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Political Polarization and Long-Term Change in Public Support for Environmental Spending

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Abstract

Public support for environmental protection has evinced declines in recent years that are widely attributed to growing antipathy among self-identified Republicans. Fractures in what was long considered broad and enduring support for the environment in the United States have called attention to the broader sociopolitical context in which individual opinion on the environment is formed, and especially the role of political parties and their leaders in shaping opinion. Empirical analyses of environmental support, however, remain strongly focused on individual-level correlates of support. We apply recent methodological advances in age-period-cohort models to scrutinize changes in Americans' willingness to pay more for environmental protection between 1973 and 2014. Analyses distinguish the importance of individual traits, such as political identification, from cohort and especially period-based fluctuations that result from changing economic and political conditions. Individual-level covariate results are reflective of previous research on environmental opinion (e.g., age is negatively and education positively associated with environmental support). We further find that political context across time periods matters as much as, and interacts with, individual political affiliation to influence support for the environment. Americans of all political stripes demonstrate decreases in support for environmental spending during Democratic presidential administrations and during difficult economic times. Declines during Democratic presidencies are especially pronounced among Republicans. Analyses also highlight parallels between the high levels of political

polarization in environmental support found at the end of the Obama presidency and the end of the Carter era.

Introduction

A now large body of public opinion research has demonstrated declines in public support for the environment in the United States and, in particular, growing antipathy among self-identified Republicans (Dunlap and McCright 2008; Dunlap, Xiao and McCright 2001; Guber 2013; Hamilton 2011; McCright and Dunlap 2011; McCright, Xiao and Dunlap 2014). This literature points to factors external to individuals to explain these intertwined trends, suggesting that the public may be responding to changes in broader social, economic, or especially political contexts, such as growing polarization among political elites or the rise of an anti-climate change movement. Despite a theoretical interest in how context influences public opinion on the environment, the extant research is dominated by attitudinal surveys employing only individual-level covariates associated with support for the environment. In other words, there is a mismatch between analyses conducted mainly at the level of individuals and explanations for change over time that point to social, economic, and political contexts.

In this article, we deploy state-of-the-science hierarchical age-period-cohort analysis (Yang and Land 2013) with repeated cross-sectional data spanning four decades to develop new insights about the changing relationship between individuals' political affiliations and support for environmental spending. This analytic approach allows us to focus on the interplay of individual and structural factors in producing social change. Analyses distinguish between period-based fluctuations caused by factors such as changing economic and political conditions from cohort effects and important individual traits (particularly age and political affiliation). Our focus is on how individual political affiliation and support for environmental spending varies across time periods and interacts with political and economic contexts. The meaning of individual political affiliation is, we argue, contingent and contextual. It does not operate in a vacuum.

We find that, across political affiliations, Americans reduce their support for additional federal environmental spending during Democratic presidencies and during difficult economic times, and increase their support during Republican presidential administrations and during better economic times. Swings in support across presidential administrations are, however, especially pronounced among self-identified Republicans who may generally support environmental protections but for whom political party is a more salient concern when Democrats are in control of the presidency.

This research also examines the long time horizon of 1973–2014, providing historical context to a political ideology/environmental opinion research stream that has focused on the post-1990, and especially post-2000, time period (for an exception see McCright et al. 2014). The recency bias in the literature contributes to the impression that political polarization of environmental issues is a distinctly new phenomenon. Our analyses indicate strong parallels to the close of the 1970s and early 1980s, when party identification played a similarly important role in explaining individual support for the environment as it does

at the close of our observation period. We discuss these parallels, and their implications, in more detail in the conclusion to the paper.

Polarization and declines in support for the environment represent an important social problem. The decision to hold the 2017 “March for Science” on Earth Day highlights concerns that physical scientists have increasingly expressed about the urgency of environmental sustainability and climate issues facing the world today. Increasingly, both physical and social scientists are stressing that solutions to these pressing issues require large-scale social, economic, and political change (Dunlap and Brulle 2015; IPCC report 2014). Public opinion can play an important role in the policy-making process (Agnone 2007; Page and Shapiro 1983), the adoption of new technologies that confer environmental advantages (e.g., solar and wind energy; smart houses) and many types of individual and community level pro-environmental behaviors (Stern 2000; Wüstenhagen, Wolsink, and Bürer 2007).

In what follows, we first review trends in support for the environment among the American public, and American political elites, from 1970 through 2014. We then draw from literature based in social psychology and political science, which shows that political partisans are particularly responsive to cueing by outgroup leaders and especially presidents from opposing political parties. From this review, we develop hypotheses about the way individual political affiliations along with political and economic contexts influences environmental opinion independently and in interaction with one another. Hypotheses are tested using the longest-standing and most widely used measure of concern available, drawn from the General Social Survey (GSS). We apply newly available and uniquely appropriate hierarchical age-period-cohort methodologies. In the conclusion we highlight a number of parallels between the current state of public opinion on environmental protection and the late 1970s, the last time the political divide between Republicans and Democrats was so large.

Public Support for the Environment and Subsequent Polarization

The rise of environmental protection to a position of prominence on US national public opinion polls was so rapid that it prompted Hazel Erskine, the 15-year editor of *Public Opinion Quarterly's* “Polls” feature, to describe its rise as “a miracle of public opinion” (1972, 120). Support for the environment declined slowly across the 1970s before rebounding in the early 1980s (Dunlap 1992). While there were notable ebbs and flows in support, the environment was widely seen at the end of the century as “an enduring concern” with broad, if generally shallow, support among the American public from its miraculous appearance in the polls through the end of the century (Dunlap 2002; see also Guber 2003).

Following thirty years of enduring support, declines since 2000 in public support for environmental protection policies generally (Dunlap et al. 2001; McCright et al. 2014) and climate change in particular (Dunlap and McCright 2008; Guber 2013; Hamilton 2011; McCright and Dunlap 2011; McCright et al. 2015) have been stark. An environmental opinion literature that has traditionally focused on identifying individual-level social correlates of environmental concern (Buttel 1987), and the extent to which concern has diffused broadly across populations (Guber 2003; Inglehart 1990; Jones and Dunlap 1992; Pampel and Hunter 2012), has pivoted toward documenting and trying to explain these declines

(Dunlap and McCright 2008; Dunlap et al. 2001; Guber 2013; Hamilton 2011; McCright and Dunlap 2011; McCright et al. 2014). Results have highlighted the importance of political party affiliation and the fact that Republicans in recent years have been particularly unlikely to support environmental spending and related federal government activities. Differences in environmental opinion based on individual political affiliation, once seen as substantively unimportant even if sometimes statistically significant (Guber 2003; Van Liere and Dunlap 1980), are now a major predictor of individual concern (Guber 2013). Our *first hypothesis* follows the now large literature on the growing importance of party identification in stating that *differences in support for environmental spending between Republicans and other Americans increase across time periods.*

Political Context of Environmental Issues, 1972–2014

Polarization among the American public on environmental issues is a phenomenon of recent interest. Democratic Party elites, however, have long been more closely identified with environmental issues than their Republican counterparts, even if the extent to which this was the case remained a valid empirical question in the 1970s (Dunlap 1975; Dunlap and Allen 1976). The election of Ronald Reagan marked a key turning point in the politicization of environmental issues (Dunlap 1992; Mitchell 1984). A self-declared Sage Brush rebel (Cawley 1993), Reagan ran for office on a platform that included major changes in federal land control and rolling back 1970s-era antipollution legislation. Support for environmental issues among Republican legislators clearly declined after 1980 (Dunlap and McCright 2008; Shipan and Lowry 2001). Reagan's attacks on environmental regulations and his appointment of known antagonists to lead the EPA and Department of Interior, meanwhile, sparked a wide-scale and often noted public backlash and a broad rebound in support for the environment among the American public (Dunlap 1992; Mitchell 1984).

Both elite and public political polarization around environmental issues solidified during the 1990s as vice president and then presidential candidate Al Gore became singularly associated with global warming, and a well-funded environmental skeptics movement with strong ties to the Republican Party emerged (Farrell 2016; McCright and Dunlap and 2003). Party polarization on environmental issues has continued during the presidencies of George W. Bush, Barack Obama, and the early years of Donald Trump. Over the observation period, Democratic politicians are generally seen as supportive of new environmental regulations, and Republicans of rolling back existing regulations. Under Democratic administrations, environmental problems are likely to be perceived as being a greater priority, and so Democratic control of Congress and the presidency may be expected to exert a dampening effect on public support for spending on the environment. When Republicans are in control, in contrast, environmental public policy is more likely to be perceived as under threat, and public support for environmental spending is likely to increase. *Hypothesis 2a* is that *individual support for environmental spending is likely to be heightened during periods of Republican control of the presidency and dampened under periods of Democratic control.* *Hypothesis 2b* is that *individual support for environmental spending is likely to be heightened during periods of Republican control of the Congress and dampened under periods of Democratic control.*

Political Identity and Political Context

Membership in political groups facilitates the development of personal values, helps individuals to define meaning in the social world, and may otherwise be important for individual socialization in a number of ways (Jacoby 1988). Party identification provides an important reference group and belief system that can shape a wide range of judgments about, for example, the economy (Durr 1993), political candidates (Rahn 1993), presidential approval (Tyson 2016), and public policy (Jacoby 1988), including environmental policy preferences and beliefs about global warming (Unsworth and Fielding 2014). At its core, political identity is the outcome of a fundamentally social process involving the interaction between individuals and the (especially political) groups to which they belong. How and when individual political identity is invoked as salient also occurs in interaction with the broader social context.

Polarization and party sorting literature focuses attention on the role of national political elites in setting political agendas, cueing the public, and sorting voters along various dimensions, such as support for the environment (Baldassarri and Gelman 2008; Fiorina and Abrams 2008). Presidents play a particularly important role. Research by Jacobson (2006), for instance, shows that presidents inspire more polarized political responses than either state governors or US senators. Political elites from the opposing party are especially likely to elicit reactions that may motivate changes in public opinion. For instance, in a series of survey experiments focused on how party leaders influence both in-group and outgroup political perspectives, Nicholson (2012) finds that individuals are especially likely to respond to presidential candidates from the opposition party, not general party cues or in-party candidates. Presidents from an opposing political party act as a sort of focusing device to which political opponents respond. They also sit at the head of a large administrative apparatus that is making numerous decisions to which partisans of the opposite party react to defend their interests. The Nicholson research highlights an important element of the political context: the tendency for group identity to be activated and made more salient when the values it represents are threatened by outgroup members (Goren et al. 2009). This greater importance of cueing on the part of political opponents, rather than cueing within one's own party, has been shown to hold for environmental issues such as climate change (Unsworth and Fielding 2014).

Given this research, we expect that individual opinion on the environment is likely to be shaped by political leaders in an asymmetrical fashion. For a Democrat, a sitting Democratic president is likely to be perceived as attending to environmental issues and so there may be some modest declines in enthusiasm for further spending, but there is little reason to expect large drops in support. For the same Democrat, when the president is a Republican that may be more inclined to roll back some environmental regulations, support for further protection is likely to increase since it aligns with both environmental values and party identification. Coming from a high base, however, there is relatively little room for variance compared to a Republican voter who may generally support spending to protect the environment, at least in the abstract. For a Republican, a Republican president poses little difficulty and support for environmental spending can be high. The presence of a

Democratic president, however, is likely to invoke partisan identification that reduces support for additional government spending.

Particularly when it comes to spending on the environment and environmental regulation more broadly, Republican constituents may fear overspending and overregulation when a Democrat holds the highest office in the nation. The result is the expectation of a larger political gap during Democratic presidencies when Republican support drops, sometimes precipitously, but smaller gaps during Republican presidencies when neither self-identified Democrats nor Republicans are likely to oppose environmental spending on strictly political grounds. Our *Hypothesis 3* is that *differences in support for environmental spending between Republicans and other Americans are particularly large during Democratic presidential administrations.*

Finally, a small body of literature examining aggregate environmental opinion data strongly suggests that economic conditions have important effects on aggregate support for the environment (e.g., Guber 2003; Scruggs and Benegal 2012). One limit of this approach, of course, is that by aggregating individual-level survey data important individual-level variation—the long-term core of environmental opinion research—is lost (Raudenbush and Bryk 2002). Given the classic positioning of a supposed trade-off between jobs and environmental protection, and the Republican party generally being seen as business friendly and the Democrats as environmentally friendly, it may be that *Hypothesis 4: differences in support for environmental spending between Republicans and other Americans are particularly large during adverse economic conditions.*

Data

We use data from the 1973–2014 General Social Survey (GSS) to examine changes in Americans' views of spending on the natural environment (Smith, Marsden, and Hout 2015). The GSS has been administered to a nationally representative sample of noninstitutionalized American adults annually or biennially since 1972. The question about environmental spending was not included on the 1972 survey and was only administered to a subset of respondents beginning in 1984. After deleting cases with missing data, primarily due to missing data on the dependent variable, the final sample size is 21,225.¹ The response rate ranges between 69 and 82 percent, based on the American Association for Public Opinion Research's (2008) Response Rate 5. These data on environmental spending preferences among the US public are common in the extant literature (maximizing comparability with other research) and, importantly for our analysis, cover the longest time span of any available set of frequently measured trend data on environmental concern. Environmental concern is a highly multidimensional concept, however, and alternate measures of, for example, perceived risk from environmental threats, participation in pro-environmental activities, or opinion on a particular issue such as air pollution, wildlife protection, or climate change do not always trend together. For this reason, some argue that analyses of environmental support are best done on single items, as we do here, rather than aggregated scales of support (Daniels and Krosnick 2012). Readers should take care in generalizing our results on support for federal environmental spending to other aspects of environmental concern (an issue to which we return in the conclusion).

GSS respondents are asked whether they think we are spending too much (1), about the right amount of money (2), or too little (3) on a series of problems and issues facing the nation. The list of issues includes “improving and protecting the environment.” Because this question implies federal government intervention, responses are likely biased by respondents’ views about the role of government more broadly (Klineberg, McKeever and Rothenbach 1998). As Pampel and Hunter (2012:430) argue, “To best capture commitment to environmentalism, we need to examine the priority respondents place on environmental spending relative to other spending. Otherwise, support for environmental spending may be conflated with general preferences for national spending.” Consequently, the dependent variable, which we term relative support for environmental spending (RSES), is a ratio for each respondent of their support for environmental spending to the mean of their support for spending on other problems and issues facing the nation.² A value above one on this measure indicates relatively greater support for spending on the environment than spending on other issues. This approach accounts for respondents’ views of government spending in general, which is essential here, given the focus on political affiliations, and results in more conservative estimates. We also examined models with a dependent variable operationalized as the raw or “absolute” support for environmental spending. Results from those models are consistent with the findings presented below (see appendices). Descriptive statistics for all variables are reported in Table 1.

At the individual level, we are primarily interested in the changing relationship between political affiliation and environmental views. Political affiliation is assessed with two dummy variables: Democrat affiliation (strong or not very strong Democrat) and political independent or affiliate of another party. The omitted reference category is identification as a strong or not very strong Republican. This approach allows us to distinguish the differences between Republicans and Democrats from the differences between Republicans and other Americans.

The models control for a host of relevant individual-level independent variables. Age is measured in years, centered on the mean of age. Age-squared is included in the models when statistically significant ($p < 0.05$) to incorporate nonlinear age effects. Education is measured in years of schooling, with zero through seven years of education combined into a single category because few respondents had fewer than eight years of education.³ Household income is assessed with logged family income in constant (2000) dollars. Dummy variables control for African American and “other” race respondents, with whites as the reference category. Dummy variables for female respondents, currently married respondents, and those with children under 18 years old living in their homes are used to measure sex, family formation, and household composition. Religious affiliation and participation are both associated with environmental perspectives (Clements, Xiao and McCright 2014). Consequently, we include dummy variables for mainline Protestants, black Protestants, Catholics, Jews, affiliates of other religions, and the religiously unaffiliated, with evangelical Protestants as the omitted reference category (Steensland et al. 2000). Religious service attendance is a nine-category variable ranging from never to more than once a week. We control for geographic variation with a dummy variable for respondents who live in the South Census Region, where residents are particularly likely to self-identify as Republican (Black and Black 2003). Rural-urban differences in environmental concern are often weak

or nonexistent (Klineberg et al. 1998), but urban dwellers may be more supportive when concern is operationalized as support for additional government action and spending on environmental protection in particular (Jones and Dunlap 1992). We control for city size based on dummy variables for respondents who live in the 100 largest SMSAs (urban), suburbs of the 100 largest SMSAs (suburb), and rural areas, with other urban areas as the reference category.

Table 1. Descriptive Statistics

	Mean (%)	Standard deviation	Min	Max
Individual-level ($N = 21,225$)				
Relative support for environmental spending	1.185	0.313	0.345	3
Democrat	(38.8)		0	1
Republican	(25.4)		0	1
Independent/other party	(35.8)		0	1
Age	43.770	16.383	18	89
Female	(51.6)		0	1
African American	(13.9)		0	1
Other race	(3.9)		0	1
White	(82.2)		0	1
Married	(56.6)		0	1
Children in home	(40.8)		0	1
Evangelical protestant	(23.8)		0	1
Mainline protestant	(22.8)		0	1
Black protestant	(9.3)		0	1
Catholic	(26.5)		0	1
Jewish	(2.1)		0	1
Other religion	(4.7)		0	1
No religion	(10.8)		0	1
Religious service attendance	3.862	2.660	0	8
Education	6.053	2.870	0	13
Family income (logged)	10.399	0.949	5.912	12.103
Urban	(23.1)		0	1
Suburban	(26.3)		0	1
Other urban	(37.7)		0	1
Rural	(12.9)		0	1
South	(34.1)		0	1
Period level ($N = 29$)				
Democratic president	(37.9)		0	1
Democratic congressional advantage	60.414	61.409	-49	149
<i>NY Times</i> articles on environment	0.018	0.007	0.006	0.031
Unemployment	6.555	1.517	4.000	9.700
Pollution	0.000	1.000	-2.121	1.458
Even year survey	(69.0)		0	1

Cohort, $N = 19$

Our primary concern at the level of time periods is with political and economic indicators. Our first measure of political context is a dichotomous measure of the president's political party (Democrat = 1). Democratic control of Congress is measured as the total number of Democratic seats held in the House of Representatives and Senate minus Republican held seats. The annual national unemployment rate of people aged 15–64, taken from Federal Reserve Economic Data, is used as a measure of economic conditions and is expected to have a negative relationship with support for environmental spending.

We control for three other important period-level covariates. Mass media may be reasonably expected to have an influence on public opinion generally (Page, Shapiro and Dempsey 1987) and on environmental issues in particular (Gamson and Modigliani 1989). Media attention to environmental harm is expected to have a positive relationship with support for environmental spending by making issues of degradation more salient. This is gauged with a one-year lagged measure of the percentage of New York Times newspaper articles focused on environmental issues, as coded by the Policy Agendas Project. Environmental degradation, a possible explanation for changes in broader public opinion, is measured using a standardized air pollution index (Cronbach's $\alpha = 0.980$). The index aggregates national-level emissions of four "criteria air pollutants," those for which the US Environmental Protection Agency has set national standards that are highly visible evaluations of environmental quality (Johnson and Frickel 2011). Finally, a dummy variable indicating surveys conducted in even years is added to the model to account for possible election year dynamics. In even years, the GSS is administered during election campaigning; and in odd years, it takes place just after a new Congress is sworn in.⁴

Analysis Technique

Social change results from fluctuations in age distributions, differences across groups of people based on when they were born (i.e., cohorts), and/or variations across time periods among the population as a whole. Our focus is on the latter, but to properly assess changes in support for environmental spending we must also take the other forms of social change into account (Yang and Land 2013). Consequently, we employ age-period-cohort models. A key problem with modeling age, period, and birth cohort effects using repeated cross-sectional data is linear dependency (i.e., $\text{period} = \text{age} + \text{cohort}$), which precludes the inclusion of measures of age, period, and cohort in standard regression models. Researchers have traditionally avoided the linear dependency problem by dropping age, period, or cohort measures from their models or by making identifying assumptions such as constraining adjacent ages, periods, or cohorts to be equivalent. The former requires strong theoretical assumptions, and it is questionable if the latter sufficiently reduces collinearity (Firebaugh 1997). Hierarchical age-period-cohort (HAPC) models, on the other hand, avoid the linear dependency problem without requiring the removal of key indicators or the constraining of variables (Yang and Land 2013). Just as hierarchical or multilevel models are used to compensate for correlated error within contexts such as schools or neighborhoods (Raudenbush and Bryk 2002), HAPC models compensate for correlated error among those born at about the same time or surveyed in close temporal proximity. Failure to address this period- and cohort-level heterogeneity can lead to invalid statistical

inference (Yang 2008), particularly underestimated standard errors and increased probability of Type I error (Hox and Kreft 1994).

The HAPC models we employ account for this shared error by treating individuals as level-1 units and periods and birth cohorts as cross-classified level-2 units in a multilevel analysis (Yang and Land 2013). Each year of the survey is a period. Birth cohorts are coded in five-year intervals ranging from 1900–1904 to 1980–1984. Due to the limited number of respondents at the ends of the cohort distribution, those born before 1900 are grouped into a single cohort and those born after 1984 are grouped into a single cohort. Such coding, and consequently the number of level-2 units, comports with extant empirical age-period-cohort research (e.g., Johnson and Schwadel forthcoming; Schwadel and Garneau 2014; Yang 2008). HAPC models are preferable to fixed-effects models for the current research because of the unbalanced data that contain unequal numbers of respondents in cohort-by-period cells (Yang and Land 2013) and, more importantly, because our research questions require period-level indicators and are best assessed with random slopes that model heteroscedasticity at the period and cohort level (Bell and Jones 2015). The individual or level-1 equation is as follows:

$$\text{Support Environmental Spending}_{ijk} = \beta_{0jk} + \beta_1 A_{ijk} + \beta_2 D_{ijk} + \beta_3 I_{ijk} + \sum_{p=18}^p \beta_p X_p + e_{ijk}$$

Each individual (i) is nested in both a birth cohort (j) and a period (k), β_{0jk} is the intercept or cell mean for respondents in cohort j and period k , β_1 , β_2 , and β_3 are the individual-level fixed effects for age (A), Democrat (D), and independent/other party (I), e_{ijk} is the individual-level error term, and β_p represents other individual-level fixed effects. The level-2 model is as follows:

$$\beta_{0jk} = \gamma_{00} + \gamma_{01} DP_k + \gamma_{02} DA_k + \gamma_{03} NY_k + \gamma_{04} UN_k + \gamma_{05} PS_k + \gamma_{06} EY_k + u_{00j} + v_{00k}$$

In this equation, γ_{00} is the model intercept, which is the overall mean of RSES, and u_{00j} and v_{00k} are the residual random effects of cohort and period, respectively. These residual random effects represent the effect of each cohort (averaged across all periods) and the effect of each period (averaged across all cohorts). Period-level fixed effects for Democrat president (DP), Democrat advantage in Congress (DA), *NY Times* articles on the environment (NY), percentage unemployed (UN), the pollution scale (PS), and surveys in even years (EY) are represented by γ_{01} through γ_{06} . A key feature of HAPC models for our research is the ability to incorporate random slopes and cross-level interactions:

$$\beta_{2jk} = \gamma_{20} + \gamma_{21} DP_k + \gamma_{22} DA_k + \gamma_{23} NY_k + \gamma_{24} UN_k + \gamma_{25} PS_k + \gamma_{26} EY_k + u_{20j} + v_{20k}$$

$$\beta_{3jk} = \gamma_{30} + \gamma_{31} DP_k + \gamma_{32} DA_k + \gamma_{33} NY_k + \gamma_{34} UN_k + \gamma_{35} PS_k + \gamma_{36} EY_k + u_{30j} + v_{30k}$$

In these equations, γ_{20} and γ_{30} are fixed-effect coefficients for Democrat and independent/other party, u_{20j} and u_{30j} are the cohort-specific effects (i.e., random slopes) of Democrat and independent/other party, v_{20k} and v_{30k} are the period-specific effects (i.e., random slopes)

of Democrat and independent/other party, and γ_{21} through γ_{26} and γ_{31} through γ_{36} are interactions between political party and period-level indicators. The ability to simultaneously model individual- and period-level fixed effects, cross-level interactions, and random slopes for political party makes HAPC models ideally suited for the current research. Recent research indicates that HAPC models provide reliable results as long as there are period effects and the period, cohort, and outcome variables are not collinear (Reither et al. 2015). All independent variables are centered on their overall means. Models are weighted and conducted in HLM 7.

Results

Age, Period, and Cohort Effects

The results from HAPC models of relative support for environmental spending (RSES) with individual-level independent variables are reported in Table 2. The first model is a baseline used to assess overall age, period, and cohort effects. Age has a strong, negative effect on RSES ($b = -0.003$). This effect is displayed visually in Figure 1a. Average RSES is 0.20 higher for the youngest respondents than for the oldest respondents, which equates to a 0.65 standard deviation difference in RSES. Clearly age is strongly associated with views of environmental spending, even when controlling for birth cohort. It may be that the young are consistently more willing to spend on the environment because of their relatively greater future orientation and lower tax burden compared to those approaching and in retirement (see Johnson and Schwadel forthcoming for more on the relationship between age and support for federal spending on the environment).

Table 2. HAPC Models of Relative Support for Environmental Spending with Individual-Level Independent Variables

Fixed effects	Model 1		Model 2		Model 3	
	<i>b</i>	se	<i>b</i>	se	<i>b</i>	se
Intercept	1.185	0.008***	1.188	0.008***	1.187	0.008***
Age	-0.003	0.000***	-0.002	0.000***	-0.002	0.000***
Democrat			0.044	0.006***	0.043	0.010***
Independent/other			0.057	0.006***	0.053	0.009***
Female			0.012	0.005**	0.012	0.005**
African American			-0.044	0.011***	-0.045	0.011***
Other race			-0.021	0.013	-0.021	0.013
Married			-0.017	0.005**	-0.017	0.005**
Children in home			-0.002	0.005	-0.002	0.005
Mainline protestant			0.022	0.007***	0.022	0.007**
Black protestant			-0.001	0.013	-0.001	0.013
Catholic			0.021	0.007**	0.021	0.007**
Jewish			0.015	0.017	0.015	0.017
Other religion			0.016	0.012	0.017	0.012
No religion			0.043	0.010***	0.042	0.010***
Service attendance			-0.006	0.001***	-0.006	0.001***
Education			0.002	0.001*	0.002	0.001
Family income			0.008	0.003**	0.008	0.003**
Urban			-0.004	0.006	-0.004	0.006
Suburban			0.005	0.006	0.004	0.006
Rural			-0.007	0.007	-0.007	0.007
South			-0.002	0.005	-0.002	0.005
Random effects	Variance comp.		Variance comp.		Variance comp.	
Individual	0.09496		0.09331		0.09305	
Period: intercept	0.00113***		0.00126***		0.00124***	
Democrat					0.00115***	
Independent/other					0.00070**	
Cohort: intercept	0.00019***		0.00016***		0.00015***	
Democrat					0.00023*	
Independent/other					0.00033**	
Deviance	10,348		9,978 ^a		9,948 ^a	

Notes: $N = 21,225$

^aImprovement in model fit relative to previous model ($p \leq 0.001$)

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$ (two-tailed test)

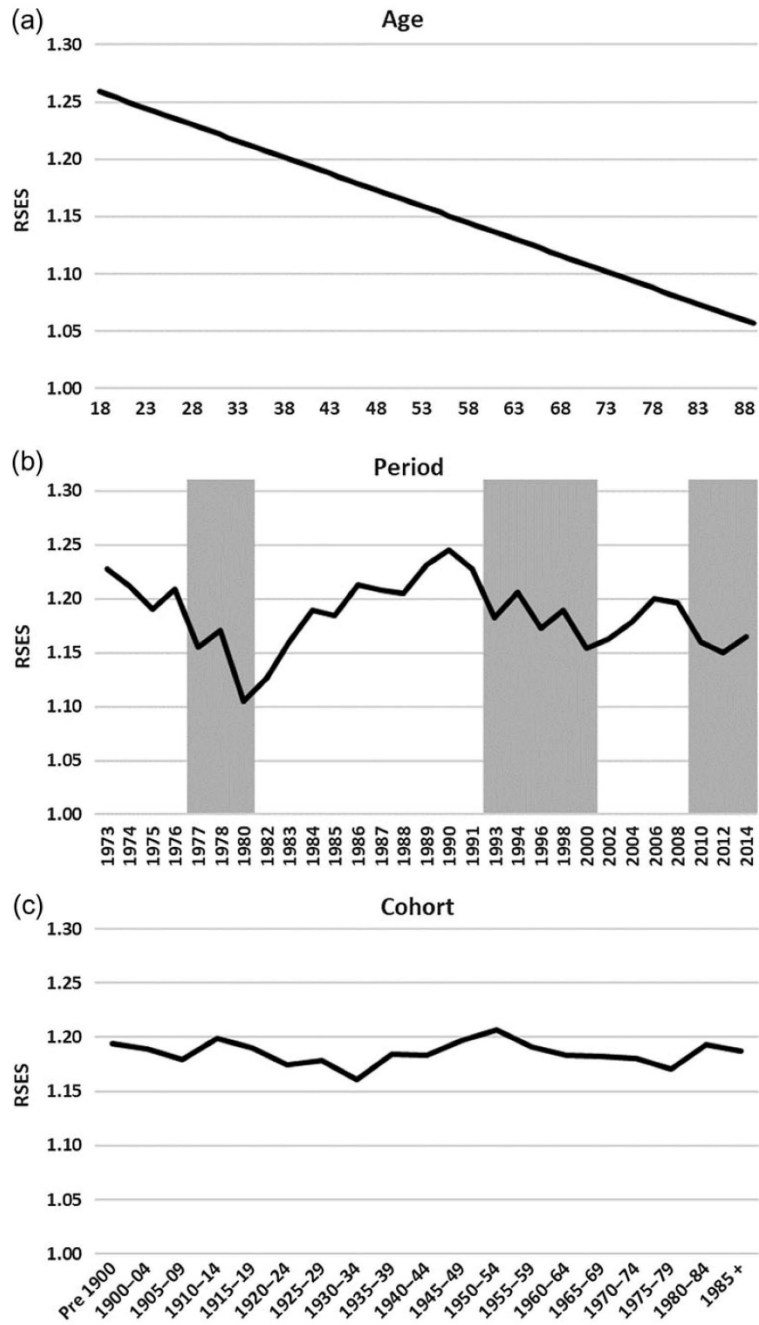


Figure 1. Age, period, and cohort variation in relative support for environmental spending. **Notes:** Figure depicts results from Model 1 in Table 2; height of each frame equivalent to one standard deviation in RSES; gray shaded areas in Figure 2b indicate periods with a Democrat president.

The period variance component in Model 1 (0.00113) indicates significant variation across periods, which is depicted in Figure 1b. As this figure shows, a general decline in support for environmental spending across the 1970s is punctuated by the cratering of public support for environmental spending in 1980. After rebounding across the 1980s, support declines through the 1990s then rebounds somewhat during the George W. Bush Presidency, before declining again shortly after Obama's inauguration. This variation is not trivial. For instance, RSES increased by 0.46 standard deviations across the 1980s. Overall, the trend in RSES appears to be correlated with variation in presidential politics, as highlighted by the shading of periods with a Democrat president in Figure 1b. We specifically model this possibility in Table 3 of the results. While there is notable period-based variation in RSES, it is important to note that most of the total variation is at the individual level. Not surprisingly, when it comes to support for environmental spending, there are far more differences between people than across time periods. A preponderance of variation at the individual level is not uncommon in such research, and it does not indicate lack of meaningful variation across periods or cohorts (Yang and Land 2006). Attempting to fully explicate the individual-level variation is beyond the scope of our analysis.

There is significant, but limited, across-cohort variation in RSES in Model 1 (variance component = 0.00019), which is shown graphically in Figure 1c. The late 1940s and early 1950s cohorts appear moderately more likely than neighboring cohorts to support increased federal spending on the natural environment. Overall, though, the cohort effects are fairly trendless compared to the large fluctuations in public support for the environment by age and time period.

The second model in Table 2 introduces political party and control variables. Our focal political party variables have robust positive effects in Model 2. Relative to Republicans, Democrat ($b = 0.044$) is associated with 0.14 standard deviation greater RSES, and independent/other party ($b = 0.057$) is associated with 0.18 standard deviation greater RSES. These findings suggest that non-Republicans in general are more supportive of spending on the environment, with independents/affiliates of other parties even more so than Democrats.⁵ Independents/other party affiliates are often more fiscally conservative than Democrats,⁶ however, and alternative analyses indicate that Democrats are more likely than independents/other party affiliates to support environmental spending in absolute terms (i.e., when views of spending in general are not accounted for, see appendices). This comports with extant research that suggests that independents and Democrats have relatively similar views on the environment (e.g., Dunlap, Xiao, and McCright 2001). We now turn to our central arguments about change in political party differences over time.

Table 3. Focal Results from HAPC Models of Relative Support for Environmental Spending with Individual-Level and Period-Level Independent Variables

Fixed effects	Model 4		Model 5	
	<i>b</i>	se	<i>b</i>	se
Democrat	0.043	0.010***	0.045	0.007***
Democratic president			0.032	0.013
*Dem. congressional advantage ^a			-0.001	0.018
*NY Times articles on environment			-2.039	1.194
*Unemployment			0.005	0.005
*Pollution			-0.015	0.011
*Even year survey			-0.009	0.015
Independent/other	0.054	0.009***	0.056	0.008***
Democratic president			0.038	0.014
*Dem. congressional advantage ^a			0.016	0.019
*NY Times articles on environment			-2.565	1.272
*Unemployment			0.001	0.005
*Pollution			-0.003	0.011
*Even year survey			0.001	0.016
Period-level variables				
Democratic president	-0.032	0.009**	-0.042	0.010***
Dem. congressional advantage ^a	0.034	0.013*	0.027	0.014
NY Times articles on environment	0.106	0.837	0.763	0.901
Unemployment	-0.015	0.003***	-0.015	0.004***
Pollution	-0.009	0.007	-0.011	0.008
Even year survey	-0.013	0.011	-0.016	0.012
Random effects	Variance component		Variance component	
Individual	0.09304		0.09303	
Period: intercept	0.00045***		0.00042***	
Democrat	0.00109***		0.00002	
Independent/other	0.00073**		0.00012	
Cohort: intercept	0.00015***		0.00015***	
Democrat	0.00022*		0.00022**	
Independent/other	0.00032**		0.00031***	
Deviance	9,926 ^a		9,897 ^c	

Notes: Models control for age, sex, race, marital status, children in the home, religious affiliation and service attendance, education, family income, urbanity, and region; $N = 21,225$.

^aCoefficient and standard error multiplied by 100

^bImprovement in model fit relative to previous model ($p \leq 0.001$)

^cImprovement in model fit relative to previous model ($p \leq 0.01$)

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$ (two-tailed test)

Changes in the Effects of Political Party

Model 3 in Table 2 includes random slopes for political party variables. Slope variance components specify the amount of variation in the effects of political party. Specifically, they indicate that the effects of Democrat affiliation (0.00115) and independent/other party affiliation (0.00070) vary significantly across time periods. Although the variance components are considerably smaller, the effects of both Democrat affiliation (0.00023) and independent/other party affiliation (0.00033) also vary significantly across birth cohorts.

Figure 2 depicts variation in the effects of Democrat and independent/other party (from Model 3). As Figure 2b shows, although statistically significant, there is little substantively relevant variation across cohorts in the effects of political party on RSES. In contrast, Figure 2a shows considerable variation in the effects of party across time periods. The gap in RSES between Republicans and both Democrats and independent/other party affiliates grew in the 1970s, declined in the mid to late 1980s, increased in the early 1990s, declined in the early 2000s, and then increased again in 2008 through 2012. These results show that Republicans' support for environmental spending was at times, such as the early 1970s and late 1980s/early 1990s, similar to that of other Americans. At other times, Republicans have been considerably less likely than other Americans to support spending on the environment. For instance, in 2012, Republicans' estimated RSES was 0.34 standard deviation less than that of Democrats, and 0.32 standard deviation less than that for independents/affiliates of other parties. While there is sizeable variation in the effect of political party, we do not see a unidirectional increase in the difference between Democrats and Republicans that we hypothesized (H1). In the next results section, we assess how the political, economic, and social context influences, first, period changes in public support for environmental spending and, second, period-based variation in the effects of political party on RSES.

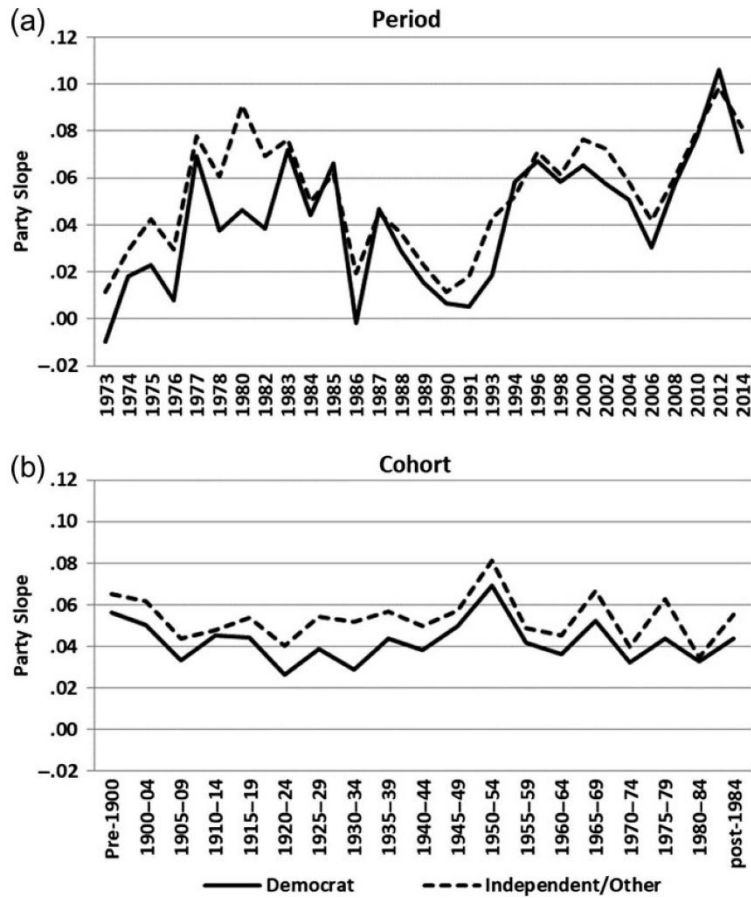


Figure 2. Period and cohort variation in effect of political party (Republican reference) on relative support for environmental spending. **Notes:** Figure depicts results from Model 3 in Table 2.

Explaining Period Variation and Variation in the Effects of Political Party

To explain period-based variation, we add to the model period-level measures that might reasonably be expected to influence public opinion on environmental spending (Table 3). These measures operationalize the political environment (Democratic president and Democratic control of Congress), media attention to environmental issues, unemployment, environmental degradation, and surveys conducted in years.⁷ Adding these measures (Model 4) explains well more than half of the period-based variation in RSES (variance component reduced from 0.00124 to 0.00045); though with six period-level independent variables and only 29 period-level units (i.e., years), it is prudent to be cautious when discussing the extent of period variation that is explained by the model. Still, the decline in the Deviance statistic indicates that the addition of period-level variables also significantly improves the model fit.

The presence of a Democrat in the White House ($b = -0.032$) and unemployment ($b = -0.015$) have strong, negative effects on Americans' willingness to support spending on

environmental protection issues. Estimated RSES is more than 0.10 standard deviation lower when a Democrat is president than when a Republican is president. In contrast to the party of the president, Democratic advantage in Congress ($b = 0.034$, coefficient for this variable multiplied by 100 for purposes of comparison) has a moderate, positive association with RSES. We view this finding as further evidence that presidents, in particular, are polarizing figures (Jacobson 2006) who often inspire oppositional opinions (Nicholson 2012). This finding also reflects the divided nature of US politics over the last few decades, during which the president's party has often been the minority party in Congress. These results support Hypothesis 2a but not 2b. Pollution, media attention, and surveys conducted in even years are not significantly associated with changes in opinions on environmental spending. Period-based variation in support for environmental spending appears to be disproportionately driven by a combination of economic and political conditions.

The final model includes interactions between political party and each of the period measures. Adding interactions to the model fully explains period-based variation in the effects of both political party variables and improves the model fit. The interactions are also similar for both Democrat and independent/other Party. As hypothesized (H3), the associations between political party and RSES vary significantly by the party of the president. These interactions are depicted in Figure 3. This figure shows that differences in support for environmental spending between Republicans and other Americans are heightened when a Democrat is president and diminished when a Republican is president. The estimated coefficient for Democrat is about half the size when a Republican is president than when a Democrat is president. Similarly, the coefficient for independent/other party is reduced from 0.080 when a Democrat is president to 0.041 when a Republican is president. The very large increase in differences between Republicans and other Americans when there is a sitting Democratic president suggests that public opinion on environmental issues is highly entwined with the political context. The results in Model 5 do not support Hypothesis 4—the effects of political party on RSES do not vary by the level of unemployment as we expected.

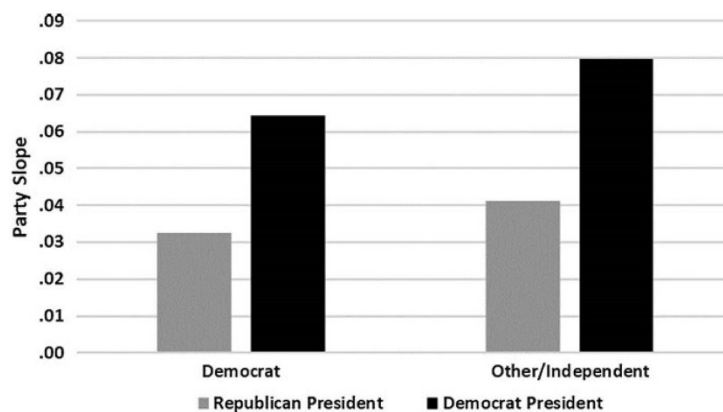


Figure 3. Variation in effect of political party (republican reference) on relative support for environmental spending by president's party. **Notes:** Figure depicts results from Model 5 in Table 3.

Discussion and Conclusion

This article uses hierarchical age-period-cohort models to examine the long-term drivers of change in Americans' support for spending to protect the natural environment. We assess the extent to which support for environmental spending varies in response to widespread period effects among the entire population, generation-specific experiences that affect particular birth cohorts, and the individual life course aging processes. Although the extant literature often attributes age effects to differences across birth cohorts (Dunlap 1992; Guber 2003, 79; Inglehart 1990; Van Liere and Dunlap 1980), we find there are, at most, moderate cohort effects (see also Johnson and Schwadel forthcoming). Instead, it is primarily period-based variation that drives changes in public support to protect the natural environment.

Polarization in environmental perspectives is not as simple as a growing gap between Republicans and other Americans after some point between 1990 and 2000 (in contrast to H1). The partisan gap in support for environmental spending is negligible from the start of our series through 1977 and again from the mid-1980s to early 1990s, but large during the closing years of the Carter administration/first few year of the Reagan administration and even larger at the close of the Obama administration and our observation period. The relationship between individual political affiliation and environmental attitudes appears to be relatively flexible over time and highly contingent on economic, social, and especially political contexts.

The changing relationship between individual party affiliation and support for environmental spending over time periods supports the notion that the meaning of political affiliation changes as a result of interactions with the broader political context. Political elites from the opposing party, particularly presidents, are especially likely to activate partisan ideology and reactions that may motivate changes in public opinion. We find that Republicans are only moderately less supportive than other Americans of environmental spending when there is a Republican president. When a Democratic president is in office, the gap between Republicans and other Americans grows larger (H3) due to a disproportionately large drop in Republican support for environmental spending. Our findings in regard to Congressional control are weak and in the opposite direction from what we hypothesized, a reflection of the divided and more fragmentary nature of Congress as well as the comparatively small role played by Congress in comparison to presidents in both agenda setting and invoking political identity as salient (Edwards and Wood 1999).

Presidents are leaders of their political parties and important drivers of news cycles. They also sit atop a large federal bureaucracy with considerable discretion over federal environmental policy, building a record of governance that political opponents may hold up for criticism, and to which partisans in the minority are particularly likely to be cued. In addition to the relative salience of individual political ideology varying by presidential administrations, Republican voters are particularly likely to be exposed to messages calling for rollbacks in environmental policy when the president is a Democrat. These contextual effects on environmental concern are overlooked in an opinion literature focused on the sorts of individual correlates of environmental support that we control for here (see also Shwom et al. 2015 on this point).

Regardless of political affiliation, the American public is generally less supportive of environmental spending when there is a Democratic presidential administration and more supportive of additional spending when Republicans are in power (H2). Americans of all political persuasions are also less supportive of environmental spending when unemployment is high. Contrary to H4, Republicans are no less supportive of the environment than other Americans when unemployment is high.

There are, of course, several caveats and limitations to the above analysis. First, the link between opinions and actual pro-environmental behavior is complicated at best (Kollmuss and Agyeman 2002) and researchers should not assume that results of this research apply to behavioral modification. Questions in this vein are one possible area of future research. Second, while much of the literature we are interacting with focuses on public opinion around the issue of climate change specifically, our analysis is of support for environmental spending more generally. Climate change is a particularly charged political issue and, we would hypothesize, is likely to display trends even more extreme than we show here. Generalizing our findings about domestic environmental spending to the issue of climate change is fraught with danger, however. It may be that rather than showing large variation across presidential administrations, because climate denialism in particular has become increasingly integrated into the Republican identity framework, opinions about it may be more well-formed and less subject to change. As well, cohort effects, which are largely absent in our analysis, may reasonably be expected to surface for climate issues. Finally, there is no “solution” to the problem of linear dependency (Glenn 2005). While the HAPC models we employ are suitable for adjusting this collinearity as well as the autocorrelation caused by correlated error within periods and cohorts (Yang and Land 2013), other methods should be pursued to attempt to replicate our results. Still, we think a number of important implications can be drawn from this work.

One question our research raises is how applicable our results are likely to be to other political issues, especially those associated with the US “culture wars.” While we think this area of research is potentially fruitful, the issue of environmentalism stands out somewhat from the cluster of more tightly entwined cultural issues which have been at the center of this debate. For one thing, the variance in self-identified Republican support for environmental spending over time periods pre-dates the US culture wars and suggests that antipathy for federal environmental spending is a longstanding by-product of presidential politics. Moreover, while environmental opinion displays relatively broad-based support in the US population, unlike many cultural issues, it is not typically a very deeply held value (Guber 2003). Environmental issues, for instance, rarely make it onto lists when respondents are asked to name the most important problems confronting the country (Policy Agendas Project 2018). One implication is that individual respondents are likely more flexible in their opinion on the environment than on other “culture war” issues where opinions are more strongly held, such as abortion and gay rights.

That large swings in Republican support for environmental spending are highly dependent on the political party of the president is indicative of the politicization of environmental issues. Despite parallels with the late 1970s, the modern period of polarization is more sustained and, given the large divide among the leading political parties, many observers are pessimistic about reconciling such differences in the future. Period effects may

get locked into institutions (like political parties) and cultures, persisting for decades. In this regard, pessimism about the immutably growing divide between Democratic and Republican support for the environment seems well placed.

We also, however, find a hopeful message in the conclusion that period effects in support of the environment are so variable. The last time support for environmental spending was as low as it is today was the end of the 1970s, when President Carter was being mocked by conservatives for suggesting that Americans try donning a sweater before turning up the heat in their houses. Then, as at the end of our time frame, there was a sitting Democratic president friendly to environmental issues and a prominent elite-funded “grassroots” conservative backlash movement opposed to the development and implementation of new federal environmental policies. In the late 1970s it was the Sage Brush rebellion (Cawley 1993); today it is the climate denial movement. However, the large 1979 partisan gap among the American public had largely closed ten years later, which suggests that the problem of political polarization is potentially more tractable than is commonly recognized in recent environmental opinion literature.

More generally, while the association between individual political affiliation and support for environmental spending has come to be seen as a social fact, it is neither immutable nor solely the product of individual-level attributes. Our study builds on the fundamental assertion of sociology that individual choices, perspectives, and opinions are socially structured, and we demonstrate one methodological approach that can better account for important structural causes of change while also accounting for important individual covariates of support. The robust effects of period-based political opportunity measures strongly reinforce the conclusion of some observers of the recent literature on environmental opinion. While there is a high level of variation across individuals in support for the environment, as with any issue, explaining changes in support over time is going to require that analysts go beyond the individual. The focus here on structural determinants of individual opinion on the environment suggests new avenues of research to complement a research stream typically anchored in social-psychological theories focused on the role of knowledge, individual belief and value orientations in explaining changing public support for the environment. In this regard our research responds to Shwom et al.’s (2015, 269) call, writing in the context of public opinion about climate change, for research to move beyond having such a “. . . strong psychological perspective, regularly emphasizing what individuals think about [the environment] as if an atomistic mind produces opinions on [the environment] in a social vacuum.”

Our results highlight the extent to which individual support for environmental issues are conditioned by the social, economic, and especially political context. In particular, we suggest that partisan differences among the public are heavily influenced by national Presidential politics. Narrowing the partisan divide on environmental issues among the American public then, we suggest, requires political change rather than tweaks to the way we educate students or communicate environmental messages to the mass public.

Parallels to the early 1980s suggest one ironically optimistic possibility, at least in terms of public support for the environment; that the presidency of Republican Donald Trump will spark a rise in support akin to that which occurred under Reagan. Sticking just to the issue of the environment, the response to the Trump administration’s attacks on

environmental regulations has not been unlike that of the early Reagan administration. At the time of our writing, the Trump administration has been in power for just under two years, and former Administrator of the EPA Scott Pruitt resigned after about 17 months, amidst a flurry of political scandals. Reagan's first appointment to the position (Ann Gorsuch), while not saddled with the same alleged ethical lapses as Pruitt, was forced to step down after 22 months in office. Activism around issues of climate and the environment is on a distinct rise (Johnson and Burke forthcoming), and independent opinion polls support the notion of a substantial rebound in public support for environmental protections since the election of President Trump (Newport 2018; Pew 2017).

Majorities of both Republicans and Democrats typically support spending to protect the environment, and partisan differences in support are sometimes insignificant. When there are large differences by political affiliation, we argue that a key factor is the influence of Presidential politics on the salience of an individual's political affiliation. We suggest that when asked questions about national spending priorities for an issue about which they have not thought deeply, partisans of all stripes often revert to scripts associated with their political identity and that the salience of political identity is influenced by national presidential politics. The key to realigning political support for environmental protection may not be better messaging to or educating Americans. Rather, changing dynamics among political elites and national political parties is key to bridging partisan divides in support for the environment. Although we are not able to test for differences among presidential policies and stances toward the environment, it is notable that one period of partisan indifference around environmental policies co-occurs with George H. W. Bush, who contested in 1988 as both an "environmental president" and a Republican, and whose record on the environment is more moderate than that of any recent Republican president. What will follow Trump is beyond our capability to predict. Further polarization among political elites could entrench partisan differences, or political realignment could fundamentally reshape the partisan divide. Changing the national political landscape, so that the environment is a less partisan political issue will likely require building constituencies, such as green industries, that support environmental protection within the Republican Party (Meckling et al. 2015).

Notes

1. Of 57,986 respondents to the 1973–2014 GSS, 33,798 are missing data on the dependent variable. The majority of these cases (25,128) were not asked the question on environmental spending. Another 8,670 are missing data on views of spending in other areas, which compose the denominator of one of the dependent variables. An additional 2,963 cases are removed from the sample due to data missing on other variables, primarily income (1,762). Respondents deleted due to missing data on income are moderately less likely than other respondents to say we spend too little on the natural environment (57.7% of cases with missing data on income vs. 62.2% for those not missing data on income).
2. The nonenvironment issues that compose the denominator of the dependent variable are: improving and protecting the nation's health, solving problems in big cities, halting rising crime rates, dealing with drug addiction, space exploration, improving the nation's education system, improving the condition of African Americans, military, armaments, and defense, foreign aid,

- and welfare. Other items included in fewer years of the GSS were not included in the current analysis.
3. The education variables is thus coded zero for fewer than eight years of education, one for eight years of education, two for nine years of education, etc.
 4. We also explored models controlling for presidential election years. There are no substantive changes to results as a result of this alternative operationalization with one exception. In Model 5, the interaction between independent and *NY Times* is significant ($p < 0.05$) with presidential election year in model (not with even year, currently shown in paper). Presidential election year does not significantly interact with either Democrat or independent.
 5. We examined an alternative model that is identical to Model 2 in Table 2 except it includes a dummy variable for Republican and does not include a dummy variable for independent/other party (not shown). The results indicate that although not very large, the difference in RSES between Democrats and independents/affiliates of other parties is significant at $p < 0.05$.
 6. The mean of support for spending in other areas besides the environment (i.e., the denominator in the RSES measure) is 2.09 for Republicans, 2.15 for independent/other party affiliates, and 2.21 for Democrats (all three groups significantly different from one another, $p < 0.001$).
 7. We examined models that used League of Conservation Voters (LCV) scorecard ratings and a measure of the proportion of the total federal budget devoted to environmental spending as independent variables. These measures were removed from the final analysis because they did not significantly influence the dependent variable or other results in the models, and there is a limited number of period-level degrees of freedom. The LCV measure also had the drawback of forcing us to remove the 1973 period from the analysis due to missing data.

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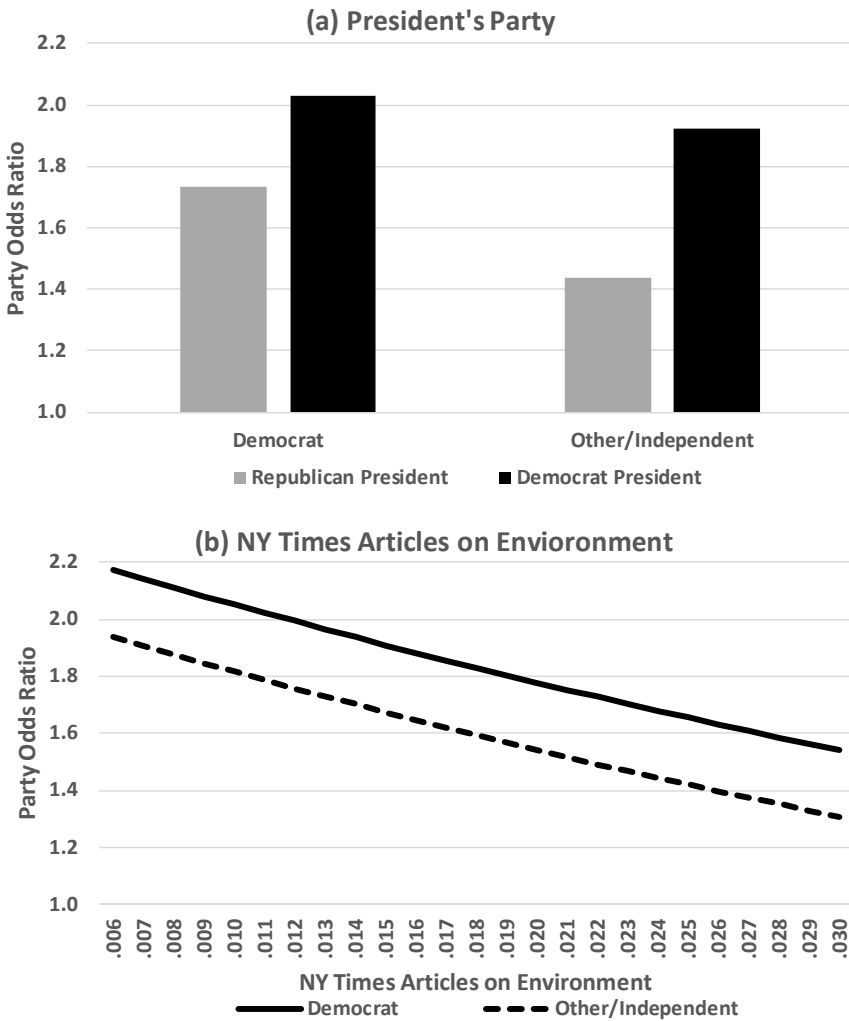
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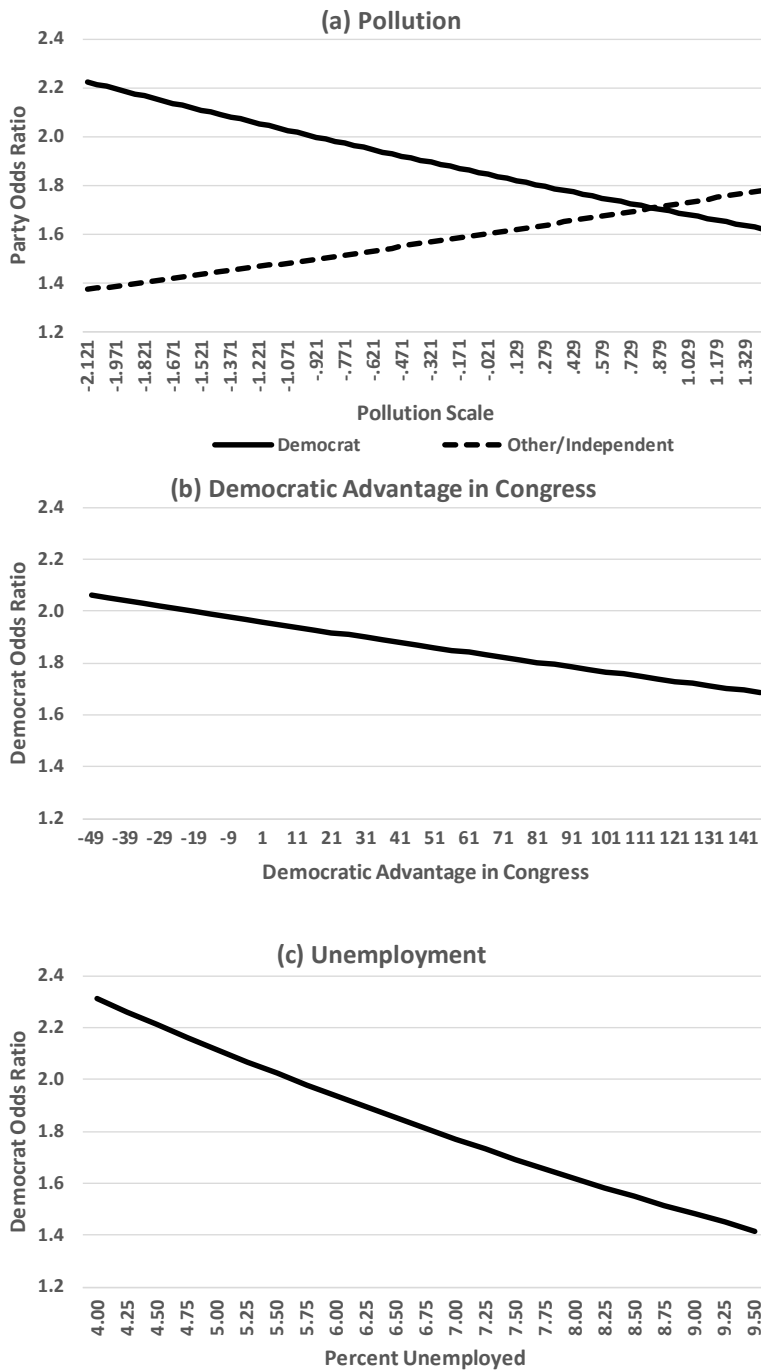
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Appendix A. Variation in Effect of Political Party (Republican Reference) on Absolute Support for Environmental Spending by President's Party and NY Times Articles on Environmental Issues



Notes: Based on model identical to Model 5 in Table 3 except the dependent variable is absolute support for environmental spending (1=too much, 2=about right, 3=too little) and the model is an ordinal HAPC model; results from the same model are used to construct Appendix B; only statistically significant ($p < .05$) interactions shown.

Appendix B. Variation in Effect of Political Party (Republican Reference) on Absolute Support for Environmental Spending by Pollution, Democratic Advantage in Congress, and Unemployment



Notes: Based on model identical to Model 5 in Table 3 except the dependent variable is absolute support for environmental spending (1=too much, 2=about right, 3=too little) and the model is an ordinal HAPC model; results from the same model are used to construct Appendix A; only statistically significant (p<.05) interactions shown.