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Exploring U.S. Climate Attitudes: 2023 SPEER Survey Findings

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Abstract

We present findings from a comprehensive survey of climate-related attitudes across the United States in 2023. Using an online sample of 2,188 U.S. adults, we examined correlates of climate-related attitudes. Regional analyses reveal regional variations in climate attitudes, with the West South-Central region showing consistently high levels of concern across most measures, while the East South-Central region demonstrates the lowest levels of concern. The Pacific region exhibits a nuanced pattern, ranking high in risk perception and concern for future generations, but lower in personal worry and anticipated harm. Linear regression analysis for climate belief identifies several significant predictors including political affiliation and orientation, religious beliefs, education, and urbanicity. Conservatives, Republicans, evangelical Christians, and rural residents are more likely to express skepticism about climate change, while higher education levels correlate with stronger climate change beliefs. Additionally, we assessed public trust in climate scientists using a feeling thermometer scale, finding generally high trust levels with notable regional and demographic variations. This inaugural survey establishes a baseline for tracking changes in climate attitudes over time and provides valuable insights for tailoring climate communication strategies and policy approaches across different segments of the U.S. population.

1. INTRODUCTION

Why study climate beliefs?

Anthropogenic climate change represents one of the most pressing challenges facing humanity today (IPCC, 2021). However, public concern about climate change remains highly polarized, particularly along political lines in Western nations like the United States (McCright & Dunlap, 2011). This divide poses a significant obstacle to mobilizing effective climate action, making the study of climate beliefs an urgent priority. Understanding the factors that influence climate beliefs, especially political ideology and party affiliation, is crucial for informing policy decisions and guiding effective communication strategies. By comprehending how political orientation shapes perceptions of climate change risk and certainty, policymakers can craft climate policies more likely to gain widespread support and implementation. This knowledge enables the development of targeted communication approaches to increase public awareness and engagement across diverse ideological groups.

Our study focuses on several key aspects of climate beliefs, including certainty about global climate change, perceptions of global warming risk, personal importance of global warming, worry about global warming, and perceptions about future impacts. By examining these variables in relation to political

ideology, party affiliation, and other demographic factors, we can gain valuable insights into the nuanced ways in which politics shapes climate attitudes. We also hope to understand how regional differences within the United States may influence climate beliefs. By analyzing responses across different U.S. Census regions, we can identify geographical patterns in climate attitudes that may inform region-specific strategies for climate communication and policy implementation.

Additionally, our investigation into the relationship between climate beliefs and attitudes towards climate scientists provides crucial insights into the role of trust in scientific expertise in shaping public opinion on climate change. This understanding is essential for developing effective educational approaches and enhancing climate literacy across different segments of the population.
By examining these various dimensions of climate beliefs and their political and demographic correlates, our study aims to contribute to the broader effort of understanding and addressing the challenges posed by climate change skepticism and political polarization on this critical issue.

What do we already know?

Extensive research has documented a significant political divide in climate change attitudes within the United States. This ideological gap manifests across various dimensions of climate belief and concern. Consistently, studies have shown that conservatives and Republicans exhibit higher levels of skepticism regarding climate change and its associated risks compared to their liberal and Democratic counterparts (Hamilton, 2011; Marquart-Pyatt et al., 2011; McCright et al., 2016).

The political schism extends beyond mere belief, influencing support for climate action and pro-environmental policies. Conservatives demonstrate markedly less concern about climate change and offer reduced backing for initiatives such as renewable energy development and emissions reduction strategies (Dunlap et al., 2016; Hornsey et al., 2016; McCright & Dunlap, 2011; McCright et al., 2016). Indeed, political ideology and party affiliation emerge as primary predictors of both climate skepticism and resistance to mitigation efforts in the United States.

However, the landscape of climate beliefs is shaped by factors beyond political orientation. Education also influences climate perceptions, generally correlating with increased acceptance of climate change and related concerns. Yet, this relationship is not uniform across ideological lines, suggesting a complex interplay between knowledge and belief (Kahan et al., 2011; Marquart-Pyatt et al., 2011). Demographic factors such as age, gender, race, and education level also contribute to the variability in climate views. However, these effects are often mediated by cultural and ideological orientations, underscoring the complexity of factors influencing climate change perceptions (McCright and Dunlap, 2011; Howe & Leiserowitz, 2013).

What are the SPEER goals?

As the inaugural iteration of a planned annual survey, this study aims to establish a baseline and begin documenting the nuanced aspects of climate beliefs in the United States. Our research focuses on five key dimensions of climate attitudes: certainty about global climate change, perceptions of global warming risk, personal importance of global warming, worry about global warming, and beliefs about future impacts of global warming. By examining these variables alongside demographic factors, political

Table 1: Climate questions

Variable	Description / Question
Belief in Climate Change (Belief)	Linear scale based on the question, "How certain are you that greenhouse gases, such as those resulting from the combustion of coal, oil, natural gas, and other materials, are causing average global temperatures to rise?"
Belief in Climate Risk (Risk)	Linear scale based on the question, "How much risk do you think global warming poses for people and the environment?"
Personal Importance of Global Warming (Personal)	Linear scale based on the question, "How unimportant or important is the issue of global warming to your personally?"
Worried About Global Warming (Worry)	Linear scale based on the question, "How worried are you about global warming?"
Personal Harm (Harm)	Linear scale based on the question, "How much do you think global warming will harm you personally?"
Belief Global Warming Will Harm Future Generations (Future Generations)	Linear scale based on the question, "How much do you think global warming will harm future generations of people?"
Climate Scientists Thermometer	Linear scale based on the question, "We'd like to get your feelings toward some groups of people. We'd like you to rate climate scientists below using something we call the feeling thermometer. Ratings between 50 degrees and 100 degrees mean that you feel favorable and warm toward the group. Ratings between 0 degrees and 50 degrees mean that you don't feel favorable toward the group and that you don't care too much for that group of people. You would rate the group at the 50- degree mark if you don't feel particularly warm or cold toward the group."

dimensions, and regional differences, we seek to provide a more comprehensive understanding of the complex landscape of climate beliefs. Our study incorporates additional elements by assessing respondents' feelings towards climate scientists, allowing us to explore the relationship between trust in scientific expertise and climate attitudes. This multifaceted approach not only captures the current state of climate beliefs but also sets the stage for tracking changes over time as we continue this survey in subsequent years.

2. METHODS

Data

Data come from the 2023 SPEER Survey. Data were collected via online survey panels administered by Qualtrics and carried out in accordance with the relevant guidelines and regulations of the University of Oklahoma Institutional Research Board, and following protocols outlined under IRB approval #15823. Informed consent was obtained by all subjects. Respondents were 2188 U.S. adults (18+ years) sampled via quota-based recruitment by Qualtrics to match census benchmarks for age, gender, race/ethnicity, education level, and U.S. region, and thus is a large and diverse sample that approximates a

representative sample of the U.S. population. Additional details are available in the SPEER 2023 Survey report (Bedle et al., 2024).

Measures

We use five linear dependent variables to measure attitudes about climate change including 1) certainty about global climate change, 2) perceptions of global warming risk, 3) personal importance of global warming, 4) worry about global warming, and 5) perceptions about future impacts of global warming. These variables as detailed in Table 1 are adapted from the Yale Climate Opinion maps survey (Ballew et al., 2019). Additionally, respondents were asked to rate their feelings towards Climate Scientists. Specific wording for these questions can be found in Table 1.

As zip codes were collected as part of the SPEER 2023 survey, regional maps can be produced based on the US Census Regions. The states assigned to each region, and the region names are detailed in Table 2.

Table 2: United States Census Regions

Census Division	States
New England	CT, ME, MA, NH, RI, VT
Middle Atlantic	NJ, NY, PA
East North Central	IL, IN, MI, OH, WI
West North Central	IA, KS, MN, MO, NE, ND, SD
South Atlantic	DE, FL, GA, MD, NC, SC, VA, DC, WV
East South Central	AL, KY, MS, TN
West South Central	AR, LA, OK, TX
Mountain	AZ, CO, ID, MT, NV, NM, UT, WY
Pacific	AK, CA, HI, OR, WA

3. INSIGHTS

Belief in Climate Change

Looking first at the belief that hydrocarbon-based greenhouse gases are causing climate change, we note that that the measurement for this scale was asked was:

- Very certain it is not happening (1)
- Certain it is not happening (2)
- Somewhat certain it is not happening (3)
- Uncertain whether it is happening (4)
- Somewhat certain it is happening (5)
- Certain it is happening (6)
- Very certain it is happening (7)

Analysis of the geographical distribution of climate change beliefs, as illustrated in Figure 1, reveals significant regional variations. The East South-Central region emerges as the area with the highest level of climate change skepticism, while the Pacific and East Northcentral regions demonstrate the strongest belief in climate change occurrence.

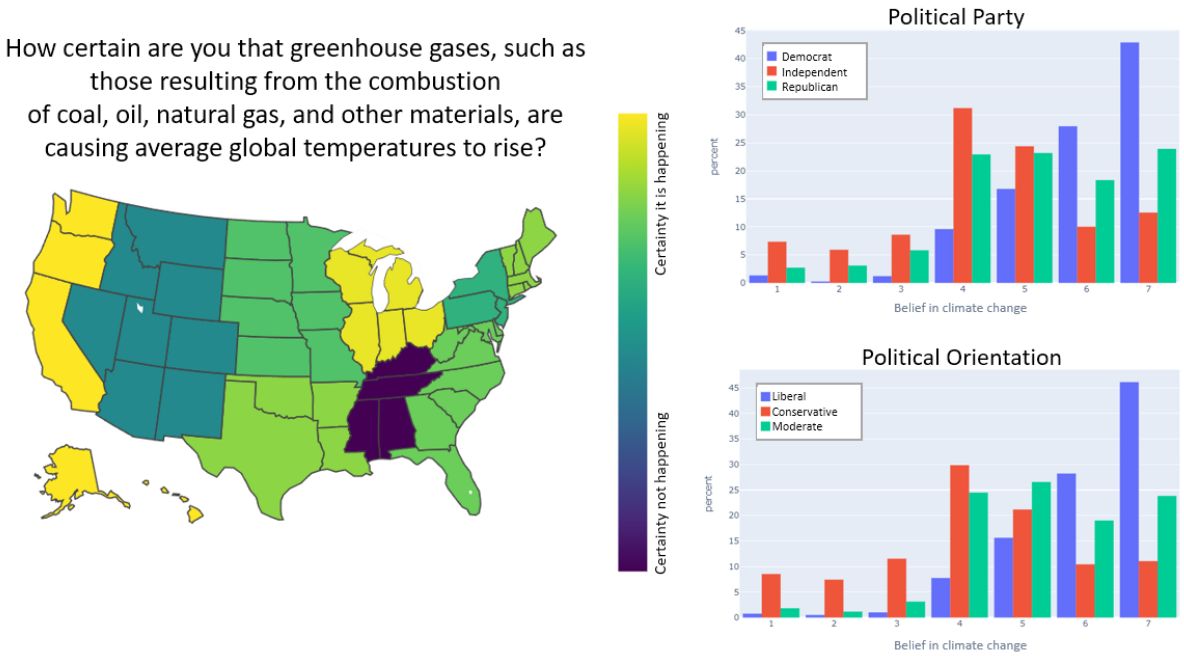

Figure 1: Left: Map of average belief for respondents I each US Census region. Right: Percent of each political party (top) and political orientation group (bottom) that fell into each category of each category of belief in human caused climate change.

To further investigate the factors influencing these beliefs, we conducted a linear regression analysis using a comprehensive set of control variables, including demographics, political dimensions, religious beliefs, SES, family variables, and residential factors. The results, presented in Table 3, indicate that several factors significantly correlate with climate change beliefs. Political party affiliation, political ideology, adherence to biblical literalism, evangelical religious identification, education level, and urbanicity emerge as statistically significant predictors.

Table 3. OLS Regressions for Climate Change Belief

	b
Political Orientation	
Moderate	-.280***
Conservative	-.706***
Political Party	
Independent	-.252***
Republican	-.300***
Demographics	
Degree	.102**
Mean-centered Age^2	.000**
Rural	-.138***
Biblical Literalist	-.158**
Evangelical	-.104*

Adj. R^2	.236

* p ≤ .05 ** p ≤ .01 *** p ≤ .001

**Note: Model includes additional controls for gender, race, socio-economic status, family status, and religious variables*

Specifically, our findings show that individuals identifying as politically conservative or moderate, compared to liberals, are more likely to express skepticism about climate change. Similarly, Republicans and Independents, relative to Democrats, show a higher propensity for climate change denial. Religious factors also play a role, with evangelical Christians and biblical literalists demonstrating a greater tendency towards climate change skepticism. Additionally, residing in rural areas (results not in table) correlates with increased doubt about climate change occurrence. Conversely, higher education levels, particularly holding a college degree, are associated with stronger beliefs in climate change. Interestingly, factors such as race, gender, family status, income, and specific U.S. region did not yield statistically significant results in our model.

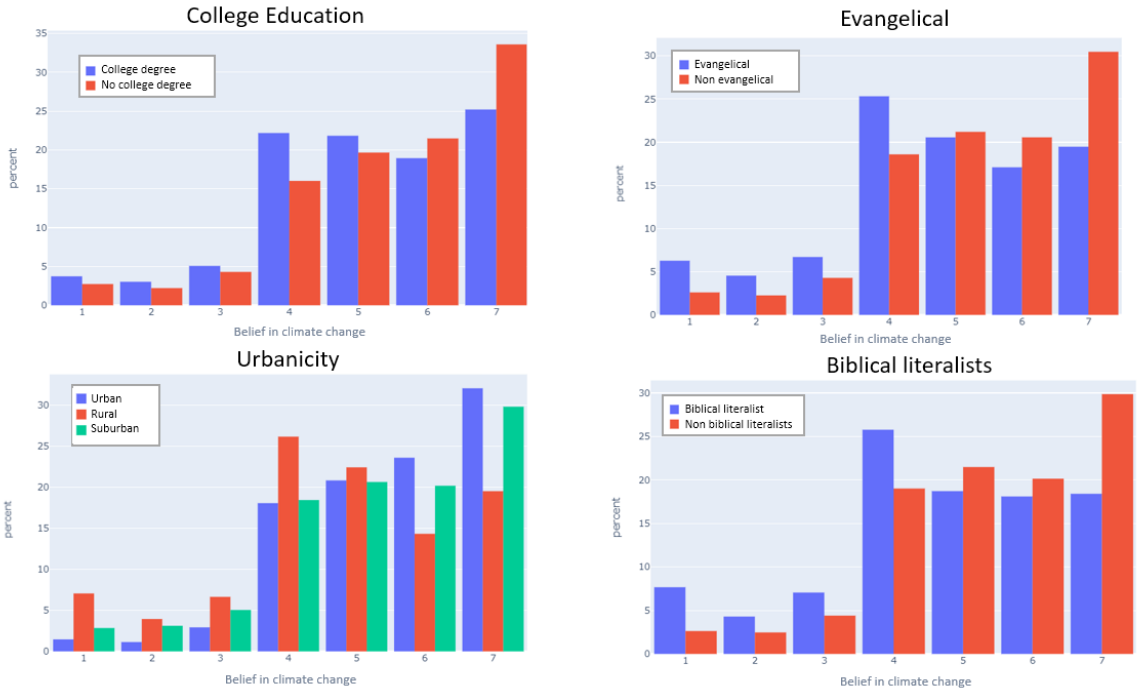

Figure 2: Percent of each subgroup that fell into each category of each category of belief in human caused climate change.

The distribution of these significant factors is visually represented in Figures 1, 2 and 3, providing a clear illustration of how these variables interact with climate change beliefs across different segments of the population. These findings underscore the complex interplay of ideological, religious, educational, and geographical factors in shaping public perceptions of climate change, highlighting the need for nuanced approaches in climate communication and policy strategies.

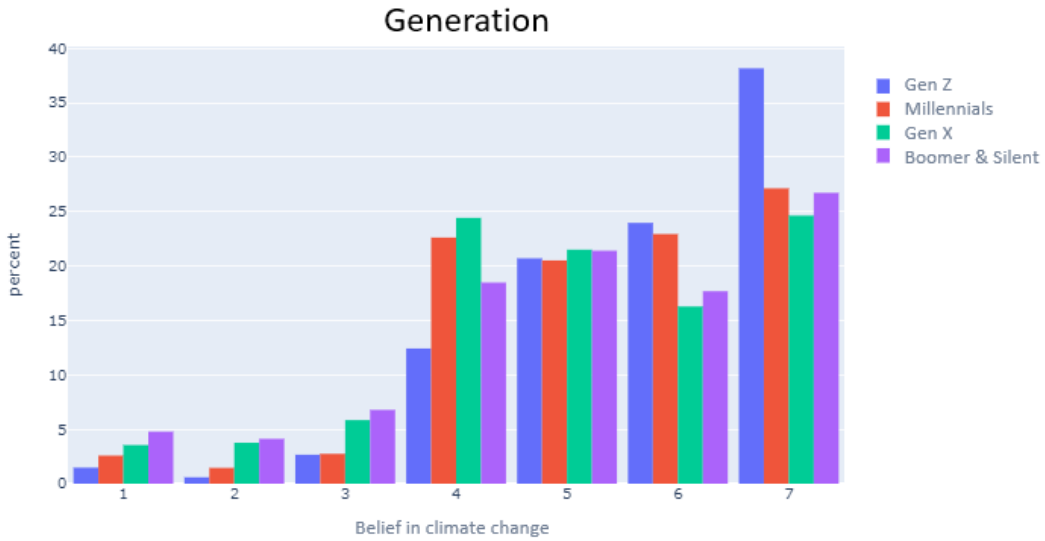

Figure 3: Generational belief in climate change caused by greenhouse gasses

Additional Climate Belief Measures

A set of five additional survey items provide a comprehensive and nuanced exploration of climate change attitudes. Each survey item probes a distinct aspect of an individual's relationship with and understanding of global warming. The wording for these survey questions is displayed in Table 1. By including these diverse but related questions, we capture a more comprehensive picture of climate attitudes. This approach recognizes that general risk perception, personal relevance, emotional responses, anticipated personal harm, and concern for future generations may not always align perfectly. The combination of these measures provides rich insights into the complexity of public opinion on climate change, ranging from immediate personal concerns to broader societal and future-oriented perspectives.

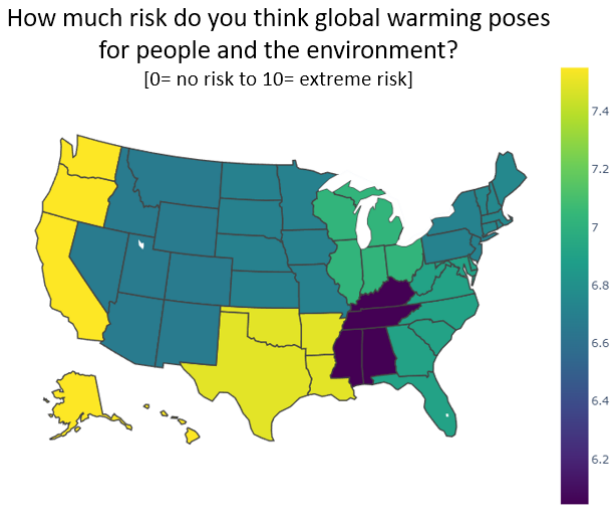

Figure 4: Risk perception of climate change.

Our analysis of climate change attitudes across U.S. Census Divisions reveals intriguing regional patterns. Consistently across all five measures (risk perception, personal importance, worry, personal harm, and concern for future generations), the West South-Central region, comprising Texas, Oklahoma, Arkansas, and Louisiana, ranks high in climate change concern (Figures 7 and 8). This finding is particularly noteworthy given the region's economic ties to fossil fuel industries. In contrast, the Pacific region shows a more nuanced pattern. While ranking high in perceived risk, personal importance, and concern for future generations, the Pacific region notably ranks lower than the West South Central in measures of worry and anticipated personal harm. This discrepancy suggests that Pacific residents recognize the broader implications of climate change but feel less personally threatened. At the other end of the spectrum, the East South-Central region, encompassing Kentucky, Tennessee, Mississippi, and Alabama, consistently demonstrates the lowest levels of concern across all measures, and recall the least trust in climate scientists. These regional variations highlight the complex interplay of geographical, cultural, and economic factors in shaping climate change attitudes, underscoring the need for tailored approaches in climate communication and policy implementation across different parts of the country.

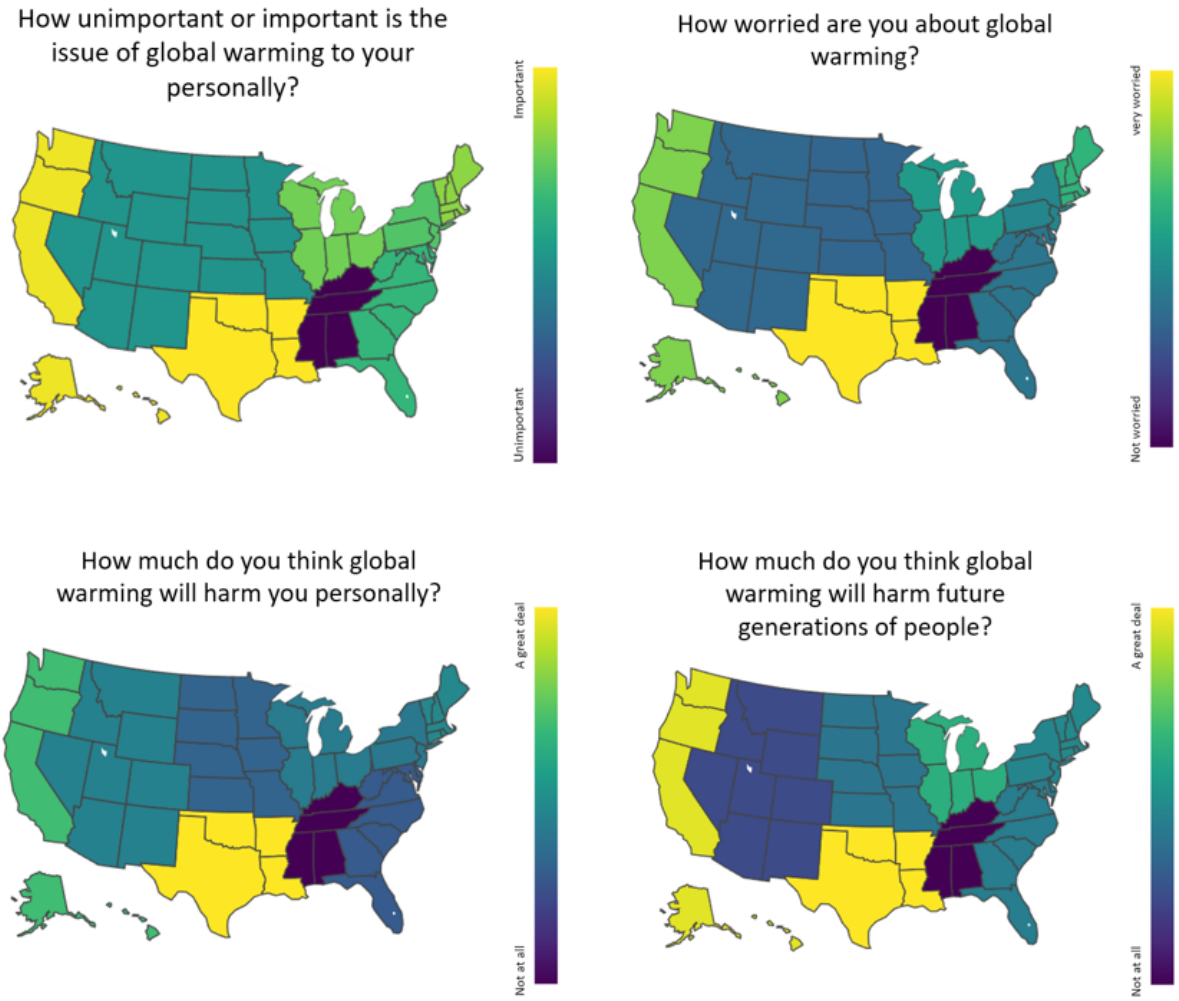

Figure 5: Climate change perceptions throughout the US

Opinion of Climate Scientists

Assessing public trust in climate scientists is crucial for understanding the broader context of climate beliefs. The feeling thermometer for climate scientists included in SPEER23 provides a valuable proxy for measuring this trust, offering insights into how people perceive the credibility and reliability of climate science information. By asking respondents to rate their feelings towards climate scientists on a scale from 0 to 100 degrees, we can gauge the level of warmth or coolness towards this group, which often correlates with trust in their findings and recommendations. This measure is particularly important because trust in scientific expertise can significantly influence how individuals interpret and respond to climate change information. Low trust in climate scientists may contribute to skepticism about climate change, while high trust may lead to greater acceptance of scientific consensus and support for climate action. By including this question alongside other climate belief measures, we can explore how trust in climate scientists relates to various aspects of climate attitudes, potentially revealing pathways for enhancing public engagement with climate science and informing more effective communication strategies.

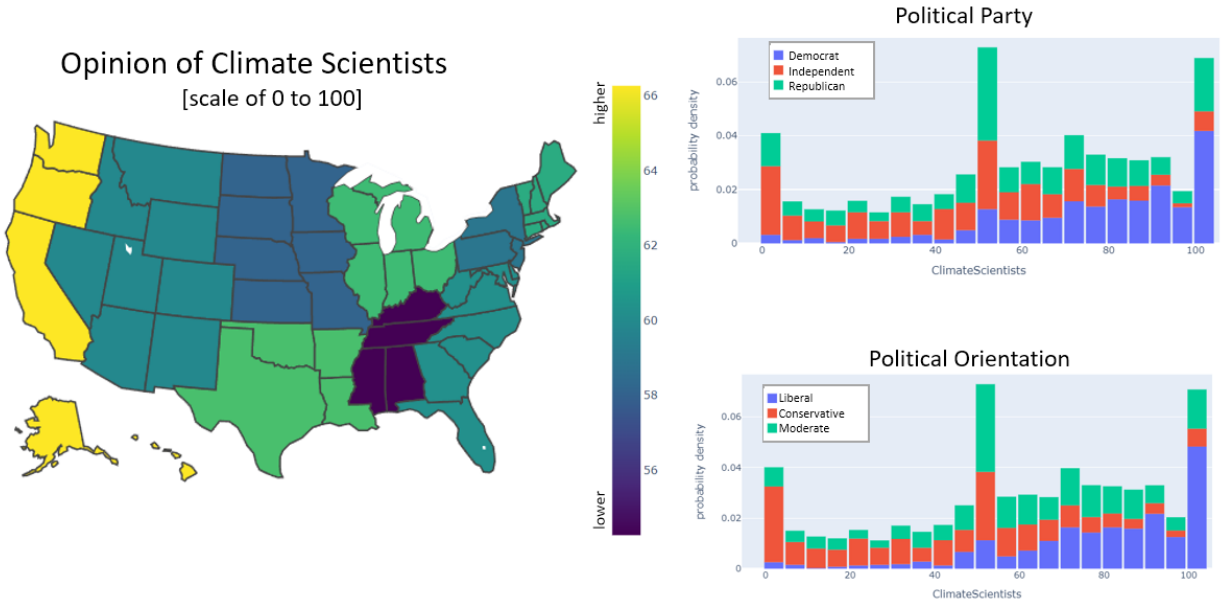

Figure 6: Regional map of opinion of climate scientists by US Census division (left), as well as opinion of climate scientists by political party and orientation (right).

Our analysis reveals that trust in climate scientists is generally high across the United States, though regional variations are evident. The East South-Central region shows the lowest average trust, with a score of approximately 55 out of 100 on the feeling thermometer scale, while the Pacific region demonstrates the highest trust, averaging around 65 out of 100 (Figure 4). To further understand the factors influencing trust in climate scientists, we conducted an OLS regression analysis (table not shown) similar to our examination of climate change beliefs. The results indicate that several demographic and ideological factors significantly impact trust levels. Political party affiliation and orientation, religious beliefs (specifically being a biblical literalist or evangelical Protestant), age, gender, race, and education all play significant roles (Figure 4,5, and 6). Conservatives and moderates (compared to liberals), independents and Republicans (compared to Democrats), biblical literalists, and evangelicals tend to express lower levels of trust in climate scientists. Additionally, individuals who identify as Black or Hispanic (compared to White) also show a tendency towards lower trust. In contrast, being female and having higher levels of education are associated with greater trust in climate scientists. These findings underscore the complex interplay of social, cultural, and demographic factors in shaping public perceptions of scientific expertise in the climate domain.

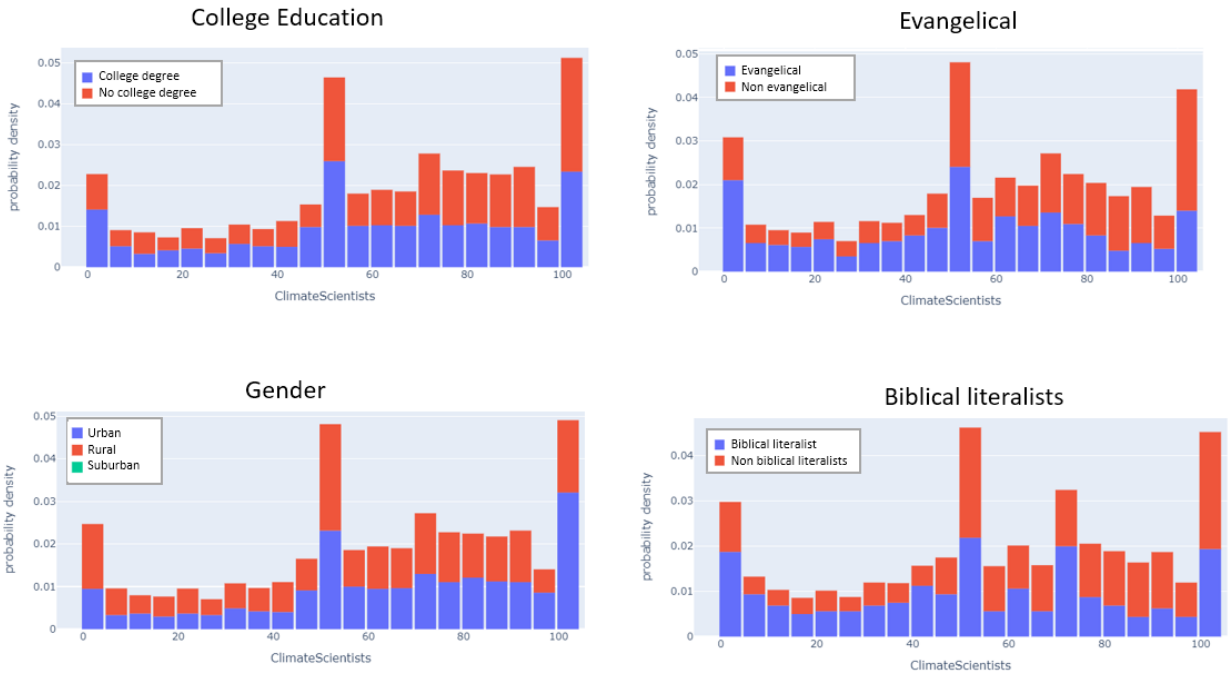

Figure 7: Opinion of climate scientists on a 100 point scale by college education, gender, Evangelical and biblical literalists beliefs.

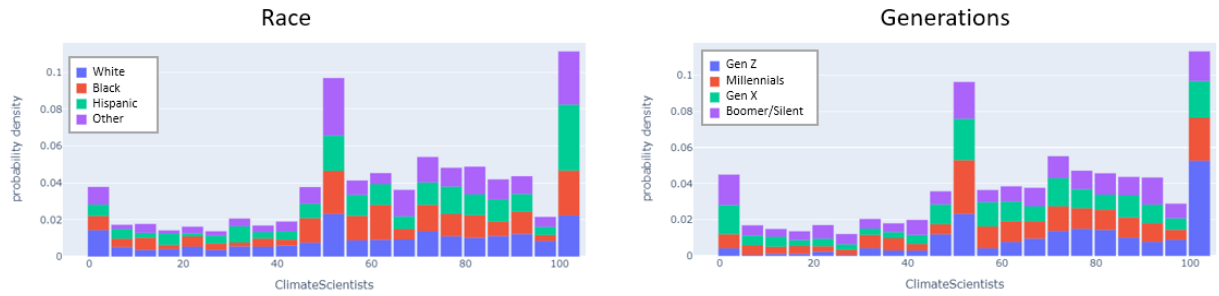

Figure 8: Opinion of climate scientists based on race and generation.

4. CONCLUDING THOUGHTS

This inaugural SPEER survey provides a comprehensive snapshot of climate change attitudes across the United States in 2023, revealing significant regional variations and complex interactions between political, religious, and demographic factors. Our findings highlight the persistent political divide in climate beliefs, with conservatives and Republicans generally expressing more skepticism about climate change. However, we also uncovered nuanced regional patterns, such as the unexpectedly high levels of climate concern in the West South-Central region, which challenge assumptions about climate attitudes. The study also revealed generally high levels of trust in climate scientists, albeit with notable variations across different demographic groups. These insights into public perceptions of scientific expertise offer valuable guidance for future climate communication strategies. We note that climate scientists were among the most favorable groups from all those asked in the full SPEER23 survey.

As the first in a planned series of annual surveys, this research establishes a crucial baseline for tracking changes in climate attitudes over time. Future iterations will allow us to monitor shifts in public opinion, assess the effectiveness of climate communication efforts, and identify emerging trends.

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