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The Effect of Elite Polarization: A Comparative Perspective on How Party Elites Influence Attitudes and Behavior on Climate Change in the European Union

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Abstract: There is considerable variability in attitudes towards climate change between citizens of different countries. By using individual-level and country-level data, I examine if this variability in public opinion is partially caused by political party elites. The results show that when elites are united in their support for environmental issues, the perceived threat of climate change is higher than in countries where party elites are divided. The results also demonstrate that the perceived threat influences behavior related to climate change, and that threat mediates the effect of party positions. Consequently, the effect of party elites is stronger than previously acknowledged. The models rely on Generalized Method of Moments estimation and instrumental variables with clustering on EU member-states.

Keywords: party cues; elite influence; threat; climate change

1. Introduction

Climatologists and other scientists who study climate change have overwhelmingly concluded that the world is going through an unprecedented temperature increase [1,2], yet this information has not uniformly been translated into a public opinion response across countries. Instead, cross-national polls on climate change show that there are substantial differences between countries in how residents view climate change. Residents in many countries view climate change as a very serious problem, whereas citizens in other countries do not think it is a serious problem. Moreover, people differ in the extent to which they have taken personal action in fighting climate change [3]. While there are notable exceptions [4,5], not enough attention has been paid to the major differences that exist between countries in public opinion on climate change and how factors at the national level influence individuals. Furthermore, insufficient focus has been put on how public opinion is translated into behavior, an area that "we need to know far more about" [6] (p. 41). Lastly, there are problematic issues of causality in this field that need to be addressed in more detail than they have been. This multilevel study aims to fill the gaps on what influences cross-national attitudes on climate change and how public opinion is transformed into behavior while at the same time accounting for potential causality problems.

I draw on two different literatures, research on elite influence and research on threat perceptions, to build a model on how (1) political party elites cause changes in the perceived threat of climate change and, how in turn; (2) the perceived threat impacts behavior. As for the first part of the model, elites are important because on issues ranging from foreign policy to attitudes towards the European Union, political party elites have strong effects on the public [7,8]. Therefore, it is plausible that these elites also influence public opinion on climate change. However, there are good reasons to be suspicious of

this causal ordering because the direction is sometimes reversed, with public opinion influencing elite opinions [9]. Fortunately, the instrumental variable approach can be used to deal with the problem of endogeneity [7,10]. In the second part of the model, I introduce the concept of perceived threat as a mediating factor between party elites and political behavior. Here, the perceived threat (which is affected by party elites) influences the political behavior of fighting climate change. While previous research on climate change has treated perceived threat as exogenous [11], this paper suggests that the reality is more complicated, with threat serving as a mediator rather than as an exogenous variable. In other words, the effects of political elites have potentially been underestimated in prior research.

I test three predictions on how political party elites and perceived threat influence behaviors and attitudes on climate change. First, I hypothesize that when political elites are divided on environmental issues, people then believe that the threat of climate change is lower. Second, I expect that when the threat of climate change is perceived as higher, individuals are more likely to take personal action to fight climate change. Third, I predict that the effect of elite division on behavior is mediated by perceived threat. That is, the effect of perceived threat on willingness to fight climate change is hypothesized to be partially driven by the effect elites have on the perceived threat of climate change.

2. Elite Influence Explanations and Endogeneity

In *The Nature and Origins of Mass Opinion*, John Zaller [8] finds that when political elites change their opinions, the public changes its attitudes accordingly. A key point in this model is that it distinguishes between when elites send a one-sided message and when they communicate a two-sided message. If elites send a one-sided message on a political issue, the public is persuaded in one direction, and consequently there is little variance in public opinion as they move uniformly. However, if political elites send a two-sided message, the public diverges along political predispositions. Zaller exemplifies with the public opinion dynamic of the Vietnam War. In the early war, political leaders sent out a one-sided message, and consequently the public supported the war. However, later in the war, the elites diverged. With a two-sided elite message on foreign policy, doves among the public became more dovish and hawks became more hawkish [8]. Similarly, public opinion records from World War II and the Iraq War show that if political party elites diverge, this influences regular partisans along party lines. When elites are united in supporting wars, as they were during parts of both wars, the public finds little objection [12,13]. There is also some evidence from U.S. public opinion data that party leaders can influence climate change attitudes of supporters [14,15]. Party cues simplify political decision-making because rather than going through the trouble of finding out information about the issues and then making an informed decision, people can quickly form opinions by adopting the same positions as trusted party politicians. Parties strongly influence a range of attitudes, including the perception of the state of the national economy, an issue that presumably could be objectively verified [7,16–20].

However, there are plausible alternative models to the elite influence approach. One is built around the idea that citizens select candidates and parties that are closest to their own preferences. After all, citizens have stable predispositions such as values that influence political issue positions [21] and vote choice [22]. Since politicians want to get elected or stay in office, they adjust their positions according to the will of the public [23]. Evidence suggests that this is not something politicians do just around elections, but rather that they are continuously trying to follow public opinion [24]. In the case of climate change, it follows that party officials tailor their environmental policies to fit the will of their constituents. If this causal order of model were correct, an analysis based on cross-sectional data that regresses attitudes among the public about climate change on elite opinions would indeed find a relationship. Unfortunately, we might therefore mistakenly conclude that elites influence the public although the reverse is correct. Thus, a traditional ordinary least squares (OLS) regression will produce erroneous results. Another model of the relationship between the public and political elites suggests that they move in unison, i.e., none is leading the other. For example, upon hearing in news media that climate change is a problem, both elites and the public conclude that something needs

to be done [25]. Even studies based on time series analysis can be affected by this problem. If elites respond to the public on climate change, even partially, it means that elite positions are endogenous, and coefficient estimates therefore inconsistent. Since it is plausible that political elites adjust their positions on climate change and the environment according to the will of the people, a viable solution is to use instrumental variables to estimate the endogenous variable.

2.1. The Perception of Climate Change as a Threat and the Link to Behavior

A central reason to study how elites influence threat perceptions is that these perceptions tend to strongly influence how people think and behave around climate change. Intuitively, when people sense that an issue poses a serious threat, they want to reduce the threat associated with the issue. With climate change, this is manifested by people taking personal action to reduce their carbon footprint and by their support for policies to reduce greenhouse gas emissions. In contrast, when the threat of climate change is perceived as low, the public tends to be much less supportive of policies and actions aimed at reducing the threat [11,26,27]. In a similar vein, research on American public opinion after the terrorist attacks in 2001 shows that individuals who felt more threatened by the terrorist attacks responded by expressing more support for military action in Afghanistan and a more active role for the U.S. in the world [28]. Likewise, social psychological research on intergroup relations has shown that threat plays a key role in generating anti-immigrant attitudes [29,30]. Faced with threats, people often want take actions to deal with the threats [31].

While prior research on climate change has contributed in identifying the importance of perceived threat, it nonetheless treats it as exogenous. Possibly, this is an oversimplification since research on other types of threat perceptions show that they are caused by a range of factors [28,32,33]. The determinants of climate change threat are presumably different compared to, for example, what affects perceptions about terrorism, but climate change is likely similar in that the perceived threat does not arise on its own. Thus, the statements in the hypotheses below are not as obvious at they might appear; research on climate change attitudes has often treated threat perceptions as exogenous and therefore potentially exaggerated the effect of threat perceptions at the expense of factors such as party elite cues.

2.2. Hypotheses

To summarize, I expect that the more party elites diverge on the environment, the less serious a problem people think that climate change is. It does not matter which parties are skeptical and which ones are pro-environment—what matters is that parties are divided, and that they are sending mixed messages to the public. In contrast, when elites send a more one-sided message on the environment, i.e., they are united in their environmentalism, the public responds by perceiving climate change as a more serious threat.

Hypothesis 1. *The more party elites are divided on the environment, the less likely it is that individuals perceive climate change as a threat.*

Another aspect of the model concerns the effect of climate change threat on climate change-related behavior. The logic here is that if something increases perceived threat, people take actions to reduce the threat. Specifically, when climate change is perceived to pose a serious threat, then people respond by taking personal actions to decrease the threat.

Hypothesis 2. *The more individuals perceive climate change as a threat, the more willing they are to fight climate change.*

The third feature of the model is that the effect of party elites on climate change-related behavior is mediated by the perceived threat of climate change. While the influence of threat perceptions on behavior found in prior research on climate change is not disputed, this model suggests that the conclusion from prior research is incomplete. In other words, the model incorporates the view that threat perceptions are malleable.

Hypothesis 3. *The effect of party elites on individuals' willingness to fight climate change is mediated by the perceived threat of climate change.*

3. Data Description and Methods

3.1. Individual-level Data

Individual-level data comes from a Eurobarometer survey (EB 72.1) that asks appropriate questions on climate change. The questionnaire also includes a number of variables that cover individuals' backgrounds, e.g., age and education. TNS Opinion & Social Network conducted the survey on behalf of the European Commission's Directorate General for Communication, and data collection took place between 28 August and 17 September 2009. Citizens from 27 countries of the European Union were interviewed for a total of 26,719 respondents, all 15 years or older [3].

A central variable in the analysis is the perceived threat of climate change. It serves both as a dependent variable and as a mediating variable. It is measured by the following question: "And how serious a problem do you think climate change is at this moment? Please use a scale from 1 to 10, '1' would mean that it is 'not at all a serious problem' and '10' would mean that it is 'an extremely serious problem'." Like all variables at the individual level except age, it was recoded to range from 0 to 1. Summary statistics of all variables are included in the Table A1.

Willingness to take personal action measures to what extent respondents have taken personal "actions aimed at helping to fight climate change". The indicator is based on a four-point scale with higher values meaning more agreement. It serves as dependent variables in models that estimate the effects of elite division and perceived threat of climate change.

The models also include the individual-level control variables. Female is a dummy variable that is coded one for women and zero for men. Education is also measured with dummy variables; lower education, coded here as 15 years or less of formal education, equals one, higher education, 20 years or more, equals one, and respondents still in school are coded as one. The baseline category is 16–19 years of schooling. Household wealth is a 10-point scale that ranges from zero, very poor, to one, very wealthy. It measures the participants' perception of their own wealth. Age measures how old the respondent is and it ranges from 18 to 98. A dummy variable is included for those participants who were unemployed. Respondents who were manual laborers were also dummy coded. Life satisfaction is a measure of perceived general satisfaction with life. It ranges from zero, very dissatisfied, to one, very satisfied. An indicator for respondents' perceived class, from lowest to highest level in society, ranges from zero to one.

3.2. Country-level Data and Instrumental Variables

Elite positions on the environment are measured with data from the Comparative Manifestos Project. The project, funded by the German Science Foundation, has coded party positions from over 50 countries on a range of issues, including their positions on environmental protection. The parties have not been coded on their policies on climate change specifically, yet rather on their environmental policy platform more generally [34]. Since climate change is an environmental problem, albeit different from many other environmental problems [35,36], this should not pose a serious problem to the analysis. (Climate change is different from other environmental problems in a number of aspects, including the fact that there are a vast number of globally distributed actors responsible for climate change and the consequences are varying and wide-ranging. Moreover, unlike many other environmental problems, the problems associated with climate change do not stop when emissions are reduced, but will most likely remain for centuries [36]. Since climate change is an extraordinary difficult problem, it has been labeled as both a "wicked" [35] and a "super wicked" problem [36].). If anything, by relying on this variable, it becomes harder to reject the null because environmental protection may introduce some noise into the measurement. I match Comparative Manifestos Project data with Eurobarometer survey data for 27 EU countries to create a merged, new dataset.

Elite division is measured by the weighted standard deviation of party positions for each country. In other words, each country receives a score that depends on how much consensus there is. A high consensus indicates that the parties are united and thus produce little variance whereas more elite divergence generates more variance. The positions of parties with higher vote shares were given more weight than those with lower. (The party positions that went into the weighted standard deviation variable came from the date closest in time before the Eurobarometer sample was collected. For example, if the Comparative Manifestos Project had coded party platforms for a country with elections in 2006 and 2010, the party scores were taken from 2006 and not 2010 because the latter date was after the collection of the EB sample.). This indicator is calculated in the same way as Gabel and Scheve [7] although in this paper it is applied to party positions on the environment rather than party positions on EU integration. Moreover, I follow their model in the expectation that parties are either united in their pro-position or that they are divided. In their paper, parties are either uniformly pro-EU or divided. There are no countries where parties are uniformly anti-EU. In the present model, parties are either pro-environment or divided on the environment. I do not expect that parties are uniformly anti-environment.

In identifying valid instruments, I follow the theoretical and empirical strategy of Gabel and Scheve [7] and specify electoral features that are expected to correlate with party elite polarization on issues, but are exogenous to public opinion. The logic behind this is that electoral laws influence the number of political parties [37] and with features that lead to more parties, it also follows that there is more heterogeneity in policy positions [7]. Based on this reasoning, one of the two instrumental variables selected for this study is whether the country relies on proportional representation or a first-past-the-post system. According to Duverger's law, compared to first-past-the-post systems, systems that rely on proportional representation tend to have more parties [38], and consequently, with more parties, there should also be more diversity on issues such as on the environment. (Duverger's law is the notion that electoral systems with single-member districts and plurality rule (i.e., first-past-the-post) tend to lead to two major parties in parliament. The system in the United States is one example of this. There are primarily two reasons for this tendency. First, parties know that they need to get the most votes in order to win any seats, which means that politicians work to form inclusive and big parties. Second, voters are aware that a vote for a smaller party is unlikely to affect the election outcome and therefore tend to vote for the biggest party closest to their preferences. In contrast, electoral systems with proportional representation are likely to produce more parties in parliament because there is less of an incentive for parties to merge and voters are at less of a risk of casting a wasted vote [38].). The data comes from the Quality of Government Social Policy Dataset and Pippa Norris's time-series data [39,40]. The other instrumental variable is an index of electoral fractionalization based on a formula from Rae [41]. Again, with more fractionalization, I expect there to be more diversity in party positions. The data for the variable comes from Comparative Political Data Set III [42].

I also include control variables at the country level such as GDP per capita and inflation rate. Since the study is about attitudes on climate change, the models also include controls related to this issue. The variable of economy energy intensity is an indicator of how much an economy relies on energy. In addition, the models include an indicator of the proportion of electricity that is generated from renewable energy sources. Furthermore, an index of greenhouse gas emissions per capita captures the total sum of CO_2, CH_4, N_2O and fluorinated gas emissions in mg/tons. All control variable data except the climate change risk index have been taken from Eurostat. The data describes the situation in the European Union for the year 2009. The variable climate change risk index is a measure of how exposed countries have been to extreme weather between 1991 and 2009 [43].

3.3. Model Specification

When there is an endogenous relationship between the dependent variable and one or more independent variables, the error distribution is not independent from the distribution of the regressors.

Therefore, OLS regression will likely yield inconsistent and biased estimates. It does not matter how many control variables are added to the model. To deal with this problem, two-stage least squares (2SLS) is frequently used. The solution is straightforward; the researcher estimates the endogenous explanatory variable with instrumental variables (IV). Here, instruments should only be related to the dependent variable through the endogenous variable. Given that these two conditions are met, 2SLS will produce consistent estimates, even in the face of endogeneity [44].

However, because of heteroskedasticity, a pervasive problem in empirical studies, the 2SLS approach is often unsound because the standard errors are inconsistent. Robust, or heteroskedasticity-consistent, standard errors can alleviate part of this problem, but the IV estimator is still inefficient because of heteroskedasticity. Fortunately, generalized method of moment estimation leads to efficient estimates despite heteroskedasticity, and therefore solves the problems associated with traditional IV estimation [45–47]. Since its introduction by Hansen [48], generalized method of moments (GMM) estimation has become an increasingly popular method in social sciences. In fact, in economics and finance it is one of the most important statistical tools. GMM estimators are consistent, asymptotically normal and efficient [49].

GMM is also useful when there is clustering. With the present study, based on a sample from several countries, GMM with clustering is ideal, not only because citizens of the same country are correlated, but also because it does not matter what shape the clustering takes from cluster to cluster; it is allowed to vary without it having a negative impact on efficiency or consistency. GMM with clustering produces both consistent standard errors and efficient estimates of coefficients. The benefit with using GMM over random-effects instrumental IV estimators is that GMM relaxes the constraint that correlations within groups are constant [45]. In sum, there are clear advantages with GMM estimation over both traditional 2SLS and random-effects models with instrumental variables, which are estimation methods often used in this type of applied political science research.

Now, GMM or 2SLS estimation should not be the first option for the researcher because there is an inevitable loss of efficiency compared to OLS. The potential nonorthogonality between regressors and errors should be weighed against the efficiency of OLS [50]. In the results section below I examine this issue by calculating the GMM distance, which is an endogeneity test in the GMM context [51].

4. Results

4.1. Elite Influence on the Perceived Threat of Climate Change

Before assessing the support for the hypotheses, a question is whether party elite positions on the environment are endogenous or exogenous. This issue is examined with an endogeneity test, the GMM distance, which is robust to violations of homoskedasticity. The null is that elite division is exogenous and a rejection of the null indicates that the variable must be treated as endogenous. If the variable is exogenous, the GMM-model is unnecessary and a traditional OLS-model preferable. The test statistic, the GMM distance, is distributed as χ^2 with 1 degree of freedom [45]. Table 1 shows that elite positions on climate change are indeed endogenous because the null is rejected ($p = 0.016$). Given these results, OLS-regression would yield inconsistent estimators.

Hypothesis 1 suggests that when party elites in a country express divergent opinions on the environment and climate change, this leads citizens to downplay the threatening nature of climate change. If, on the other hand, parties in a country express similar sentiments in that they are more uniformly pro-environment, this yields less variation, which leads to a heightened perceived threat of climate change. The results support Hypothesis 1 since the coefficient for elite division is statistically significant and negative. The results from the IV-GMM model are presented in Table 1. (The use of the IV-GMM estimation over the traditional 2SLS method is justified also because of the presence of heteroskedasticity. The null hypothesis of homoskedasticity is rejected at $p < 0.001$. Heteroskedasticity is present in all models in this paper.). They show that a one unit change in elite division decreases perceptions of climate change as a serious threat by 0.0635, holding both individual-level and

country-level variables constant. In other words, just as predicted, when party elites send a more two-sided message, the public thinks that climate change is less of a threat. Conversely, if party elites send a one-sided message, residents believe that climate change is a more serious threat. To put this in more substantive terms, when the predicted value at one standard deviation above the mean (i.e., in an information environment with a high degree of elite division) the perception of climate change threat is 0.59 (on the 0–1 scale) yet when elite division is low, at one standard deviation below the mean, threat perception is higher at 0.75. (The GMM estimates are clearer compared to the traditional 2SLS approach. The coefficient and standard error for elite division with 2SLS is −0.0460 and 0.0247, respectively ($p = 0.063$). Thus, the 2SLS results also support Hypothesis 1 as it is a directional hypothesis, yet the coefficient is smaller and the standard error larger. Similarly, a GLS random-effects model with instrumental variables also supports Hypothesis 1. According to the estimates based on the random-effects model, elite division decreases perceived threat with 0.0423 (0.0151). The effect is significant ($p = 0.005$).)

Table 1. Determinants of perceived threat of climate change—GMM and OLS estimation.

	Generalized Methods of Moments (Instrumental Variables)		**Ordinary Least Squares (No Instruments)**	
Female	0.0195	(0.0047) *	0.0213	(0.0048) *
Lower Education	0.0017	(0.0081)	−0.0025	(0.0063)
Higher Education	0.0250	(0.0071) *	0.0137	(0.0067) *
Still Educated	0.0099	(0.0096)	0.0007	(0.0087)
Household Wealth	−0.0142	(0.0142)	−0.0163	(0.0166)
Age	−0.0003	(0.0002)	−0.0003	(0.0002)
Unemployed	−0.0035	(0.0063)	−0.0046	(0.0071)
Manual Laborer	0.0057	(0.0045)	−0.0014	(0.0049)
Life Satisfaction	0.0314	(0.0118) *	0.0189	(0.0133)
Class	−0.0022	(0.0178)	0.0376	(0.0176) *
Elite Division	−0.0635	(0.0188) *	−0.0251	(0.0075) *
GDP/Cap	−0.0038	(0.0019) *	−0.0021	(0.0017)
Inflation	−0.0112	(0.0071)	−0.0119	(0.0062)
Unemployment	−0.0060	(0.0024) *	−0.0067	(0.0034) *
Economy Energy Intensity	−0.0002	(0.0001) *	−0.0001	(0.0001)
Renewable electricity	0.0025	(0.0010) *	0.0009	(0.0006)
Greenhouse Gas Emissions/Cap	0.0072	(0.0061)	0.0009	(0.0053)
Climate Change Risk Index	0.0004	(0.0004)	−0.0001	(0.0002)
Constant	0.8896	(0.0711) *	0.8598	(0.0756) *
Partial R^2	0.178		-	
F Statistic (First Stage)	5.420	0.011	-	-
Hansen's J Statistic	1.187	0.276	-	-
Endogeneity (GMM Distance)	5.802	0.016	-	-
N	24,437		24,437	
Number of clusters	27		27	

Notes: Entries are coefficients with standard errors in parentheses. * $p < 0.05$.

Instrumental variables are effective to the extent that they are related to the endogenous regressor. The partial *R*-squared from the first-stage regression is 0.178, and the *F* statistic (2, 26) is 5.42 ($p = 0.011$). Thus, the instruments, the index of electoral fractionalization and the measure of the proportional election system, have a positive and strong effect on party elite division. The Sargan-Hansen test is a test of whether or not the instruments are uncorrelated with the error term. The null hypothesis is that the instruments are valid, so a rejection of the null indicates a validity problem with the instruments. The test statistics is Hansen's J statistic when the GMM estimator is used. As Table 1 shows, the null is not rejected ($\chi^2 = 1.187$, $p = 0.2759$), which suggests that the instruments were excluded correctly.

While OLS-regression yields inconsistent estimates because of endogeneity, for purposes of comparison I nonetheless present these results. Just as in the instrumental variable model, it has

clustering based on country. As we can see in Table 1, the coefficients show a similar pattern of results with OLS. Yet while the effect of elite division is significant and in the right direction, −0.0251, it is underestimated compared to the instrumental variable model.

4.2. The Effect of Party Cues and Threat Perceptions

The next steps in the analysis are to examine how the perceived threat of climate change influences climate change-related behavior, and how perceived threat mediates the effect of party elite positions on the environment. Since there are theoretical reasons to suspect an endogenous relationship between elites and climate change attitudes, the subsequent analysis is based on results estimated with IV-GMM.

Hypothesis 2 is supported because the perception of climate change as a serious problem has a statistically significant and substantial effect on personal behavior, as Table 2 demonstrates. A one-unit increase in perceived threat leads to a 0.2127 increase in the likelihood that people take personal action to fight the problem. Since both variables are coded from zero to one, it means that an increase from the lowest to the highest value of perceived threat causes a 21% change in the scale's value. While the effect of elite division is still significant, its effect is reduced (−0.0594) when perceived threat is added to the model.

Table 2. Determinants of personal action to reduce climate change.

Perceived Threat of Climate Change	-	-	0.2127	(0.0245) *
Female	0.0142	(0.0045) *	0.0108	(0.0039) *
Lower Education	−0.0342	(0.0132) *	−0.0329	(0.0121) *
Higher Education	0.0388	(0.0078) *	0.0337	(0.0074) *
Still Educated	−0.0305	(0.0108) *	−0.0294	(0.0107) *
Household Wealth	0.0047	(0.0206)	0.0084	(0.0204)
Age	0.0003	(0.0002)	0.0004	(0.0002) *
Unemployed	−0.0136	(0.0100)	−0.0104	(0.0090)
Manual Laborer	−0.0016	(0.0058)	−0.0033	(0.0057)
Life Satisfaction	0.0670	(0.0156) *	0.0606	(0.0156) *
Class	0.0842	(0.0301) *	0.0792	(0.0276) *
Elite Division	−0.0714	(0.0238)*	−0.0594	(0.0208) *
GDP/Cap	−0.0068	(0.0028) *	−0.0060	(0.0027) *
Inflation	−0.0131	(0.0128)	−0.0108	(0.0120)
Unemployment	−0.0082	(0.0031) *	−0.0066	(0.0029) *
Economy Energy Intensity	−0.0006	(0.0002) *	−0.0005	(0.0002) *
Renewable electricity	0.0037	(0.0013) *	0.0032	(0.0011) *
Greenhouse Gas Emissions/Cap	0.0232	(0.0097) *	0.0219	(0.0094) *
Climate Change Risk Index	0.0006	(0.0004)	0.0006	(0.0004)
Constant	0.6976	(0.1010) *	0.5000	(0.1009) *
Partial R^2	0.181		0.177	
F Statistic (First Stage)	5.63	0.009	5.39	0.011
Hansen's J Statistic	0.154	0.694	0.072	0.789
Endogeneity (GMM Distance)	6.328	0.012	7.056	0.008
N	23,768		23,362	
Number of clusters	27		27	

Notes: Entries are coefficients with standard errors in parentheses. * $p < 0.05$.

Party elite division on climate change reduces the likelihood that residents will take personal action to fight climate change. The left side model of Table 2 shows that a one-unit change in elite division leads to a 0.0714 reduction in personal actions. Thus, not only does a two-sided message on climate change lead to a reduction in perceived threat, it also makes citizens less willing to personally take action on climate change.

As for the instruments, the partial *R*-squared is similar to the model that uses perceived threat as a dependent variable. This is unsurprising since the instruments are the same. The *F* statistic is 5.63 and therefore significant ($p = 0.009$) for the relationship between the instruments and the endogenous

regressor. Moreover, the use of the GMM-model over OLS is justified because of the endogeneity between personal actions and elite positions on climate change (χ^2 = 6.328, p = 0.012). Hansen's J statistic indicates that the instruments are not correlated with personal actions on climate change (p = 0.694).

Hypothesis 3 states that the effect of elite positions is mediated by perceived threat. The results show that the four steps of mediation are met [52]. First, elite division (X) is correlated with personal behavior (Y). Second, elite division (X) predicts perceived threat (M). Third, perceived threat (M) significantly affects personal behavior (Y) while controlling for elite division (X). Fourth, the reduction of the effect of elite divisions (X) on personal behavior (Y) when perceived threat (M) is included in the model is statistically significant, as shown by the Sobel test statistic of −2.84 (p = 0.01). Consequently, Hypothesis 3 is supported. (Given that IV-GMM is used to estimate the models, the traditional method of assessing mediation is appropriate. The Sobel test can be problematic in small-N situations, but since the dataset includes more than 25,000 observations, it should be acceptable.)

To validate the support for the model, I attempt to replicate the results with another, highly related, dependent variable. Instead of examining the personal actions to fight climate change, I study beliefs about the economic consequences of fighting climate change and anticipate that those who are exposed to polarized party elites are more likely to see negative economic consequences. As shown in the Table A2, this theoretical expectation is confirmed with the alternative outcome variable. Moreover, all four steps of mediation are met, with the Sobel test being statistically significant (t = 2.45, p = 0.005).

5. Conclusions and Discussion

There are large differences in climate change attitudes between countries. The results presented in this paper suggest that political party elites partially influence these differences in public opinion about climate change. When elites are divided about the importance of environmental problems such as climate change, then people in these countries tend to perceive climate change as less of a threat. In countries where elites are more united in their environmental concern, the perceived threat of climate change is generally higher. That political elites have this causal effect on public opinion can be stated with greater certainty because of the use of instrumental variables. The GMM approach to the endogeneity problem illustrates how this method can deal with the problem without the loss of efficiency that is associated with the traditional 2SLS approach. An advantage with the GMM estimation used in this paper is that the standard errors are not only robust to arbitrary heteroskedasticity, but also to arbitrary intragroup correlation, which is a common feature of cross-national data.

Another finding in the paper is that the perceived threat of climate change has a substantial and significant effect on climate change-related behavior. Individuals who think that climate change is highly threatening are also more likely to have taken personal steps to fight climate change. On the contentious issue of whether or not a fight against climate change helps the economy, an increased perceived threat makes people more likely to believe in the beneficial economic effects. I interpret this as an example of motivated reasoning; people who have been persuaded by the climate change threat also prefer to think that economic growth is compatible with the existence of climate change. The support for the theoretical model indicates that the effect of elites on climate change behaviors and attitudes might have been understated in prior research. While I found a direct effect of party elites on personal behavior, there is also an indirect effect of elites that goes through perceived threat. In other words, perceived threat mediates the effect of elites and party cues thus appear to have a larger effect than previously thought.

Using data from 2009 for the analysis, I look at whether elites drive public opinion on climate change. On the one hand, the observed changes in our climate accumulated over the period of 2009 to the present [1], which could have made the public increasingly aware of the realities associated with climate change. With objective facts available, the possibility of elites affecting public opinion should be reduced. Moreover, other issues, such as the refugee crisis, have gotten a great deal of attention. Thus, even though elites could potentially sway public opinion on climate change, people

might currently be paying more attention to other issues. After all, on issues where elite cues are weaker, elite effects should be smaller. On the other hand, political elites may still influence the public. In 2009, the world economy was still reeling from the financial crisis of 2007–2008, which presumably reduced the impact of elites because environmental issues were given less attention than the economy. From this perspective, elite effects on the climate may have been particularly small around this time. Furthermore, while researchers are documenting multiple, tangible changes to the global climate, it may still seem too farfetched for ordinary citizens to conclude that climate change is real based solely on personal experience. Nevertheless, even if ordinary people do conclude that climate change is real, perhaps due to their own experiences, elites may still be able to influence the public simply because of the wickedness of climate change. It is an extraordinarily complex problem to understand and address, which may leave more latitude for elites to affect the public.

An additional caveat to the conclusions drawn in this paper is that they rely on only one method. The cross-national approach with instrumental variables places conclusions of cause and effect on firmer ground, yet experimental techniques could provide additional evidence on causal mechanisms. Moreover, experimental techniques could be used to study factors that moderate the effects of elites. As suggested previously, two factors that may influence the effect of elites are the strength of elite cues and the degree of personal experience, but there are also others. For example, future studies could focus on the interaction between political trust and messages from political elites. It is possible that political elites need to be trusted in order for them to influence their constituents, and with the greater flexibility and internal validity of experimental studies, this could be examined more in-depth.

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Appendix A

Table A1. Summary statistics.

Variable	Obs	Mean	S.D.	Min.	Max.
Perceived Threat of Climate Change	25,801	0.68	0.25	0	1
Personal Action to Reduce Climate Change	25,078	0.55	0.31	0	1
Belief in Positive Economic Effects of Fighting Climate Change	22,165	0.63	0.27	0	1
Female	26,719	0.55	0.50	0	1
Lower Education	26,234	0.21	0.41	0	1
Higher Education	26,234	0.28	0.45	0	1
Still Educated	26,234	0.08	0.27	0	1
Household Wealth	25,944	0.49	0.18	0	1
Age	26,719	48.12	18.52	15	98
Unemployed	26,719	0.08	0.27	0	1
Manual Laborer	26,719	0.19	0.39	0	1
Life Satisfaction	26,654	0.63	0.25	0	1
Class	26,171	0.51	0.18	0	1
GDP/Cap	26,719	22.05	12.89	4.6	75.2
Inflation	26,719	1.35	1.68	−1.7	5.6
Unemployment	26,719	9.04	3.48	3.7	18
Economy Energy Intensity	26,719	283.63	188.44	108.36	842.54
Renewable electricity	26,719	19.75	16.61	0	66.79
Greenhouse Gas Emissions/Cap	26,719	9.63	3.09	4.74	23.68
Climate Change Risk Index	26,719	77.49	31.31	39	154.5
Elite Division	26,719	2.72	1.31	0.60	5.60
Electoral Fractionalization	26,719	76.89	7.40	51.88	88.94
Proportional Representation	26,719	0.74	0.44	0	1

Table A2. Determinants of Beliefs in Positive Economic Effects of Fighting Climate Change.

Perceived Threat of Climate Change	-	-	0.2265	(0.0199) *
Elite Division	−0.0527	(0.0210) *	−0.0359	(0.0171) *
Partial R^2	0.180		0.175	
F Statistic (First Stage)	5.44	0.011	5.25	0.012
Hansen's J Statistic	3.00	0.083	3.299	0.069
Endogeneity (GMM Distance)	6.05	0.014	5.074	0.024
N	21,083		20,915	
Number of clusters	27		27	

Notes: Entries are coefficients with standard errors in parentheses. * $p < 0.05$. Control variables are excluded from the table for presentational purposes. The dependent variable is measured by asking respondents their agreement or disagreement with, "Fighting climate change can have a positive impact on the European economy", with responses recorded on a four-point scale.

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