Research Note

Understanding climate change conspiracy beliefs: A comparative outlook

Are climate change conspiracy theories widespread across the world, or do we find climate change conspiracy beliefs more so in some countries than in others? This research note explores the prevalence of conspiracy beliefs that identify climate change as a hoax across eight geographically and culturally diverse countries. Using original data, we found that climate change conspiracy beliefs are prevalent around the world, with some variations across countries. Our results indicate that political ideology, populist attitudes, age, and distrust of scientists primarily explain climate change conspiracy beliefs. We found cross-national heterogeneity in the importance of age and political ideology as determinants of such beliefs.

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Research questions

- How prevalent are beliefs in climate change conspiracy theories around the world?
- What are the determinants of climate change conspiracy beliefs?
- Are climate change conspiracy theory believers the same across different national settings?

Research note summary

- We report the results of an original multinational survey conducted across eight countries.
- We found that climate change conspiracy beliefs exist in every corner of the world.
- The propensity of populations to believe that climate change is a hoax varied considerably between the countries we studied.
- According to our data, the typical climate change conspiracy believer is someone young with a right-wing ideology who distrusts scientists and embraces populist attitudes.
- We also found that there is some variation in the typical climate change conspiracy believer, with political ideology and age being more important determinants in some countries than in others.

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Implications

Around the world, millions of people adhere to conspiracy theories. They believe that the COVID-19 pandemic was deliberately produced to harm mankind, that a deep state controls politics, or that the American 2020 election was stolen, among others (Bordeleau, 2023). What these explanations have in common is that they relate to real events, but they offer alternative, speculative, and unsubstantiated explanations of these events (Douglas et al., 2019). In their review, Douglas and Sutton (2023) defined conspiracy theories as "a belief that two or more actors have coordinated in secret to achieve an outcome, and that their conspiracy is of public interest, but not public knowledge" (p. 287).

In this research note, we focus on one of the most dominant and influential conspiracy theories in recent decades: climate change. Since the 1980s and 1990s, more and more scientific evidence has emerged that climate change is a direct result of human-made carbon emissions (Harvey et al., 2018). However, despite such overwhelming evidence that relates extreme weather patterns, the rise of sea levels, and the melting of glaciers worldwide to human-made warming of the earth's temperature, climate change conspiracy theorizing has spread in many countries across the globe. In a 2020 survey, roughly 25% of the U.S. population indicated agreement with the statement that climate change is a hoax (Stockemer, 2024). In other countries, such as Australia, up to 20% believe that climate change is an elite-driven conspiracy (Daume et al., 2023).

Climate change conspiracy theories can take many forms. According to Biddlestone et al. (2022), they can range "from the simple idea that climate change is a hoax and accusations of systematic scientific bias and fraud, to elaborate plots that the government is manipulating the weather through advanced geoengineering and that influential elites invented global warming as part of a sinister plot to create a New World Order" (p. 1). Throughout this research, we relied on the following statement to capture beliefs in climate change conspiracy theories: "climate change is a hoax and scientists touting its existence are lying." This generic statement was ideal for our cross-national comparative study, allowing for universal understanding across a wide range of countries. With that said, we acknowledge that this statement is not representative of all climate change conspiracy theories in circulation across the world.

Our research has several implications. First, we shed light on the simple question of how widespread climate change conspiracy beliefs are in different parts of the world. Aside from some studies in the United States and other Western European countries (Fischer, 2020; Sarathchandra & Haltinner, 2021), there is very little published work on other regions such as Latin America (e.g., Queiroz-Stein et al., 2023) or Asia (e.g., Vakulchuk et al., 2023). There is even less work that takes a global perspective (e.g., Nartova-Bochaver et al., 2022). Adding a global dimension to the literature and tapping into the prevalence of climate change conspiracy beliefs across eight geographically and culturally diverse countries (i.e., Australia, Brazil, Canada, Germany, Lebanon, Morocco, South Africa, and the United States), we found that climate change conspiracy beliefs exist in every corner of the world. Even more importantly, our results further illustrate that there are strong fluctuations in belief patterns in the eight countries we studied. In fact, only participants from Brazil matched those from the United States in terms of agreement with our climate change conspiracy statement (roughly 25%). In other countries, such as Germany, roughly one in ten respondents believed that climate change is a hoax. Finally, we establish that there are some universal factors such as distrust in scientists or populist attitudes that explain individuals' propensity to believe in conspiracy theories regardless of space. However, other factors such as age and political ideology are more context specific; these factors bear salience in some countries such as the United States and Germany, but not in others such as Lebanon or South Africa.

Our study contributes to the literature on believers in climate change conspiracy theories in several ways and opens some important avenues for future research. First, we contribute to the literature a discussion of the existence of a prototypical believer in the idea that climate change is a hoax. The general literature on conspiracy theories in the United States and Western countries insinuates that such a typical

believer exists (Goreis & Voracek, 2019). Most notably, Walter and Drochon (2022) argue that country context does not matter in determining individual beliefs in conspiracy theories. However, their study only looks at conspiracy theory believers in culturally similar contexts (i.e., the United States and Western Europe) and might thus not be generalizable across different contexts. Using a more diverse sample of countries, we nuance the findings of Walter and Drochon (2022). Our results illustrate that some indicators such as populist attitudes and distrust in scientists appear to explain climate change conspiracy beliefs across contexts. Other factors, such as age and political ideology, seem to have varying influence across our eight cases. Particularly, age seems to lose its association with climate conspiracy beliefs in the developing countries in our data (i.e., Brazil, Lebanon, Morrocco, and South Africa). The generally younger populations in these areas might explain the closing of the age gap. For ideology, we see similar patterns. In more polarized countries, including Brazil and the United States, a right-wing political ideology strongly relates to climate change conspiracy beliefs. In other countries without clear ideological dividing lines such as South Africa or Lebanon, political ideology does not associate with climate change conspiracy theories. For theory, this implies that there are some general factors associated with climate change conspiracy beliefs (including distrust of scientists and populist attitudes). However, for other factors such as age or political ideology, their influence might be context specific. We believe that similar nuances might exist for beliefs in other conspiracy theories and invite future research to test this stipulation.

Second, our study brings another important feature to the fore when measuring beliefs in climate change. In our sample, a very high percentage of respondents (more than 40% in Lebanon and Morrocco, and more than 25% in Western contexts such as Germany or the United States) chose the middle or uncertain category when answering whether they believed that climate change is a hoax or not. In contexts such as Morocco and Lebanon, this high percentage could be a result of people not having enough information or education to have a genuine opinion. However, a lack of information should be less of a factor in countries such as Australia, Canada or the United States. Across all countries, we also suggest that believing in conspiracy theories is non-normative (i.e., not the 'normal' view to have). Hence, social desirability could deflate individuals' self-reported answers to questions which measure beliefs in conspiracy theories (Smallpage et al., 2023). Our study points to this possibility, which, if true, could increase the "real" number of conspiracy believers. Therefore, future research should try to decipher the degree to which respondents to survey questions about climate change, (and any other conspiracy theory for that matter) could be swayed by social desirability bias.

Our findings also have important implications for policy. Previous research demonstrates the negative consequences of climate change conspiracy beliefs, ranging from lower levels of concern for the environment to decreasing support for pro-climate policies (Biddlestone et al., 2022; Douglas & Sutton, 2015). Accordingly, it is crucial to find ways to address beliefs in climate change conspiracy theories. Our results provide some insights into how we could develop mitigation strategies. Most notably, we found little evidence to suggest that education substantively matters; rather, we found that in the Western countries that we studied, an individual's political ideology was salient, and in all countries, levels of trust in science and scientists were leading factors in explaining individuals' propensity to believe in climate change conspiracy beliefs. These findings highlight the need for interventions that target ideological divisions and distrust in the scientific community and the broader population. Such policies could include, for example, greater scientific transparency (open science practices), more effective public-science dialogues, and engagement with ideological opinion leaders. These suggestions align with existing efforts to develop interventions to improve climate attitudes (see Geiger et al., 2017). Overall, the results of our research indicate the need to create opportunities for scientists and community members to discuss concerns and share knowledge directly, fostering mutual understanding and trust while reducing the 'elitist' perception often attributed to scientists (a perception which is central to the development of many conspiracy theories, including those related to climate change).

Findings

Finding 1: Beliefs in climate change conspiracy theories are prevalent worldwide, although there is some cross-national variation.

Through an original survey with roughly 1,000 answers per country collected in eight geographically and culturally diverse countries (i.e., Australia, Brazil, Canada, Germany, Lebanon, Morocco, South Africa, and the United States) (Bordeleau et al., 2023), we first found that beliefs in climate change conspiracy theories are prevalent around the world. On average, our cross-national sample revealed that 18.69% of respondents agree with the statement that climate change is a hoax and that scientists who claim it exists are lying (see Table 1). Conversely, we found that 51.80% of our sample disagree with this statement, leaving 29.51% who are uncertain about their stance on the issue.

We note that there was some strong variation in the uncertain category. In some countries, such as Lebanon and Morocco, more than 40% were uncertain whether climate change is a hoax or not. Even in countries such as Australia, Canada, or the United States, more than one in four respondents chose the middle category. Interestingly, there was also wide variation in beliefs in conspiracy theories both within the Western and the non-Western world. In Western countries, the average number of people who agree that climate change is a hoax ranges from 10.7% in Germany to 24.2% in the United States. In the non-Western world, the range is slightly smaller (from less than 14% in Morocco to over 24% in Brazil).

Table 1. *Percentage of respondents by country who agree/disagree that "climate change is a hoax and scientists touting its existence are lying."*

	Australia	Brazil	Canada	Germany	Lebanon	Morocco	South Africa	United States	Total
Agree	17.99	24.36	14.93	10.70	21.95	13.91	21.51	24.15	18.69
Disagree	57.87	50.59	59.83	69.48	31.53	44.26	52.43	48.40	51.80
Uncertain	24.14	25.05	25.24	19.82	46.52	41.83	26.06	27.45	29.51
N	1,026	1,024	999	1,027	931	1,072	1,016	1,006	8,101

Note: All entries are percentages except sample size.

Finding 2: Climate change conspiracy beliefs are mostly driven by political ideology, populist attitudes, distrust of scientists, and age.

To identify the main determinants of climate change conspiracy beliefs, we followed the Western-based literature on climate denial and distinguished between socio-economic and political covariates (Czarnek et al., 2021; Huber et al., 2022). We considered the socio-economic factors of age, gender, place of residence, socio-economic status, and immigrant status. For political factors, we included political ideology, populist attitudes, and trust in scientists. Figure 1 presents the standardized coefficients of a pooled regression model featuring all countries (with country-fixed effects). Belief in climate change conspiracy theories is the dependent variable and the four socio-economic factors as well as the three political factors are independent variables.

In our analysis, four predictors stand out. These are a right-wing political ideology, populist attitudes, distrust in scientists, and a young age. Importantly, we found that political factors appear to be more strongly related to climate change conspiracy beliefs than socio-economic factors. All three political factors are statistically significant and substantively related to climate change conspiracy beliefs. In more detail, we found that people with a right-wing ideology appear to be more likely to believe in climate

change conspiracy theories. The same relationship applies to people who do not trust scientists. The third political factor, populist attitudes, also relates to citizens' propensity to adhere to climate change conspiracy beliefs, even though the association of populist attitudes seems a bit weaker than for the two other political factors. When it comes to socio-economic indicators, the only factor that sticks out is age, with younger individuals appearing more likely to believe in climate change conspiracy theories. Pertaining to other socio-economic factors, there seems to be no relationship to socio-economic status and only a small negative relationship for immigrants and urban lifestyle. There is also a small yet statistically significant relationship with education, but this relationship is mostly driven by Germany and Brazil (see Table 5).
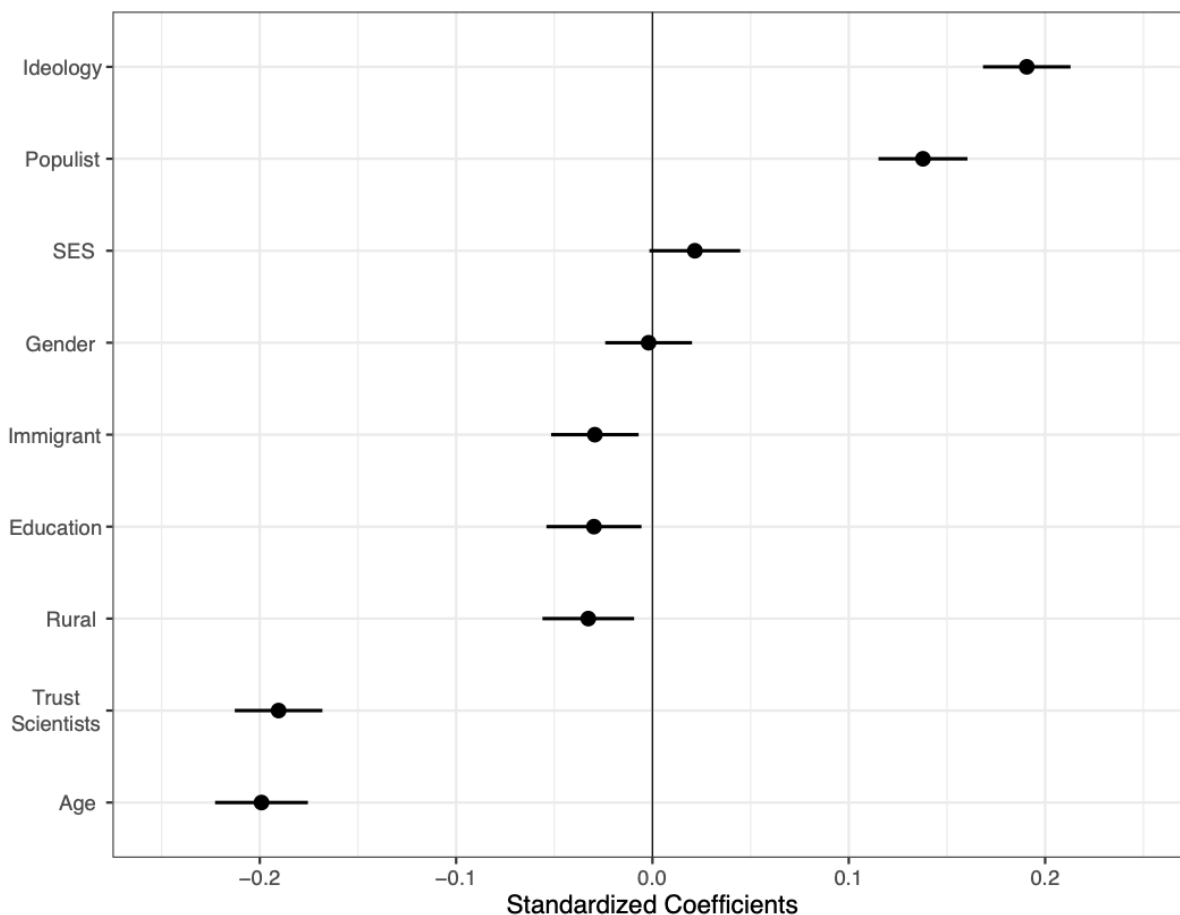

Figure 1. Standardized OLS regression coefficients for climate change conspiracy beliefs with 95% CI (SES = socioeconomic status; model includes country fixed effects; N = 6,836; R^2 = 0.19).

Finding 3: The prototypical climate change conspiracy believer is similar, but not entirely the same, across different national settings.

The relationship between most independent variables and the belief that climate change is a hoax appears similar across the eight countries we studied (i.e., there is a lot of overlap in the confidence intervals for the countries). However, for age and political ideology, we found diverging relationships between Western and non-Western countries. For age, younger people appear to be more likely to endorse conspiracy theories in Australia, Canada, Germany, and the United States. For Lebanon, Morocco, Brazil, and to a lesser degree South Africa, the same relationship is not visible in our regression models. For

political ideology, a right-wing ideology seems to be a major correlate of conspiratorial beliefs in some countries, such as the United States or Brazil, while in others such as South Africa and Lebanon, this does not seem to be the case.
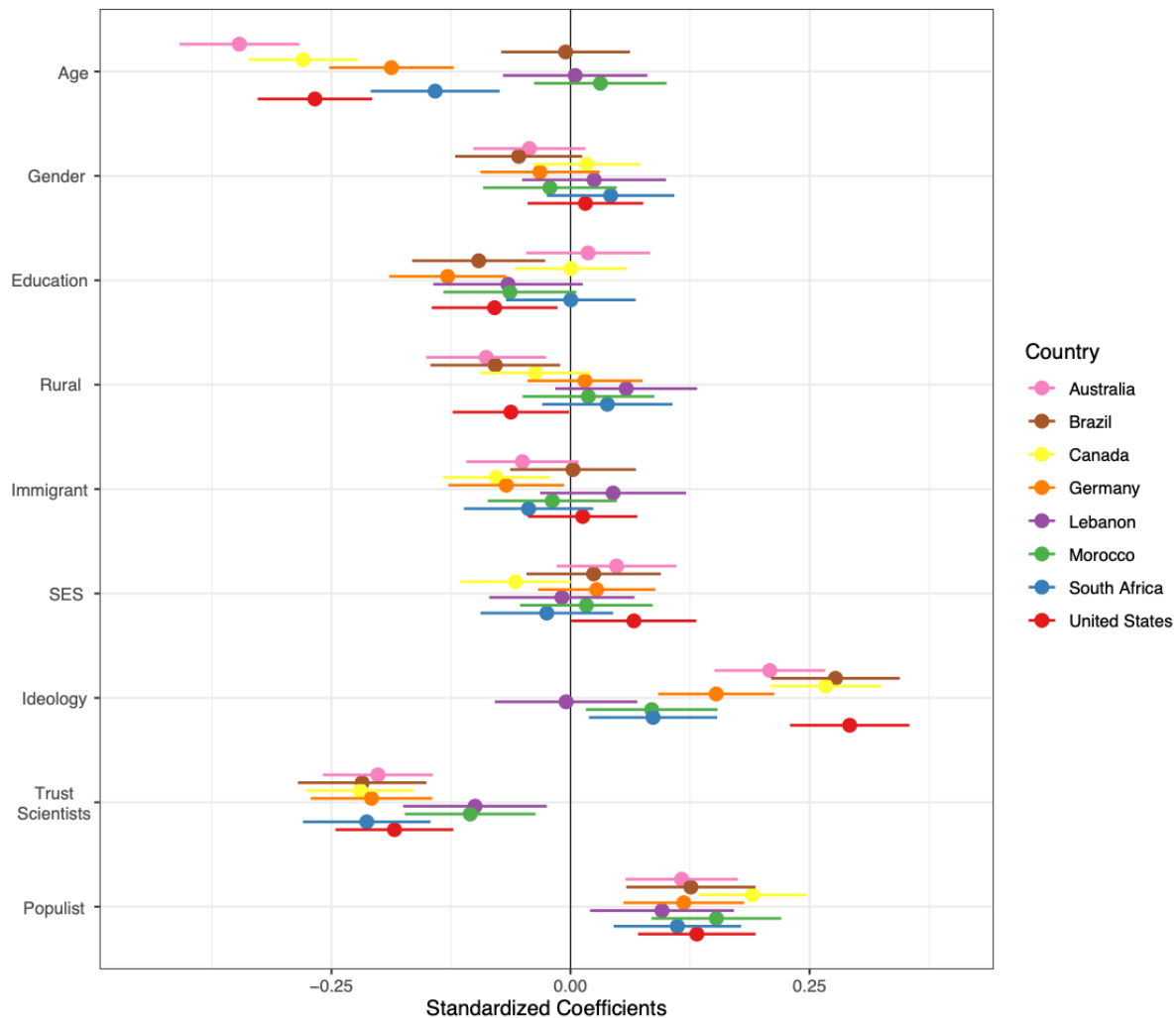

*Figure 2. Standardized OLS regression coefficients for climate change conspiracy beliefs by country (*SES = socioeconomic status; N = 6,836; R² = 0.19*).*

Methods

Survey details

We conducted the cross-national survey (*n* = 8,101) in December 2022 and January 2023 using a convenience sample from the market research firm Cint. The sample consisted of adults currently living in one of the eight specified countries. The English survey was translated into French, German, Arabic, and Portuguese. The composition of the country samples was mostly representative based on the most recent census data available. Table 2 presents the sociodemographic characteristics of the sample at the country level.

Table 2. *Sociodemographic information about all samples.*

	Australia	Brazil	Canada	Germany	Lebanon	Morocco	South Africa	United States
Age	44.3	38.7	46.7	46.9	30.5	36.2	37.1	44.3
Female	48.7	51.4	51.1	52.0	32.0	44.8	49.0	55.6
University	46.9	16.9	44.2	51.4	15.3	16.8	44.2	33.8
Live in city	32.2	72.4	43.1	27.9	36.7	74.9	31.9	28.9
N	1,026	1,024	999	1,027	931	1,072	1,016	1,006

Note: All entries are percentages except the sample size and age, which is the mean.

The sample is slightly younger in Brazil, Lebanon, Morocco, and South Africa, which is consistent with the younger populations present in these respective states. In terms of gender, male respondents are overrepresented in the Moroccan and Lebanese samples due to the low availability of online female survey respondents. Lastly, Brazil and Morocco stand out with overly urban samples, which may be explained by low connectivity in rural communities impeding online survey participation. We also present in Table 3 key descriptive statistics for the main variables used in this research. More specifically, we present the mean, standard deviation, and range. These statistics will be useful for the interpretation of the regression models and will add context to the analyses.

Table 3. *Descriptive statistics for main variables.*

	M	*SD*	Range
Climate Conspiracy Beliefs	1.37	1.24	[0, 4]
Age	40.74	15.53	[18, 99]
Gender	0.52	0.50	[0; 1]
Education	3.62	0.94	[1, 5]
Urban/Rural	2.04	1.12	[1, 5]
Immigrant	0.91	0.28	[0; 1]
Socioeconomic Status	1.78	0.52	[1, 3]
Political Ideology (Left-Right)	5.41	2.54	[0, 10]
Trust in Scientists	5.93	2.79	[0, 10]
Populist Attitudes	3.73	0.78	[1, 5]

Note: Age is a continuous variable representing the age of respondents. Gender is 0 for female and 1 for male. Education is from 1 = no schooling to 5 = postgraduate degree. Urban/rural is from 1 = city to 5 = countryside. Immigrant is 0 = no and 1 = yes. SES is 1 = lower class to 3 = upper class. Political ideology is from 0 = left to 10 = right. Trust in scientists is from 0 = no trust to 10 = complete trust. Populist attitudes are from 1 = low to 5 = high.

Operationalization of variables

To capture belief in climate change conspiracy theories, we asked respondents to rate the extent to which they agreed with the following statement: "Climate change is a hoax and scientists touting its existence are lying." Answers were recorded on a scale from 0 = *definitely not true* to 4 = *definitely true*.

In terms of the main determinants (independent variables), we measured age and gender using standard demographic items: "How old are you?" and "How do you describe yourself?" Education was captured differently across each country but standardized to a 5-point scale (1 = *no formal education*, 2 = *elementary education*, 3 = *secondary education*, 4 = *college/university education*, and 5 = *postgraduate education*). Urban/rural living was measured with the following question: "How urban or rural is your place of residence?" with answer choices including 1 = *a big city*, 2 = *a suburb or outskirt of a big city*, 3 = *a town or small city*, 4 = *a village*, and 5 = *the countryside*. To measure respondents' socioeconomic standing across our cross-national sample, we asked them to self-identify either as being in the lower class, middle class, or upper class. Immigrant status was determined using the answer to the following question: "Were you born in [country]?"

Political ideology was measured using a standard 10-point left-right scale: "In politics people sometimes talk of left and right. Where would you place yourself on a scale from 0 to 10 where 0 means the left and 10 means the right?" Trust in scientists was captured using the following question: "On a scale from 0 (no trust) to 10 (most trust), how much trust do you have in each of the following groups: Scientists." Lastly, populist attitudes were captured using the 8-item populist attitudes scale developed by Akkerman et al. (2014). Items included "the people, and not politicians, should make our most important policy decisions" and "I would rather be represented by a citizen than a specialized politician."

Analytical details for Findings 1 and 2

We first investigated the prevalence of climate change conspiratorial beliefs across the eight countries in our sample. We relied on percentage frequency scores for the climate conspiracy item in each of the countries and in the full sample (see Table 1). The R code for this—and all other analyses—is available alongside the dataset on the Harvard Dataverse.

Table 4. *OLS linear regression for climate change CBs.*

	B	SE b
Age	-0.016**	0.001
Gender	-0.005	0.028
Education	-0.040+	0.016
Urban/Rural	-0.036*	0.013
Immigrant	-0.129*	0.050
Socioeconomic Status	0.052	0.028
Political Ideology	0.095**	0.006
Trust in Scientists	-0.086**	0.005
Populist Attitudes	0.223**	0.019
Intercept	1.394**	0.124

Note: Unstandardized regression coefficients (N = 6,691). Model includes country fixed effects. Age is a continuous variable representing the age of respondents. Gender is 0 for female and 1 for male. Education is from 1 = no schooling to 5 = postgraduate degree. Urban/Rural is from 1 = city to 5 = countryside. Immigrant is 0 = no and 1 = yes. SES is 1 = lower class to 3 = upper class. Political ideology is from 0 = left to 10 = right. Trust in scientists is from 0 = no trust to 10 = complete trust. Populist attitudes are from 1 = low to 5 = high. R^2 = 0.18. + p < 0.05, * p < 0.01, ** p < 0.001

We then proceeded to examine the determinants of climate conspiracy beliefs in the full sample. To do so, we computed an ordinary least-square regression model with climate conspiracy beliefs as the

outcome variable (5-point scale). To control for cross-country variation, we included country-fixed effects. The results of this model are illustrated in Figure 1 and presented in Table 4 below. All analyses were computed in R, and the replication code for each table/figure is clearly labelled in the .R file.

Analytical details for Finding 3

Lastly, we examined whether the determinants of climate change conspiracy beliefs varied across national setting. To do so, we computed country-level ordinary least square regression models with climate conspiracy beliefs as the dependent variable. The results of these models are illustrated in Figure 2 of the main text and presented in the model output below (Table 5). The data and code used for these analyses have been uploaded on the Harvard Dataverse.

Table 5. *OLS linear regression models for climate change conspiracy beliefs by country.*

Variable	Australia (N = 917)	Brazil (N = 864)	Canada (N = 905)	Germany (N = 891)	Lebanon (N = 705)	Morocco (N = 818)	South Africa (N = 829)	United States (N = 901)
	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)
Age	-0.026* (0.002)	0.000 (0.003)	-0.021* (0.002)	-0.014* (0.002)	0.000 (0.004)	0.003 (0.003)	-0.013* (0.003)	-0.023* (0.003)
Gender	-0.106 (0.074)	-0.135 (0.084)	0.042 (0.070)	-0.073 (0.072)	0.056 (0.088)	-0.047 (0.077)	0.110 (0.089)	0.042 (0.083)
Education	0.022 (0.039)	-0.218* (0.081)	0.001 (0.058)	-0.187** (0.045)	-0.077 (0.047)	-0.076 (0.043)	0.000 (0.051)	-0.096+ (0.041)
Urban	-0.117* (0.042)	-0.094+ (0.041)	-0.040 (0.032)	0.014 (0.029)	0.052 (0.034)	0.022 (0.042)	0.052 (0.047)	-0.072+ (0.036)
Immigrant	-0.169+ (0.100)	0.033 (0.433)	-0.244** (0.090)	-0.267+ (0.122)	0.145 (0.127)	-0.143 (0.258)	-0.286 (0.225)	0.077 (0.177)
SES	0.110 (0.073)	0.055 (0.082)	-0.145+ (0.074)	0.062 (0.071)	-0.018 (0.077)	0.043 (0.092)	-0.068 (0.097)	0.153+ (0.077)
Political Ideology	0.121** (0.017)	0.106** (0.013)	0.144** (0.016)	0.087** (0.018)	-0.002 (0.018)	0.038+ (0.016)	0.045+ (0.018)	0.138** (0.015)
Trust in Scientists	-0.099** (0.014)	-0.098** (0.015)	-0.106** (0.014)	-0.090** (0.014)	-0.034** (0.013)	-0.042** (0.014)	-0.103*** (0.016)	-0.085** (0.014)
Populist Attitudes	0.206** (0.053)	0.217** (0.059)	0.329** (0.050)	0.170** (0.046)	0.134* (0.054)	0.200*** (0.045)	0.213** (0.065)	0.222** (0.053)
Intercept	1.798** (0.333)	1.567+ (0.609)	1.339** (0.335)	1.766** (0.321)	1.499** (0.341)	1.024+ (0.398)	1.571* (0.482)	1.544** (0.303)

Note: Unstandardized OLS linear regression coefficients with standard error in parentheses. Age is a continuous variable representing the age of respondents. Gender is 0 for female and 1 for male. Education is from 1 = no schooling to 5 = postgraduate degree. Urban/Rural is from 1 = city to 5 = countryside. Immigrant is 0 = no and 1 = yes. SES is 1 = lower class to 3 = upper class. Political ideology is from 0 = left to 10 = right. Trust in scientists is from 0 = no trust to 10 = complete trust. Populist attitudes are from 1 = low to 5 = high. + p < 0.05, * p < 0.01, ** p < 0.001.

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Competing interests
The authors declare no competing interests.

Ethics
The survey protocol employed was approved by the institutional review board of the University of Ottawa Human subjects provided informed consent.

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Data availability
All materials needed to replicate this study are available via Harvard Dataverse: https://doi.org/10.7910/DVN/FYOVZQ. Replication code available upon request from the second author.