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ARTICLE

Experience and self-interest: Diverging responses to global warming

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Abstract

People are increasingly feeling global warming's effects through extreme heat and natural disasters. How do these climate shocks affect political attitudes? We argue that the effect of climate-related experiences depends significantly on self-interest. People in more vulnerable locations are more likely to respond to climate shocks with greater concern and more support for mitigation policy. We test this hypothesis with a macroeconomic model of climate change, geospatial data on climate shocks, and survey data of 148,712 people across 137 countries, and over time with the same 9,500 individuals in the United States. The results show that climate shocks heighten risk perceptions and lead to greater support for mitigation policies only among people in climate-vulnerable places. This responsiveness to experience is most evident in democratic countries and among people whose livelihoods depend on the weather. Integrating political economy and behavioral theories helps to explain how political attitudes change.

Politicians have few incentives to combat climate change if the public does not prioritize the issue. People in climate-vulnerable places, in theory, have strong incentives to mitigate climate change to avoid future damage. However, the policies to stop global warming also require sacrifices such as higher energy bills. To date, many voters appear unwilling to pay climate policy's costs today even to avoid future climate perils (e.g., Bechtel & Scheve, 2013).

A prominent view is that as people feel climate change's effects, the threat will become more concrete. The public will prioritize global warming and demand that the government pass policies to mitigate greenhouse gas emissions (Weber, 2006). How does experiencing climate shocks affect the public's concern about the issue and support for mitigation policies?

There is mixed evidence that climate shocks affect political behavior (Howe et al., 2019). Some studies find that certain heat extremes and natural disasters modestly increase belief in global warming and mitigation support (Arias & Blair, 2024; Bergquist & Warshaw, 2019; Egan & Mullin, 2012; Konisky et al., 2016). Climate shocks may also influence voting (Baccini & Leemann, 2021; Hazlett & Mildenberger, 2020; Hoffmann et al., 2022), trust in institutions (Balcazar & Kennard, 2023), and bureaucrats' behavior (Clark & Zucker, 2024). But other analyses report little relationship between natural disaster experience and

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The Cornell Center for Social Sciences verified that the data and replication code submitted to the AJPS Dataverse replicates the numerical results reported in the main text of this article.

political outcomes (Bechtel & Mannino, 2023; Hilbig & Riaz, 2024).

It is not automatic that global warming would uniformly affect political attitudes. Climate change has profoundly unequal effects, so people vary in how much costly mitigation is in their self-interest. Some individuals reside in places that will suffer severe climate perils, such as extreme heat, whereas others live in locations facing more limited damage. This variation emerges from geography that influences the local climate and distance to the coastline (Burke et al., 2015; Cruz & Rossi-Hansberg, 2024; Hsiang et al., 2017).

These geographic inequalities in climate vulnerability imply a new hypothesis. People will diverge in how they respond to climate shocks depending on where they live for two reasons. First, climate shocks will have more negative effects in more vulnerable places. The intensity of these adverse experiences creates stronger pressure for belief change than for people who face more limited damages.

Second, geography creates different expectations about the likelihood of climate shocks. From passive observation and intuition, people develop an understanding of how often shocks occur. People who live far from the coast, for example, do not worry as much about sea level rise. These varied prior beliefs imply that it takes less to convince people in vulnerable areas that global warming is a present threat. In contrast, any single shock is less likely to affect the views of people in areas facing more limited damage.

Therefore, we expect that people in more vulnerable places are the most likely to react to climate shocks with greater concern about global warming. The shocks make global warming a more temporally proximate threat. The increased immediacy of climate change leads people to place more value on mitigation policy benefits. They previously discounted avoided damage from higher temperatures. They still discount these damages but now at a lower rate. In turn, political attitudes evolve, reflecting individual self-interest defined in terms of how vulnerable someone is to future climate damage.

We test our argument with high-resolution spatial data on climate shocks, public opinion, and macroeconomic climate projections. The first study examines the effect of local climate shocks that have a strong mental association with global warming, such as temperature extremes. The outcome is whether survey-takers view global warming as a risk in their daily lives. We construct a crosswalk to map 148,712 respondents from existing nationally representative surveys in 137 countries to 2,458 administrative zones. This procedure enables us to measure local variation in vulnerability and shock exposure, which is necessary to credibly identify the effects of self-interest and experience.

A challenge for the analysis is that factors, such as education, could confound the relationship between climate shock exposure and risk perceptions. We approach this issue by estimating covariate balancing propensity scores (CBPS), which weight respondents so their exposure and vulnerability are exogenous to observed covariates (Imai & Ratkovic, 2014). The results persist when estimating covariate-adjusted models and models with both covariates and weights. Sensitivity analyses of the conditional ignorability assumption show that a hypothetical extreme confounder would be unlikely to alter the findings (Cinelli & Hazlett, 2020).

The analysis finds that a one standard deviation increase in a climate shock increases the probability that someone names climate change as a top daily risk by an average of .54 percentage points. This effect only appears among people who live in the most climate-vulnerable locations. Climate shocks do not influence the risk perceptions of people in places facing more limited damages.

Our assumption is that these climate shocks increase concern by making global warming appear in the here and now. Placebo tests attempt to falsify this interpretation. The placebos assess how climate shocks affect non-climate risk perceptions, which would not change if the shocks only affected climate opinions. Indeed, there is no relationship between climate shocks and the placebo outcomes. This evidence is consistent with climate-related experiences causing belief updating about global warming's immediacy.

The geographic range of our data allows us, unlike past studies focused on single countries, to test how political institutions moderate the effect of climate shocks. Responsiveness to experience is greatest for vulnerable locations within democracies. Further, people whose livelihoods depend on the weather, such as those living in agricultural areas, are more likely to respond to shocks with heightened concern.

The second study examines how climate shocks affect mitigation policy support. If climate-related experiences cause people to become more concerned about climate change, as the first study shows, their support for solutions could also increase. Mitigation policy support would be most likely to increase in vulnerable locations because it is more in the public's self-interest there to reduce greenhouse gas emissions.

We test this hypothesis with a difference-in-differences research design. We leverage an existing three-wave panel of 9,500 American adults in 2010, 2012, and 2014 to explore how the same person's policy preferences change after experiencing climate shocks, while using panel matching methods to account time-varying factors that could confound shock exposure (Imai et al., 2023).

We find that extreme heat and wildfire experiences increase climate policy support by 2 and 4 percentage points, respectively. Policy support increases only among people in vulnerable locations. There is no effect in counties facing relatively limited climate damage. The change in policy support persists for up to 2 years after the shocks.

Our paper brings together political economy and behavioral approaches to understand how political attitudes change. Our findings challenge the view that ordinary people lack the capacity to coherently act on information from experience (e.g., Achen & Bartels, 2016). Instead, we show that predicting how people respond to external shocks requires a model of their self-interest.[1] Their self-interest affects both the information that an experience encodes and how much an individual would value certain policy solutions. People's self-interest varies according to their locations and experiences, and this heterogeneity can shape political attitudes.

We also make empirical and theoretical contributions to climate politics research. Empirically, we test a prominent hypothesis about climate change's political effects using a wealth of subregional and panel data. This departs from previous studies that largely focused on the United States or relied on cross-sectional surveys. Political attitudes respond to climate shocks even in developing countries with less awareness of climate change.

Our theoretical approach also offers a path to reconcile mixed findings about climate change and public opinion. Researchers should consider how experience and self-interest interact. This synthesis will allow scholars to advance and test more precise hypotheses about how the public will respond to climate change.

DO CLIMATE SHOCKS AFFECT POLITICAL ATTITUDES?

We focus on the public's attitudes because they shape politicians' incentives.[2] Scholars, therefore, have sought to understand the underlying factors that shape climate attitudes. They have paid particular attention to climate-related experiences (Egan & Mullin, 2017; Howe et al., 2019). Climate change is a statistical phenomenon, so people cannot experience it directly, but they can feel the effects of shocks that would not have been possible without warming.

The idea that experience with extreme heat, for example, could increase concern about climate change is rooted in psychology. Dual-process theories of reasoning contend that information from experience is more vivid and accessible, so it exerts greater sway compared to analytical information (Evans, 2008). This theory suggests that people begin with a view of global warming as an abstract, distant phenomenon, but climate-related experiences render it more concrete and proximate, thereby changing beliefs, policy preferences, and behavior (Marx et al., 2007; van der Linden, 2015; Weber, 2006, 2010).

Numerous studies have examined the relationship between experience and climate attitudes. The results are mixed. Several reviews find a small, positive effect of temperature anomalies on the belief that climate change is happening (Bergquist et al., 2022; Borick & Rabe, 2017; Egan & Mullin, 2017; Hornsey et al., 2016; Sugerman et al., 2021). A recent evaluation of 73 studies finds that there are often null effects and that research design differences have impeded knowledge accumulation (Howe et al., 2019).

Motivated reasoning is a common explanation for why certain people would not change their minds after climate shocks (Druckman & McGrath, 2019; Myers et al., 2013; Weber, 2013). Some studies find that Republicans are less likely to shift their climate change attitudes because of their stronger prior beliefs (Bohr, 2017; Boudet et al., 2020; Hai & Perlman, 2022; Hazlett & Mildenberger, 2020; Marquart-Pyatt et al., 2014; Ogunbode et al., 2019). But other analyses find that climate shocks cause Republicans and conservatives to become more concerned about global warming and supportive of government solutions (Arias & Blair, 2024; Deryugina, 2013; Egan & Mullin, 2012; Kim et al., 2021; Marlon et al., 2021).

Partisan motivated reasoning is only a partial explanation as to why a subset of the public may be unresponsive to climate shocks. There would still be a positive average effect unless the entire population held strong climate views. The focus on partisan motivated reasoning is also an artifact of the almost exclusive study of the American public (Howe et al., 2019). Findings from high-income Western nations may not generalize to other contexts with less polarization, lower climate change awareness, and more severe vulnerability. Indeed, cross-national surveys suggest that personal experience is a stronger predictor of climate beliefs in developing countries (Lee et al., 2015).

Another reason that experience may not affect policy attitudes is that these preferences depend on factors aside from climate change concern. People could lack information about how certain policies work, so climate shocks could shift how worried people are but not their preferred policy solutions (Bechtel & Mannino, 2023).

[1] Also see Ashworth et al. (2018) for why it could be rational for voters to judge incumbents on how they handle exogenous shocks.

[2] See Gazmararian et al. (2025) for a discussion of climate policy responsiveness to public opinion.

INTEGRATING POLITICAL ECONOMY AND BEHAVIORAL THEORIES

We integrate political economy and behavioral theories to explain when experience affects political attitudes. The political economy component of the theory is a model of an issue's distributive effects.[3] The behavioral aspect of the theory is a model of learning from experience. The behavioral model explains how people form their beliefs, while the economic model explains the content of these political attitudes.

We apply this general theoretical approach to study how climate change opinions develop and evolve. Climate change is a vexing challenge. There is abundant evidence that it is real and harmful, but people appear unconcerned and unwilling to pay for mitigation. Uncertainty about global warming's timing contributes to inaction (Finnegan, 2022b, 2022a; Hale, 2024; Jacobs, 2016). Climate change's worst effects occur in the future. People can understand how climate change will harm them but still discount these damages because they prioritize consumption today. If people are not concerned about climate change in the here and now, they will be less willing to support costly policy solutions (Gazmararian, 2025).

The public could also be uncertain about where global warming inflicts the most damage. This paper focuses on temporal uncertainty because, as described below, people often have a general understanding of which places are vulnerable. There are multiple sources of climate change information. Individuals learn about global warming risks through the news, classrooms, and social networks. They also have an intuitive sense of what geographies are vulnerable such as the coastline.

Knowledge of vulnerability is unlikely to affect political attitudes until people view global warming as a present threat. Analytical information, such as scientific facts discussed in the news, is less concrete. In contrast, information from experience is more vivid, accessible, and salient, so it exerts more weight in decision-making (Slovic et al., 2002; Weber, 2006). Experience in this paper refers to geographically proximate events that people can see for themselves.

Political messages and experiences could reinforce each other. In other contexts, messages in the media activate concern about visible local changes (Hopkins, 2010; Mutz, 1994). People need to understand the concept of climate change to interpret extreme weather as the consequence of human pollution. Still, information by itself is unlikely to spur action. Experience is the catalyst.

Climate shock experiences make global warming appear more temporally proximate. These shocks include extreme weather or disasters that would be unlikely to occur absent human-caused warming. People judge a shock against their understanding of the normal climate. This understanding forms through daily experience and information acquired from the media, education, and social networks. Individuals pay attention to the weather because it affects their lives and livelihoods. For example, many parts of the world depend on agriculture, so their communities have deep knowledge of the historical climate (Orlove et al., 2010).

The public must associate climate shocks with global warming for such experiences to affect political attitudes. The top associations that come to mind when people think of global warming are heat, melting ice, and unpredictable weather (Leiserowitz, 2006; Leviston et al., 2014). While climate change brings other perils such as floods, a majority do not yet associate these processes with global warming.[4] Indeed, Marlon et al. (2019) find no evidence that precipitation changes, for example, affect climate opinions. Leiserowitz et al. (2023) surveyed 150 countries and territories and found that the most common climate shock that people reported was extreme heat.

How vulnerability moderates climate shocks

People differ in how much they will be harmed by global warming, which implies that climate shocks will induce different public reactions. Vulnerability is the propensity for a location to be adversely affected by climate change. Places differ in their climate hazard exposure and adaptive capacity, which influence vulnerability (IPCC, 2023, p. 43).

Global warming's unequal effects are well-established. Macroeconomic models project that climate change could cause welfare losses as large as 15% in Africa and Latin America, whereas some northern and polar regions could see gains up to 11% (Cruz & Rossi-Hansberg, 2024). This geographic inequality appears in other analyses of the relationship between temperature and economic outcomes (Burke et al., 2015; Carleton et al., 2022). Vulnerability varies most drastically across the globe. Western Africa is more vulnerable than North America. There is also variation within large countries such as the United States. Hsiang et al. (2017) project that median climate change damages in some American areas will exceed 20% of gross county product, whereas median gains exceeded 10% in others. Neighborhoods and

[3] See Gazmararian and Tingley (2026) for a review on the political economy of climate politics.

[4] Spence et al. (2011) study flood experience but use a self-reported measure. Floods may become increasingly relevant in contexts with high levels of climate change knowledge such as Europe (Garside & Zhai, 2022; Hilbig & Riaz, 2024), but have a weaker association during our study period and context.

even houses within the same city vary in vulnerability, though these are often differences of degree than of kind (Thomas et al., 2019).

Much of this variation in vulnerability stems from geography. Geographic factors that affect exposure to climate hazards and vulnerability include latitude, elevation, and distance to the coast. Today's warmer places will suffer the most from higher temperatures, whereas cooler locations have more room to adapt. Global warming's economic effects vary across and within countries, but the consequences for the entire world are decisively negative.

We argue that people in more vulnerable places are more likely to respond to climate shocks with heightened concern and support for government mitigation. In contrast, individuals in less vulnerable places are less likely to shift their political attitudes after climate-related experiences.

Hypothesis 1. Climate shocks cause people in more vulnerable places, compared to those in less vulnerable areas, to become more concerned about global warming as a risk today.

Hypothesis 2. Climate shocks cause people in more vulnerable places, compared to those in less vulnerable areas, to become more supportive of mitigation policies.

There are two mechanisms behind vulnerability's moderating effect: shock intensity and prior beliefs. While we do not directly test these mechanisms in this paper, we describe them for theoretical completeness and provide evidence of their plausibility.

Shock intensity

Everyone will see their local temperatures rise because of climate change, but the consequences are not always negative. Climate shocks differ in intensity. The economic models cited above indicate that the same temperature increase in Brazil is more harmful than in Canada. While people in both countries will feel global warming's effects, how this temperature increase affects their livelihoods varies depending on location.

The severity of a negative experience influences how the public's beliefs react. Negative experiences provoke anxiety, threat, and distress, which motivate attitude change (Brügger et al., 2021). Indeed, there is a correlation between self-reported harm from a climate shock and the strength of climate change beliefs (Wachinger et al., 2013; Zanocco et al., 2018).

Negative experiences also make climate change's costs unambiguous, a context in which self-interest is most influential in shaping political attitudes (Citrin & Green, 1990). Individuals, even with strong prior beliefs, are most likely to update their attitudes in response to new information when there are material stakes (Hill, 2017). Global warming is a context where people who persist in their incorrect beliefs could pay costs, such as higher housing prices or property destruction in disasters.

Climate shocks in less vulnerable places could still lead people to view global warming as happening today but not provoke the same concern. Shocks might even reduce worry. Egan and Mullin (2016), for example, document how many Americans have enjoyed warmer winters. Less harmful experiences with disasters can even cause people to view themselves as invulnerable, leading them to underestimate risks (Halpern-Felsher et al., 2001; Peacock et al., 2005).

Prior vulnerability beliefs

The second way that vulnerability moderates the climate shock effect is through the prior beliefs that people hold. We focus on expectations regarding how vulnerable a location is to global warming. While some people already view their location as climate-vulnerable, this does not initially translate into heightened concern and support for government mitigation. Global warming remains distant. Experience with extreme weather brings climate change into the present.

Prior beliefs influence how people incorporate new information from experience (Hill, 2017; Taber & Lodge, 2006; Zaller, 1992). We expect that people in more vulnerable areas require less information to infer that climate change is an immediate risk and that the government should act. In contrast, people who are more confident that their location is not vulnerable need more shocks to be convinced that global warming is harmful and that governments should pass mitigation policies (Brügger et al., 2021; Weber, 2010). If people do not view themselves as vulnerable, paying for mitigation would not be in their self-interest.

People have a general understanding of how vulnerable regions are to climate change. This knowledge comes from three sources: markets, past experiences, and intuition. First, markets increasingly reflect climate risks through housing prices and insurance rates, for instance. Businesses in certain locations are already communicating these climate dangers to consumers (e.g., Fairweather et al., 2024).

Second, past experiences inform prior beliefs. People passively observe how frequently climate shocks occur in a place. While people do not think in terms of probability distributions, experience leads people to learn how often events occur (Koehler, 1996). Someone who lives in Georgia knows that snow is an infrequent occurrence. California residents are not as worried about hurricanes as Gulf Coast dwellers where the water is warmer.

Third, intuition helps individuals judge which climate risks are likely. People have an intuitive understanding of the likelihood of what climate perils afflict certain geographies. Inland residents, for example, are less worried about sea level rise (Hopkins, 2018; Reny et al., 2026). People in desert regions may also perceive themselves as being more susceptible to drought and extreme heat.

There is evidence that beliefs about climate vulnerability correlate positively with objective risks (Allan et al., 2020; Brody et al., 2008; Gaikwad et al., 2022; Milfont et al., 2014; Whitmarsh & Capstick, 2018; Zahran et al., 2006). People in climate-vulnerable developing countries are more likely to think that climate change will harm them compared with people in less vulnerable countries (Dabla-Norris et al., 2023; Dechezleprêtre et al., 2025; Kim & Wolinsky-Nahmias, 2014). Urban planning has also carefully studied disaster risk perceptions and finds a relationship between proximity to risks and beliefs (Balžekiene et al., 2024; Botzen et al., 2009; Lindell, 2013; Peacock et al., 2005).

We also conducted a survey in the United States to measure whether climate vulnerability beliefs correspond with the projections from the economic models we use. Indeed, people facing severe climate damage are more likely to believe their location is vulnerable, even when controlling for predictors of climate attitudes such as partisanship (Online Appendix A, p. 4). The studies referenced above suggest that this finding generalizes across countries, which we find in parallel research (Gazmararian & Milner, 2026).

A possible objection is that individuals in less vulnerable areas could erroneously react to climate shocks. People may overweight recent experiences when making decisions, a psychological bias called the availability heuristic (Gallagher, 2014; Zaval et al., 2014). But the shock intensity and prior belief mechanisms explain why the public in less vulnerable areas is unlikely to overreact. Ultimately, this is an empirical question. If residents of less vulnerable locations respond to climate shocks, this would attenuate our hypothesized effects.

STUDY 1: CLIMATE CHANGE AS AN IMMEDIATE RISK

We first test whether the effect of climate shocks on the belief that global warming is a risk today varies with vulnerability (Hypothesis 1). Testing this hypothesis requires surveys that measure climate risk perceptions and that also include geolocated identifiers to map respondents to shocks and vulnerability data. The surveys must also span several regions because climate vulnerability is most unequal across the world.

We leverage spatially disaggregated samples of 148,712 people across 137 countries and territories. These data capture heterogeneity in vulnerability and climate shocks. Gallup and Loyd's Register Foundation conducted these surveys as part of the 2019 World Risk Poll.[5] These are probability-based, nationally representative samples of approximately 1,000 respondents in each country.[6] The questions underwent piloting and multiple rounds of review. The questionnaire was translated into the major conversational languages of each country. Trained enumerators then administered the survey face-to-face and over the phone.

We extend these data to better capture climate shocks experience by constructing a crosswalk mapping respondents to 2,458 administrative zones within each country. These administrative boundaries are at the lowest possible level of aggregation, which includes level 1 boundaries (states and prefectures), level 2 (counties and districts), and some cities. We manually standardized the subregion names in many instances to build this crosswalk connecting the survey respondents to shapefiles.

Figure 1 provides examples of the granularity of these zones while also describing some of the data we use later (Online Appendix B7, pp. 25–26, provides additional data visualizations). The administrative zones represent a remarkable improvement over analyses focused on the country level. The median respondent is in an area covering 7,859 km^2, slightly larger than the state of Delaware. In larger zones, there will be greater measurement error, which we try to reduce by calculating zonal statistics with population weights. Absent individual-level coordinates, administrative zones are the best approach to capture climate experience.

The primary limitation of the survey data is that it represents a snapshot. The ideal way to estimate the effect of climate shocks would be with panel data, which is what we use in the second study. Panel survey data are, unfortunately, not available at the global level. Still, this cross-sectional analysis enables a more comprehensive assessment of vulnerability and democracy's moderating influences which vary most across countries.

Measurement

Climate risk perceptions

Climate risk perceptions refer to whether people view global warming as a danger in their daily lives. This

[5] We use surveys from countries where we can reliably interpolate economic projections.

[6] The sample size is higher for China, India, and Russia, while lower for Jamaica.

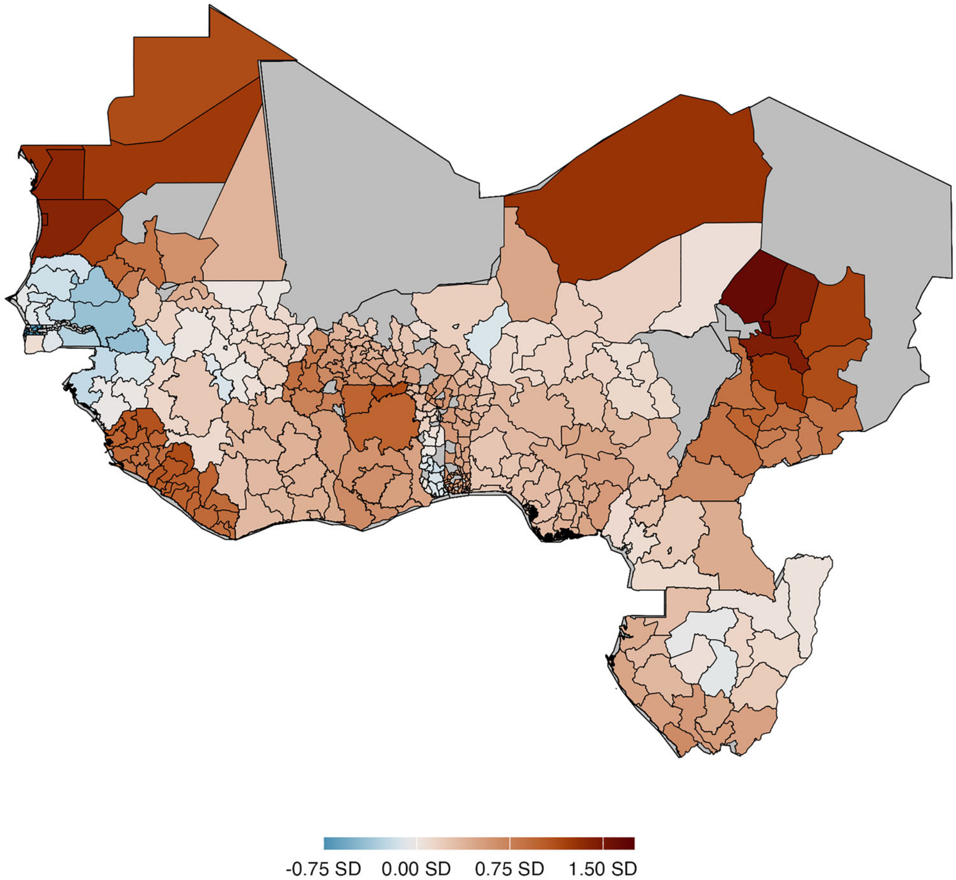

FIGURE 1 Data example from Middle/Western Africa. *Notes*: Gray areas have no survey respondents. Seven-day temperature anomalies scaled by region standard deviation. *Source*: Berkeley Earth.

concept captures the immediacy of the threat, corresponding with our theory that climate shocks make global warming temporally proximate. Risk perceptions matter because, as Study 2 tests, they can motivate people to support government climate policies (Bergquist et al., 2022).

Social desirability bias introduces challenges to measuring attitudes. Asking how concerned someone is about global warming or how much they support climate policy often suggests high levels of worry and support thatdecreases when surveys elicit opinions using techniques where people consider trade-offs (Bechtel & Scheve, 2013).

We avoid this problem by measuring risk perceptions with open-ended questions. The first question reads, "In your own words, what is the greatest source of risk to your safety in your daily life?" Respondents next are asked, "Other than what you just mentioned, in your own words, what is another major source of risk to your safety in your daily life?" This question avoids priming people to say climate change. Further, the "daily life" wording captures whether people perceive climate change as a temporally proximate risk.

The outcome is an indicator that takes the value 1 if a respondent identifies climate change as a top or major risk, and 0 if not.[7] For robustness, we also examine results when using an indicator for whether the respondent says climate change is a top risk.

Climate vulnerability

There are two challenges with measuring vulnerability. First, the measure must account for adaptation. Floodplain maps, for instance, do not fully capture future economic harm because they do not account for how people adapt by moving. Second, the measure must be spatially resolved to merge the data with survey respondents.

We measure climate vulnerability with a Spatial Integrated Assessment Model (SIAM; Cruz & Rossi-Hansberg, 2024). The SIAM models how economic activities affect the climate, how the climate affects

[7] The World Risk Poll maps these answers to categories including "Climate change, natural disasters or weather-related events (such as floods, drought, wildfires, etc.)."

local temperatures, and how those changes affect the economy. The SIAM incorporates adaptation with damage functions that account for how temperature changes affect productivities and amenities through trade, migration, and innovation. The model builds upon the established spatial growth framework.[8] The projections capture vulnerability because an economic contraction from warming implies that a location is exposed and lacks adaptation capacity.

The SIAM is not a measure of exposure to higher temperatures. All locations will see local temperatures increase at varying rates due to climate change. Instead, the model captures how places differ in how they are affected by global warming. Two locations could see the same increase in temperature, but because of their varying vulnerability, one place suffers intense damage while the other feels limited effects.

The SIAM projections are at the 1°× 1° resolution. We aggregate these to administrative zones using population weights to account for where people live.[9] Aggregation reduces measurement error that could arise from using downscaled estimates.

We interpret these economic projections as how much mitigation would be in the self-interest of people in a location. People in places made worse off because of higher temperatures will see their income and quality of life decline. The outcome measure also captures personal risk perceptions, aligning with this interpretation. Global warming will also cause other political, social, and cultural problems in damage zones. Therefore, additional motivations, such as concerns for local welfare, could also be at play, which would be complementary with our claim about self-interest's influence on political attitudes.

To be sure, economic models cannot account for all damages, such as cultural losses. That said, economic and noneconomic damages are likely positively correlated. The omission of other sources of vulnerability would, further, introduce bias against the hypotheses; there would be people in locations (incorrectly) coded as less vulnerable who respond to climate shocks because they (actually) anticipate damage.

Figure 2 shows how climate change's economic effects vary worldwide. These estimates overlay a map that indicates the countries in Study 1. Some places face severe losses of up to 3% of GDP by 2050, whereas other areas face limited damages and could even see net benefits of about 2%.

While there is substantial global variation in global warming's economic effects, there is more homogeneity within regions (see Figure B27, p. 25, in the Online Appendix). Since the research design described below focuses on shock deviations within large regions, a continuous vulnerability measure would lack sufficient variation after residualizing the fixed effects. Therefore, we operationalize climate vulnerability with a binary indicator for whether a zone faces severe damage (1) or limited damage (0) in 2050.[10] The relevant variation is of kind, not degree.

While we focus on global warming's macroeconomic effects as the measure of vulnerability, it would be possible, in principle, to leverage tailored measures that vary more within regions. For example, a researcher could locate heat risk data that account for how households without air conditioning or neighborhoods without green space are more vulnerable (Reid et al., 2009). We hope other scholars employ our framework with these measurement tools, which could generate more bespoke predictions for researchers interested in particular shocks. We prefer the SIAM because, as stated above, it accounts for adaptation.

Climate shocks

The climate shock measure should have the following properties. It should be an event that people mentally associate with global warming, such as extreme heat, unnatural weather, or fire disasters. It should be comparable across countries. It should also be objective because pre-existing beliefs can bias self-reported experiences (Howe & Leiserowitz, 2013).[11]

We employ several climate shock measures. The first is temperature anomalies, which is the standard in climate opinion research because of the strong mental connection to global warming and cross-national data quality (Howe et al., 2019). There is also a strong statistically detectable change in local temperatures, so publics worldwide are likely to notice more extreme heat (IPCC, 2021).

The gridded daily temperature maximum data come from Berkeley Earth. This instrumental temperature data product has more observations and often better coverage than other comparable data sets. These data are at the 1° × 1° resolution. We estimate population-weighted zonal means and spatially interpolate a few missing values.

We follow Egan and Mullin (2012) by calculating the sum of temperature anomalies in the week before survey fielding began in the respondent's country. This is the most precise start date available. For robustness, an alternative measure counts the number of days with more than a two standard deviation anomaly. Berkeley Earth preprocesses the data so that anomalies are calculated relative to the 1951–1980 climate normal, which aligns with the World

[8] The projections are also robust to different modeling assumptions.

[9] We spatially interpolate missing data within a narrow bandwidth prior to aggregation.

[10] We estimate a model that interacts the vulnerability moderator with all covariates, which is akin to subsetting the data by severe and limited damage.

[11] It remains valuable to measure beliefs which influence preference formation and political behavior.

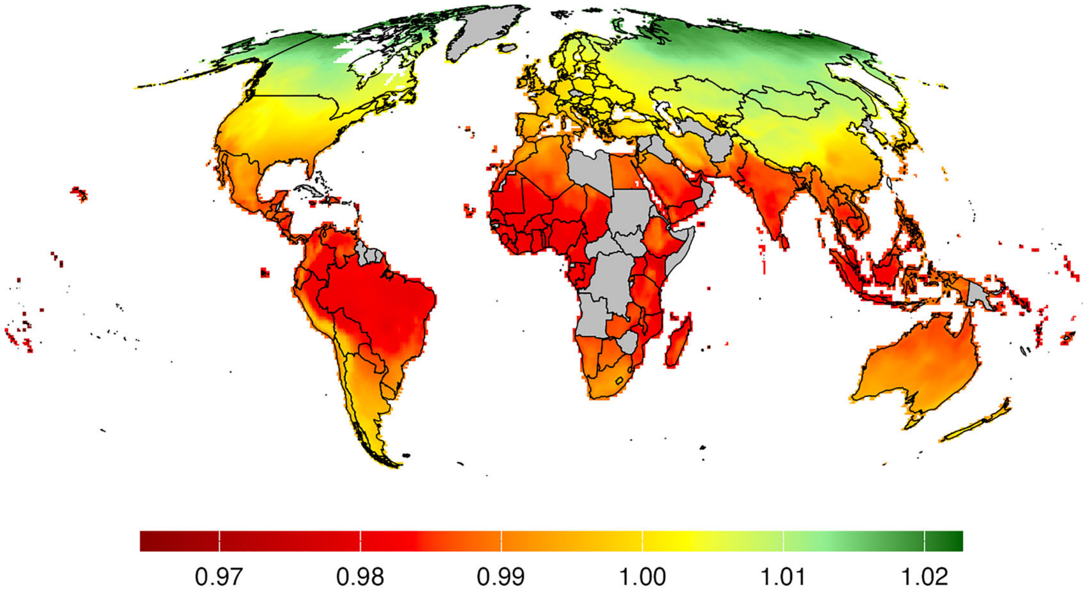

FIGURE 2 Projected 2050 GDP relative to no warming baseline. *Notes*: Bar denotes ratio of GDP in the warming scenario relative to counterfactual with no warming damage. Values less than 1 denote damages, while those greater than 1 indicate net GDP increases. Gray countries are not included in the World Risk Poll sample used in Study 1. *Source*: Cruz and Rossi-Hansberg (2024).

Meteorological Organization's 30-year definition (Bye et al., 2011). There is a large increase in the average global temperature post-1980, so using a later baseline could underestimate anomalies. This is also a relevant period for survey-takers to assess climate shocks. The public's understanding of the "normal" climate reflects both individual experiences and shared cultural understanding through stories of past weather (Hulme et al., 2009). The median respondent was born in 1979, meaning they either lived through this climate normal or it shaped their cultural context growing up. For robustness, we also use NOAA Climate Prediction Center (CPC) daily temperature data with a climate normal that ends 10 years before survey fielding begins.

Fires are the second climate shock. Wildfires are hot and sudden, so people likely notice and associate them with climate change. Global warming is creating dry and hot conditions conducive to fires, though the signal for temperature anomalies is stronger (IPCC, 2023).

Data come from NASA's MODIS Burned Area product (Giglio et al., 2003, 2016). Burned areas are those scarred by fires, as indicated by charcoal and ash deposits and rapid drops in vegetation. The data product uses surface reflectance dynamics measured from satellite sensors to estimate monthly areas burned within 500-m grids. As before, we aggregate these data to the zonal level using population weights.

We operationalize the fire shock as follows and it is robust to alternative setups: The measure averages the positive deviations in burned area in the 6 months prior to survey fielding.[12] The fire data are measured monthly and they are rarer than heat anomalies, so the window is larger. The fire data begin in 2000, so it is not possible to construct an equivalent historical benchmark. The baseline period is the 15 years after the data commence. This standardization is important because fires happen seasonally for reasons unrelated to climate change such as crop burning.

Research design

The goal is to estimate the effect of climate shocks on risk perceptions, moderated by the survey-taker's vulnerability. The challenge for learning about causality is that shock exposure and vulnerability could be affected by socioeconomic variables that also predict climate attitudes. Certain regions are also more exposed to shocks because local temperatures are rising at faster rates than in other places.

Therefore, we estimate linear probability models with regional fixed effects. This means that the identifying variation comes from climate shocks relative to the average for a region.[13] The assumption is that this variation is plausibly exogenous to potential unobserved confounders.

[12] The measure is windsorized on the right side by 1% to account for outliers.
[13] South Asia is a region which is not the same as an administrative zone.

We further control for predictors of climate shock exposure, vulnerability, and risk perceptions. Online Appendix B1 details the covariate operationalization and data sources (pp. 5–6).

Individual-level controls include age, sex, income, household size, Internet use, children, risk aversion, rural residence, and risk understanding (Bush & Clayton, 2023; Dechezleprêtre et al., 2025; Hornsey et al., 2016; Lee et al., 2015). The relationship between age and risk perceptions is nonlinear, so the model also includes a quadratic term.[14]

Zone-level covariates include GDP (logged), population (logged), CO_2 emissions (logged), fossil fuel development potential, cropland, and urbanization. Variables such as urbanization account for how the urban heat effect could result in more temperature anomalies. GDP relates to an area's ability to adapt to climate change. These validated data sources come from a combination of administrative, survey, satellite, and cell phone data, aggregated to zones using population weights.

Country-level controls include democracy, GDP per capita (logged), educational attainment levels, population (logged), CO_2 emissions (logged), and agriculture's share of GDP. Wealth and education could affect an area's ability to adapt to climate change and the public's climate knowledge. Variables for national wealth and agriculture's share of the economy also hold constant factors that could induce vulnerability unrelated to geography.

This model specification includes many covariates, so we separately estimate CBPS to reduce the data's dimensionality. CBPS is well-suited for continuous treatments, such as temperature shocks (Imai & Ratkovic, 2014). The weights balance survey-takers according to their climate shock exposure and vulnerability.

The linear probability model we estimate is as follows:

$$Y_i = \beta_1 Shock_i + \beta_2 Vulnerable_i + \delta (Shock_i \times Vulnerable_i) + X\boldsymbol{\beta} + \eta_i + \epsilon_i. \quad (1)$$

Y_i is the climate risk perception indicator. *Shock* is the climate shock measure, scaled by the regional standard deviation. *Vulnerable* indicates whether a respondent's area faces severe climate damage. X is a covariate matrix that also includes their interactions with the vulnerability moderator. The model accounts for treatment effect heterogeneity by including in X interactions between the shock treatment, moderator, and relevant covariates.[15] δ is the differential effect of climate shocks for people in vulnerable areas compared to those in less vulnerable zones. η contains the region fixed effects. One model with CBPS weights includes no covariates, while another includes both covariates and weights.

We take two steps to assess the assumptions for treating these estimates as causal. First, we report how sensitive the results are to omitted variable bias.

Second, we analyze covariate balance after applying CBPS weights. The pretreatment imbalances vary by climate shock. After weighting, there is almost no correlation between the interacted treatment and moderator and the observed covariates. We conduct an equivalence test of the conservative null hypothesis that there is an imbalance. We fail to find evidence of imbalance after weighting (Hartman & Hidalgo, 2018). The one exception is coal development potential, for which there remains some imbalance. Therefore, we view the models with weights and covariates as the most credible (Online Appendix B4, p. 9).

Results

Figure 3 plots the average climate shock effect on the belief that global warming is an immediate risk among people in places facing severe damage versus limited damage. The black diamond at the top reports the results from a meta-analysis summarizing the effects of all shocks. The average effect for damage zones is a .54 percentage point increase in risk perceptions. The average effect for places facing more limited damages is −.23 percentage points. Climate shocks only make global warming an immediate danger in vulnerable locations.

The shocks appear to have equivalent effect sizes. The confidence intervals overlap, so we cannot conclude that fires spark more concern than temperature anomalies, though the fire estimates are more precise. The temperature shocks using the climate normal baseline 10 years before the survey are less precise, which may be because this baseline underestimates anomalies by capturing recent warming.

It is challenging to benchmark the effect size against other studies because our outcome differs. We use an open-ended question, whereas others often ask about climate change importance or worry. We can, however, compare the effect size against the outcome mean; the estimated effect is about 10% the size of the outcome mean (5%).

We conduct placebo tests to probe the mechanism that climate shocks convey information about global warming. The tests use the same model to estimate how the shocks affect outcomes unrelated to climate change. The placebos include a host of outcomes, such as fear of cooking accidents and artificial intelligence. With the number of tests, there

[14] The survey did not ask about ideology, but it is unlikely that ideology is associated with climate shock deviations.

[15] Those covariates include risk understanding, education, cropland, rural, age, and democracy.

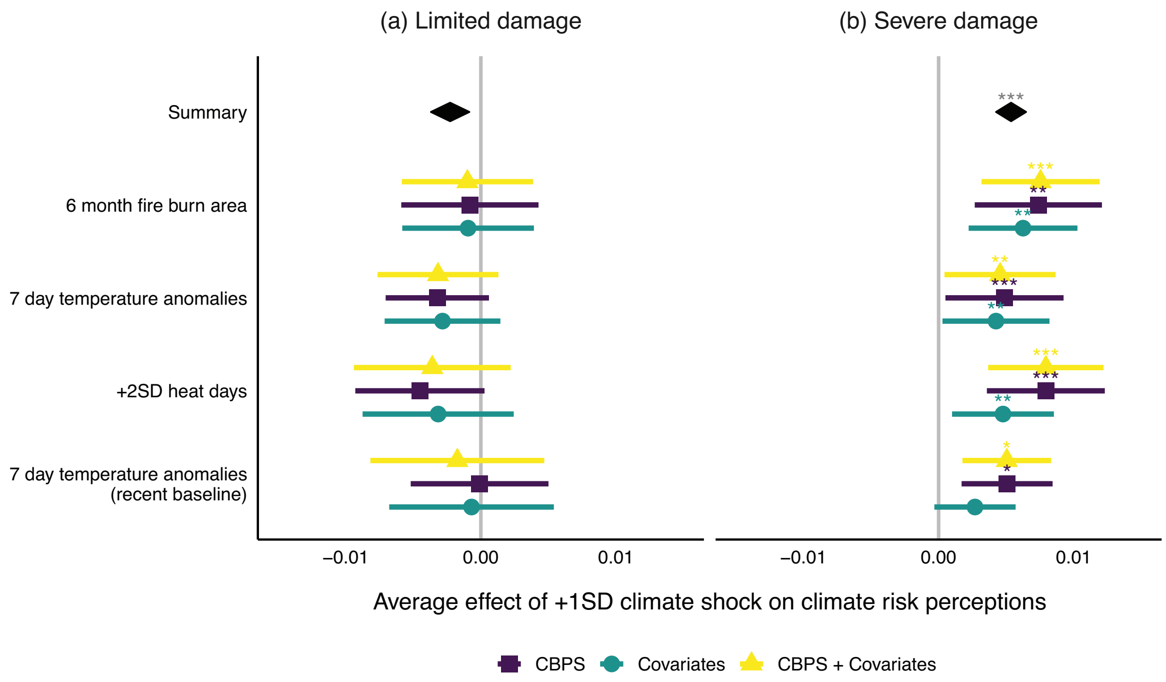

FIGURE 3 Climate shock effect on climate risk perceptions moderated by vulnerability. *Notes:* The outcome indicates whether respondents identify climate change as a top or major risk in their daily lives (1) or not (0). Black diamonds report meta-analyses across the studies with the horizontal bar width corresponding with the same confidence threshold. CBPS stands for covariate balancing propensity scores. 148,712 respondents across 2,458 zones in 137 countries. Bars denote 95% confidence intervals with robust standard errors clustered by administrative zone.
$^{*}p < .10$; $^{**}p < .05$; $^{***}p < .01$ indicate significance levels for hypothesis tests comparing the difference in average marginal effect estimates.

will be some false positives, but on average, the tests should be null. Indeed, Figure 4 shows that there is no average effect of the climate shocks on the placebo outcomes. These results are consistent with the interpretation that climate shocks shift beliefs about global warming.

To interpret these estimates as causal, we assume that after conditioning on covariates, climate shock exposure and vulnerability are plausibly random. We conduct sensitivity analyses to evaluate how extreme an unobserved confounder would have to be to alter the results (Cinelli & Hazlett, 2020). We benchmark against a battery of covariates that predict shock exposure, vulnerability, and climate attitudes. There would have to be an extreme confounder—orthogonal to the covariates in the model—with more than eight times the correlation of income with temperature anomalies or fires and the outcome to have the 95% confidence interval cover 0. Given previous studies on the determinants of climate attitudes, such an extreme confounder is unlikely (Online Appendix B5, pp. 13–16).

The results are also robust to an alternative outcome coding, alternative fire shock measures, and sub-setting the sample to only those who understand risk as danger.

Treatment effect heterogeneity

Regime type

The geographic scale of our data allows us to examine treatment effect heterogeneity by regime type. Free and fair elections could lead citizens to have a greater sense of self-efficacy. Self-efficacy matters because when people do not think solutions exist, they can choose to ignore risks (Campbell & Kay, 2014). There is also more press freedom and public education in democracies, so voters could be more knowledgeable about global warming, which we try to control for with measures of national wealth and education.

We measure democracy with the polyarchy index. Polyarchy is an aggregate index that aims to measure the components of electoral democracy, including free and fair elections, freedom of expression, associational autonomy, and inclusive citizenship (Coppedge et al., 2019).

Figure 5 presents the average marginal effect of climate shocks in vulnerable (black) and less vulnerable places (blue) across quartile bins divided by the 25th, 50th, and 75th percentiles of polyarchy. Across all shocks, there are positive effects in vulnerable zones within the most democratic countries. For the

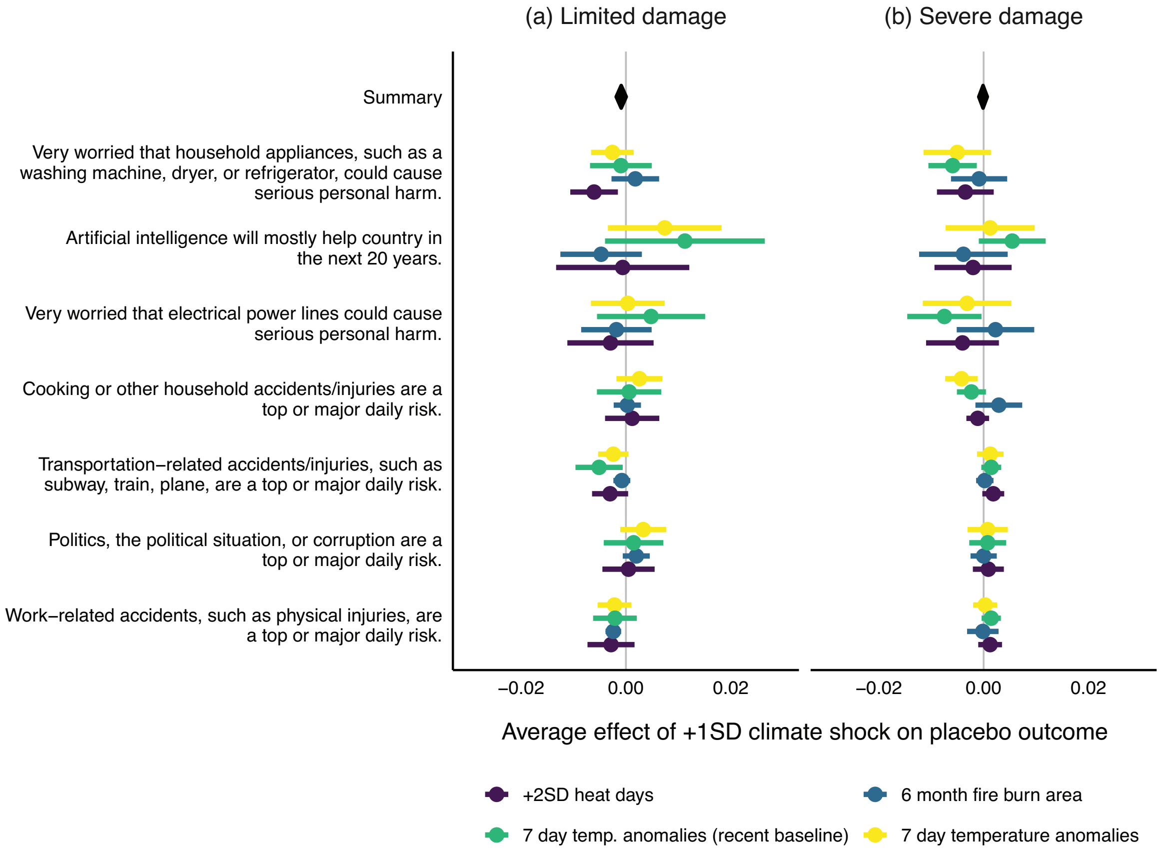

FIGURE 4 Placebo test results. *Notes*: Black diamonds report meta-analyses across the studies with the horizontal bar width corresponding to the 95% confidence interval. 148,712 respondents across 2,458 zones in 137 countries. Bars denote 95% confidence intervals with robust standard errors clustered by administrative zone.

temperature-related shocks, we can conclude that the shock effect is stronger in democracies.[16]

Individual capacity and age cohort

We next examine other variables that affect an individual's capacity to perceive climate shocks. The effects are generally larger in places with more cropland, which may be because agricultural livelihoods depend on the weather. There is insufficient evidence that the effects differ by education. There is also no evidence of heterogeneous effects by sex.

We also examine how age moderates the treatment effect. Climate shocks in vulnerable areas tend to have larger effects on risk perceptions among older generations, except for fires that also affect younger generations. A possible interpretation of age's moderating effect is that older people are expressing intergenerational concern. Older people may also better remember the normal climate, so shocks are easier to detect, whereas this applies less to fires with the more recent baseline. Future research should explore the mechanism behind these different responses by age cohort.

[16] $p < .01$ for 7d anomalies with both baselines and $p < .06$ for +2SD heat anomalies.

STUDY 2: POLICY PREFERENCE CHANGE

Study 1 shows how vulnerability moderates when climate shocks make global warming a more immediate risk. Hypothesis 2 states that this heightened immediacy affects policy preferences. The more immediate threat leads people to value mitigation policy's benefits more than its costs.

Study 2 examines experience and policy preference change with panel data, which refers to repeated surveys of the same individual. Data come from the Cooperative Congressional Election Study's 2010–2014 Panel Study (Ansolabehere & Schaffner, 2015), with a sample collected over the Internet by YouGov using the firm's matched random sampling methodology. After accounting for attrition, 9,500 respondents were interviewed in 2010, 2012, and 2014 using a common set of questions across the waves.

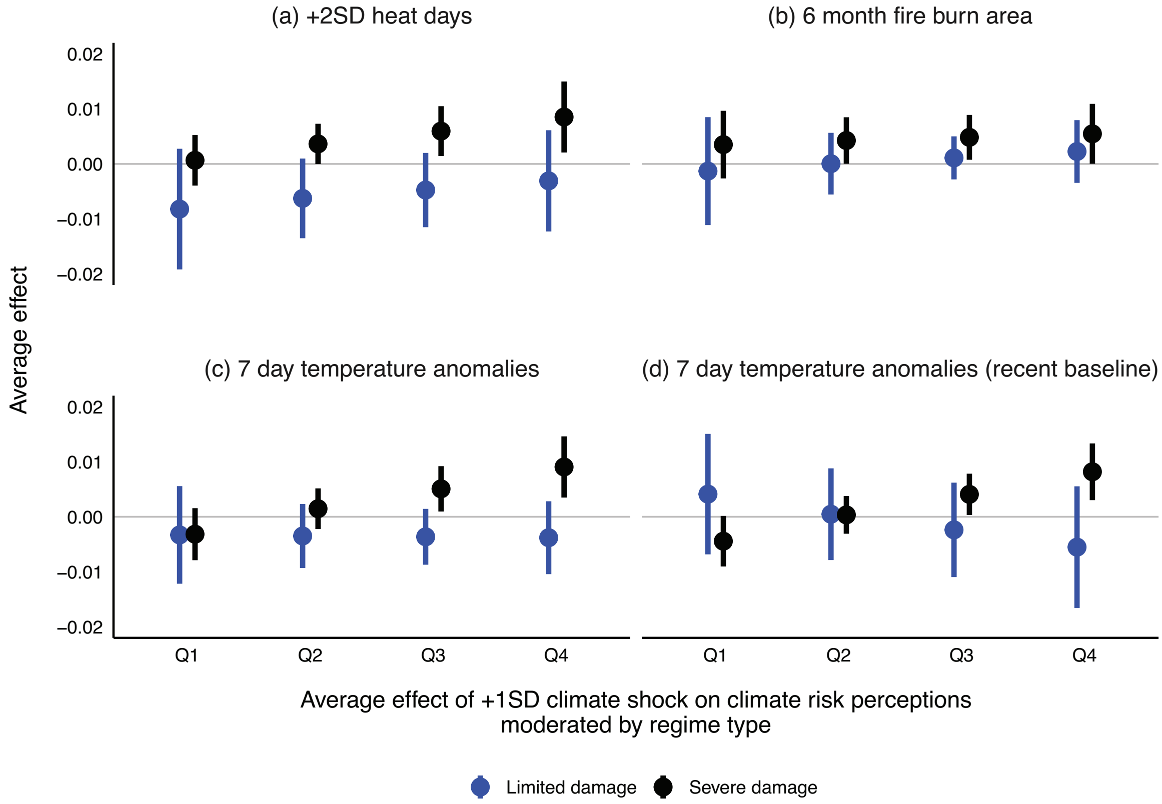

FIGURE 5 Democracy's moderating effect on climate shocks and vulnerability. *Notes:* The outcome indicates whether respondents identify climate change as a top or major risk in their daily lives (1) or not (0). Q1 (least democratic) through Q4 (most democratic) are based on the polyarchy index. 148,712 respondents across 2,458 zones in 137 countries. Bars denote 95% confidence intervals with robust standard errors clustered by administrative zone.

Measurement

Climate beliefs and policy preferences

The outcome captures belief in climate change and support for mitigation. Answer options include: "Global climate change has been established as a serious problem, and immediate action is necessary," "there is enough evidence that climate change is taking place and some action should be taken," "We don't know enough about global climate change, and more research is necessary before we take any actions," "Concern about global climate change is exaggerated. No action is necessary," and "Global climate change is not occurring, this is not a real issue."

We employ a dichotomous measure, where 1 indicates whether immediate climate action is necessary and 0 otherwise. This threshold corresponds with a break in the response distribution, where the main divide is whether people think the government should mitigate. Since the question bundles beliefs and preferences, it is not appropriate to use a linear scale. When someone moves from 0 to 1, it represents moving from climate policy opposition to support.

Ceiling effects do not appear to be a risk in this analysis. Just over half the sample supports action to stop climate change, though support is higher for particular subgroups.

Climate vulnerability

We measure vulnerability with county-level projections tailored to the United States (Hsiang et al. 2017). The model behind these projections has a finer resolution for the United States compared to the global projections. Hsiang et al. (2017) estimate the value of market and non-market damages from higher temperatures in agriculture, crime, coastal storms, energy, human mortality, and labor. Like Cruz and Rossi-Hansberg (2024), they find substantial spatial heterogeneity in global warming's economic effects. Figure 6 shows how parts of the North and West of the United States may experience potential net GDP gains while the South incurs large losses.

We focus on GDP for model comparability. As before, we construct an indicator for whether a county faces future climate damage, defined as greater than

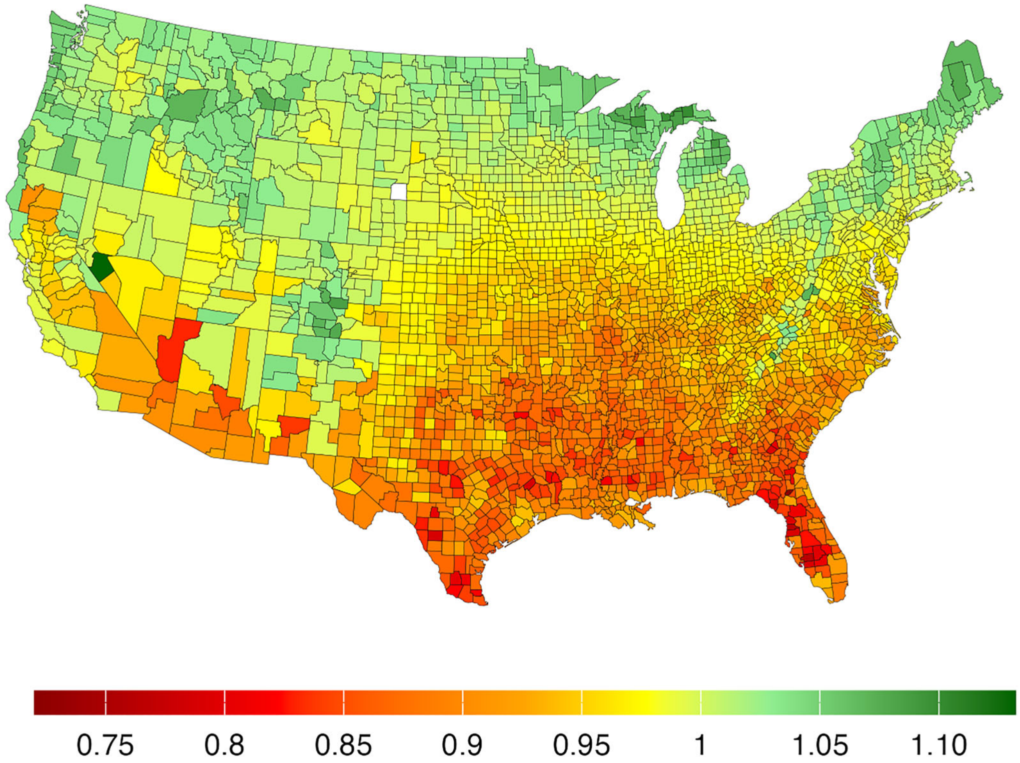

FIGURE 6 Climate change's effects on county GDP. *Notes*: Bar denotes ratio of county GDP with warming relative to counterfactual with no warming damage. Values less than 1 denote damages, while those greater than 1 indicate net GDP increases. *Source*: Hsiang et al. (2017).

0% GDP loss from global warming by the late 21st century.[17]

Climate shocks

We employ two climate shock measures similar to those in Study 1. The first are extreme heat anomaly days. Since the research design requires discrete treatment and control groups, we construct an indicator for whether a respondent experienced more than 1 day with a heat anomaly two standard deviations above the norm in the week before the survey, with the norm using the same baseline as in Study 1. Temperature data come from NOAA's nClimGrid-Daily product. About 4% to 5% of the sample in a panel wave were exposed to such extreme heat just before taking the survey.

Wildfires are the second shock in the analysis. Fires are becoming more frequent and longer lasting due to climate change (Westerling et al., 2006), and the media often connects wildfires to global warming (Molder & Calice, 2023). Wildfires can be destructive and impressionable, making them a powerful experience that could alter attitudes (Egan & Mullin, 2017; Koubi et al., 2016).[18]

There is inconclusive evidence about the relationship between fires and political behavior. Hui et al. (2022) find that proximity to wildfires increased Republican support for adaptation policy, while Hazlett and Mildenberger (2020) find a conditional relationship between fire exposure and voting in California climate-related referenda. Researchers have not yet analyzed whether vulnerability moderates the relationship.

We construct an indicator for whether a county suffered a wildfire disaster during the panel year, excluding the months after the survey was fielded. Data come from the FEMA Disaster Declaration's Summaries. The reports are generated when a locality declares an emergency that the federal government then certifies. There might be wildfires where emergencies were not declared, but these would have been less damaging. Local governments also have an incentive to declare a disaster because it unlocks federal funding to assist with the recovery.

[17] There is more subnational heterogeneity in damages, so we also examine a continuous moderator. The results are consistent but weaker for wildfires. There is less common support across the damage moderator for heat shocks, so those results are not precise (Online Appendix C5, p. 33).

[18] We also examined natural disasters with less direct associations to climate change. There was no effect of hurricanes, severe storms, and floods. The media is more likely to cover wildfires as worsened by climate change than hurricanes (Molder & Calice, 2023), though survey data about a decade after the CES panel finds belief updating after hurricanes, which may indicate that associations are evolving (Arias & Blair, 2024).

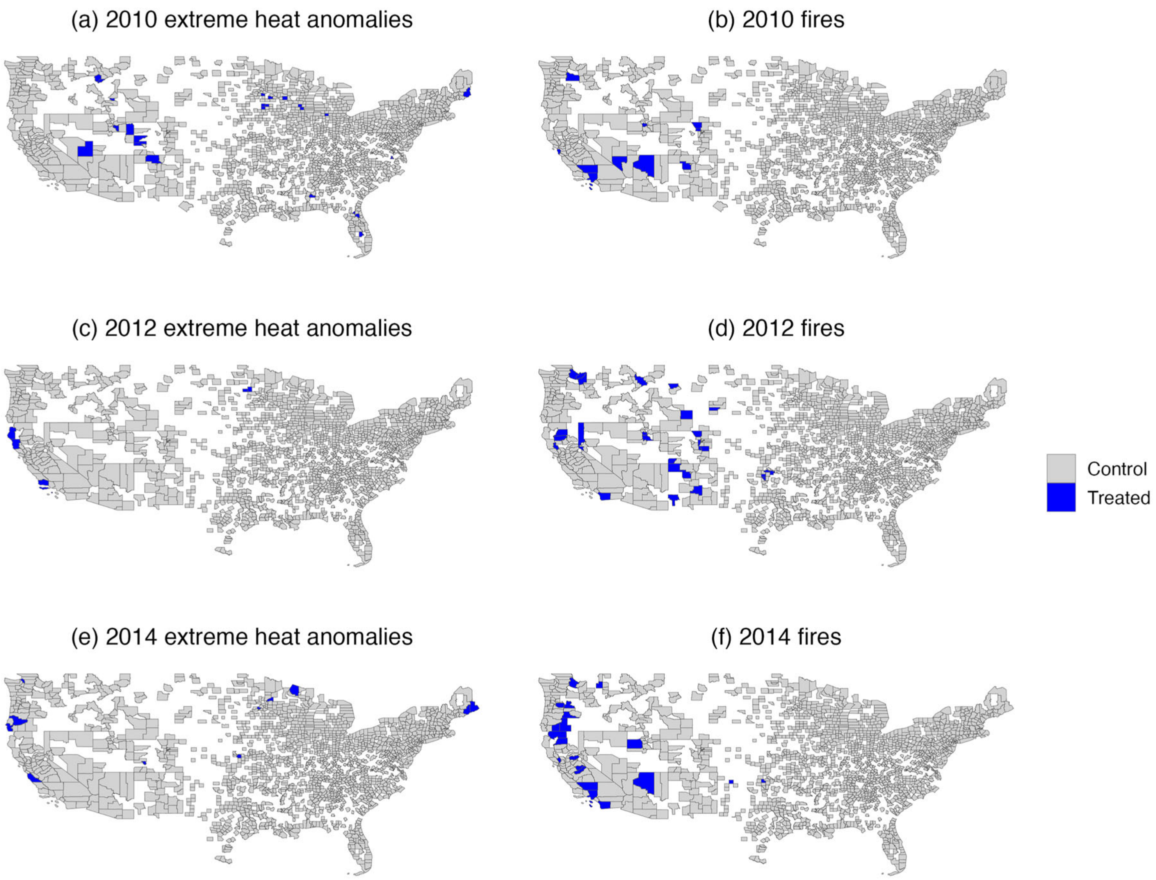

FIGURE 7 Sampled counties and climate shocks. *Notes*: Heat anomalies are in the 7 days before the survey, hence their more limited occurrence. Gray areas denote no climate shock during a panel wave but with survey responses. Hawaii and Alaska not shown.

Figure 7 plots the distribution of wildfires during the panel waves. Most occur on the West Coast, but there is variation across several states in each period.

Research design

We use a difference-in-differences research design to estimate how climate shocks affect changes in individual climate policy support. The assumption to learn about causality is had someone not experienced a shock, their climate attitudes would have followed the same average trend as the unexposed control group. While we cannot directly test this parallel trends assumption, we report results from placebo tests that attempt to falsify it.

Another risk is that climate shock exposure could be nonrandom. For example, as people become wealthier, they might move away from vulnerable areas while their income also shifts their political views. Climate risk was unlikely to be a significant driver of location choice during the 2010s. Further, geographic sorting would attenuate the effect: shock-exposed people would have more skeptical views that are harder to change. The estimation strategy still attempts to account for possible sources of time-varying confounders.

We employ the panel matching estimator to estimate the average within-person change in climate policy support after a climate shock (Imai et al., 2023). This approach uses CBPS to match individuals exposed to climate shocks with a control group that is otherwise similar in terms of observed covariates. The model matches on age, gender, race, employment, education, and household income, partisan identification, ideology, and parenthood (Egan & Mullin, 2017; Gazmararian, 2025; Hornsey et al., 2016).

The model also includes panel wave and individual fixed effects. The panel wave fixed effect removes bias from shocks that have a common effect on climate policy attitudes or wildfire exposure. Examples include seasonal conditions that make fires more likely or prompt campaign messages discussing global warming. The individual fixed effect removes confounding from invariant characteristics of the respondents, such as race.

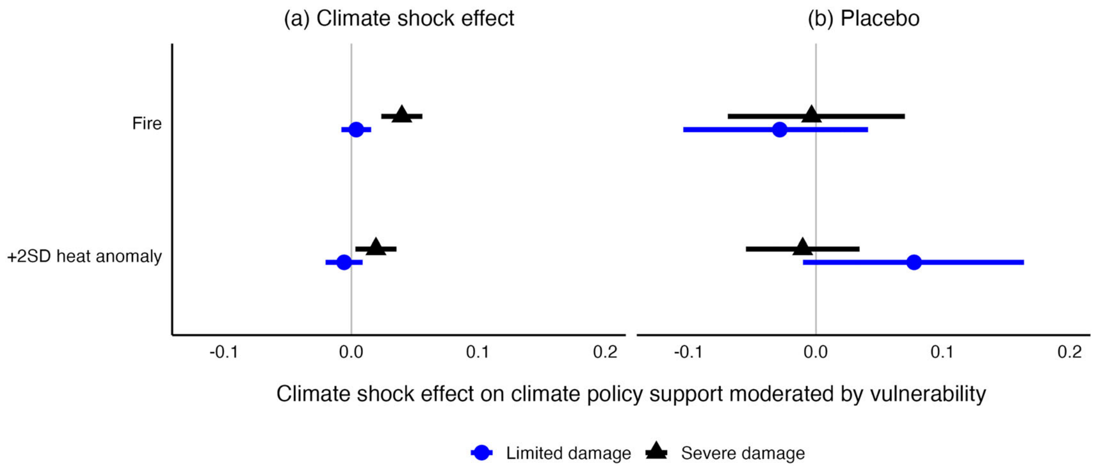

FIGURE 8 Climate shock effect on change in climate policy support, within-individual. *Notes:* Panel (a) shows the average climate shock effect on an individual's change in climate policy support, by climate vulnerability status. Panel (b) shows the effect of lagged climate shocks as a placebo test. The outcome is coded as 1 if the respondent supports climate mitigation, and 0 otherwise. Bars denote 95% confidence intervals. Estimates are from a panel matching estimator that balances survey respondents on employment, education, income, partisanship, ideology, religiosity, age, gender, race, parental status, and home ownership. Nationally representative sample of American adults comes from the Cooperative Election Study, which surveyed the same 9,500 individuals in 2010, 2012, and 2014.

Crucially, this estimator allows for changes in treatment status, whereas the standard ordinary least squares model with two-way fixed effects does not and could be biased. Changing treatment status is relevant because some people experience a fire or heat anomaly in one year but not the next.

Results

Figure 8 plots the average effect of climate shock experience on within-individual changes in climate policy support. The left panel shows that fires cause climate support to increase by 4 percentage points, while heat extremes increase support by 2 percentage points. This change in policy attitudes only appears among respondents in vulnerable counties.

The magnitude of the wildfire coefficient is similar to Hazlett and Mildenberger (2020), who estimates a 5 to 6 percentage points effect of fires on climate-related ballot referenda support. The temperature shock effect is smaller than the finding reported by Egan and Mullin (2012) that experiencing hot days increases climate change belief by 5 percentage points. However, our results differ in two ways. First, we use panel data on the same individuals. Second, only people in vulnerable places respond to the shocks.

Our results also show more persistence in attitude change than some studies. There are 2 years between the panel waves, so the effects last for at least 0–2 years after someone suffers a wildfire. In contrast, Egan and Mullin (2012) identify an effect that dissipates after only 12 days. Arias and Blair (2024) find that Hurricane Ian's effect on attitudes lasted between 1 and 6 months. In general, Egan and Mullin (2017) note that the effects of climate experience tend to be ephemeral, though there are studies examining a range of outcomes, almost exclusively in Europe, that report effects persisting for 12 months, 4 years, and 5 years (Baccini & Weymouth, 2021; Bechtel & Hainmueller, 2011; Hoffmann et al., 2022).

Figure 8 in the right panel reports the placebo tests results. These tests attempt to falsify the parallel trends assumption, which would be violated if there were a time-varying process in climate shocked areas that also led people to change their climate attitudes. The placebo tests look for a change in the outcome in the prior period. These tests fail to find evidence of a parallel trends violation.

We also assess how sensitive the estimates would be to an omitted variable that explained shock exposure, vulnerability, and climate policy support. We benchmark the sensitivity analyses with covariates for Democratic partisanship, education, and parenthood, which are strong predictors of climate policy support. It would take an extreme confounder correlated with the treatment, moderator, and outcome to alter the results (Online Appendix C4, pp. 31–32).

Treatment effect heterogeneity

We first check for treatment effect heterogeneity by prior climate beliefs. The belief updating model implies that people with stronger beliefs are less likely to change their views. We test this claim by subsetting respondents to three groups based on their baseline climate attitudes. The first group are skeptics who thought climate change was exaggerated. Next are the undecideds who think there needs to be more information or that a little action should take place. Finally, the believers think global warming is serious and mitigation cannot wait. We find that the results appear among skeptics and undecideds, but not for believers. For wildfires, the effect seems most evident among undecideds. We are careful in interpreting these results because prior climate attitudes are not random.

As in Study 1, we also check whether results vary by education, since people with bachelor's degrees may have more climate change knowledge. People of all educational backgrounds respond to wildfires if they are vulnerable. The effect appears slightly stronger among people with a high school degree or less. For extreme heat, both high school graduates and those with more than a bachelor's degree react as predicted. Educational differences do not appear to influence how political attitudes change after climate shocks in the United States.[19]

Summary

Study 1 shows how climate shocks make global warming a more immediate risk for people in vulnerable locations. Study 2 demonstrates how these beliefs translate into policy preferences; people in vulnerable places who suffer climate shocks become more supportive of mitigation policies.

CONCLUSION

There is a new type of polarization within and across countries in how the public is responding to global warming. People in climate-vulnerable locations are reacting to climate shocks, especially when they live under democratic institutions. The shocks inflict more harm in vulnerable areas, causing people to see climate change as a present problem and increasing support for mitigation. In contrast, people in less vulnerable areas do not respond to climate-related experiences with heightened concern or increased policy support.

This divergence in climate attitudes matters for the incentives of politicians to address climate change. If citizens do not prioritize global warming, leaders could face political risks if they enact costly mitigation policies. In parallel work, we connect these changing climate risk perceptions with the policy outputs of nations, where we find a similar relationship that varies by whether a country is climate vulnerable or not (Gazmararian & Milner, 2025, 2026).

The findings imply that as global warming becomes more visible in the lives of ordinary people, it is unlikely to mobilize the public in less vulnerable and less democratic places. The shocks do not have the same adverse consequences as they do for the livelihoods of people in more vulnerable areas. Therefore, policymakers in locations facing limited damage may have more success building climate coalitions when they emphasize mitigation's co-benefits or make normative appeals. In contrast, the public in damage zones could increasingly become concerned about global warming and pressure their politicians to mitigate.

Our paper brings together political economy and behavioral theories to better explain how policy attitudes respond to experiences. The same experience has diverging implications depending on how someone is affected by the underlying material issue. The effects of experience on political attitudes are not automatic but can depend on self-interest. Future research should apply this general framework to other technological, scientific, and economic issues.

There are three limitations that we are addressing in ongoing work. First, more detailed survey questions would be helpful in fully testing the mechanisms behind our theory and pinpointing how climate-related experiences affect attitudes. It would be useful to know whether people believed a disaster was caused by global warming, how much they thought it affected their livelihoods, and their expectations of future damages. Researchers should field surveys that capture a wider set of beliefs related to climate change to better understand the mechanisms linking experience and attitudes.

Second, this paper focused on climate attitudes, but it would be valuable to examine behaviors such as voting (e.g., Hazlett & Mildenberger, 2020). Climate risk perceptions and mitigation policy preferences still matter because they are inputs into how leaders make decisions, and they are likely positively correlated with behaviors such as voting. However, vote choice also depends on other factors, such as economic performance, which could crowd out climate concerns.

Third, scholars should incorporate the media, parties, and elites into our framework. Our results indicate that experience and self-interest can predict how attitudes change in this context. The results might be even stronger when accounting for the messages that people receive from elites, which could activate or depoliticize personal experience (Hopkins, 2010; Mutz, 1994). Hai and Perlman (2022), for example, find that Republican lawmakers have few electoral incentives to attribute disasters to climate change, which could contribute to different responses to personal experiences among partisans, as Hazlett and

[19] We also checked for differences by age generation but found limited treatment effect heterogeneity.

Mildenberger (2020) report happens after Californian wildfires.

Our paper further contrasts with a prominent view that information has little coherent effect on political behavior (e.g., Achen & Bartels, 2016). Instead, our findings suggest that people can sometimes learn the right lesson from experiences. The economic model of climate change allowed us to better predict how people reacted to shocks, which would have been missed if one assumed that all people had the same incentives. This paper shows that it can be rational for individuals to respond differently to the same event based on how they are materially affected.

Lastly, we contribute to the climate politics literature by integrating politics with economic models of global warming. The economic model enables more precise predictions about how political attitudes change in response to climate shocks. Our findings help to understand when, where, and why political mobilization will occur in response to climate change.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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