



Climate Belief and Issue Salience: Comparing Two Dimensions of Public Opinion on Climate Change in the EU

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Abstract

Cross-country research on public opinion on climate change has mostly focused on people's beliefs about whether climate change is happening or is a serious problem, with little attention paid to other opinion dimensions such as issue salience. Relying on Eurobarometer data from 28 EU member states, we systematically compare the public's belief in and salience of climate change, examining variation across the EU using Bayesian multilevel analysis. We find high levels of belief but low levels of salience in most countries. Salience varies substantially between countries and is positively related to country wealth. Levels of greenhouse gas emissions appear to have a negative relationship with both belief and salience, and individuals' political orientation has more influence on climate opinion (particularly salience) in richer countries than in poorer countries. Overall, our findings suggest that belief and salience are distinct dimensions, and that country context influences salience more than belief.

Keywords Climate change · Public opinion, Issue salience · Cross-country · Eurobarometer

1 Introduction

Climate scientists have been warning governments and civil society about the potential catastrophic consequences of climate change for many years now. To avoid such consequences, governments around the world must rapidly curb their greenhouse gas emissions.

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Although national governments in most countries have taken some kind of action to reduce emissions, this action so far has fallen well short of what is required to restrict warming to the internationally agreed goal of well under 2 °C degrees (United Nations Environment Programme, 2020), let alone the 1.5 °C target recommended by the Intergovernmental Panel on Climate Change in 2018 (IPCC, 2018). Recently a number of countries, including the US, South Korea and Japan, have pledged to reduce their emissions to net zero by 2050, which could limit warming to 2.1 °C degrees by 2100 (Climate Action Tracker, 2020). However, some analysts are concerned that these goals may be very difficult to achieve, due in part to the time it has taken for countries to set them (Climate Action Tracker, 2020).

In democracies, public opinion often plays an important role in shaping policy (Anderson et al., 2017; Burstein, 2003), and thus public opinion could be one of the factors contributing to the inadequate political response to climate change. Researchers have therefore carefully examined public opinion on climate change over the course of the last two decades, seeking to both quantify and explain the climate views of the public (e.g. McCright & Dunlap, 2011; Scruggs & Benegal, 2012). Recently, a number of cross-national studies have brought to light the variation between nations and have identified contextual factors that may influence climate change views (Echavarren et al., 2019; Fairbrother et al., 2019; Kim & Wolinsky-Nahmias, 2014; Knight, 2016; Kvaloy et al., 2012; Lee et al., 2015; Lewis et al., 2019; Lo & Chow, 2015; McCright, et al., 2016a, 2016b; Mostafa, 2016; Poortinga et al., 2019; Sandvik, 2008; Tranter & Booth, 2015; Tvinnereim et al., 2020).

Most previous comparative studies on climate change opinion, however, have limited their investigation to the extent to which people are aware of climate change, believe it is happening, or are concerned about it. In other words, cross-national studies have focussed on people's beliefs about the climate change phenomenon itself. This choice of focus is understandable, given that people's climate beliefs are fundamental to understanding public opinion on climate change. If people do not believe that climate change is happening, or is a serious problem, it is unlikely that politicians will take the necessary (and difficult) actions to address it. The focus on climate belief has also been driven by the phenomenon of climate denial among the public; many social scientists have sought to explain why well-established climate facts continue to be denied by some sections of society (Dunlap, 2013; McCright & Dunlap, 2011; Weber & Stern, 2011).

Yet, a focus solely on belief in climate change may not provide a complete picture of public opinion on climate change. Opinions about climate change are complex, and people cannot necessarily be classified as either 'believers' or 'deniers' (Corry & Jørgensen, 2015). In particular, issue salience is critical to understanding how public opinion may influence policy. Even if a majority of the public agrees that a problem exists, politicians may still be hesitant to act if the public views climate change as a low priority issue (Burstein, 2003). Understanding the extent to which the public sees climate change as a high salience issue therefore provides insight into the degree to which politicians are under public pressure to act, and thus may contribute to explanations of the political response to climate change. Despite the importance of issue salience, only a handful of single-country climate change opinion studies have investigated salience (Bromley-Trujillo & Poe, 2018; Crawley et al., 2020; Dannevig & Hovelsrud, 2016; Hagen et al., 2016), and few studies have examined the degree to which salience varies across different national contexts (however see: Hagen et al., 2016).

To better understand public opinion on climate change, the current study examines both people's beliefs about climate change and their perceptions of the salience of climate change across the EU. We thus systematically compare climate opinion across EU countries, in terms of the two dimensions of belief and issue salience. Our aim is to demonstrate

that belief and salience are distinct dimensions of climate opinion, and that many people who accept the seriousness of climate change do not see it as a high salience issue.

Our study encompasses two research questions. First, what are the levels of belief in and salience of climate change in the EU? Second, why might climate opinion on these two dimensions vary cross-nationally? Specifically, we examine the extent to which contextual factors (country wealth and levels of greenhouse gas emissions) relate to public belief in and salience of climate change. In addition, we examine the extent to which the relationship between climate opinion and political orientation—a factor that has previously been found to relate strongly to climate views in several countries (Hornsey et al., 2016)—varies between countries. To answer our research questions, we use Bayesian multilevel analysis of data from Eurobarometer 87.1 (European Commission and European Parliament, 2017), which includes data from the 28 European Union (EU) member states.¹

A core characteristic of climate change is that it is a collective action problem, meaning that action by central bodies—particularly national governments—is required in order to mitigate the effects of climate change by rapidly decarbonising society (Stern, 2015). Such far-reaching action will require strong support from the public in each country, both in terms of belief in the climate change phenomenon, and the degree to which the public views climate change as a high salience issue (Bromley-Trujillo & Poe, 2018; Burstein, 2003). Our comparative investigation of public beliefs in and salience of climate change in the EU aims to shed light on how and why climate opinions vary, and thus to provide insight into why particular climate policies are adopted in different countries.

2 Theory

2.1 Climate Change Opinion: Belief and Salience

The nature of representative democracy means that the salience of an issue plays an important role in determining whether or not the issue enters the political agenda and is acted on by politicians (Dennison, 2019; Pralle, 2009). The importance of issue salience is largely due to the relationship between salience and vote choice. People's political issue preferences are essentially funnelled through a single vote, meaning that only issues that are of high salience to voters have any substantial bearing on their vote choice (Dalton, 2013). Thus, as voting is the strongest signal of public preferences available to politicians, the salience of issues is critical in determining which issues and policies politicians will focus on (Burstein, 2003; Pralle, 2009). Empirical research has found that salience moderates the effect of public opinion on policy, illustrating that public salience influences which issues are at the front of the minds of elected policy-makers (Bromley-Trujillo & Poe, 2018; Burstein, 2003; Dennison, 2019).

Many studies on public opinion on climate change are motivated by a desire to understand the inadequate political response to climate change (Cann & Raymond, 2018; Engels et al., 2013). McCright and Dunlap (2011, p. 1164), for instance, investigate the precursors of climate change denial, because it 'may help account, at least [in] part, for the USA's intransigence in international climate policy.' However, despite the theoretical importance of salience to models of political responsiveness, the vast majority of studies examining

¹ The United Kingdom was still an EU member in 2017, at the time the survey was conducted.

public opinion on climate change focus on the dimension of belief rather than salience (e.g. McCright & Dunlap, 2011; Scruggs & Benegal, 2012).

Three main aspects of belief about climate change have been the focus of previous literature: (1) the degree to which people believe climate change is happening at all, (2) whether or not people believe climate change is primarily caused by humans, and (3) the extent to which people believe climate change is a serious problem (Poortinga et al., 2011). These three aspects of belief in climate change are often referred to respectively as trend, attribution and impact scepticism (Poortinga et al., 2011; Rahmstorf, 2004). Climate beliefs thus refer to people's perceptions of the climate change phenomenon itself, rather than what should be done about it, or how important it is relative to other issues. Recent survey data has shown that in Europe—and in most countries around the globe—trend and attribution scepticism are relatively rare, typically being found in no more than 10% of the population of a country (Capstick et al., 2015; McCright, et al., 2016a, 2016b; Poortinga et al., 2019). In this study, we therefore focus on the third aspect of belief: the extent to which people believe climate change is a serious problem, which can also be framed as people's degree of concern about climate change, or their perceptions of the risk of climate change (Kvaloy et al., 2012; van der Linden, 2017).

While fewer people accept that climate change is a serious problem than accept it is happening and is caused by humans, previous studies have found that a high proportion of the population in almost every developed country acknowledge the seriousness of climate change, at least to some extent (Kim & Wolinsky-Nahmias, 2014; Lee et al., 2015; Poortinga et al., 2019; Tranter & Booth, 2015). For instance, in a study of 47 countries using data from the World Values Survey, Kvaloy et al. (2012) find that all EU countries included had mean scores of 3.4 or higher on a 4-point scale measuring individuals' perceptions of the seriousness of climate change. Analysing European Social Survey data, Poortinga et al. (2019) find that the public in most European countries are, on average, 'somewhat concerned' about climate change.

As outlined above, examining the issue salience of climate change can give a more complete picture of public opinion on climate change. We define 'issue salience' as the perceived importance of an issue among the public *relative to* other issues (Dennison, 2019; Moniz & Wlezien, 2020). In contrast to definitions of issue salience that consider the absolute importance of an issue, this definition allows for differentiation of how the public rank the importance of different issues. Members of the public often think of a number of issues as being 'important.' But because there is finite space on the political agenda (Pralle, 2009), and only a small number of issues are likely to influence a person's vote, it is useful to understand which issues people consider to be among the most important (Moniz & Wlezien, 2020). Understanding how people rank issues—and where they place climate change in this ranking—can therefore expand knowledge of climate opinion, and how it might influence climate policy. While most people may now believe that climate change is happening and is a serious problem, many people are likely to rank other issues as more important than climate change, limiting the public pressure on politicians to act on climate change.

The relatively limited research on the public salience of climate change suggests that most people see climate change as a low salience issue, with issues such as the economy, healthcare and education often ranking higher (Bromley-Trujillo & Poe, 2018; Crawley et al., 2020; Hagen et al., 2016; Herrnstadt & Muehlegger, 2014). Few studies have investigated issue salience across multiple countries, and those that do tend to compare only a handful of countries. In a four-country study comparing the salience of climate change, Hagen et al. (2016) find that climate change is considered the least important issue in the

UK and the Netherlands among the nine issues they investigate, and is ranked in the bottom third of issues in Spain and Germany. A divide in issue salience has also been noted in Europe, with salience tending to be higher in Western European compared with Eastern European countries (Lorenzoni & Pidgeon, 2006; McCright, et al., 2016a, 2016b).

In sum, most recent studies have found levels of belief to be high in most countries, including the EU. However, the more limited available evidence on the issue salience of climate change suggests salience tends to be low. Our first hypothesis thus reads as:

H1: On average, EU countries will have high levels of belief in climate change, but will have low levels of issue salience.

2.2 Explaining Cross-Country Variation in Belief in and Salience of Climate Change Opinion

2.2.1 Contextual Factors: Country Wealth and Level of Greenhouse Gas Emissions

To help explain cross-country variation in climate opinion, and to further shed light on the differences between climate beliefs and issue salience, we examine two contextual factors: country wealth and level of greenhouse gas emissions. These factors have already been investigated in several previous cross-country studies of public opinion on climate change (Kim & Wolinsky-Nahmias, 2014; Knight, 2016; Kvaloy et al., 2012; Lo & Chow, 2015; e.g. Mostafa, 2016; Sandvik, 2008). However, to the best of our knowledge, no previous study has examined how contextual factors relate to the public salience of climate change. Moreover, there have been inconsistent results when examining the relationship between country wealth and climate opinion, which—as explained below—may be due to differences in the relationship depending on the particular dimension of climate opinion that has been examined.

Focussing first on country wealth, there has been an extensive debate on the degree to which country wealth relates to people's climate views. Some authors expect that people in wealthier countries will tend to be more concerned about climate change than those in poorer countries, because wealthier countries are more willing and able to direct economic resources to manage climate change and other environmental issues (Mostafa, 2016). Others have argued that, because the opportunity cost of addressing climate change seems higher in wealthier countries than in poorer countries, some people in wealthier countries may be reluctant to support government action to address climate change (Kim & Wolinsky-Nahmias, 2014).

Results of empirical tests of the relationship between country wealth and climate opinion have been mixed. Some studies have found that people in wealthier countries are more aware and concerned about climate change, and are more likely to see human activity as the main cause of climate change, compared with those in poorer countries (Knight, 2016). Other studies have found a negative relationship between a country's level of wealth and climate concern (Mostafa, 2016; Sandvik, 2008), while some did not detect any relationship (Kvaloy et al., 2012).

These mixed results are likely driven, in part, by the specific dimensions of climate opinion investigated in each study. For instance, in a study incorporating 33 countries, Lo and Chow (2015) find that country wealth has a negative relationship with perceptions of how dangerous climate change is, but a positive relationship with how important climate change is (relative to other environmental issues). They argue that people in wealthier

countries tend to acknowledge that climate change is an important problem, but believe that their country has the capacity to avoid the most dangerous effects of climate change.

We therefore have different expectations for the relationship between country wealth and the dimension of belief than we do for country wealth and issue salience. When focusing on belief in climate change (including concern and perceptions of risk) most previous studies have found a negative relationship with country wealth (Lo & Chow, 2015; Mostafa, 2016; see, however: Knight, 2016). However, there is evidence that a positive relationship with country wealth can be expected when investigating the perceived importance of climate change among the public (Lo & Chow, 2015). Thus, we formulate our next hypotheses as:

H2a: Wealthier countries will have lower levels of belief in climate change among the public than poorer countries.

H2b: Wealthier countries will have higher levels of issue salience of climate change among the public than poorer countries.

Several cross-country studies have investigated the link between a country's degree of reliance on fossil fuels (typically measured by level of greenhouse gas emissions) and the climate change views of the population (Knight, 2018; Kvaloy et al., 2012; Lo & Chow, 2015; Sandvik, 2008). The general expectation is that people living in countries that have higher levels of greenhouse gas emissions are likely to express lower levels of concern about climate change than those who live in countries with lower levels of greenhouse gas emissions. The idea behind this expectation is that countries with higher emissions tend to have economies more closely tied to high carbon industries, and thus a move to a carbon zero economy would be perceived as difficult and expensive compared with countries that already have lower emissions.

Some studies have found support for this expectation, although typically the relationship between country-level greenhouse gas emissions and climate change beliefs is found to be weak (McCright, et al., 2016a, 2016b; Sandvik, 2008; see, however: Kvaloy et al., 2012). Lo and Chow (2015) is one of the few studies that has investigated the relationship between greenhouse gas emissions and the importance of climate change (relative to other environmental issues), finding a negative correlation between the two. However, this relationship was not statistically significant when other variables (such as country wealth) were included in their models (Lo & Chow, 2015). Since there is little previous literature to guide our expectations on what the relationship between greenhouse gas emissions and public issue salience will be, we assume the relationship will work similarly as the one between greenhouse gas emissions and other aspects of climate opinion. In other words, we expect greenhouse gas emissions to have a negative relationship with both the dimensions of climate opinion that we consider:

H3: Countries with higher levels of greenhouse gas emissions will have lower levels of both belief in climate change and salience of climate change among the public than countries with lower levels of greenhouse gas emissions.

2.2.2 Country Wealth, Political Orientation and Climate Opinion

One of the most consistent findings in the public opinion literature on climate change is that people holding liberal or politically left-wing values are more likely to believe in and be concerned about climate change than those with conservative or politically right-wing values (Kvaloy et al., 2012; McCright, et al., 2016a, 2016b; Mostafa, 2016; Poortinga

et al., 2019; Tranter & Booth, 2015). For instance, in a meta-analysis that covers academic research across 56 countries, Hornsey et al. (2016) find that political ideology is a strong predictor of belief in climate change. Although few studies have examined the relationship between political orientation and the salience of climate change, the evidence that does exist suggests that people on the political left are more likely to see climate change as high salience compared with those on the right (Crawley et al., 2020).

One area which has received little attention in the literature is the extent to which the relationship between political orientation and climate opinion depend on country context. Political orientation appears to matter more in some countries than in others. For example, in some countries, conservative parties have opposed strong climate change policies, and in some cases refused to accept the science of climate change (McCright & Dunlap, 2010). In such countries, cueing effects mean that people on the right of politics tend to be less likely to accept the science of climate change compared with right-wing people in countries where conservative parties have not taken such stances.

As noted in the previous section, belief in climate change has been shown to be weaker in wealthier countries compared with poorer countries. There are also reasons, which we expand on below, to believe that the relationship between political orientation and climate opinion will be stronger in wealthier countries than in poorer countries, due—for example—to the increased prevalence of support for free-market economic principles in wealthier countries (Lewis et al., 2019). Thus, to provide a clearer and more nuanced picture of public opinion on climate change and its relationship with political orientation, we investigate the extent to which the strength of the relationship between political orientation and climate opinion depends on country wealth.

At the individual level, climate opinion seems to be related to specific political values among those on the right. People who support free-market economics tend to have below average concern about climate change, most likely because they oppose the strong government economic intervention that is likely to be required to address climate change (Scoones, 2016). Additionally, people who have social and political attitudes commonly associated with the right of politics—such as social dominance orientation—tend to be less likely to be concerned about climate change than those who do not hold such attitudes, perhaps because they believe in human domination over nature (Milfont et al., 2013).

There are differences in the way these individual-level patterns of political values and their relationship with climate opinion operate in different countries. In some countries, political orientation and political attitudes seem to be deeply connected to the extent to which people are concerned about climate change or see it as a high salience issue (McCright & Dunlap, 2011). However, this deep connection may not exist in every country. Indeed, climate change appears to be a highly politically polarised issue in the US, but less so in Europe (McCright, et al., 2016a, 2016b; Poortinga et al., 2019). There is also evidence that the relationship between political orientation and climate opinion varies within Europe, tending to be stronger in Western Europe compared with Eastern Europe (McCright, et al., 2016a, 2016b; Poortinga et al., 2019).

Investigating the specific context of country wealth can shed light on the extent to which the relationship between political orientation and climate opinion varies between countries. Advanced economies tend to have stronger links between conservatism and free-market economics, among both elites and the public (Lewis et al., 2019). As mentioned, many policies required to address climate change directly contradict central tenets of free market economics, and therefore tend to be opposed by supporters of the latter (Longo & Baker, 2014). Consequently, we can expect wealthier countries to be more politically polarised when it comes to climate change than poorer countries.

Moreover, as wealthier countries tend to carry more political weight in the international sphere, these countries may experience activity by the so-called ‘Climate Change Counter-movement’ (CCCM), which seeks to spread misinformation and sow doubt about climate change (Brulle, 2014). Although most prominent in anglophone countries, such organised denial of climate change has also been seen in Germany, France, Sweden and the Netherlands (Busch & Judick, 2021; Dunlap & McCright, 2015). Large corporations tend to be highly active in wealthy countries, meaning CCCM groups—such as conservative think tanks—often have access to substantial funding for their efforts (Dunlap & McCright, 2015). On the other side of the climate debate, higher levels of affluence and post-material values can create space for environmental groups campaigning to raise awareness and salience of climate change among the public (Jenkins et al., 2008), while in many post-communist countries, civil society is comparatively weak and activism not as widespread (Wallace et al., 2012).

The high degree of campaigning from social movements and CCCM groups in wealthy countries, and the deeper links between conservatism and free market economics mean that climate change tends to be a more politically charged issue in wealthier countries than in poorer countries (Marcinkiewicz & Tosun, 2015; McCright, et al., 2016a, 2016b). As political divisions over climate change will be more prominent in wealthier compared with poorer countries, we can thus expect to see a strong relationship between left–right orientation and climate opinion in wealthier countries among the public, leading us to the following hypothesis:

H4: Individual-level left-right political orientation will have a stronger positive relationship to both climate beliefs and salience in wealthier countries compared with poorer countries.

2.3 Data and Method

To investigate the variation in climate change views in the 28 EU member states, we analyse data from Eurobarometer 87.1 (European Commission and European Parliament, 2017), which includes a series of questions relating to climate change (a full list of variables used in this study can be found in Sect. 1 of the supplemental material). The survey was conducted with face-to-face interviews, between 18 and 27th March 2017. Participants were resident in an EU member state, and aged 15 and over. In most countries, the sample size is between approximately 1,000 and 1,500 respondents, although some of the smaller countries have only 500 responses. Before removing observations with missing data, the total sample size was 27,901. Respondents who had missing information on one or more of the individual-level independent variables were dropped from the sample. The final sample size used for the analyses presented below is 21,304.²

² Given the high percentage of missing observations, we also investigated models that used multiple imputation to estimate the missing values. As the results of models using multiple imputation were similar to those presented below, we decided not to use multiple imputation, in order to reduce the complexity of the analyses.

2.4 Dependent Variables

Our aim in this study is to examine both people's beliefs about climate change, and their perspectives on the relative salience of climate change. To measure *beliefs* about climate change, we rely on a question asking respondents how serious a problem they think climate change is, with possible responses ranging from 'not at all serious' (1) to 'extremely serious' (10). To simplify interpretation of results, we use the recoded, three-category version of this variable (provided by Eurobarometer) in the analyses below. Thus, our measure of belief about climate change is coded as 0 to indicate climate change is 'not a serious problem' (1–4 on the original scale), 1 'a fairly serious problem' (5–6) and 2 'a very serious problem' (7–10).³

As we define *issue salience* as the relative importance of issues, a rank-ordering question was most appropriate for our purposes. The Eurobarometer survey includes a question asking respondents to indicate which of the following issues are among the most important to the world today: climate change, international terrorism, poverty, hunger and lack of drinking water, spread of infectious diseases, the economic situation, proliferation of nuclear weapons, armed conflicts or the increasing global population.⁴ Respondents were asked which of these issues is the most important, and then for up to three issues that are the next most important. We used this question to construct our measure of issue salience by coding it as 1 if a respondent mentioned climate change as the most or one of the next three most important issues (indicating high salience), and 0 otherwise (indicating low salience). The decision to code the variable this way (rather than coding it as 1 only if respondents said climate change is the most important issue) was done on the basis that people may have multiple issues that are important to them, and that may influence their political or vote preferences.

Using a rank-ordering question to measure issue salience has a number of advantages. The predefined list of issues in the question cues respondents to consider the relative importance of issues (Moniz & Wlezien, 2020), and allows us to measure their perceptions of the importance of the specific issue of climate change. Respondents answering open-ended 'most important problem' (MIP) questions—which have previously been used to measure issue salience—may respond with an issue at the top of their mind, even though climate change is equally or more important to them. Additionally, a predefined list makes it possible to measure respondents' (in this case) four most important issues, rather than only their most important issue as with an MIP question. Ranking a predefined list of issues is a cognitive process that is analogous to the one undertaken by many voters when funnelling a set of issues to select a party or candidate to vote for (Dalton, 2013), and thus aligns with our theoretical interest in issue salience. While there are some disadvantages—including that the list of issues may not include issues that are particularly important to

³ We also analysed a model using the original 10 category version of the seriousness variable using linear multilevel regression. The results were similar to those described below, and are presented in Sect. 3.6 of the supplemental material.

⁴ It could be argued that it is more appropriate to measure issue salience by asking people about the most important issue to their country rather than to 'the world.' While we were obviously limited by the questions that were available in the Eurobarometer survey, centring the question on 'the world' is appropriate for a global issue such as climate change. However, it is worth noting that climate change could be viewed as lower salience in a national context, as it would be competing with other national issues such as education and healthcare, which many people have a strong personal connection to (Yeager et al., 2011).

some respondents—on balance, this question and our choice of variable coding is more appropriate for our purposes than alternatives such as MIP.

The Spearman's correlation coefficient between the two dependent variables was 0.27 ($P \leq 0.01$), indicating a moderate correlation between people believing climate change is a serious problem and seeing it as a high salience issue.

2.5 Country-Level Variables

The two country-level independent variables—which, along with political orientation, are the main focus of our study—were both obtained from World Bank data. GDP per capita for 2017, measured in 2010 US dollars, which provides a measure of a country's wealth. A country's level of greenhouse gas emissions is measured by metric tons of CO₂ emissions per capita for 2014, and is an indication of how reliant on fossil fuels a country is.

2.6 Individual-Level Variables

To investigate the extent to which the relationship between political orientation and issue salience and beliefs about climate changes varies between countries, we include a measure of left–right orientation in our models. It is measured by asking respondents to place themselves on a scale from 1 (left) to 10 (right). Additionally, we include a number of individual-level factors that have previously been found to relate to climate opinion as controls: gender, age, social class, years in education, level of political interest, and degree of concern about inequality (van der Linden, 2017).

2.7 Analytic Strategy

The data were analysed in separate random intercept, fixed slope Bayesian multilevel models, one for each of our two dependent variables. A Bayesian framework is particularly useful for multilevel analyses when the second-level sample size is small (Bryan & Jenkins, 2016; Stegmueller, 2013). For our dichotomous dependent variable (climate change salience), we used binary logistic regression. For our three-category ordinal dependent variable (climate change belief), proportional odds tests indicated that some of the independent variables did not relate proportionally to the dependent variable. Therefore, we used categorical (multinomial) logistic regression for this dependent variable. To test H4, we also analysed models which included a cross-level interaction between GDP per capita and left–right orientation. In these models, left–right orientation was included as a random slope. More information on the method used in this study, including specification of priors, model fit and testing, and the application of survey weights, can be found in Sect. 2 of the supplemental material.

3 Results

3.1 Descriptive Statistics

Figure 1 illustrates the country means of each of the two dependent variables. The dashed line indicates the overall mean for the EU. As seen in the figure, there is little cross-county

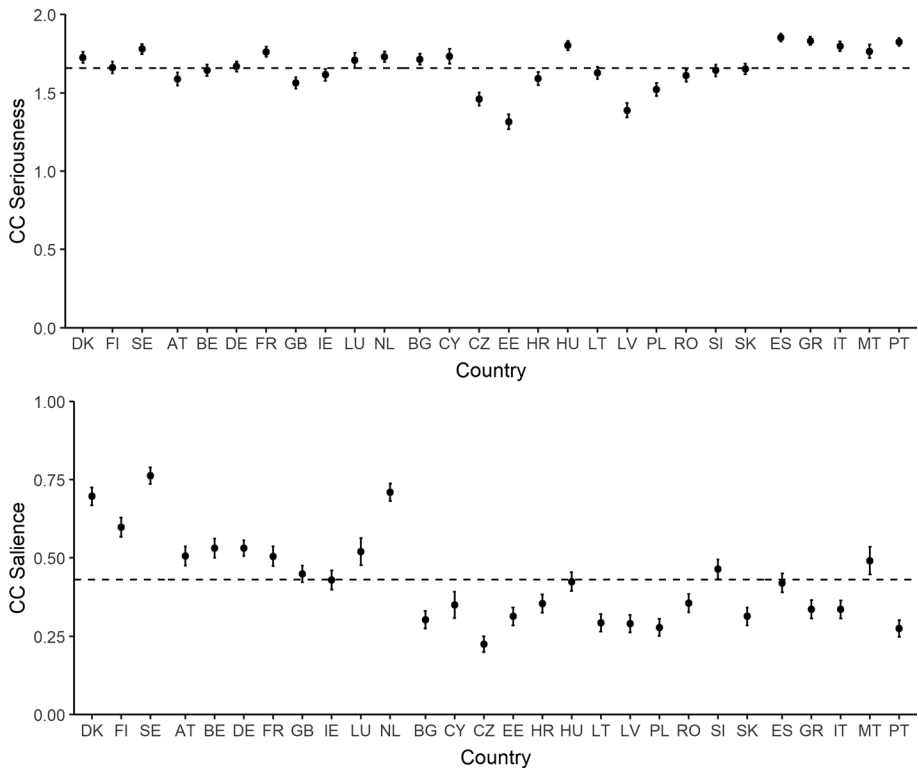


Fig. 1 Plot of country means for each of the dependent variables. Note: the dashed horizontal line indicates mean for all EU countries. Vertical whiskers on each point indicate standard deviation

variation in the perceptions of the seriousness of climate change. The public in all EU countries views climate change as a very serious problem, with the lowest mean for the three-category measure (mid-point = 1) being in Estonia (EE), at 1.32, while the country with the highest level of concern is Spain (ES), at 1.85. There is greater cross-national variation in the saliency variable. The probability across all countries that a respondent listed climate change in the four most important of the eight issues provided in the survey was only 0.43. This result aligns with previous findings suggesting that, although belief that climate change is a serious problem tends to be widespread, saliency is low (Bromley-Trujillo & Poe, 2018). However, there are substantial differences in saliency levels across the EU, with respondents in Czechia (CZ) having a probability of 0.22 of listing climate change in the top four issues, while those in Sweden (SE) had a probability of 0.76. Based on these results, we accept H1, as belief in climate change is high overall, but saliency is low.

3.2 Multilevel Regression Analyses

In this section, we present the analyses examining the relationship between our two contextual explanatory variables (GDP per capita and CO₂ emissions per capita) and our two dependent variables (viewing climate change a serious problem and seeing it as a high

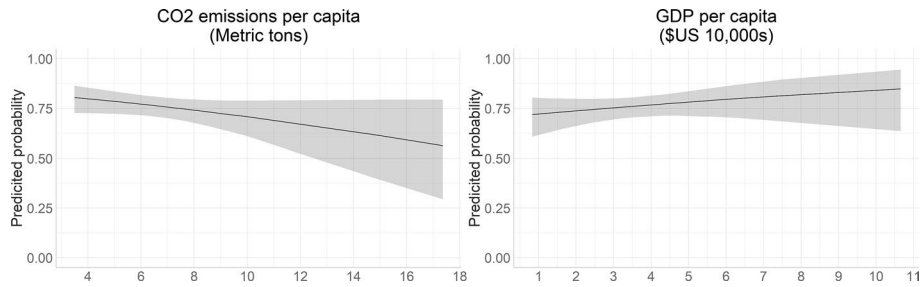


Fig. 2 Predicted probabilities (with 95% credible intervals) of viewing climate change as a very serious problem (belief)

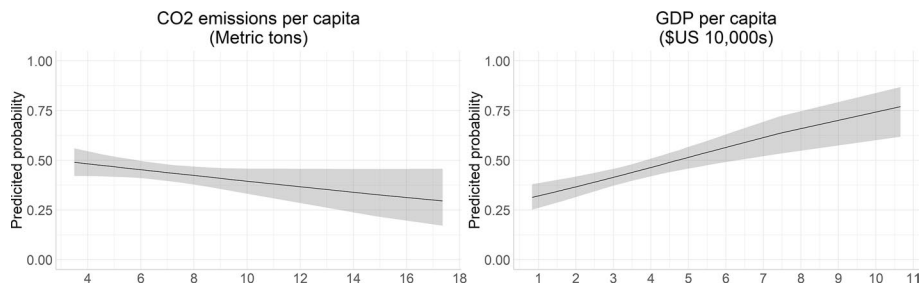


Fig. 3 Predicted probabilities (with 95% credible intervals) of viewing climate change as important relative to other issues (salience)

salience issue).⁵ Figure 2 shows the predicted probabilities of participants seeing climate change as a very serious problem for each of the explanatory variables.⁶ Although the predicted probability plot for GDP per capita shows a positive slope, test indices suggest uncertainty about the existence of the effect ($pd=0.94$). There is some evidence of a contextual effect for CO₂ emissions per capita, where countries with higher emissions per capita tend to be less likely to view climate change as a very serious problem ($pd=0.99$, $ROPE=0.03$). However, the wide credible intervals suggest caution is warranted in this interpretation.

The predicted probabilities for each of our explanatory variables when salience is the dependent variable are presented in Fig. 3. The figures show that wealthier countries are much more likely than poorer countries to have a population that sees climate change as

⁵ Tables of coefficients for the regression models described below can be found in Sect. 3.2 of the supplemental material. We discuss the results using probability of direction (pd) and region of practical equivalence ($ROPE$) statistics. The pd statistic indicates the probability that the effect exists and is in the direction indicated. A value of ≥ 0.97 suggests the effect likely exists, and ≥ 0.99 that it probably exists. $ROPE$ tests used a region of ± 0.181 , and values of ≤ 0.03 indicate the magnitude of the effect is probably significant (Makowski et al., 2019).

⁶ To ease interpretation, only the predicted probabilities for the ‘very serious’ category are presented here. As very few respondents believed climate change was not a serious problem, presenting only the ‘very serious’ category gives a good indication of the results, because the middle ‘fairly serious’ category is close to the inverse of ‘very serious.’ Plots showing predicted probabilities for all three categories are available in Sect. 3.5 of the supplemental material.

a high salience issue ($pd = 1.00$, $ROPE \leq 0.01$). The probabilities range from 0.31 for the countries with the lowest GDP per capita, to 0.77 for countries with the highest GDP per capita. The slope for CO₂ emissions per capita is downward, as expected, with a difference in probability of 0.2 between the lowest and highest emitting countries, although test statistics suggest some uncertainty about the effect ($pd = 0.96$, $ROPE = 0.17$).

In sum and as expected (H2b), we find that issue salience is substantially higher among wealthier countries compared with poorer countries. This contrasts with the unclear relationship between country wealth and seeing climate change as a serious problem. We therefore reject H2a, which anticipated a negative relationship between country wealth and climate beliefs. We also find weak evidence that countries with lower levels of CO₂ emissions per capita tend to have populations who view climate change as a high salience issue, and that there is a negative relationship between CO₂ emissions per capita and seeing climate change as a serious problem. We thus tentatively accept H3, as there is some evidence of the expected negative relationship between greenhouse gas emissions and both measures of climate opinion.

3.3 Cross-level interactions

To test the extent to which the relationship between political orientation and climate opinion varies depending on country wealth, we investigated models that include a cross-level interaction between left–right orientation and GDP per capita.⁷ Before presenting these results, we note that the analyses only including direct effects show that people on the left are moderately more likely to see climate change as high salience compared with those on the right. There is no significant effect when analysing belief in climate change. The results are presented in Sects. 3.2 and 3.3 of the supplemental material.

The models including an interaction between political orientation and country wealth revealed that cross-level interactions exist for both dependent variables.⁸ In Fig. 4, we present the predicted probabilities for seeing climate change as a very serious issue (upper plot) and a high salience issue (lower plot) at different levels of GDP per capita (GDP per capita is plotted at the mean and at ± 1 standard deviation). Left–right political orientation seems to have a stronger relationship with salience and perceptions of the seriousness of climate change in richer countries than in poorer countries. In countries with higher GDP per capita, people on the left are more likely than people on the right to see climate change as a very serious and high salience issue, whereas in countries with lower GDP per capita, there is little difference in how people on the left and right of the political spectrum see the salience of climate change. These results suggest that left–right orientation relates more

⁷ We also investigated models including cross-level interactions between left–right orientation and CO₂ emissions per capita for our two dependent variables. These analyses indicated that the interaction was not significant for either dependent variable. The full results of our analyses of models including cross-level interactions are presented in Sect. 3.4 of the supplemental material.

⁸ The pd was 1.00 and 0.97 respectively for these interactions. For the seriousness dependent variable, the ROPE test indicated that the magnitude of the interaction was significant (0.03). For the salience dependent variable, the ROPE value was 0.24, indicating doubt about the significance of the magnitude of the interaction. However, as Fig. 4 suggests, there appears to be a substantive difference between how left–right orientation relates to salience depending on the country's level of GDP. We interpret this evidence as weak support for the interaction between left–right orientation and GDP per capita existing and being of significant magnitude for the issue salience dependent variable.

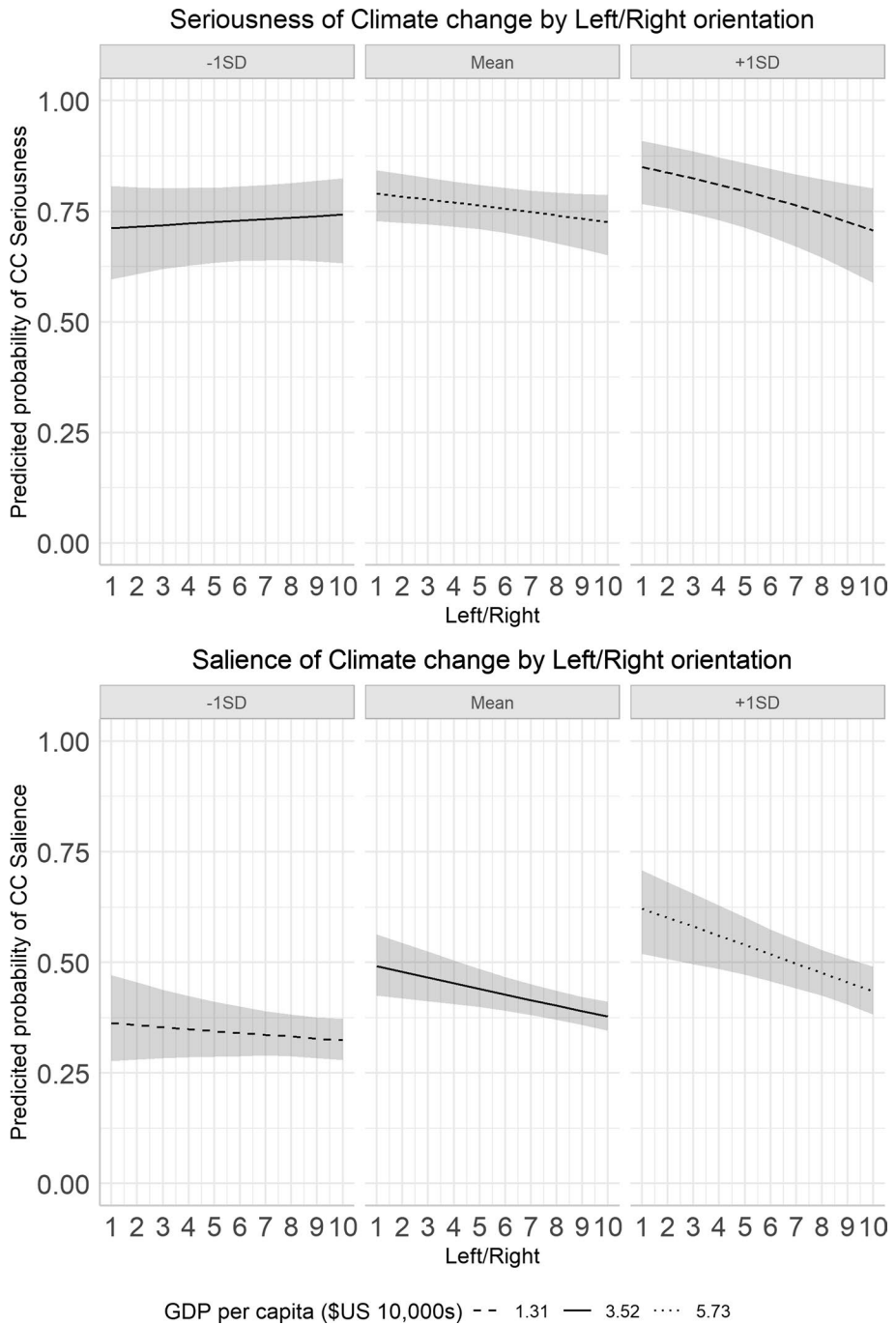


Fig. 4 Predicted probabilities (with 95% credible intervals) by levels of GDP per capita of seriousness and salience of climate change for different values of left–right orientation

strongly to climate opinion in wealthier countries compared with poorer countries. We can thus accept H4.

4 Discussion and Conclusion

This study sought to systematically compare belief in climate change and perceptions of the issue salience of climate change, and to explain cross-country differences in climate opinion across the EU. Perhaps the most striking finding of our study is the cross-country variation in the salience of climate change, which depends on country wealth. There is strong evidence that people in wealthier countries are more likely to see climate change as high salience than people in poorer countries, at least when considering the relatively wealthy set of countries in the EU. This finding suggests that people's perceptions of salience may be partially driven by post-material values (Kvaloy et al., 2012; Mostafa, 2016). In other words, people in richer countries have fewer material concerns than people in poorer countries, and are thus able to prioritise climate change as an issue (Mostafa, 2016). Such cross-country variation was not apparent when investigating people's perceptions of the seriousness of climate change.

Although there was some uncertainty in our results, countries with higher levels of CO₂ emissions tend to have lower levels of both belief and issue salience. While previous studies have shown that greenhouse gas emissions have a negative relationship with climate belief (Knight, 2016; Sandvik, 2008), such a relationship has not previously been confirmed for issue salience. Although the effect sizes are small for both dimensions, our findings do suggest that countries that are more dependent on fossil fuels tend to have populations that are less engaged with climate change compared with countries with economies not as closely tied to fossil fuels.

When considering the EU as a whole, people on the left are moderately more likely to see climate change as high salience compared with those on the right; however we could not detect a similar pattern when analysing belief in climate change. The lack of a strong relationship between political orientation and either of our measures of climate opinion was surprising, given the centrality of political orientation that has been reported in previous literature on climate opinion (Hornsey et al., 2016; McCright, et al., 2016a, 2016b). This finding can be partly explained by variation in the relationship between left–right orientation and climate opinion across the EU. Political orientation matters more in wealthier countries than in poorer countries. This cross-country variation underlines the need to further expand the study of climate opinion and its precursors to countries beyond Western Europe and the anglophone countries.

Overall, we find that belief and salience can be considered distinct dimensions of climate opinion. Most people believe that climate change is a serious problem, a pattern which is consistent across the EU. In contrast, the issue salience of climate change is low in most EU countries. Most people do not seem to consider climate change to be an important issue, at least relative to other issues such as the economy. However, there is a high degree of cross-country variation in salience, with at least 60% of the population placing climate change in the top four issues in the three Nordic EU countries, but less than half doing so in almost every other country. Moreover, context matters, particularly for issue salience, which—as mentioned—tends to be much higher in wealthier countries compared with poorer countries.

Our results thus support the argument made by Lo and Chow (2015) that many people in wealthier countries believe that their country will be able to ‘weather the storm’ of the worst effects of climate change, and are thus not substantially more concerned (or are even less concerned) about climate change than people in poorer countries. However people in wealthy countries are still more likely to see climate change as an important issue than people in poorer countries. The different effects of contextual factors such as country wealth on different dimensions of climate opinion may go some way to explaining the inconsistent previous results in studies examining these relationships (Knight, 2018; Kvaloy et al., 2012; Mostafa, 2016; Sandvik, 2008). Future studies should pay careful attention to the specific dimensions they consider when investigating how climate opinion is shaped by country context.

While our investigation was limited to EU countries, there is reason to believe that similar patterns for the salience of climate change will be found in countries beyond the EU. Studies have shown that concern about climate change is high in countries across the world, but salience is generally agreed to be low (Bromley-Trujillo & Poe, 2018). Based on the results of this study, we would expect research examining a wider set of countries to find that salience is lower in countries with lower levels of affluence and higher in wealthier countries. It would be particularly interesting to confirm this hypothesis in developing countries, some of which have higher levels of concern than many developed countries. Additionally, it would also be interesting to investigate whether structural and attitudinal effects on issue salience can be identified when comparing developing and developed countries.

The results of our study suggest that the ‘front line’ in the battle over climate change opinion has moved from perceptions of the climate change phenomenon (including awareness, belief and concern) to issue salience. While people in most countries are concerned about climate change, many continue to rank other issues as more important. The dimension of issue salience thus deserves more attention in the academic literature on public opinion on climate change. In particular, future research could pay attention to understanding the specific reasons why most people seem to rank other issues as more important than climate change.

The clearer picture of public opinion on climate change outlined in this study can enhance our understanding of the prospects of improved climate policy. As described above, public opinion is much more likely to influence policymakers when they believe their jobs may depend on taking action to address an issue. Salience is thus critical here, as only high salience issues are likely to affect who a person votes for (Dalton, 2013). The majority of the general public are not deniers, but tend to prioritise other issues over climate change. In response, politicians devote their finite resources to acting on the issues that the public seem to care most about—and are most likely to get the politicians re-elected—rather than climate change. Given the far-reaching policies that are needed to combat climate change, politicians will require a stronger ‘push’ to action by public opinion than they may do for many other issues. Thus, unless we observe an increase in the salience of climate change around the world, it appears unlikely that adequate climate policies will be widely adopted.

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