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The Politicization of Risk: Party Cues, Polarization, and Public Perceptions of Climate Change Risk

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ABSTRACT: Previous research shows that public perceptions of climate change risk are strongly related to the individual willingness to support climate mitigation and adaptation policy. In this article, I investigate how public perceptions of climate change risk are affected by communications from political parties and the degree of polarization among them. Specifically, using survey data from Sweden, Norway, Australia, and New Zealand, I study the relationship between party source cues, perceived polarization, and public perceptions of climate change risk. The results reveal a positive relationship between party cues and perceptions of climate change risk, indicating that individuals adjust their risk perceptions to align with their party preference. Furthermore, a negative relationship between perceived polarization and individual risk perceptions is also discovered, showing that individuals tend to be less concerned with climate change the more polarization they perceive. However, the effect of perceived polarization is found to be limited to more abstract perceptions of risk, while being unrelated to perceptions of concrete risks. Even with some contextual variance, the results generally hold up well across the four countries.

KEY WORDS: Climate change; country comparison; party cues; perceived polarization; political parties; risk perceptions

1. INTRODUCTION

Research shows that individual concern for climate change is positively related to support for climate change policies (Brügger, Morton, & Dessai, 2015; Dietz, Dan, & Shwom, 2007; Gadenne et al., 2011; Lubell, Zahran, & Vedlitz, 2007; O'Connor, Bord, & Fisher, 1999; van der Linden, 2015; von Borgstede, Andersson, & Johnsson, 2013; Zahran et al., 2006). Policy support is invaluable to governments' abilities to effectively counteract the negative consequences of climate change. However, the extent to which individuals are concerned about climate change is not necessarily reflective of scientific consensus or the actual risks that they face. Unlike scientists and other experts—who evaluate risks on basis of scientific information about probability and severity—public perceptions of climate risk have been found to differ with demographic factors (e.g., gender and education), personal experience with extreme weather events, and core values (Leiserowitz, 2005, Shi, Visschers, & Siegrist, 2015; van der Linden, 2015).

Two factors particularly influential on public concern for climate change are political ideology and partisan preferences (Brulle, Carmichael, & Jenkins, 2012; Guber, 2013; Krosnick, Holbrook, & Visser, 2000; Malka, Krosnick, & Langer, 2009; McCright, 2011; McCright & Dunlap, 2011; Tranter, 2013). The importance of partisan preferences and ideology is so pervasive that they both reduce the impact of education (Hamilton, 2011; Malka et al., 2009) and

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overshadow the importance of personal experiences with extreme weather events (Brulle et al., 2012; Carmichael & Brulle, 2017; Marquart-Pyatt et al., 2014; McCright, Dunlap, & Xiao, 2014; Ogunbode et al., 2017; Zahran et al., 2006). One common explanation for the strong effects of partisanship and ideology is that voters, by following communications from party representatives, adapt their beliefs and attitudes to match the stance of their preferred party (e.g., Dunlap & McCright, 2008; Guber, 2013; Linde, 2018a). However, the extent to which political parties have this influence is currently uncertain, as most previous studies failed to incorporate an explicit measure of party communications (instead, the effect was assumed). Furthermore, the studies that included this kind of measure focused on analysis on the aggregate level (see Brulle et al., 2012; Carmichael & Brulle, 2017) and were, thus, unable to account for variations in individual-level factors. There is, as such, limited evidence supporting the claim that political parties can shape public concern for climate change.

In this article, I (1) investigate the extent to which communications from political parties, in the form of party source cues and perceived polarization, affect public perceptions of climate change risk and (2) investigate the extent to which the proposed relationships hold up across different political contexts. Considering the limited attention given to understanding the effects of political communication on public perceptions of climate change risk, this research significantly contributes both theoretically and empirically to previous studies. In the next section, I review previous research and outline the main theoretical argument of the article. Then, I present the data collection process and the operationalization of the variables, after which the results are presented. Finally, I end with a discussion on the implications and interpretation of the findings and future ways ahead.

2. THEORY

2.1. Predictors of Climate Change Concern

Previous research has identified four main groups of factors predicting public climate change concern: cognitive, experiential, sociocultural, and sociodemographic (van der Linden, 2015). In the first group of studies, focusing on cognitive factors, scientific knowledge is suggested to be one of the most important drivers of public concern for climate change (Malka et al., 2009; O'Connor et al., 1999; Shi et al., 2015). Results from this group of studies are though mixed, and the effects found are largely dependent on the methodology used (Shi, Visschers, Siegrist, & Arvai, 2016). Specifically, in studies using subjective measures of knowledge (where respondents are asked to rate their own level of knowledge), results have shown both positive, negative, and contingent effects on levels of concern (Malka et al., 2009). For studies relying on objective measures of knowledge (where respondents are asked to answer a number of factual questions), results have more consistently shown a positive relationship between knowledge and climate change concern (O'Connor et al., 1999; Shi et al., 2015). However, these studies have also shown that the impact of knowledge on concern varies across different types of knowledge. For example, while causal knowledge tends to be positively related to concern, knowledge about the physical characteristics of climate change has been found to have both a negative and an insignificant relationship with concern (Shi et al., 2016).

The second group of studies focuses on the effect of personal experiences with extreme weather events and long-term changes in weather patterns. According to this line of research, personal experiences with extreme weather have a potentially important influence on public engagement with climate change, by both increasing the cognitive salience of climate change and triggering an emotional response (Demski et al., 2017). Thus, by making potential risks more concrete, personal experiences with extreme weather are argued to create feelings of personal vulnerability and concern, thereby decreasing the "psychological distance"[1] to climate change (Jones et al., 2017; Spence et al., 2012). However, the extent to which weather events have this effect on personal beliefs is still debated. Although a number of previous studies discovered a significant relationship between extreme weather events (or more long-term changes in weather) and individual climate change beliefs (Bohr, 2017; Carmichael & Brulle, 2017; McCright et al., 2014; Spence et al., 2011), several others have failed to do so (Brulle et al., 2012; Marquart-Pyatt et al., 2014; Shum, 2012).

[1]Psychological distance is a term used to describe how individuals often view climate change risks as geographically and temporally distant. This means that climate change often is perceived as only affecting people in other countries or in future generations (Spence et al., 2012).

Like studies focusing on the effects of scientific knowledge, differences in research design and measurement seem to affect what types of effects that are found.

The third group of studies focused on the relationship between risk perceptions and a number of sociocultural factors, such as individual cultural worldviews and core values. According to this research, individual risk perceptions are expected to embody "social representations of risk in a given culture" that are shaped both by interpersonal interaction and the media (van der Linden, 2015:116). Specifically, at the individual level, risk perceptions are believed to be based on the individual adherence to fundamental values, such as individualism, communitarianism, egalitarianism, and hierarchy. Findings show, for example, that individuals who hold hierarchic and individualistic value orientations (as opposed to communitarian and egalitarian values) commonly are less concerned with climate change (Leiserowitz, 2006; Shi et al., 2015). The development of proenvironmental attitudes and beliefs (such as climate change concern) has, similarly, been shown to be related to the individual acceptance of biospheric or social-altruistic values, as opposed to egocentric values (e.g., Steg & Vlek, 2009).

Finally, the fourth group of studies investigated the effect of a number of sociodemographic factors on climate change concern. This research shows that women tend to be more concerned about climate change compared to men (O'Connor et al., 1999) and that education is a strong predictor of climate change awareness (Lee et al., 2015). However, few studies have found a consistent relationship between income and age, and climate change concern (van der Linden, 2015). Of all sociodemographic factors studied, the most consistent predictor of climate change concern is partisanship. Across a range of studies, partisanship is identified as the most stable predictor of climate change concern, with supporters of conservative parties commonly being less concerned about climate change compared to supporters of liberal parties (Brulle et al., 2012; Guber, 2013; Krosnick et al., 2000; Malka et al., 2009; McCright, 2011; McCright & Dunlap, 2011; Tranter, 2013). A common assumption in these studies is that it is political parties that, through different forms of communication, are driving the partisan divide in climate change risk perceptions. This link, between political parties and public attitudes on climate change, is the main focus of this article.

2.2. Political Communication and Public Perceptions of Climate Change Risk

Generally, political parties are believed to influence public opinion mainly in two ways. First, parties structure the political debate and provide voters with a limited set of choices from which they can chose. Individuals do, as such, not create the alternatives, but only chose between the options presented to them. Second, political parties also inform, mobilize, and persuade voters to make specific choices from the alternatives presented (Leeper & Slothuus, 2014). By these routes of influence, political parties can exercise considerable influence over public opinion.

2.2.1. Party Positions and Party Source Cues

In order to effectively use political communications to form well-grounded attitudes, individuals need ways to evaluate the information they are provided. The simplest way to do so is by relying on so-called "party source cues." Essentially, a party source cue is any piece of information in a communication that enables an individual to identify the source of the message (e.g., a party endorsement or a liberal/conservative statement) and thereby judge its credibility (Nicholson, 2012). According to this perspective, individuals evaluate political communications mainly based on the source of a message (as opposed to evaluating the contents and framing of the message). In communication, a cueing message consists of two parts: a message (e.g., a problem description or a policy statement) and a source (e.g., a politician). An individual who recognizes the source of a message will be primed to evaluate the message through a partisan perspective. If the source and the recipient share party labels, the message will generally be accepted, whereas it is more likely to be rejected if they support different parties (Goren, Federico, & Kittilson, 2009). A Liberal Party voter will thus generally trust a message from a Liberal Party representative, while a Conservative Party voter will distrust it, regardless of the content. It is, as such, not the message contents that is the most important factor determining whether an individual accepts it or not, rather, it is the source of the message (and whether an individual trust that source) that has the largest influence on this decision (Goren et al., 2009; Nicholson, 2012). However, it is important to note that individuals do not automatically accept any political message they receive, but, when motivated to

do so, are able to critically evaluate the contents of a message (Boudreau & MacKenzie, 2014; Bullock, 2011; Slothuus & de Vreese, 2010). Nevertheless, in a political context, the default option for most individuals is to accept a message based on the trustworthiness of the source (Leeper & Slothuus, 2014).

By identifying party source cues, individuals have an efficient way to figure out the position of the party they identify with (as well as other parties) and to subsequently also adopt this position themselves. This way, individuals can make political choices that are aligned with their underlying preferences even on complex and abstract issues as climate change. Following this line of reasoning, we should expect to find a positive relationship between individuals' risk perceptions and the position they perceive the party they identify with as taking on climate change (the party source cue).

Hypothesis 1: Party source cues are positively associated with climate change concern, such that individuals who perceive their preferred party to take a stronger stance on climate change perceive more climate change risk.

2.2.2. *Perceived Polarization*

Party cues are not only expected to individually influence public risk perceptions, but also to have an aggregate effect, reflected in the degree of party polarization. From a cross-sectional perspective, party polarization denotes a situation where the distance in ideology or issue position between parties is large and the degree of homogeneity within parties is high (Druckman et al., 2013; Rehm & Reilly, 2010). Under high levels of party polarization, individual voters are expected to more easily pick up on the cues sent by political parties. This, in turn, is expected to enable citizens to more easily connect their underlying predispositions with more specific political attitudes, effectively increasing the correlation between party identities and issue positions and between attitudes on different issues (Fiorina & Abrams, 2008; Lelkes, 2016; Levendusky, 2010). Thus, by increasing the importance of party cues to voter opinion formation, party polarization is expected to also increase polarization in the mass public (Claassen & Highton, 2009; Hetherington, 2001; Mullinix, 2016; Ray, 2003; Zaller, 1992).

Here, focus will be put on a specific aspect of party polarization, namely, perceived party polarization (e.g., Lelkes, 2016). A well-documented finding in social psychology, as well as in political science, is that people generally find it difficult to accurately estimate the beliefs and attitudes of opposing groups (e.g., Van Boven, Judd, & Sherman, 2012). Commonly, such difficulties cause individuals to overestimate the distance in ideology or issues position between groups (i.e., the degree of polarization). This tendency has, for example, been documented concerning attitudes toward the Vietnam War (Dawes, Singer, & Lemons, 1972), affirmative action (Sherman, Nelson, & Ross, 2003), abortion and racial issues (Robinson, Keltner, Ward, & Ross, 1995), and tax, immigration, trade, and public financing (Levendusky & Malhotra, 2016). Public perceptions of party polarization are thus not necessarily an accurate reflection of the actual degree of polarization.

Perceived party polarization has a number of potentially important substantive effects on individual attitude formation. It has, for example, been suggested that perceived polarization is positively associated with different forms of political engagement, such as voting (Van Boven et al., 2012; Westfall, Van Boven, Chambers, & Judd, 2015). Others have argued that perceived polarization might make people more pessimistic, causing them to detach from politics (Lupu, 2015; Robinson et al., 1995; Sherman et al., 2003). In relation to public perceptions of climate change risk, we should expect perceived polarization to have a negative effect. Under high degrees of polarization, people will be exposed to a large number of conflicting messages as to whether climate change is a threat or not. In general, such an increase in polarization is expected to lead to an overall reduction in public support for any given issues (see, e.g., Gable & Scheve, 2007; Hellström, 2008; Ray, 2003; Sanders & Toka, 2013). Similar effects have also been found on the individual level, where perceived polarization has been found to be negatively related to public support for CO_2-taxes (Linde, 2018b). Following that, we should expect an increase in perceived polarization on the individual level to lead to a reduced level of concern.

Hypothesis 2: Perceived polarization is negatively related to climate change risk perceptions, such that higher level of perceived polarization is associated with lower perceived risk.

3. DATA AND METHODS

3.1. Case Selection

To investigate what the relationship between party cues, perceived polarization, and public perceptions of climate change risk looks like in different contexts, a comparative approach focusing on four countries, Sweden, Norway, New Zealand, and Australia, was chosen. These countries were chosen on the basis of their varying characteristics in relation to climate change politics (these differences are, among other things, based on variations in political culture and national economic dependence on natural resource extraction). Below, a short introduction to each case is given.

From an international perspective, Sweden is often described as a frontrunner on climate change mitigation. This position is to large extent made possible by the overarching political consensus that existed around the importance of mitigating climate change (Sarasini, 2009; Zannakis, 2015). This enabled Sweden to take a leading role in international climate negotiations and also to domestically overimplement many of its commitments to international climate agreements, such as the Kyoto protocol and the EU burden sharing agreement (SEPA, 2015). Norway is also traditionally an international leader on climate change mitigation and, in many cases, an early adopter of environmental policies. However, the country's increasing economic dependence on the petroleum sector put pressure on the previous political consensus, resulting in an increasing degree of polarization among the political parties (Hovden & Lindseth, 2004; Roettereng, 2016).

Unlike Sweden and Norway, climate change politics in Australia and New Zealand is to a considerable degree characterized by a political conflict. This is especially true in Australia, which has experienced considerable political conflict over climate change in recent years. The polarized nature of Australian climate change politics has also hampered most efforts to enact any serious climate policies, which, for example, is evident in the failure to implement an emissions trading system (Fielding et al., 2012; McDonald, 2016; Pearse, 2016; Tranter, 2013). In New Zealand, political conflicts over climate change mitigation are affected considerably by its unique emissions profile, with most emissions coming from agriculture and forestry. The national economic dependence on these industries has effectively worked to hinder any wider political agreements, despite cross-partisan agreement on the need of effective climate policies (Bullock, 2012).

3.2. Data Collection

The data were collected using a country comparative sample survey. Although the survey was the same in all countries, the data collection process differed somewhat between the countries. In Sweden, the survey was part of an ongoing online panel survey administered by the Laboratory of Opinion Research (LORE), at the University of Gothenburg. The data were collected in two waves, with some variables collected between June 5 and July 17, 2014, and the rest of the variables collected between February 5 and March 5, 2015.[2] Upon registration for participation in the panel, respondents stated their gender, age, education, and place of residence. The sample was then selected using proportional stratified random sampling, where the size of each stratum was decided based on census data from Statistics Sweden. The total number of respondents was 4,022 in the first wave (response rate 69.86%). Of these, 2,632 also participated in the second wave (response rate 76.36%). The sample consists of a mix of probability and opt-in respondents. The number of probability respondents was 43% in the first sample and 44% in the second sample.

In Australia, New Zealand, and Norway, the surveys were administered by the sample provider Cint and Survey Sampling International (SSI). In Australia and Norway, all data were collected by Cint (field period March3 to March 31, 2015), whereas New Zealand also had some supplementary data collected by SSI (field period March 3 to March 26, 2015). Like the Swedish survey, these surveys were

[2]Collecting the data in two waves meant that some of the variables were collected before the rest. One important implication of this is that the measure of the dependent variable (risk perceptions) was collected before the independent variables (party cues and perceived polarization) for Sweden. Although public attitudes toward environmental issues tend to fluctuate over time (e.g., Martinsson & Weissenbilder, 2019), the relatively short time frame between the two waves of data collection (a few months) should mean that the variables of interest (risk perceptions and party cues) remain relatively stable over the period (see also Stimson, MacKuen, & Erikson, 1994). The specific mode of data collection is, therefore, not expected to significantly affect the results. Of course, in instances of major shifts in party positions or government policy (e.g., the U.S. withdrawal from the Paris Agreement), one could expect more rapid changes also in public opinion. However, this was not the case during the process of data collection in the present case.

administered electronically. The surveys were translated from Swedish by two separate translators for each language, and the translations were then compared for any inconsistencies. The samples collected by Cint and SSI were quota samples (with quotas for age and gender) with an aim of 2,000 respondents from each country (1,000 for each sample in New Zealand).

3.3. Variable Measurement

Risk perceptions were measured using six different survey items. For each item, respondents indicated the degree to which they agreed or not with a statement about the potential risks posed by climate change (both personal and global risks).[3] Answers were given on a 7-point scale (1 = completely disagree, 7 = completely agree). Since people commonly differentiate between different types of risk, for example, personal risks compared to risks for other people, or for the environment (see, e.g., Leiserowitz, 2005), factor analysis was used to investigate the presence of any underlying dimensions. Principal component analysis (Table I) revealed two components: abstract risk (2 items, Cronbach's alpha = 0.76), and concrete risk (4 items, Cronbach's alpha = 0.88). The first component, abstract risk, includes items focusing on how emissions will change the earth's climate and how climate change will affect future generations. The second component, concrete risk, includes items focusing on the effects of climate change for the respondents, their families, their countrymen, and for people globally.

To measure the two main independent variables, party cues and perceived polarization, respondents were asked to report the extent to which the parties in their national/federal parliament were "for or against more forceful measures against climate change even if it means low or no economic growth for the country." Respondents indicated their party ratings on a 7-point scale (1 = strongly opposed to 7 = strongly favor). Based on these party ratings, respondents were then assigned a value on the variable party cue according to their party affiliation (i.e., the rating of their own preferred party). Thus, party cues were operationalized as the individual respondent's perception of their preferred party's stance on climate change mitigation.

[3]More information on question wording and measurement can be found in the Appendix.

To measure perceived polarization, the rating of the parties was used to calculate the spread in positions between the parties. Given that parties are expected to have different influence on the political environment (specifically that bigger parties generally are expected to be more influential), perceived polarization was operationalized as the weighted standard deviation of the perceived party ratings (see, e.g., Gabel & Scheve, 2007). The weighting was done by multiplying the perceived party positions with each party's vote share in the last national/federal election, before calculating the standard deviation.

Two measures were used to control for general ideological leaning. The first was the common "left-right scale" asking respondents to rate themselves on an 11-degree scale ranging from "Furthest to the left" (0), to "Neither to the left nor right" (5), to "Furthest to the right" (10). The second scale was used to estimate the degree to which individuals held environmentalist values. For this dimension, respondents were asked to rate themselves on an 11-degree scale ranging from "Not green at all" (0) to "A great deal green" (10).

Four demographic variables used in the previous research were also controlled for. Level of education was measured on a 9-point scale, recoded into three categories: low education (below upper secondary), medium education (upper secondary), and high education (tertiary). Income was measured as monthly salary before taxes, recoded into three categories: low income (income quartile 1), medium income (income quartiles 2–3), and high income (income quartile 4). Respondents were also asked to report their age and gender (0 = "female" and 1 = "male").

3.4. Statistical Approach

The first part of the analysis focused on investigating the mean estimates of the respondents' risk perceptions and their distribution across countries and parties. A combination of paired-sample *t*-tests (sig. level 0.01) and one-way ANOVA-tests with post-hoc Tukey tests (sig. level 0.05) was used to control for significant differences. The second part of the analysis focused on estimating the effect of party cues (Hypothesis 1) and perceived polarization (Hypothesis 2) on abstract and concrete risk perceptions. Given the clustered nature of the data, with voters clustered in parties, a fixed effects approach was used. This approach controls for cluster heterogeneity by including dummy variables for N-1 clusters (i.e., parties) in the models (Allison, 2009).

Table I. Factor Analysis: Abstract and Concrete Risk Perceptions

	Components	
	1	2
Climate change will have a negative impact on my life.	0.86	0.11
Claims that the current levels of emissions have a negative impact on the earth's climate are exaggerated.	0.16	0.87
The lives of many (country inhabitants) will be negatively affected by climate change.	0.89	0.19
Globally, the lives of many people will be negatively affected by climate change.	0.71	0.40
It is not certain that climate change will affect the lives of future generations.	0.17	0.88
Climate change will have a negative effect on my family's life.	0.87	0.11

Note: Table I reports the results from a principal component analysis with Varimax rotation (with Kaiser normalization). Component 1: concrete risk and component 2: abstract risk.

Risk perceptions were thus estimated as:

$$y_{ij} = \gamma_0 + \beta_1 x_{ij} + \cdots + \beta_k x_{kij} + \alpha_1 u_{j1} + \cdots + \alpha_{N-1} u_{jN-1} + e_{ij},$$

where γ_0 s the intercept, $\beta_1 x_{ij} + \cdots + \beta_k x_{kij}$ are the independent variables and their coefficients, $\alpha_1 u_{j1} + \cdots + \alpha_{N-1} u_{jN-1}$ are the fixed effects for N-1 parties, and e_{ij} is the error term.

4. RESULTS

The analysis was performed in two main steps, where the first step focused on investigating whether risk perceptions varied across party supporters and countries, and the second explicitly estimating the effect of party cues and perceived polarization on these perceptions.

As a first step of the analysis, the level of perceived risk was compared across the four countries. Table II displays the country-level mean and standard deviation in abstract and concrete risk perceptions for each country. For abstract risk perceptions, the level of concern was found to be the greatest in Sweden, followed by Norway, New Zealand, and Australia. A one-way ANOVA test showed that the differences in means were significantly different at the $p < 0.001$ level: F (3, 8,436) = 273.20. Furthermore, a post-hoc Tukey test found the mean value of each pair of countries to be significantly different at the $p < 0.05$ level. For concrete risk perceptions, greatest concern was again found in Sweden, followed by Australia, New Zealand, and Norway. A one-way ANOVA test showed that the means were significantly different at the $p < 0.001$ level: F (3, 8,387) = 51.49. However, a post-hoc Tukey test failed to find a significant difference between Sweden and Australia and between New Zealand and Australia. All other differences were though significant at the $p < 0.05$ level.

Following the initial country-level overview, the next step of the analysis focused on investigating differences in risk perceptions across party supporters in the four countries. Table III displays the mean and standard deviation for the two measures of risk perceptions stratified by party preference and country. In Sweden and Norway, supporters of all parties were found to perceive abstract risks as greater than concrete risks. Paired-samples t-tests confirmed the statistical significance of these differences (at the $p < 0.001$ level[4]) for all parties except the Christian Democrats in Sweden ($p = 0.001$) and the Center Party ($p = 0.118$) and the Christian Democrats ($p = 0.173$) in Norway. The results thus indicted that the respondents in the two Nordic countries generally consider climate change a bigger threat to the planet, whereas they were less concerned about the risk it poses for themselves, their family, or their countrymen. In Australia, the pattern was the opposite. Across all parties, perceptions of concrete risks were greater than perceptions of abstract risks. However, this effect was only found to be statistically significant (at the $p < 0.001$ level) for two parties: the Country Liberal Party and the Liberal National Party. For the Australian Greens and the Australian Labor Party, the difference in means was borderline to being statistically significant ($p = 0.001$), whereas the differences for the Liberal Party of Australia ($p = 0.008$) and National Party of Australia ($p = 0.475$) were further away from significance. Taken together, there was still a slight indication that Australians are more worried about the risks that climate change poses closer to home.

[4]The somewhat stricter significance level of $p < 0.001$ was chosen to adjust for the multiple comparisons being made.

Table II. Descriptive Statistics: Abstract and Concrete Risk Perceptions Across Countries

	Australia			Norway			New Zealand			Sweden		
	M	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*
Abstract	4,41	1,74	1,955	4,87	1,68	1,926	4,56	1,63	1,866	5,65	1,50	2,693
Concrete	4,68[a,b,c]	1,52	1,941	4,24	1,43	1,910	4,58[a,b]	1,48	1,857	4,76[a,c]	1,40	2,683

Note: Table II displays the country-level mean (*M*), standard deviation (*SD*), and number of respondents (*N*) for abstract and concrete risk perceptions (measured on a 7-point scale, where higher numbers indicate more perceived risk). The table also reports the results from post-hoc Tukey test performed in conjunction with the one-way ANOVA-tests: statistically insignificant differences in means are reported in superscript letters, where means with the same superscript are statistically insignificantly different (at the 0.05 level). Entries without superscripts are thus statistically significantly different from all other means.

Finally, for New Zealand, there was no clear pattern what risks were considered the biggest, and the differences in means for the two types of risk perceptions were found to be insignificant across all parties.

As the next step in the analysis, differences in risk perceptions across parties within each country were studied. In Sweden and Norway, supporters of the Green parties, followed by supporters of the socialist/social democratic parties, were found to be the most concerned about climate change. Least concern was found among the populist/anti-immigration parties (Sweden Democrats and Progress Party), and the conservative and Christian democratic parties. A similar pattern was found in Australia and New Zealand, where supporters of the Green parties and the Labor parties were found to be the most concerned, whereas supporters of the liberal and conservative parties generally were less concerned. One-way ANOVA tests showed that the differences across parties were significant at the $p < 0.001$ level for all countries: *Australia*: abstract: F (6, 1,886) = 24.56, $p < 0.000$; concrete: F (6, 1,872) = 29.22, $p < 0.000$; *Norway*: abstract: F (8, 1,823) = 36.65, $p < 0.000$; concrete: F (8, 1,807) = 32.50, $p < 0.000$; *Sweden*: abstract: F (8, 2,676) = 47.31, $p < 0.000$; concrete: F (8, 2,667) = 36.23, $p < 0.000$; *New Zealand*: abstract: F (7, 1,764) = 16.39, $p < 0.000$; concrete: F (7, 1,756) = 12.53, $p < 0.000$. Post-hoc Tukey tests furthermore gave support to the grouping of the parties as described (Table III).

To get a better understanding of how important partisanship is for climate change risk perceptions, two fixed effects regression models were estimated. In each model, one of the measures of climate change risk was regressed on N-1 party dummies for each country, without any other independent variables (the models were estimated separately for each country). Table IV displays the results. Overall, these results supported the findings in the previous analysis, with a similar grouping of the supporters of the different parties. Looking at the adjusted R^2, we can see that partisanship accounted for around 4–10% of the variance in Australia and New Zealand, and around 14–20% of the variance in Sweden in Norway. The amount of explained variance indicates that partisanship, at least in the two Nordic countries, is an important predictor of individual risk perceptions.

The next step of the analysis was to estimate the effect of party cues and perceived polarization on the two measures of risk perceptions. To do so, two multiple regression models (with fixed effects controlling for party preferences), one for each type of risk perception, were estimated for each country separately. The results are shown in Tables V and VI. Looking first at the results in Table V, which displays the regression for abstract risk perceptions, we can see that party cues in three of the four countries had a significant and relatively strong positive effect on risk perceptions (insignificant effect in New Zealand). This finding indicates that individuals generally perceive more abstract risk when the party they support is perceived as taking a strong stance on climate change. How political parties position themselves on climate change thus seems to have an important influence on the abstract risks individual voters perceive.

Second, as can be seen in Table V, the analysis also discovered a statistically significant negative relationship between perceived polarization and abstract risk perceptions in all four countries. This finding indicates that individuals generally are less concerned about abstract climate change risks the more polarization they perceive. Just as expected, perceived political polarization thus seems to suppress public concern for climate change. Moving on to the two ideological measures, we can see that

Table III. Descriptive Statistics and One-Way ANOVA-Tests: Estimating Differences in Abstract and Concrete Risk Perceptions Across Party Supporters

		Abstract			Concrete				Abstract			Concrete			
		M	*SD*	*N*	*M*	*SD*	*N*		*M*	*SD*	*N*	*M*	*SD*	*N*	
Sweden	Sweden Dem.	4,52[a,b]	1,67	176	3,91[a,b]	1,54	176	Progress Party	3,94[a,c]	1,76	248	3,48	1,47	244	Norway
	Christian Dem.	4,79[a,b,c]	1,82	63	4,06[a,b,c]	1,45	63	Conservative P.	4,39[b,c,d]	1,59	300	3,84[a,b,c]	1,30	299	
	Moderates	4,97[b,c]	1,59	311	4,24[a,b,c]	1,28	311	Center Party	4,58[a,b,c,d,e]	1,71	70	4,26[a,b,c,d]	1,31	70	
	Center Party	5,49[d]	1,42	101	4,57[b,c,d]	1,32	100	Christian Peoples P.	4,67[b,c,d,e]	1,66	60	4,41[a,b,c,d,f]	1,09	58	
	Liberals	5,55[d]	1,33	202	4,71[c,d]	1,31	201	Labour Party	4,91[c,d,e]	1,58	494	4,33[b,c,d,e]	1,27	487	
	Social Dem.	5,66[d]	1,41	527	4,74[c,d]	1,27	526	Liberals	5,66[f]	1,30	102	4,75[b,c,d,e,f,g]	1,28	102	
	Left Party	6,12	1,31	343	5,23[e]	1,32	341	Socialist Left P.	5,95[f]	1,18	102	4,95[c,e,f,g]	1,29	103	
	Green Party	6,48	0,91	363	5,49[e]	1,18	360	Green Party	5,98[f]	1,41	200	5,19[e,f,g]	1,33	199	
Australia	Country Liberals	3,52[a]	1,21	47	4,84[a,c,e,f]	1,17	46	ACT	3,26[a,b,d]	1,93	21	4,57[a,b,c,e,f,g]	1,94	21	New Zealand
	National Party	3,56[a]	1,71	40	3,76[b,c,d]	1,45	40	National Party	4,20[a,b,c,d]	1,52	518	4,31[a,b,c,e]	1,40	515	
	Liberal Nat.P.	3,65[a]	1,62	190	4,22[a,b,c,d]	1,43	189	NZ First	4,40[b,c,d,e]	1,63	135	4,12[a,b,c]	1,51	133	
	Liberal Party	3,83[a]	1,54	266	4,11[b,c,d]	1,59	264	United Future	4,46[a,b,c,d,e,f]	2,21	16	4,05[a,b,c,d,e,f]	1,64	16	
	Labor Party	4,59	1,71	668	4,85[a,e]	1,44	665	Maori Party	4,51[b,c,d,e]	1,73	62	4,80[a,b,e,f,g]	1,74	62	
	Green Party	5,10	1,81	269	5,51[a,f]	1,34	266	Labour Party	4,67[c,d,e]	1,54	518	4,72[a,e,f]	1,36	519	
								Green Party	5,37[d,f]	1,62	262	5,19[a,d,e,g]	1,55	260	

Note: Table III reports the mean (*M*), standard deviation (*SD*), and number of respondents (*N*) for abstract and concrete risk perceptions (measured on a 7-point scale, where higher numbers indicate more perceived risk) stratified by country and party preference. The table also reports the results from post-hoc Tukey test performed in conjunction with the one-way ANOVA-tests: statistically insignificant differences in means are reported in superscript letters, where means (in the same country) with the same superscript are statistically insignificantly different (at the 0.05 level). Entries without superscripts are thus statistically significantly different from all other means (within the same country).

Table IV. Fixed Effects Model: Regressing Abstract and Concrete Risk Perceptions on Party Preference

		Abstract Risk Perceptions			Concrete Risk Perceptions		
		B	*SE*	95% CI	B	*SE*	95% CI
Australia	Green Party	1,74†	0,29	1,18/2,30	0,71**	0,25	0,22/1,19
	Labor Party	1,18†	0,27	0,65/1,71	0,04	0,24	–0,42/0,50
	Liberal National Party	0,19	0,29	−0,38/0,77	−0,57*	0,26	−1,07−0,07
	Liberal Party	0,43	0,29	−0,13/0,99	−0,66**	0,25	−1,15/−0,17
	National Party	0,04	0,38	−0,72/0,79	−1,09**	0,33	−1,74/−0,43
	Constant	3,45†	0,26	2,94/3,97	4,83†	0,23	
	N	1,955			1,941		
	F	27,38†			27,60†		
	Adj. R^2	0,10			0,10		
New Zealand	Green Party	2,33†	0,38	1,58/3,07	0,67	0,35	−0,01/1,35
	Labour Party	1,68†	0,37	0,95/2,41	0,21	0,34	−0,46/0,88
	Maori Party	1,49**	0,43	0,65/2,33	0,20	0,39	−0,57/0,96
	United Future	1,45*	0,57	0,33/2,57	−0,26	0,52	−1,29/0,76
	NZ First	1,30**	0,39	0,52/2,07	−0,36	0,36	−1,07/0,35
	National Party	1,13**	0,37	0,40/1,85	−0,13	0,34	−0,80/0,54
	Constant	3,05†	0,36	2,34/3,77	4,51†	0,33	3,86/5,17
	N	1,866			1,857		
	F	16,81†			9,13†		
	Adj. R^2	0,07			0,04		
Norway	Green Party	2,17†	0,16	1,85/2,49	1,79†	0,14	1,51/2,06
	Socialist Left Party	2,05†	0,20	1,67/2,44	1,48†	0,17	1,15/1,82
	Liberals	1,89†	0,21	1,48/2,29	1,35†	0,18	1,00/1,69
	Labour Party	1,10†	0,14	0,84/1,37	0,89†	0,12	0,66/1,12
	Center Party	0,72**	0,23	0,27/1,18	0,79†	0,20	0,41/1,18
	Christian Peoples' P.	0,67**	0,26	0,17/1,17	0,88†	0,22	0,45/1,32
	Conservative Party	0,50**	0,15	0,21/0,80	0,48†	0,13	0,22/0,73
	Constant	3,93†	0,11	3,72/4,15	3,45†	0,09	3,26/3,63
	N	1,926			1,910		
	F	38,69†			30,60		
	Adj. R^2	0,18			0,15		
Sweden	Green Party	2,00†	0,13	1,74/2,27	1,61†	0,13	1,36/1,86
	Left Party	1,64†	0,13	1,38/1,90	1,38†	0,13	1,13/1,63
	Social Democrats	1,14†	0,13	0,90/1,39	0,84†	0,12	0,61/1,08
	Center Party	0,99†	0,18	0,64/1,35	0,67†	0,17	0,34/1,01
	Liberals	1,04†	0,15	0,75/1,34	0,82†	0,14	0,54/1,09
	Moderate Party	0,47**	0,14	0,20/0,73	0,35**	0,13	0,09/0,60
	Christian Democrats	0,27	0,21	−0,15/0,69	0,07	0,20	−0,32/0,47
	Constant	4,51†	0,11	4,29/4,72	3,90†	0,10	3,69/4,10
	N	2,693			2,683		
	F	52,70†			41,59†		
	Adj. R^2	0,16			0,13		

Note: Table IV reports unstandardized regression coefficients (B), standard errors (*SE*), and 95% confidence intervals (95% CI) for abstract and concrete risk perceptions (measured on a 7-point scale, where higher numbers indicate more perceived risk). Reference dummies: Country Liberal Party (Australia), ACT (New Zealand), Progress Party (Norway), and Sweden Democrats (Sweden).

$^{*}p < 0.05$.

$^{**}p < 0.01$.

$^{\dagger}p < 0.001$.

Table V. Multiple Regression: Regressing Abstract Risk Perceptions on Party Cues and Perceived Polarization, Controlling for Ideology, Demographic Variables, and Party Preference

	Norway			Sweden			Australia			New Zealand		
	B	*SE*	95% CI	B	*SE*	95% CI	B	*SE*	95% CI	B	*SE*	95% CI
Party cue	0,14†	0,04	0,06/0,21	0,08**	0,03	0,02/0,13	0,14†	0,04	0,07/0,21	0,02	0,03	-0,05/0,08
Perceived polarization	−2,10†	0,35	−2,80/−1,41	−0,65*	0,27	−1,18/−0,12	−1,96†	0,34	−2,63/−1,29	−0,85†	0,22	−1,28/−0,42
Left/right ideology	−0,12†	0,02	−0,17/−0,08	−0,05**	0,02	−0,09/−0,01	−0,25†	0,02	−0,29/−0,20	−0,15†	0,03	−0,20/−0,10
Environmentalism	0,16†	0,02	0,12/0,20	0,24†	0,01	0,21/0,26	0,17†	0,02	0,13/0,20	0,15†	0,02	0,11/0,19
Age	0,00	0,00	−0,01/0,01	−0,01†	0,00	−0,01/0,00	0,02†	0,00	0,01/0,02	0,01	0,00	0,00/0,01
Male	−0,30**	0,09	−0,48/−0,13	−0,26†	0,06	−0,38/−0,14	−0,11	0,09	−0,28/0,05	−0,18	0,09	−0,35/0,00
Moderate education	0,29	0,19	−0,07/0,65	0,36**	0,13	0,10/0,61	0,46	0,38	−0,28/1,20	0,04	0,40	−0,74/0,82
High education	0,47*	0,19	0,10/0,84	0,40**	0,13	0,14/0,66	0,51	0,38	−0,23/1,25	0,13	0,40	−0,65/0,92
Medium income	0,09	0,10	−0,11/0,28	0,13	0,07	−0,01/0,27	−0,16	0,10	−0,35/0,03	−0,11	0,10	−0,30/0,07
High income	−0,13	0,14	−0,41/0,16	0,28**	0,09	0,10/0,45	−0,10	0,13	−0,36/0,16	0,17	0,18	−0,18/0,51
Constant	4,60†	0,22	4,18/5,03	4,95†	0,17	4,61/5,29	3,40†	0,44	2,53/4,26	3,48†	0,53	2,43/4,53
N	1,210			1,860			1,252			1,192		
F	31,89†			53,12†			36,08†			14,44†		
Adj. R^2	0,30			0,32			0,30			0,15		

Note: Table V reports unstandardized regression coefficients (B), standard errors (*SE*), and 95% confidence intervals (95% CI). Dependent variable: abstract risk perceptions (measured on a 7-point scale, where higher numbers indicate more perceived risk). Party fixed effects supressed. Reference dummies: Country Liberal Party (Australia), ACT (New Zealand), Progress Party (Norway), and Sweden Democrats (Sweden).
$^{*}p < 0.05$.
$^{**}p < 0.01$.
$^{\dagger}p < 0.001$.

left/right ideology had a significant negative effect in all four countries, whereas environmentalism had a positive effect. This means that the more the right you are and the less you hold environmentalist values, the less likely you are to perceive climate change as an abstract risk. Studying the demographic control variables, we can see that age had a negative effect in Sweden and Australia, gender (being male) had a negative effect in Sweden and Norway, education had a positive effect in Norway and Sweden, and high income had a positive effect in Sweden. Looking at the adjusted R^2 value, we can see that the model managed to explain from 15% of the variance in New Zealand to 32% in Sweden.

Finally, overviewing the results in Table VI, we can see that party cues had a significant positive relationship with concrete risk perceptions in Norway, New Zealand, and Australia. However, the effect was insignificant for the Swedish sample. Similar to the results in Table V, these results indicate that political parties have an important influence also on individual perceptions of concrete climate change risks. However, as the results in Table VI show, no statistically significant relationship was found between perceived polarization and concrete risk perceptions. Thus, unlike the relationship between polarization and abstract risk perceptions, individuals do not seem to consider the degree of political polarization when forming concrete risk perceptions. Looking at the two ideological measures, we can see that left/right ideology had a significant negative effect in Norway and Australia (insignificant effect in Sweden and New Zealand) and that environmentalism had a strong positive significant effect in all four countries. Among the demographic variables, age had a small negative effect in all four countries, gender (being male) had a negative effect in Sweden, and high education had a positive effect in Australia. Finally, the adjusted R^2 values show that the model managed to explain between 15% of the variance in New Zealand and 31% in Norway and Australia.

5. DISCUSSION

This article aimed to investigate how political parties, through different forms of communication, can influence public perceptions of climate change risk. The results show that both party cues and perceived polarization have an important impact on public risk perceptions. First, the positive correlation

Table VI. Multiple Regression: Regressing Concrete Risk Perceptions on Party Cues and Perceived Polarization, Controlling for Ideology, Demographic Variables, and Party Preference

	Norway			Sweden			Australia			New Zealand		
	B	*SE*	95% CI	B	*SE*	95% CI	B	*SE*	95% CI	B	*SE*	95% CI
Party cue	0,10**	0,03	0,04/0,16	0,02	0,03	−0,03/0,08	0,13†	0,03	0,06/0,19	0,09**	0,03	0,04/0,15
Perceived polarization	−0,12	0,30	−0,71/0,46	0,31	0,26	−0,19/0,82	−0,05	0,30	−0,63/0,53	−0,38	0,20	−0,76/0,01
Left/right ideology	−0,05*	0,02	−0,09/−0,01	−0,01	0,02	−0,05/0,03	−0,05**	0,02	−0,09/−0,01	−0,03	0,02	−0,08/0,01
Environmentalism	0,23†	0,02	0,20/0,26	0,24†	0,01	0,22/0,27	0,24†	0,02	0,21/0,28	0,19†	0,02	0,15/0,22
Age	−0,01**	0,00	−0,01/0,00	−0,01*	0,00	−0,01/0,00	−0,01*	0,00	−0,01/0,00	−0,01†	0,00	−0,02/−0,01
Male	0,02	0,07	−0,13/0,16	−0,20**	0,06	−0,31/−0,08	−0,11	0,07	−0,25/0,04	−0,08	0,08	−0,24/0,08
Moderate education	0,22	0,16	−0,08/0,53	0,10	0,12	−0,14/0,34	0,50	0,33	−0,14/1,13	−0,12	0,36	−0,82/0,59
High education	0,29	0,16	−0,02/0,60	0,15	0,13	−0,10/0,40	0,68*	0,33	0,05/1,32	0,08	0,36	−0,63/0,79
Medium income	0,10	0,08	−0,07/0,26	0,12	0,07	−0,02/0,25	−0,10	0,08	−0,26/0,06	0,10	0,09	−0,07/0,27
High income	−0,04	0,12	−0,27/0,20	0,16	0,09	−0,02/0,33	−0,08	0,12	−0,31/0,14	0,02	0,16	−0,29/0,33
Constant	3,81†	0,18	3,45/4,18	4,42†	0,16	4,10/4,74	4,24†	0,38	3,49/4,99	4,52†	0,48	3,57/5,46
N	1,201			1,855			1,247			1,190		
F	32,14†			46,18†			37,61†			14,43†		
Adj. R^2	0,31			0,29			0,31			0,15		

Note: Table VI reports unstandardized regression coefficients (B), standard errors (SE), and 95% confidence intervals (95% CI). Dependent variable: concrete risk perceptions (measured on a 7-point scale, where higher numbers indicate more perceived risk). Party fixed effects supressed. Reference dummies: Country Liberal Party (Australia), ACT (New Zealand), Progress Party (Norway), and Sweden Democrats (Sweden).
*$p < 0.05$.
**$p < 0.01$.
†$p < 0.001$.

between party cues and risk perceptions found in three out of four countries in each regression indicates that individuals do consider the communications they receive from the party they identify with when forming attitudes toward climate change. Specifically, individuals were found to be more concerned about the risks of climate change the more they perceived the party they identify with as being concerned. These findings give support to Hypothesis 1, and are also in line with previous research suggesting that political parties have an important influence on voters' attitudes on climate change (e.g., Brulle et al., 2012; Carmichael & Brulle, 2017; Dunlap & McCright, 2008; Guber, 2013).

Second, the negative correlation found between perceived polarization and abstract risk perceptions indicates that individuals generally are less concerned about climate change the more polarization they perceive. These results are in line with previous research suggesting that perceived polarization can be associated with a detachment from politics (Lupu, 2015; Robinson et al., 1995; Sherman et al., 2003) and with reduced support for government policies (Linde, 2018b). However, only partial support can be given to Hypothesis 2, since only one of the two investigated relationships came up statistically significant. Although the effect of perceived polarization was strong and significant across all four countries for abstract risk perceptions, the effect on concrete risk perception was insignificant across all countries. The extent to which individual risk perceptions are impacted by perceived polarization thus seems to depend on what these perceptions relate to. One possible explanation to the difference in effect is that the abstract perceptions, relating to the cause–effect relationship and the temporal aspects of climate change, simply are harder to form compared to concrete risk perceptions. Since the concrete risk perceptions relate to personal risks and risks posed to other people, individuals might be more inclined to base these perceptions on personal experiences, for example, with extreme weather events, besides relying on party communications and personal values. Conversely, for the more abstract beliefs, individuals might instead be forced to rely more on external communication and might, therefore, to a greater extent be influenced by the wider political debate (Boudreau, 2009; Nicholson, 2012).

Despite the statistically significant effects found between party cues, polarization, and risk perceptions, the cross-sectional data used in this study limit possibilities of making causality claims. That

is, it is impossible to tell whether it is parties that influence public attitudes, or the other way around. This is especially important to note since there is an ongoing debate over the causal direction of the relationship between party positions and mass attitudes. While there currently is no final answer to the debate on the causality of the relationship between parties and voters (see, e.g., Gabel & Scheve, 2007; Hobolt & Klemmemsen, 2005; Ray, 2003; Steenbergen, Edwards, & de Vrie, 2007; Stimson et al., 1994), it has been suggested that individuals will be more reliant on party communications for more abstract and complex political issues (Boudreau, 2009; Nicholson, 2012). Given that climate change is characterized by high degrees of both environmental and social uncertainty (Jones et al., 2017; Spence et al., 2012), it seems reasonable to assume that individuals, at least to some extent, will depend on external communication (e.g., from political parties) when forming risk perceptions. However, to more firmly state that party cues and perceived polarization affect public perceptions of climate change risk, more research is needed. Such research could, for example, employ longitudinal or experimental research designs to be better equipped to disentangle the issues of causality.

While the results largely are similar across contexts, there are a few contextual differences that are interesting to discuss. Specifically, the results indicated that there might be a difference in the types of risks (abstract or concrete) that individuals in different contexts rate as being the most severe. While Swedes and Norwegians consistently rated the abstract risks as greater, there was an indication that the opposite might be true for Australians. In New Zealand, there was no clear pattern indicating what risks were considered the most severe. One reasonable explanation for the differences between countries is the varying environmental risks that individuals in these contexts face in everyday life. In the two Nordic countries, environmental problems that can be associated with climate change are, to date, very hard to personally experience. Although some effects probably already are present (e.g., shorter winters and more precipitation), these are still small and hard to observe. In contrast, there are several environmental impacts with clear connections to climate change that Australians repeatedly experience in everyday life. Most clearly, these include extended periods of draught and the often-associated wildfires. How individuals view climate change risk could thus, at least to some extent, be expected to be contextually conditioned.

However, the effects of extreme weather events should also be expected to be affected by how climate change is communicated and framed. Findings from a previous research indicated that the effect of extreme weather events varies across different types, and different levels of severity, of events (Brody et al., 2008; Sisco, Bosetti, & Weber, 2017). Such a difference can be attributed to methodological issues, to the severity of each event, but also to how different events are conceptualized and politicized in communication. For example, not only do political ideology and partisan preferences eclipse the effect of extreme weather on climate change attitudes directly (Brulle et al., 2012; Marquart-Pyatt et al., 2014; McCright et al., 2014), but they also indirectly moderate the effect of experiences with extreme weather on climate change attitudes (Bohr, 2017; Ogunbode et al., 2017). The effect of contextual differences in the occurrence of extreme weather on public perceptions of climate change risk should, therefore, also be expected to be moderated by domestic political conditions. How extreme weather events can be framed and communicated by political actors is an issue that has received relatively limited attention in the previous research and should be further investigated in future studies.

Besides the effect of the main independent variables, the results also discovered a significant effect for both types of ideological measures and a number of demographic variables. Of the two ideological measures, environmentalism had the strongest and most consistent effect with a strong positive relationship to both types of risk perceptions across all four countries. This finding resonates well with a previous research emphasizing the link between altruistic/biospheric value orientations and environmental beliefs (e.g., Steg & Vlek, 2009). Furthermore, the measure of left/right ideology had a relatively consistent effect, with a negative relationship to abstract risk perceptions in all four countries and to concrete risk perceptions in Australia and Norway. In line with in much previous research (e.g., Brulle et al., 2012; Guber, 2013; Krosnick et al., 2000; Malka et al., 2009; McCright, 2011; McCright & Dunlap, 2011; Tranter, 2013), this finding confirms how individuals to the right on the ideological spectrum often are less concerned about the risks climate change poses. Among the demographic variables, the most consistent effect was the negative relationship between age and perceived risk. Studying the rest of the variables, it is possible to see a gender effect in Sweden (and to some degree also in Norway), with men being significantly less concerned.

However, looking at the effect of education, which in previous research has been argued to be a key determinant of perceived risk (e.g., Lee et al., 2015), this is (with the exception of abstract risks in Sweden) largely insignificant.

Overall, in line with a previous research, the results underscore the fact that public concern for climate change is more than a matter of educational attainment and scientific literacy, but is shaped by a combination of factors, such as personal values, ideology, and knowledge (see, e.g., Leiserowitz, 2005; Shi et al., 2016; van der Linden, 2015). Specifically, the present study shows that perceptions of climate change risk are shaped both by ideological preferences, demographic factors (notably age differences, but also, to some extent, gender and education), but importantly, also by the political climate surrounding individuals.

For policy makers interested in increasing public concern for climate change in order to bolster individual action and support for new climate policy measures, it is therefore not enough to simply provide the public with more scientific evidence. Such information might not only risk being ineffective (see, e.g., Shi et al., 2016 for a discussion), but might also, if communicated in a politicized environment, risk increasing public polarization on climate change. This is, for example, what has happened in the United States, which has witnessed an increasing partisan divide on climate change following the polarization of the Democratic and Republican parties (see, e.g., Brulle et al., 2012; Dunlap, McCright, & Yarosh, 2016; Guber, 2013; McCright & Dunlap, 2011). Furthermore, given the differences in effects found across the four countries in this study, policy makers must find ways to communicate climate change in ways that are designed to fit the national political environment. Such communication efforts could, for example, focus on finding new, nonpoliticized, ways of framing climate change (e.g., as a health or security issue), but also try to emphasize similarities and shared goals across party lines. If done right, these efforts might not only reduce polarization between partisan voters, but might also reduce the risk of political disengagement and political distrust within the electorate.

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APPENDIX: SURVEY DETAILS

Variable	Question	Scale
Risk perception	Below is a list of statements about climate change and its potential effects. To what extent do you agree (or disagree) with these statements? 1) Climate change will have a negative impact on my life. 2) Claims that the current levels of emissions have a negative impact on the earth's climate are exaggerated. 3) The lives of many (country inhabitants) will be negatively affected by climate change. 4) Globally, the lives of many people will be negatively affected by climate change. 5) It is not certain that climate change will affect the lives of future generations. 6) Climate change will have a negative effect on my family's life.	Completely disagree (1), 2, 3, 4, 5, 6, Completely agree (7)
Party cue	For each of the following political parties, report to what extent you think that they are for or against more forceful measures against climate change even if it means low or no economic growth for the country.	Strongly opposes 1, Opposes 2, Somewhat opposes 2, Neither opposes nor favors 4, Somewhat favors 5, Favors 6, Strongly favors 7
Party preference	Generally speaking, do you consider yourself attached to one particular party? If so, which one?	
Left/right ideology	There is sometimes talk of political attitudes falling on a left-right scale. Where would you place yourself on this left-right scale?	Furthest to the left 0, 1, 2, 3, 4, Neither left nor right 5, 6, 7, 8, 9, Furthest to the right
Environmentalism	There is sometimes talk of a green environmental dimension in (country) politics. Where would you place yourself on this green dimension?	Not green at all 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A great deal green 10
Gender	Are you female or male?	Female (1), Male (2)
Age	What year were you born?	Before 1910 … 1998 or later
Income	On average, what is your monthly salary before taxes?	
Education	What is the highest level of education you have completed? Mark the answer that best applies to you. If you have not completed your education, mark the level you are at right now.	

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