al. 2006; Leiserowitz 2006; McCright and Dunlap 2011). The mechanism through which elite polarization is linked to mass polarization in the US case thus seems to be ideological; it is not simply that both political party elites and citizens are absorbing information on the environment which is gradually crystallizing their views and spreading them out on a spectrum of beliefs, with the elites slightly ahead of the masses due to greater information consumption. Rather, it appears to be that elite polarization on the environment is having a direct effect on mass polarization. Guber demonstrates convincingly that party sorting on the environment only occurs as people become familiar with elite cues (Guber 2013). Though policymaking on environmental issues can and does respond to popular

attitudes (Mackuen, Erikson and Stimson 2002), party sorting on the environment appears in the US to have preceded its grassroots counterpart.

During the period in which the US was becoming more polarized over the environment, many other countries were experiencing growing consensus, including many countries in Europe, Latin America, sub-Saharan African and parts of Asia in tandem with rising levels of concern about problems such as climate change (Lee et al. 2015). This parallel movement between polarization and levels of environmental concern hints at a possible general link between elite polarization on the environment and the strength of citizen concern – at aggregate and individual levels – about global environmental issues (bearing in mind the caveats discussed below).

At the individual level, ideological sorting should reflect two distinct processes: those on the right aligning with positions skeptical of environmental regulation, and those on the left bolstering their pro-environmental views. Evidence from case studies provides some support for each of these conjectures. There have been documented rises in antagonism to environmental regulations in many states where policies to protect the environment became more stringent (Dunlap and McCright 2015). Voters have also punished incumbents when pro-environmental policy initiatives threaten to disturb their way of life (Stokes 2016). It stands to reason that these processes should be reflected in patterns in individual-level attitudes, and that aggregate elite-led movement toward greater environmental protection might potentially strengthen attitudes among that sector of the electorate that is most opposed to state regulation (those on the political right), and those most vulnerable to economic adversity, including unemployment and inflation (Guber 2013; Scruggs and Benegal 2013). These considerations suggest the following hypothesis:

H1: Elite polarization on the environment should be associated with greater divides in levels of support for environmental protection among citizens with different ideological orientations.

There are reasons to expect that this effect may not be observed in all settings, however. The above survey of the literature indicates that research in this area has been carried out mainly in established democracies, where 'left' and 'right' have broadly similar interpretations, and where there is relatively high congruence between popular and elite attitudes (Macdonald and Budge 2005). We know from comparative research that the political 'right' at citizen and elite level is in some countries, especially postcommunist countries, more aligned with pro-environmental policies (Chaisty and Whitefield 2015; Rohrschneider and Miles 2015); in such contexts it follows logically that we ought to see the opposite relationship to that observed in contexts where left-wing positions are associated with support for environmental protection:

H2: The direction of the effect hypothesized in H1 will depend on whether pro-environmental stances are associated with left-wing or right-wing positions.

Moreover, in newer democracies and hybrid regimes where politics is more clientelistic and less programmatic, ideological orientations among both elites and citizens may be less well-defined, and sorting on environmental issues at citizen level may not align with that at elite level. This ought to dampen the effect of elite cues:

H3: Polarization effects will be dampened in contexts where ideological divides on the environment are weak.

Data and methods

To test these hypotheses I require both individual- and aggregate-level data. The individual-level data are drawn from the environmental concern battery included in Waves 3-6 of the World Values Survey (WVS). The World Values Survey (worldvaluessurvey.org) includes representative surveys carried out every several years in countries which collectively contain the vast majority of the world's population.[1] Of all comparative academic-quality survey projects, WVS has the greatest global reach and includes the widest variety of countries. The WVS data are also well-suited to addressing environmental attitudes as the environment has figured prominently in most waves of the survey, though unfortunately there are few questions that have been asked in identical from across multiple waves. The survey item selected for use as a dependent variable in this study is a dichotomous choice question fielded in Waves 3-6, which cover the 1995-2015 period, asking respondents whether they prioritize environmental protection or economic growth:

> Here are two statements people sometimes make when discussing the environment and economic growth. Which of them comes closer to your own point of view? (*Read out and code one answer*):
>
> 1 Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs.
>
> 2 Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent.
>
> 3 Other answer (*code if volunteered only!*).

Though some view single items to be sub-optimal as dependent variables, Daniels et al. (2012) argue that when it comes to environmental attitudes, single measures are preferable to

composite measures, due to the heterogeneity in citizen attitudes toward different aspects of the environment.[2] The trade-off measure used here is a well-established indicator employed in other studies of environmental attitudes (e.g. Dorsch 2014; Knight and Messer 2012; Neumayer 2004), and it has the practical advantage of being the only relevant question fielded across Waves 3-6 of the WVS. Despite skepticism among some scholars that the trade-off implicit in the question represents a choice policymakers might actually face or the public might accept (Drews et al. 2008; Kaplowitz et al. 2011), the requirement that respondents assess their commitment to environmental protection against the benefits of economic growth provides a good indicator of intensity of support for environmental protection. Indeed, similarly-worded questions have been fielded in a number of other surveys, including the cross-national PEW, Gallup and Eurobarometer surveys (Drews et al. 2018; Dunlap, Gallup and Gallup 1993). This item is used to create a binary variable designating support for environmental protection.[3] To check whether this also applies to other dimensions of environmental concern, models employing alternative dependent variables based on a battery of environmental concern indicators included in Wave 5 of the WVS are reported in the Online appendix.

Of the 86.46% of respondents in the pooled sample of Waves 3-6 who were able to state a preference for either environmental protection or economic growth, 54.05% said they preferred environmental protection. These figures are relatively stable over time: 54.65% in Wave 3, 52.13% in Wave 4, 57.22% in Wave 5, and 51.96% in Wave 6. Though these figures are not strictly speaking comparable, as different countries were included in different waves of the survey, they provide an indication of broad stability in these relatively high levels of support for environmental protection

I combine the survey data described here with aggregate-level data on polarization. Party polarization on the environment is not directly measurable via the WVS as this project does not include questions on citizen placement of parties on issues that would make it possible to derive such a measure from the survey data, as Dalton (2008) does with Comparative Study of Electoral Systems (CSES) data. The dataset employed to construct a measure of party polarization on the environment is the Manifesto Project Database (MPD) (Volkens et al. 2015; previously the Comparative Manifesto Project), which has the widest country coverage of the various party ideology datasets available. MPD data availability reduces the number of countries in the analysis to 42, including states on every continent in the world.[4]

The MPD measures of party position are derived from the proportion of a party's manifesto composed of statements ('quasi-sentences' in the lingo of the MPD) on that topic, in keeping with the saliency theory of party position which understands party stance in terms of the emphasis given to a policy by a party (Budge et al., 2001). The key variable designating parties' position environmental protection, 'per501', is defined as follows:

> General policies in favour of protecting the environment, fighting climate change, and other 'green' policies. For instance:
> • General preservation of natural resources;
> • Preservation of countryside, forests, etc.;
> • Protection of national parks;
> • Animal rights.

May include a great variance of policies that have the unified *goal* of environmental protection (Volkens et al. 2015: 16).

I use party scores on the environmental policy scale to construct an index of party polarization on the environment at the time of the lower-chamber legislative election that immediate preceded the dates when the corresponding WVS survey was fielded in each country.[5] The party polarization index (*P*) I use for this purpose is a variation on that employed by Sigelman and Yough, which is based on the variance index originally proposed by Taylor and Herman (Sigelman and Yough 1978; Taylor and Herman 1971; Lachat 2008):

$$P = \sum_{a=1}^{a} \omega_a (p_a - \bar{p})^2$$

Where ω_a is the vote share of party *a*, p_a is the position of party *a* on per501 environmental position indicator, in this variation of the index, $\bar{p}$ is the average position on this scale weighted by party vote share:

$$\bar{p} = \sum_{a=1}^{a} \omega_a \, p_a$$

These equations together provide indicators for the macro-level variable of interest in this paper: elite polarization on the environment.

Given the structure of the data, with a binary dependent variable and individuals nested within surveys (country-years), I employ multilevel logit models with the following general form:

$$\Pr(E_{ij} = 1 | x_{ij}, u_j) = f(B_{0j} + \gamma_{01} P_j + \gamma_{02} I_{ij} + \gamma_{01} P_j * \gamma_{02} I_{ij} + \beta \boldsymbol{x}_{ij} + \delta \mathbf{z}_j)$$

$$B_{0j} = \gamma_{00} + u_{1j} I_{ij} + u_{0j}$$

Where *E* is support for environmental protection of respondent *i* in survey *j*, *P* is elite polarization on the environment, *I* is individual-level left-right self-placement, $\boldsymbol{x}_{ij}$ is a vector

of individual-level fixed effects controls, $\delta \mathbf{z}_j$ is a vector of macro-level fixed effects controls, γ_{00} is the intercept, $u_{1j}I_{ij}$ is the random effect for left-right self-placement and u_{0j} is the macro-level random effect. The individual-level data are weighted by WVS sample weights to account for differential sample sizes across surveys and standard errors are clustered by country. The multilevel structure of these models allays possible concern about direction of causality as the individual whose attitude is constructed as the object of influence cannot alone have shaped the aggregate elite position that is the independent variable of interest, even if mass attitudes may *collectively* condition elite positions. Moreover, the polarization data are lagged with respect to the survey data.

The models include a variety of controls, reflecting the findings in the previous comparative literature on environmental attitudes. At the individual level, variables consistently found in comparative studies to be associated with concern for environmental issues include age, with younger respondents in many contexts expressing greater levels of environmental concern; female gender; education; income or proxies such as class, and ideology (e.g. Franzen and Meyer 2010; Gelissen 2007; Kvaløy, Finseraas and Listhaug 2012; Lewis, Palm and Feng 2019; Marquart-Pyatt 2012).

At the aggregate level, I employ per capita GDP as a control for development, with the UNDP's Human Development Index (HDI) used as an alternative in one of the robustness checks. Due to lack of established consensus on the role of other macro-level variables, and in order to avoid loss of macro-level cases due to missing data, the main models presented here will include per capita GDP as the sole macro-level control, though models with a range of other controls are included as robustness checks (see below). Descriptive statistics for all variables can be found in the Online appendix.

Results

Table 1 presents models designed to test the principal hypothesis of this paper (H1): that elite polarization on the environment should be associated with ideological polarization at citizen level. The results of these analyses are presented in Table 1. Model 1 is a baseline model with covariates at the individual-level only; this includes the full set of 180 surveys for which individual-level data are available.[6] This model confirms findings from previous studies that the demographic variables of female gender, education and income are positively associated with support for environmental protection over economic growth. Left-right self-placement is also statistically significant and has the expected negative sign; given that higher values on this indicator correspond to a more right-wing position, this indicates that those who place themselves on the left of the political spectrum are more supportive of environmental protection overall in this pooled sample. Model 2 includes the same variables as Model 1, but only those 92 macro-level cases that are available for analysis when macro-level variables are added in Models 3 and 4. There is little substantive difference between the larger and smaller samples, save that age is weakly significant and negative in Model 2, as anticipated on the basis of previous findings. Model 3 includes the macro-level variables of elite polarization on the environment and a control for economic development.[7] Elite environmental polarization is significantly and positively related to support for protection of the environment, though the coefficient for this variable is very small; this suggests that in contexts where environmental issues have polarized leaders, there is on average slightly greater aggregate concern for the environment, possibly due to higher levels of popular debate on environmental problems.

Table 1 about here

Model 4 tests H1, namely the hypothesis that elite polarization on the environment should be associated with greater divide in levels of support for environmental protection among

citizens with different ideological orientations, by including a cross-level interaction term between left-right self-placement and elite polarization. This term is significant, consistent with the conjecture that elite polarization on the environment conditions citizen orientations on the issue. This relationship is best explored visually. Figure 1 plots predicted probabilities of support for environmental protection at different levels typical of elite polarization across typical observed values of the relevant variables. As can be seen from this graph, at high levels of polarization there is a fanning out at both ends of the political spectrum corresponding to expectations: those on the left (lower values on the left-right scale) exhibit higher levels of support for environmental protection, while those on the right display lower levels. Interestingly, there is greater fanning-out on the left than on the right, and the tipping point is slightly above the halfway-point on the left-right scale, such that those slightly to the right-of-center are marginally more pro-environmental in highly polarized contexts. At high levels of elite polarization, those furthest to the left are up to 13 percentage points more likely to report support for environmental protection than those at the lowest level of polarization, whereas on the right of the political spectrum high levels of elite polarization results in an up to eight percentage points lower likelihood of favoring environmental protection over economic growth. This explains why, as evident in Model 2, the overall effect of polarization is to boost levels of support for environmental protection. The magnitude of this effect is thus not huge, but it is sufficient to account for alterations of majority views on environmental policies, and potentially to decide election outcomes in contests where environmental issues are highly salient, given that elections in democratic countries are typically won on margins of several percentage points.

Figure 1 about here

The models in Table 2 are designed to test H2 and H3, namely the suppositions that there will be variations in the global effect documented in the models in Table 1 depending on contextual variations in the relationship between left-right ideology and support for environmental protection. Models 1 and 2 in Table 2 segment the data into those macro-level contexts (country-years in which WVS surveys were conducted) where left-wing self-placement predicts support for environmental protection (Model 1) and those where right-wing self-placement predicts support for environmental protection (Model 2). The segmentation was carried out by running separate individual-level models on each of the 92 macro-level cases included in Models 2-4 in Table 1, and ascertaining the direction and significance level of the relationship between these two variables. Cases were included in one of these models if the coefficient for left-right self-placement was larger than the standard error in the model in question. This broader approach to statistical significance was employed on the grounds that the aim of the exercise was to allocate cases to categories as far as possible, and coefficients that are larger than their standard errors afford some indication that the relationship, however weak, is in the direction suggested by the coefficient.

Tables 2 & 3 about here

Model 1 (48 cases) reflects the dominant trend in the pooled dataset, and the coefficient for the key interaction term between left-right placement and elite polarization is identical to that in the pooled dataset (Model 4 in Table 1). The coefficients on the other variables are very similar to those in the pooled model, though they are in many cases more strongly significant. Model 2, by contrast, provides no evidence of a relationship between left-right self-placement and elite polarization. This model includes only 19 macro-level cases; the interaction term is of extremely small magnitude and nowhere near conventional

levels of statistical significance, suggesting that the lack of significant effect is not due exclusively to the small number of macro-level cases. Interestingly, most of the other effects found in Model 1 (and in the pooled model) are absent in this model as well. In other words, the core story told in the pooled model appears to be driven by the circumstance that left-wing self-placement predicts support for environmental protection. Where the opposite is true, support for environmental protection is much more poorly defined by both the demographic and macro-level variables included here. H2 thus receives only partial support – the relationship between ideology and support for environmental protection does indeed condition the interaction between ideology and elite polarization, but the effect in a pro-left-pro-environment context is not the mirror image of that in a pro-right-pro-environment setting; only the former effect is evident in the data. Something else, not well captured by these models, appears to be driving support for environmental protection in those countries where people on the right politically are more likely to favor environmental protection.

Table 3 lists the macro-level cases in each model. Though both models include a range of cases from different parts of the world, established democracies dominate in Model 1, whereas post-Communist cases are most common in Model 2. This finding thus lends further support to existing research discussed above that attitudes toward environmental protection are both quantitatively and qualitatively different in those countries that have experienced Communism. There is limited evidence that this may gradually be changing – the more recent elections in Georgia and Russia saw these countries move from Model 2 into Model 1 – but post-Communist eastern Europe and the former Soviet Union remain largely a region apart, where dominant global patterns are not evident. Several other countries also appear in different models at different points in time (Argentina, Armenia, Chile, Cyprus, Macedonia, Mexico, Poland, Romania, South Africa and South Korea), suggesting a

relatively high level of variability in patterns of environmental support over time within individual national contexts.

Model 3 tests H3, the notion that the effects observed in the pooled dataset will be dampened in contexts where ideological divides on the environment are weak. This model includes those 25 macro-level cases there the relationship between support for environmental protection and ideology is insignificant (the relevant coefficient is smaller than its standard error) in separate individual-level models based on each survey. This model resembles Model 1 (and the pooled model) in that there is a significant interaction between ideology and elite polarization on the environment, and it resembles Model 2 in that the effect, though significant, is very small in magnitude. The overall picture painted by these three models is that the effect evident in the pooled model in Table 1 is indeed dominant, though it fades as the relationship between left-wing self-placement and support for environmental protection itself fades. Moreover, it is probable that were truly global data available to test these hypotheses, we might well observe that this effect is more evident in developed than in less developed contexts. The availability of CMP data limits the analysis undertaken here to countries that have relatively high levels of economic development; in the WVS where relevant individual-level variables are available but CMP data are not, 27 are cases where left-wing orientation predicts support for environmental protection, an equal number – 27 – are cases where support for the environment is predicted by right-wing self-placement and 32 are cases where this relationship is insignificant (these figures are derived through the same procedure as described above for the 92 cases included in the models in Table 2). Thus the general finding that left-wing orientation is associated with support for environmental protection, and that this effect is conditioned by elite polarization on the environment, is likely to be one that is most common across the world, but a sizeable number of countries exhibit drivers of environmental support that do not reflect this general pattern.

In order to probe these models, I carried out a range of robustness checks (for details, see Section IV of the Online appendix). Alternative specifications included the UNDP Human Development Index in place of per capita GDP as a measure of development (Table A3), and added a range of additional macro-level control variables, including indicators of fossil fuel reliance, protected areas and democracy (Table A4). In both cases, the coefficients for the key interaction term used to test the hypotheses remain unchanged in all models. Another check employed a logged version of elite polarization, as this indicator exhibits some skew (Table A5). I also ran models with nominal education indicators, in case the ordinal version of this variable included in the main models provides too crude an indicator of gradations in educational achievement (Table A6). A further potential concern is that fact that some countries are included up to four times in the Table 1 models, whereas others are included only once. Table A7 therefore includes a macro-level country frequency weight, which is multiplied by the sample weight so as to ensure that each country is counted equally. In all three of these models the effect studied here remains virtually unchanged.

Finally, I ran models with alternative dependent variables based on a battery of environmental concern indictors included only in Wave 5 of the WVS (for details of variable construction see the Online appendix). The battery included both global and domestic/local issues: concern about local water quality, local air quality, local sewage and sanitation, climate change, biodiversity and water pollution.[8] In models based on an additive index created from all six survey items, Models 1 and 2 in Table A8, the ideology effect and the interaction between elite polarization and left-right self-placement remain significant and correctly signed, indicating that the phenomenon identified here is not specific to the environmental support indicator used in the other models. It must be noted, however, that the magnitude of the interaction effect, though significant, is very small. Models 3 and 4 are based on an index of local problems only (air, water and sewage), and these models do not

have significant coefficients on either the ideology or the interaction variable. Models 5 and 6 have as a dependent variable an analogous index based on global problems only – climate change, biodiversity and water pollution at global level. These models display the same effects as those in models 1 and 2 of Table A7, but with coefficients of larger magnitude. This indicates that the link between left-wing ideology, elite polarization and environmental attitudes is one that is specific to certain types of attitude only – support for positions on the environment that involve some kind of trade-off or sacrifice of personal well-being for a larger good. This evidence adds texture to our understanding of the effect under analysis, as it suggests that elite polarization widens the gap in environmental attitudes between political groups in the citizenry, but that this effect does not hold where attitudes toward the environment are associated with local issues that might have an immediate effect on citizen livelihoods, or right-wing values that prioritize individual achievement. This also comports with the findings of Harring and Sohlberg (2017) that the impact of ideological position on environmental support is stronger when the trade-off between environmental protection and growth is emphasized and protecting the environment is less a valence issue.

Conclusion

The received wisdom in the literature on US environmental attitudes is that environmental polarization at elite level has led to a rift in citizen views on the environment between those furthest to the left and those furthest to the right. The evidence presented here provides support for the hypothesis that this supposition can be generalized to many other parts of the world, but there is also evidence that there is a substantial subset – most notably the post-Communist context – where this pattern is not observed. My general findings are robust to a wide range of alternative specifications, and they hold also when using an alternative indicator that captures a separate dimension of environmental attitudes.

The results of this analysis are relevant for understanding opinion formation on environmental issues, as they indicate that in many contexts voters align on environmental issues along party lines. The finding with regard to polarization complements recent research on the role of partisanship and party cues in shaping popular environmental attitudes in less polarized environments (Harring and Solhberg 2017; Linde 2018). It would be interesting in future research to explore the dynamics of elite and mass opinion formation on individual environmental issues, a task that would require more detailed longitudinal data than is currently available but which would help to distinguish more clearly the dynamics of opinion formation on topics typically perceived as distant and abstract, such as climate change, and those more immediate and tangible, such as air and water pollution. The evidence presented in Table A8 suggests that concern for local environmental problems is driven by different dynamics than that for global problems. Different dynamics also clearly obtain in the context of countries where the link between left-wing ideology and support for environmental protection is reversed, and further examination of these contexts would help us better to understand how ideology is related to environmental attitudes. Finally, future work could usefully probe the configuration of country-specific factors that might make elite polarization accentuate public opinion on environmental issues. The comparative study of environmental attitudes is a rapidly developing area in which much work remains to be done, but I hope that here I have gone some way toward helping make sense of a piece of this puzzle.

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Table 1. Multilevel models of support for environmental protection

	Model 1	Model 2	Model 3	Model 4
Individual-level factors				
Gender (f)	.056** (.018)	.094*** (.028)	.094*** (.028)	.090** (.029)
Age	-.001 (.001)	-.002* (.001)	-.002* (.001)	-.001 (.001)
Education	.065*** (.007)	.083*** (.009)	.082*** (.009)	.082*** (.009)
Income	.014* (.006)	.019* (.007)	.019** (.007)	.022*** (.007)
Left-right self-placement	-.022* (.009)	-.037** (.014)	-.037** (.014)	-.033* (.013)
Left-right self-placement * elite environmental polarization				-.002** (.001)
Macro-level factors				
Elite environmental polarization			.005** (.002)	.010** (.003)
GPD per capita (ln)			.076 (.078)	.423** (.140)
Intercept	-.023 (.089)	.006 (.130)	-.788 (.762)	-4.157 (1.367)
Random intercept variance component	.318 (.081)	.193 (.040)	.174 (.033)	.329 (.069)
Left-right random slope variance component				.006 (.001)
Log pseudolikelihood	-106328.4	-56354.6	-56349.8	-56119.9
Wald chi^2(df)	154.60(5)	160.98(5)	188.55(7)	203.24(8)
AIC	212670.7	112723.2	112717.7	112261.8
BIC	212740.7	112788.7	112801.9	112364.8
Individual-level N	162,694	86,135	86,135	86,135
Macro-level N	180	92	92	92

Notes: All models are multilevel random intercepts logit models; random slopes are included where specified. Cell entries are unstandardized coefficients (standard errors). The dependent variable in these models is a binary variable designating support for "Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs" over "Economic growth and creating jobs should be the top priority, even if the

environment suffers to some extent." Standard errors are clustered by country. Variable definitions can be found in the Online appendix.
* = p>.05; ** = p>.01; *** p>.001.

Table 2. Multilevel models of support for environmental protection broken down by ideological alignment

	Model 1: Contexts where left-wing self-placement predicts support for environmental protection	**Model 2: Contexts where right-wing self-placement predicts support for environmental protection**	**Model 3: Contexts where there is no significant association between ideology and support for environmental protection**
Individual-level factors			
Gender (f)	.108* (.044)	.069 (.041)	.079* (.038)
Age	-.002* (.001)	-.001 (.002)	.001 (.002)
Education	.102*** (.011)	.046** (.017)	.067*** (.013)
Income	.027*** (.008)	.017 (.017)	.015 (.012)
Left-right self-placement	-.102*** (.012)	.068*** (.014)	.005 (.006)
Left-right self-placement * elite environmental polarization	-.002*** (.001)	-.0004 (.002)	-.0004* (.0002)
Macro-level factors			
Elite environmental polarization	.010*** (.003)	.035 (.027)	.009** (.003)
GPD per capita (ln)	.365*** (.114)	-.053 (.144)	-.244* (.099)
Intercept	-3.355 (1.094)	-.262 (1.321)	1.844 (.853)
Random intercept variance component	.133 (.037)	.123 (.038)	.204 (.078)
Left-right random slope variance component	.003 (.001)	.0001 (.0003)	.000 (.000)
Log pseudolikelihood	-27981.6	-11566.6	-16443.3
Wald chi^2(df)	352.03(8)	95.56(8)	195.87
AIC	55985.3	23155.1	32906.7
BIC	56080.8	23240.4	32988.0
Individual-level N	43,745	17,172	25,218

Macro-level N	48	19	25

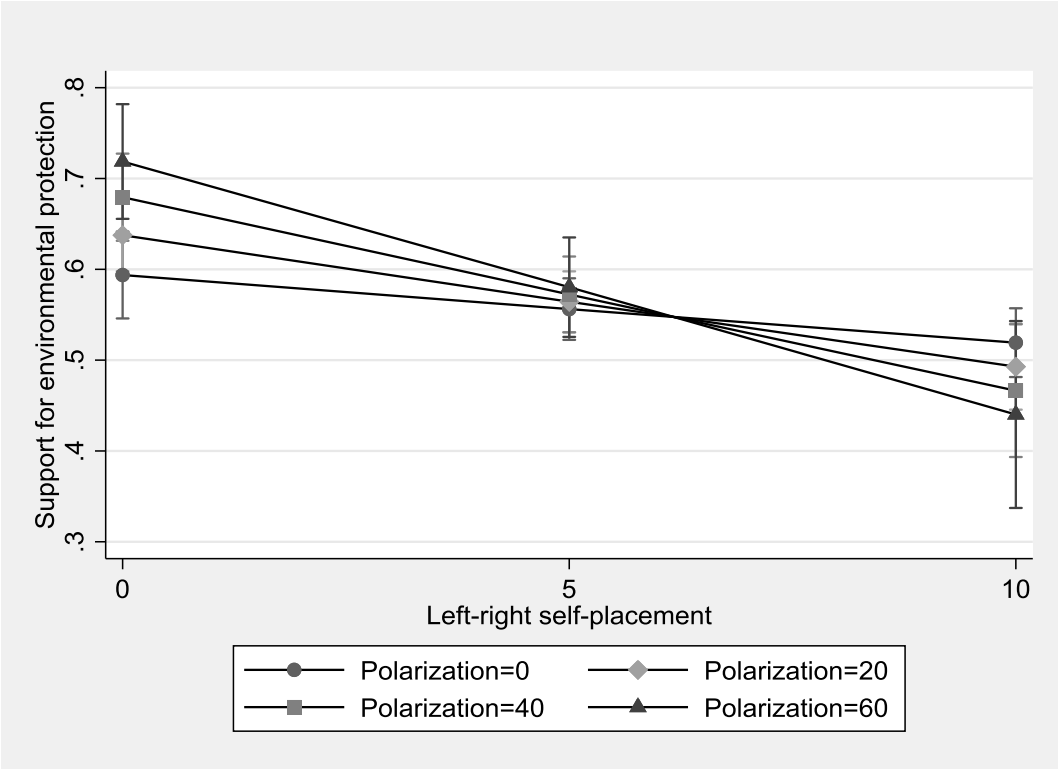
Notes: All models are multilevel random intercepts logit models; random slopes are included where specified. Cell entries are unstandardized coefficients (standard errors). The dependent variable in these models is a binary variable designating support for "Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs" over "Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent." Standard errors are clustered by country. Variable definitions can be found in the Online appendix.
* = p>.05; ** = p>.01; *** p>.001.

Table 3. Macro-level cases included in each model in Table 2

Model 1 (left-wing self-placement predicts support for environmental protection)	Model 2 (right-wing self-placement predicts support for environmental protection)	Model 3 (there is no significant association between ideology and support for environmental protection)
Albania 1998	Azerbaijan 1997	Argentina 1999
Albania 2002	Armenia 1997	Armenia 2011
Argentina 1995	Bulgaria 1997	Brazil 2006
Argentina 2013	Cyprus 2006	Brazil 2014
Australia 1995	Estonia 1996	Chile 2006
Australia 2005	Estonia 2011	Finland 1996
Australia 2012	Georgia 2009	Georgia 1996
Bosnia and Herzegovina 2001	Israel 2001	Hungary 2009
Canada 2000	Latvia 1996	Macedonia 2001
Canada 2006	Lithuania 1997	Mexico 2000
Chile 1996	Macedonia 1998	Mexico 2012
Chile 2000	Poland 1997	Moldova 1996
Cyprus 2011	Romania 1998	Moldova 2002
Finland 2005	Russia 1995	Moldova 2006
France 2006	Slovakia 1998	Poland 2005
Georgia 2014	South Africa 2013	Poland 2012
Germany 1997	South Korea 2001	Romania 2005
Germany 2006	Ukraine 1996	Romania 2012
Germany 2013	Ukraine 2006	Serbia 1996
Italy 2005		Serbia 2001
Japan 2000		South Africa 1996
Japan 2005		South Africa 2001
Mexico 1996		South Africa 2006
Mexico 2005		Turkey 1996
Netherlands 2006		Turkey 2007
Netherlands 2012		
New Zealand 1998		
New Zealand 2004		
New Zealand 2011		
Norway 1996		
Norway 2007		
Russia 2011		
Slovenia 2005		
Slovenia 2011		
South Korea 1996		
South Korea 2005		
South Korea 2010		
Spain 1995		
Spain 2000		
Spain 2007		
Spain 2011		

Sweden 1996		
Sweden 2006		
Sweden 2011		
Switzerland 1996		
Switzerland 2007		
Turkey 2001		
United Kingdom 2005		

Figure 1: Predicted margins for environmental support



NOTES

[1] Details of WVS data collection are contained in Section I of the Online Appendix.

[2] I am grateful to an anonymous reviewer for drawing this argument to my attention.

[3] Full details of variable construction are contained in the Online Appendix.

[4] See Table A2 in the Online appendix for details.

[5] Vote shares data for the Brazilian elections of 2006 and 2010 and the 1999-2000 election in Chile were missing from the MPD file; this information was obtained from Nicolau 2008; Hunter 2011; electionguide.org.

[6] Table A2 in the Online appendix details the macro-level cases available for analysis.

[7] A model (not shown) controlling for economic growth instead of level of economic development showed this variable not to be significant when other factors are controlled; the coefficients for the other variables in this model were not substantively affected.

[8] See the Online appendix for question wording and variable construction.