

# Community attitudes towards advancing climate justice with climate aid

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## ABSTRACT

Research on support for climate policies has predominantly focused on support for mitigation policies. Research remains scarce on public support for climate aid policy (i.e., adaptation policies that direct support to those most affected by climate change). The justice implications of unmitigated climate change loom large, yet it is currently unclear to what extent people view climate change as an inequality issue. To investigate this, we surveyed participants from the United Kingdom ( $n = 531$ ), United States ( $n = 528$ ), Australia ( $n = 1450$ ), and New Zealand ( $n = 1022$ ) on attitudes about climate change inequality, experiences of climate emotions, support for climate aid policy, and political orientation. Those who reported greater agreement that climate change is an inequality issue also reported experiencing more intense negative emotions about climate change and greater support for climate aid policy. We propose a theoretical model whereby political conservatives are less likely to see climate change as an inequality issue, which could account for their lower support for climate aid policy and their more muted emotional response to climate change. We find preliminary support for this model using mediation analyses. Our findings suggest that in these four nations, beliefs about the inequality in who causes climate change and who suffers its worst consequences may be relevant to community support for the implementation of climate aid policy.

## 1. Introduction

Climate change threatens to displace millions of people, increases the burden of disease, and disrupts access to vital resources such as food and water (Bhowmik, 2020; IPCC, 2022). However, these climate impacts do not affect everyone in the same way or to the same extent. Those who already face greater disadvantage are most likely to experience severe effects of environmental decline, which makes climate change a justice issue (Antadze, 2020). Using cross-sectional online survey data through

two studies in the United Kingdom and United States (Study 1), and Australia and New Zealand (Study 2), we examined the extent to which people living in these four high-income nations viewed climate change as an inequality issue, and how this perception was related to their emotional response to climate change and their support for climate policies that direct support to those most affected by climate change. We further examined the relationship between perceptions of climate inequality and conservative political ideology.

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### 1.1. Climate change as an inequality issue

The inequality of climate change exists at many levels. Within countries, there is marked disparity between the rich and poor, whereby high-income individuals contribute significantly more emissions than those earning at or below the median wage (Chancel, 2022). Yet, the more disadvantaged are also more vulnerable to climate change (Manning & Clayton, 2018). Taking a global perspective, the nations most responsible for releasing large amounts of climate-altering emissions are projected to be relatively safer from climate effects than geographic regions with far smaller environmental footprints, which are expected to experience the worst effects of climate change (van Houtan et al., 2021). The greater harm to those least responsible for causing climate change has been described as a “double injustice” (Gough, 2011), and as an instance of “double jeopardy” (Pearson et al., 2021), because these already-disadvantaged groups will also face greater challenges adapting to climate change due to their lower economic capacity.

Under a climate justice framework, climate solutions ought to seek to rectify the unequal benefits and burdens of environmental exploitation (Schlosberg, 2012). This could be partly addressed through what we refer to as ‘climate aid policies’, which we use as an umbrella term for policies that direct support to those most affected by climate change. Such policies could involve supporting the climate-vulnerable and climate-affected through reparations (i.e., compensating for losses incurred due to climate impacts), funding adaptation measures to enable communities to build resilience to withstand increasing climate risks, and offering resettlement opportunities for those facing displacement due to climate change who wish to migrate. This latter example of climate mobility is increasingly viewed as a form of climate adaptation because while migration is not a panacea, relocation can be beneficial, such as by enabling people to reduce their exposure to climate risks via relocating, while also gaining access to new opportunities (McAdam & Wood, 2023).

Research on public attitudes towards climate migration is still nascent and emerging (see e.g., Arias & Blair, 2022; Hedegaard, 2022; Helbling, 2020). These forms of aid could be designed to direct support within one’s country (i.e., domestic climate aid) or abroad (international climate aid), with the potential for some forms to be favoured over others (e.g., Stanley et al., 2023a). One salient example of international climate aid is the Loss and Damage fund. Delegates agreed in principle at COP27 to create this fund, which would direct financial resources from wealthier nations and high emitters to vulnerable nations grappling with the effects of climate change (Wyns, 2023). However, the funding announced at the recent COP28 is estimated to be well below the amount needed, and there are concerns about the voluntary nature of nations’ contributions (McDonald, 2023). Whether wealthy nations will make significant contributions will depend on whether their electorates back such contributions, but it is still an open question whether the public will rally behind stronger commitments to climate aid.

### 1.2. Political orientation and public attitudes towards climate change

It is generally accepted that public opinion about climate change and its solutions influence government responses (Fairbrother, 2022). Yet there is currently little research on public support for climate aid policy. Those studies that do exist identify that public opinion is divided along political and ideological lines. For example, Stanley et al. (2021a) showed that political polarisation on climate refugee policy support in Australia and New Zealand was as strong as the political divide on belief in climate change (see also Hornsey, Harris, Bain, & Fielding, 2016; 2018). Those who more strongly endorse social dominance orientation (SDO) – which represents a greater tolerance of social inequality and hierarchy and is conceptualised as one dimension of political conservatism (Jost et al., 2018) – are less supportive of both climate mitigation (Stanley & Wilson, 2019) and climate migration (Stanley & Williamson,

2021) and express lower support for resettling those displaced by climate change (Stanley et al., 2023a).

Several accounts of conservative attitudes towards climate change and climate mitigation policy argue that political conservatives hold more contrarian views because they are more likely to perceive climate solutions as threatening the current way of life and economy (see Stanley et al., 2023b, for a review). When applied to the issue of climate migration, Stanley and Williamson (2021) found that New Zealanders’ endorsement of SDO related to lower support for climate migration, with some evidence of mediation by higher perceptions of symbolic threat. In Australia, right-wing ideology related to lower support for migration with mediation through both higher realistic and symbolic threats (Stanley et al., 2023a). This suggests that, depending on the context, people endorsing conservative ideologies perceive climate migrants to conflict with their nations’ cultural values and economic success. However, there are some doubts about threat-based accounts of conservative climate attitudes (e.g., Brandt & Bakker, 2022; Stanley et al., 2023b) and while much theorising exists about why conservatives deny climate change and oppose climate action (e.g., see also Milfont & Sibley, 2014), there is also utility in developing models that focus on explaining why a liberal political orientation tends to be associated with greater acceptance of the reality of climate change and its solutions. This shifts the focus away from science denial-based approaches (e.g., see Jylhä et al., 2022; for a review) and threat-based motivated opposition to climate solutions (Clarke et al., 2019; Stanley et al., 2023b) to examination of the potential motives of those who do accept the reality of climate change, and may be more supportive of climate aid policies.

We propose that an unexplored reason for the divide in public opinion on climate aid policy across the political spectrum could be that there are differences in the extent that people perceive climate change as a justice issue. Specifically, political liberals may be more likely to see inequality inherent in the issue, report being more emotionally moved by the issue, and more willing to support climate aid policy, as compared to their conservative counterparts. Exploring this possibility is useful because there is a shifting dialogue about climate change and justice. Gulliver et al.’s (2023) analysis of materials created by environmental non-governmental organisations found that when they included climate justice discourse, they most often emphasised distributive justice. Distributive justice is concerned with the distribution of benefits and risks (Jafino et al., 2021). In the context of climate change, those most responsible (i.e., with highest historical emissions) have benefited the most from the environmental exploitation, while remaining better positioned to avoid the most severe risks from dangerous climate change.

### 1.3. Perceptions of climate inequality

Few studies lend insight into whether people tend to view environmental issues as justice issues. In the context of the Deepwater Horizon oil spill, Clayton et al. (2013, Study 1) found that a more liberal political orientation was associated with greater likelihood of characterising the event as an injustice or as a crime, and lower likelihood of characterising it as a natural disaster. Crime and injustice characterizations were associated with experiencing more negative emotions about the event and perceiving greater harm done. They concluded that “people care very much about justice, so that defining an event as unjust endows it with greater significance.” (p. 310). In a second study set in the context of climate change, Clayton and colleagues did not ask about injustice perceptions, but they measured emotional responses and perceived harm, finding again that political liberals reported higher perceptions of harm and responsibility for addressing climate change, though no more intense emotional responses, than political conservatives.

Nielsen et al. (2024) explored whether people are aware of the inequality in individual-level contributions to climate change through emissions. Through surveying participants in the US, Denmark, India, and Nigeria, they identified widespread overestimation of the emissions

of low-income citizens and underestimation of high-income citizens' emissions within ones' country. Underestimating the inequality in carbon emissions appeared to be consequential, with larger underestimation associated with lower support for policies to reduce emissions. Nielsen and colleagues corrected these misperceptions by telling participants of the actual disparity in emissions across income groups and then measured how fair they perceived the inequality to be. Those endorsing a more right-wing political orientation tended to view the inequality in carbon emissions as more fair, suggesting that carbon inequality is perhaps seen as more of a moral violation among the political left.

Other studies have hinted at the possibility that climate change itself is not top-of-mind as a justice issue. Through surveys with young adults (aged 18–35 years) in Europe, Gellatly et al. (2022) asked questions about perceptions of climate justice and found that most could not define this term, and tended to view climate change as primarily an environmental issue. However, participants generally agreed with broad principles when prompted with these ideas, including that climate change increases inequality. Just over half (55%) agreed that those least responsible are most affected by climate change. The authors reported that these ideas “were not politically polarising and were supported, or at least not rejected, across the political spectrum.” (p. 22). A similar percentage of respondents (58%) agreed that wealthy nations with a recent history of high emissions ought to compensate poorer nations for damage caused by climate change.

Relatedly, Ogunbode et al. (2023) surveyed people in 11 countries about their justice-related beliefs. Asked if they had ever heard of the term ‘climate justice’, two thirds said no. This suggests that the term might not be widely used in the public domain. However, and consistent with Gellatly et al.'s (2022) findings, participants generally agreed with the principles of climate justice when presented with survey items on the topic. Specifically, Ogunbode and colleagues measured these perceptions using a belief index that asked participants' views about various forms of climate justice including distributive, as in the focus of our research, as well as issues of procedural justice and beliefs about the role of colonialism and capitalism in driving climate change. As a whole, the measure related negatively to conservative political orientation. Finally, and in relation to climate migration specifically, Yates et al. (2022) found that individuals who more strongly agreed there is inequality in climate impacts were more supportive of neighbouring countries and high-emitters accommodating people displaced by climate change.

#### 1.4. Aims of our research

Responding to recent calls for research about how the public perceives climate change-related inequality (Pearson et al., 2021), we examined beliefs about climate change disproportionately affecting those least to blame for causing the problem and support for climate aid policies. Although climate justice is multifaceted, we focused on perceptions of inequality in both the perpetrators and the victims of climate change because this is the most common framing used by environmental organisations (Gulliver et al., 2023). We focused our analysis on community samples from four countries: the United Kingdom and United States in Study 1, and Australia and New Zealand in Study 2. Each of these nations is relatively affluent, and thus may be called upon to increase their contribution to climate finance given their financial capacity to do so. Much of the research on conservative climate denial comes from the United States (e.g., Hornsey, Harris, Bain, & Fielding, 2016), and the association between political orientation and climate attitudes may be stronger there than elsewhere in the world (Hornsey et al., 2018), and thus this setting provides a good initial test for our ideas. Meanwhile, much of the existing research on support for climate aid has come from Australia and New Zealand (e.g., Stanley et al., 2021a; Stanley et al., 2023a; Yates et al., 2022), where we recruited larger, and more demographically representative samples, in a second study to conceptually replicate and build on Study 1 by examining the

associations with slightly different measures.

In both studies, and based on the literature reviewed above, we hypothesised that those holding a more conservative political orientation would be less likely to view climate change as an inequality issue (H1), and would report lower support for climate aid policies (H2). We also included measures of climate emotions because emotional responses to climate change are common (Hickman et al., 2021) and emotions such as anger in response to perceived injustice are core to social psychological theories of collective action (van Zomeren et al., 2008). We expected that conservative political orientation would be associated with lower emotional engagement with climate change (H3) and that those who more strongly agreed that climate change is an inequality issue would experience more intense negative climate emotions (H4). Consistent with the argument that perceptions of justice influence acceptance of policy, we predicted that such beliefs would relate to greater support for climate aid policy (H5). Our theoretical reasoning therefore positions climate inequality beliefs as a potential explanation for our hypothesised political differences; that political conservatives' lower climate inequality beliefs could help to explain the political divide in emotive and policy reactions to climate change. We focus on correlational findings in Study 1 and 2, though also report preliminary tests of this proposed theoretical model using mediation analyses in Study 1, which we test again following preregistration of mediation hypotheses in Study 2.

## 2. Study 1

We recruited participants from the UK and US in Study 1 with a goal to establish a measure of climate inequality beliefs. This included an examination of whether there are distinct dimensions of public views on distributive climate justice issues: that is, do perceptions of climate inequality at individual-, nation-, and generation-level emerge as distinct factors, or is the best measurement an undifferentiated factor or more general construct? This question is explored in the Supplementary Materials alongside analysis of a series of items developed to examine perceptions of climate inequality across these different domains (i.e., beliefs regarding the inequality in causes and consequences between individuals, across countries, and generations), as well as a general measure that does not refer to specific groups or domains of inequality that we use in our main analyses. We tested the five hypotheses outlined in section 1.4. When examining intensity of climate emotions in Study 1, we particularly focused on feelings of anger, anxiety, and depression felt in relation to climate change (per Stanley et al., 2021b). In further exploratory analyses, we also tested two mediation models: first examining perceptions of climate inequality as a mediator of the effect of conservative political orientation on support for climate aid policy, and second on intensity of climate emotions. As our data are cross-sectional, findings from the mediation models must be interpreted with caution as they cannot test or confirm that our theorized ordering of the variables are correct (Rohrer et al., 2022).

### 2.1. Study 1 method

#### 2.1.1. Participants and procedure

In October 2022, we collected data from 547 participants in the United Kingdom and 554 in the United States via Prolific, which has been shown to have good data quality (Peer et al., 2022). We compensated participants with 1.25GBP each to complete a 10-min survey. The sample size was determined by resource constraints and a goal to collect large samples from these two countries to enable initial scale validation work. The total sample size of 1100 is appropriate for factor analysis (Comrey & Lee, 1992; Goretzko et al., 2021). Our survey items were included alongside others that were used to develop measures of anticipatory solastalgia and climate anxiety, reported elsewhere (Hogg et al., 2024; Stanley, 2023). We removed participants who failed either of two instructional attention checks, which each asked participants to

select a specified response option ( $n = 16$  in UK,  $n = 26$  in US). Our final samples had 531 (UK) and 528 (US) participants. Based on sensitivity analyses using G\*Power (Faul et al., 2007, 2009), each of these samples were sufficiently powered to detect Pearson's correlations of .12–.14 at 80% and 90% power, respectively. On average, the UK sample was slightly older ( $M = 41.69$ ,  $SD = 12.15$ , range 18–77 years) than the US sample ( $M = 36.25$ ,  $SD = 12.86$ , range 18–82 years). We used the balanced sample feature on Prolific to ensure samples had similar gender distributions (UK: 50.1% identified as women, 49.0% men, 0.6% preferred to self-describe their gender using another term, and 0.4% preferred not to say; US: 49.8% identified as women, 47.5% men, 2.5% another term, 0.2% preferred not to say).

The Australian National University Human Research Ethics Committee approved the ethical aspects of this research (2020/429). The lead researcher was based in Australia and thus conducted the research in line with local ethical guidance based on the 2007 *National Statement on the Ethical Conduct in Human Research*, in accordance with the *National Health and Medical Research Council Act 1992*. Participants read a detailed on screen information sheet before progressing to the survey.

### 2.1.2. Measures

**Climate inequality beliefs.** Participants were asked to “Please rate the extent you agree or disagree with the following statements”, and presented with 13 items to respond to on Likert scales from 1 (strongly disagree) to 7 (strongly agree). These items were created for this study and full details of the validation are presented in the Supplementary Materials, which used factor analysis techniques to devise separate subscales to measure perceptions of inequality at individual-, nation-, and generation-level (Table S1), as well as the three-item global measure included here (Table S2). We favoured the short, single-dimensional measure because it offered better predictive power than the alternative (see Table S3). Our 3-item measure was internally consistent in both countries (UK  $\alpha = .89$ , US  $\alpha = .92$ ).

1. Climate change will make global inequality worse,
2. There is inequality in who benefits from high-emission activities and who is burdened by environmental decline,
3. There is inequality in who causes climate change and who will be most affected by its consequences

**Climate aid policy support.** Participants were asked to: “Please indicate your level of support for the following climate change policies” from 1 (Strongly oppose) to 7 (Strongly support). Two items measured support for *international* climate aid.

1. The [United Kingdom/United States] government increasing foreign aid to nations experiencing the effects of climate change
2. The [United Kingdom/United States] government resettling people who have had to leave their country due to the effects of climate change

Two items measured support for *domestic* climate aid.

1. The [United Kingdom/United States] government providing financial assistance to citizens in the [United Kingdom/United States] displaced by the effects of climate change (e.g., bushfire, flooding, sea level rise)
2. The [United Kingdom/United States] government contributing to reparations for people within the [United Kingdom/United States] most affected by climate change

Again, the Supplementary Files presents full validation of these measures, which were developed for this study. Both international (UK Spearman-Brown coefficient (SB) = .86; US SB = .90) and domestic (UK SB = .82, US SB = .84) climate aid policy support subscales were internally consistent in both countries.

**Climate emotions.** Participants rated on sliding scales from 0 (Not at all this way) to 100 (A great deal) how much they experience the following emotions in relation to climate change: climate anxiety (scared, worried, afraid, anxious; UK  $\alpha = .95$ , US  $\alpha = .96$ ), climate anger (frustrated, mad, irritated, angry; UK  $\alpha = .92$ , US  $\alpha = .96$ ), climate depression (depressed, miserable, sad, upset; UK  $\alpha = .91$ , US  $\alpha = .93$ ), based on the measure used in Stanley et al. (2021).

**Political orientation.** We use a single item requesting participants place themselves on the political spectrum in both studies, which is common in this area of research (Jost, 2006). Participants were instructed: “Move the cursor below to the place on the slide which best represents your political views”. They were presented with a sliding scale from 0 (with the label: left-wing/liberal) to 100 (labeled: right-wing/conservative).

### 2.1.3. Analysis strategy

Study 1 was designed to develop a measure of climate inequality beliefs and to explore its correlates and it was not preregistered. Our data and syntax for both studies are available on the OSF: <https://osf.io/xb6ce/>. Our analysis included computing descriptive statistics for all variables and Pearson's correlations between variables. We constructed structural equation mediation models using lavaan (Rosseel, 2012) in R, treating multi-item constructs as latent variables. Numbers reported in square brackets after the regressions coefficients below represent bootstrapped 95% confidence intervals (5000 cycles, bias-corrected accelerated). We report both standardised and unstandardised estimates for each path. To assess model fit, we relied on Hu and Bentler's (1999) guidance, whereby satisfactory fit is indicated by comparative fit index (CFI) and Tucker-Lewis index (TLI) values  $\geq .90$ , the root mean square error of approximation (RMSEA)  $\leq .08$ , and good fit is indicated by CFI and TLI  $\geq .95$ , RMSEA  $\leq .06$  and a standardised root mean square residual (SRMR)  $\leq .08$ . In our figures, we report standardised regression estimates and show latent variables as ovals and without composite items and factor loadings to simplify the figures. We also show outcome variables without covariances. These additional results are presented in the Supplementary Materials.

## 2.2. Study 1 results and discussion

### 2.2.1. Descriptive statistics and correlations

Table 1 shows that on average, both UK and US samples tended to slightly agree that climate change is an inequality issue, and to support climate aid policies (i.e., scoring above the theoretical scale midpoint). Of the demographic variables, only political orientation was a consistent correlate of the key variables: In both countries, greater political conservatism related to lower climate inequality beliefs (supporting H1), lower support for both international and domestic climate aid policies (supporting H2), and reports of less intense climate anger, anxiety, and depression (supporting H3). Additionally, and in both countries, stronger climate inequality beliefs were associated with stronger climate emotions (supporting H4) and greater support for climate aid policies (supporting H5). In all cases, these correlations were weak-to-moderate in size.

### 2.2.2. Mediation models

We next tested two exploratory mediation models to examine whether differences in climate inequality beliefs are associated with conservatives' lower support for climate aid policy and lower emotional engagement in climate change.

The model predicting support for climate aid fit the data well in both the UK ( $\chi^2(15) = 54.45$ ,  $p < .001$ , CFI = .98, TLI = .97, RMSEA = .07, 90% CI [.05, .09], SRMR = .03) and US ( $\chi^2(15) = 79.09$ ,  $p < .001$ , CFI = .98, TLI = .96, RMSEA = .09, 90% CI [.07, .11], SRMR = .03). The pattern of findings are very similar in each country, and thus results from both samples are discussed together and presented in Table 2. Additionally, Fig. 1 (panel 1) presents fully standardised path estimates

**Table 1**

Correlations in the UK (below the diagonal) and US (above the diagonal) and descriptive statistics.

|                                       | 1.          | 2.          | 3.          | 4.            | 5.            | 6.            | 7.            |
|---------------------------------------|-------------|-------------|-------------|---------------|---------------|---------------|---------------|
| 1. Climate inequality beliefs         | –           | .64         | .60         | .53           | .52           | .48           | –.64          |
| 2. International climate aid          | .52         | –           | .73         | .47           | .52           | .43           | –.62          |
| 3. Domestic climate aid               | .43         | .55         | –           | .41           | .47           | .39           | –.54          |
| 4. Climate anger                      | .46         | .38         | .26         | –             | .78           | .82           | –.53          |
| 5. Climate anxiety                    | .41         | .41         | .35         | .74           | –             | .81           | –.51          |
| 6. Climate depression                 | .43         | .33         | .27         | .77           | .78           | –             | –.49          |
| 7. Conservative political orientation | –.43        | –.47        | –.31        | –.35          | –.27          | –.27          | –             |
| Measurement                           | 1–7         | 1–7         | 1–7         | 0–100         | 0–100         | 0–100         | 0–100         |
| M (SD) – UK sample                    | 5.27 (1.24) | 4.58 (1.56) | 5.43 (1.24) | 40.53 (29.56) | 43.07 (29.37) | 30.54 (27.15) | 40.27 (21.83) |
| M (SD) – US sample                    | 5.37 (1.47) | 4.68 (1.68) | 5.26 (1.57) | 42.83 (33.86) | 46.92 (32.69) | 32.19 (30.18) | 33.97 (27.36) |

Note. All correlations are significant at the  $p < .001$  level.**Table 2**

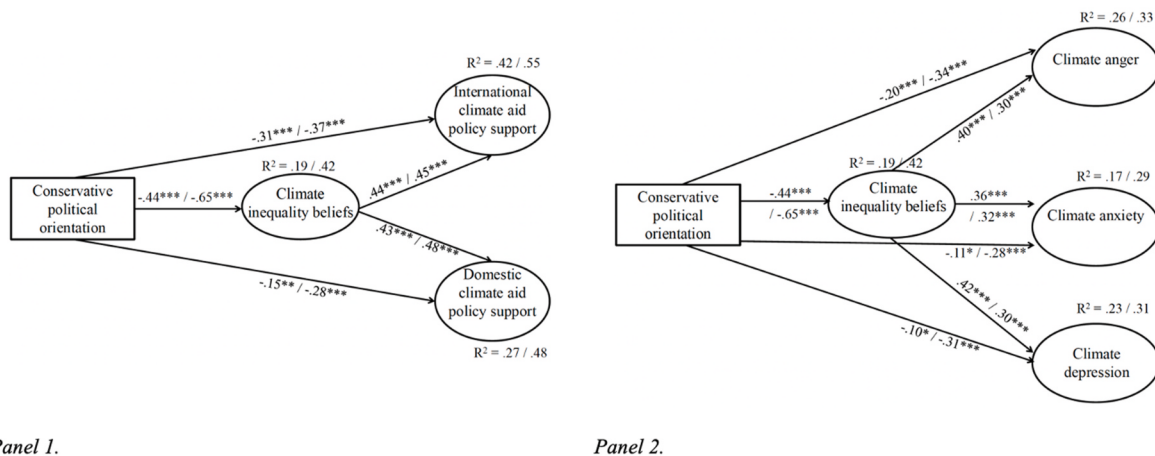
Results from path model whereby climate inequality beliefs mediate the associations between conservative political orientation and support for climate aid policy in Study 1.

|                                                                                                  | United Kingdom        |       |                   |       | United States        |       |                   |       |
|--------------------------------------------------------------------------------------------------|-----------------------|-------|-------------------|-------|----------------------|-------|-------------------|-------|
|                                                                                                  | b                     | SE    | $\beta$           | p     | b                    | SE    | $\beta$           | p     |
| <b>Direct paths</b>                                                                              |                       |       |                   |       |                      |       |                   |       |
| Conservative political orientation -> Climate inequality beliefs                                 | –0.02 [–0.03, –0.02]  | 0.003 | –.44 [–.52, –.36] | <.001 | –0.03 [–0.04, –0.03] | 0.003 | –.65 [–.71, –.58] | <.001 |
| Conservative political orientation -> international policy support                               | –0.02 [–0.03, –0.01]  | 0.003 | –.31 [–.40, –.23] | <.001 | –0.02 [–0.03, –0.01] | 0.003 | –.37 [–.48, –.26] | <.001 |
| Conservative political orientation -> domestic policy support                                    | –0.01 [–0.01, –0.003] | 0.003 | –.15 [–.25, –.05] | .003  | –0.01 [–0.02, –0.01] | 0.003 | –.28 [–.40, –.16] | <.001 |
| Climate inequality beliefs -> international policy support                                       | 0.52 [0.38, 0.67]     | 0.07  | .44 [.34, .54]    | <.001 | 0.50 [0.34, 0.68]    | 0.08  | .45 [.32, .56]    | <.001 |
| Climate inequality beliefs -> domestic policy support                                            | 0.45 [0.30, 0.62]     | 0.08  | .43 [.30, .56]    | <.001 | 0.51 [0.35, 0.70]    | 0.09  | .48 [.35, .61]    | <.001 |
| <b>Indirect paths</b>                                                                            |                       |       |                   |       |                      |       |                   |       |
| Conservative political orientation -> climate inequality beliefs -> international policy support | –0.01 [–0.02, –0.01]  | 0.002 | –.19 [–.25, –.14] | <.001 | –0.02 [–0.02, –0.01] | 0.003 | –.29 [–.37, –.21] | <.001 |
| Conservative political orientation -> climate inequality beliefs -> domestic policy support      | –0.01 [–0.02, –0.01]  | 0.002 | –.19 [–.27, –.12] | <.001 | –0.02 [–0.02, –0.01] | 0.003 | –.31 [–.40, –.23] | <.001 |
| <b>Total effects</b>                                                                             |                       |       |                   |       |                      |       |                   |       |
| Conservative political orientation -> international policy support                               | –0.03 [–0.04, –0.03]  | 0.003 | –.51 [–.58, –.43] | <.001 | –.04 [–.04, –.03]    | .003  | –.66 [–.71, –.60] | <.001 |
| Conservative political orientation -> domestic policy support                                    | –0.02 [–0.02, –0.01]  | 0.003 | –.34 [–.42, –.26] | <.001 | –.03 [–.04, –.03]    | .003  | –.59 [–.66, –.52] | <.001 |

to enable comparison of strength of paths. Findings show that conservative political orientation was moderately (in the UK) and strongly (in the US) negatively associated with climate inequality beliefs, and these beliefs related to greater support for both international policy and domestic policy (with moderate effect sizes). Conservative political orientation was weakly directly associated with lower international and

domestic policy support, and it also had significant indirect weak negative effects through its association with climate inequality beliefs on international and domestic policy support. Total effects indicated weak-to-moderate negative effects of conservative political orientation on policy support.

The second model predicting climate emotions was an acceptable fit

**Fig. 1.** Associations between political orientation and climate aid policy support (panel 1) and climate emotions (panel 2), as mediated by climate inequality beliefs, in the UK/US.

Note. Values shown are fully standardised. For each path, the first value presents results for the UK and the second value for the US. For simplicity, latent variables (ovals) are shown without composite items and factor loadings and outcome variables without covariances (see Supplementary Materials). All indirect paths are significant (see Table 2).

to the data in the UK ( $\chi^2(95) = 576.00, p < .001, CFI = .94, TLI = .92, RMSEA = .10, 90\% CI [.09, .11], SRMR = .05$ ) and US ( $\chi^2(95) = 654.25, p < .001, CFI = .95, TLI = .93, RMSEA = .11, 90\% CI [.10, .11], SRMR = .05$ ). Patterns of findings were again largely consistent in both countries, and are reported in Table 3 and shown in Fig. 1 (panel 2). Again, conservative political orientation was related to lower climate inequality beliefs. Climate inequality beliefs were positively associated feelings of with anger, anxiety, and depression about climate change (weak-to-moderate effect sizes). Conservative political orientation had significant, weak indirect effects through climate inequality beliefs on each of the negative climate emotions, supporting our hypothesis that conservatives' lower emotional engagement with climate change would be associated with their lower belief in climate inequality. Total effects indicated weak negative effects of conservative political orientation on climate emotions.

The  $R^2$  values suggest that more variance is explained in the endogenous variables in each model in the US than in the UK. Based on inspection of the standardised regression weights, this is consistent with the stronger associations between political orientation and the other variables in the models in the US, and hence reflects the greater political polarisation on climate change in the US compared to other countries (e.g., Hornsey et al., 2018).

To summarise, the patterns of correlations in Study 1 supported each of our hypotheses through finding negative associations between conservative political orientation and climate inequality beliefs, support for climate aid policies, and intensity of climate emotions. Further, endorsement of climate inequality beliefs was correlated with greater support for policy and more intense anger, anxiety, and depression felt in relation to climate change. Exploratory mediation models provided preliminary support for the relevance of climate inequality beliefs in the relationship between conservative political orientation and both support for climate aid policy and emotional engagement with climate change. Although the US may be an outlier for particularly strong conservatism-climate denial associations (Hornsey et al., 2018) and oversized associations between climate beliefs and public opinion on climate policy (Bergquist et al., 2022), we identified similar patterns of associations between our variables as measured in UK and US samples. Next, we examine these relationships within two nations that have substantial recent discourse about climate aid (e.g., McAdam, 2023).

### 3. Study 2

In our second study, we aimed to learn the extent to which people living in Australia and New Zealand agree that climate change is an inequality issue, and the extent to which they support climate aid policies. Study 2 tested the same five hypotheses tested in Study 1 and outlined in section 1.4 and included preregistered hypotheses for the two mediation models from Study 1.<sup>1</sup> Specifically, we predicted that awareness of climate inequality would mediate the association between right-wing political orientation and lower support for climate aid policy (H6) and between right-wing political orientation and lower intensity of climate emotions (H7). We included a wider range of emotional responses in Study 2, including anxiety, anger, guilt, shame, depression, and pessimism felt in relation to climate change, which we collapsed to form an overall index of negative climate emotions.

#### 3.1. Study 2 method

##### 3.1.1. Participants and procedure

In January and February of 2023, the survey company Bilendi & Respondi recruited our participants from Australia and New Zealand as

part of the Trust in Science and Science-Related Populism Many Labs project (TISP; Cologna et al., 2025; Mede et al., 2025). We analysed data from 1450 participants in Australia and 1022 participants in New Zealand who completed our measures of climate inequality beliefs and support for climate aid policies, as developed in Study 1, at the end of the core TISP survey, which included preselected measures of climate emotions and political orientation that differ from our measures used in Study 1. The sample size was determined by the number of researchers who signed up in these countries and agreed to collect the additional data for this project. Participant recruitment used a quota sampling approach, which allocated survey placements to approximately equal numbers of men and women, and equal numbers of people in the age brackets of 18–29, 30–39, 40–49, 50–59, 60+ years, to reach a broader and more representative sample of the populations in these two countries. Participants were excluded if they failed either of two instructional attention checks, or if their Bilendi participant identification number appeared a second time in the dataset (see Supplementary Materials for details). The same ethics principles regarding participant informed consent were followed as in Study 1, with the ethical aspects of the research approved by the Australian National University Human Research Ethics Committee (2022/506).

Our Australian sample ( $n = 1450$ ) ranged in ages from 18 to 88 years ( $M = 45.49, SD = 16.79$ ). Approximately half (48.1%) identified as women, 51.5% identified as men, 0.3% preferred to self-describe, and 0.1% preferred not to say. Most participants lived in urban areas (78.3% vs 21.7% in rural areas). The modal education level was tertiary (68.6%), followed by secondary (29.9%), primary (1.5%), and no formal education (0.1%). Our New Zealand sample ( $n = 1022$ ) ranged in ages from 18 to 91 years ( $M = 45.37, SD = 16.14$ ). Approximately half (49.6%) identified as women, 50.0% identified as men, 0.2% preferred to self-describe, and 0.2% preferred not to say. Most participants lived in urban areas (78.6% vs 21.4% rural). The modal education level was tertiary (70.7%), followed by secondary (26.9%), and primary level (2.3%; no respondents reported no formal education). These sample sizes were sufficient for testing our correlational hypotheses (H1–H5) as sensitivity analyses indicated they were large enough to detect small Pearson correlation coefficients at 80–90% power ( $r = .07$ –.08 in Australia,  $r = .09$ –.10 in New Zealand). Our Australian and New Zealand samples were also larger than our Study 1 samples, which did detect small indirect effects in the mediation models, suggesting our Study 2 samples would be sufficient to test our mediation models.

##### 3.1.2. Measures

**Climate inequality beliefs.** We used the same 3-item measure as in Study 1, which was internally consistent in Australia ( $\alpha = .83$ ) and NZ ( $\alpha = .81$ ).

**Support for climate aid policies.** We adapted the items developed in Study 1 to the Australian and New Zealand contexts by changing the country names, to measure support for international (Australia SB = .84; NZ SB = .77) and domestic climate aid (Australia SB = .82; NZ SB = .80).

**Climate emotions.** Participants were asked: "To what extent does climate change make you feel any of the following?". They rated from 1 (not at all) to 5 (very strongly) nine emotions: Helpless, anxious, optimistic, angry, guilty, ashamed, depressed, pessimistic, indifferent, with the measure developed for the TISP core survey (but see Searle & Gow, 2010, for a similar approach). We specified our interest in six negative emotions in our preregistration (anxious, angry, guilty, ashamed, depressed, pessimistic)<sup>2</sup> and did not specify whether analyses would treat these as single-item measures or construct an index of negative climate emotions. However, Principal Components Analysis of the items showed that the Australian results and New Zealand results supported a single component (see Supplementary Materials for details). These items

<sup>1</sup> We also preregistered that we would include and examine associations with trust in scientists and with support for environmental protection policies. We report these results in the Supplementary Materials.

<sup>2</sup> In one section of the preregistration, we erroneously stated that we would include all climate emotions measured in the TISP survey.

**Table 3**

Results from path model whereby climate inequality beliefs mediate the associations between conservative political orientation and climate emotions in Study 1.

|                                                                                              | United Kingdom       |       |                   |       | United States      |       |                   |       |
|----------------------------------------------------------------------------------------------|----------------------|-------|-------------------|-------|--------------------|-------|-------------------|-------|
|                                                                                              | b                    | SE    | $\beta$           | p     | b                  | SE    | $\beta$           | p     |
| <b>Direct paths</b>                                                                          |                      |       |                   |       |                    |       |                   |       |
| Conservative political orientation<br>-> Climate inequality beliefs                          | -.02 [-.03, -.02]    | 0.003 | -.44 [-.52, -.36] | <.001 | -.03 [-0.04, -.03] | 0.003 | -.65 [-.70, -.58] | <.001 |
| Conservative political orientation<br>-> climate anger                                       | -.01 [-.02, -.01]    | 0.003 | -.20 [-.29, -.11] | <.001 | -.02 [-0.02, -.01] | 0.002 | -.34 [-.43, -.24] | <.001 |
| Conservative political orientation<br>-> climate anxiety                                     | -.01 [-0.01, -.0001] | 0.002 | -.11 [-.20, -.02] | .021  | -.01 [-0.02, -.01] | 0.002 | -.28 [-.38, -.18] | <.001 |
| Conservative political orientation<br>-> climate depression                                  | -.01 [-0.01, 0.00]   | 0.002 | -.10 [-.19, -.01] | .036  | -.01 [-0.02, -.01] | 0.002 | -.31 [-.41, -.22] | <.001 |
| Climate inequality beliefs -> anger                                                          | 0.42 [0.31, 0.52]    | 0.06  | .40 [.30, .48]    | <.001 | 0.28 [0.18, 0.39]  | 0.05  | .30 [.19, .40]    | <.001 |
| Climate inequality beliefs<br>-> anxiety                                                     | 0.35 [0.26, 0.46]    | 0.05  | .36 [.27, .45]    | <.001 | 0.29 [0.19, 0.39]  | 0.05  | .32 [.21, .42]    | <.001 |
| Climate inequality beliefs<br>-> depression                                                  | 0.43 [0.34, 0.53]    | 0.05  | .42 [.34, .50]    | <.001 | 0.28 [0.18, 0.38]  | 0.05  | .30 [.20, .41]    | <.001 |
| <b>Indirect paths</b>                                                                        |                      |       |                   |       |                    |       |                   |       |
| Conservative political orientation<br>-> climate inequality beliefs<br>-> climate anger      | -.01 [-0.01, -.01]   | 0.002 | -.17 [-.23, -.12] | <.001 | -.01 [-0.01, -.01] | 0.002 | -.20 [-.26, -.12] | <.001 |
| Conservative political orientation<br>-> climate inequality beliefs<br>-> climate anxiety    | -.01 [-0.01, -.01]   | 0.001 | -.16 [-.21, -.11] | <.001 | -.01 [-0.01, -.01] | 0.002 | -.20 [-.28, -.13] | <.001 |
| Conservative political orientation<br>-> climate inequality beliefs<br>-> climate depression | -.01 [-0.01, -.01]   | 0.001 | -.19 [-.24, -.14] | <.001 | -.01 [-0.01, -.01] | 0.002 | -.20 [-.27, -.13] | <.001 |
| <b>Total effects</b>                                                                         |                      |       |                   |       |                    |       |                   |       |
| Conservative political orientation<br>-> climate anger                                       | -.02 [-0.03, -.02]   | 0.002 | -.37 [-.45, -.30] | <.001 | -.02 [-0.03, -.02] | 0.002 | -.53 [-.59, -.47] | <.001 |
| Conservative political orientation<br>-> climate anxiety                                     | -.01 [-0.02, -.01]   | 0.002 | -.27 [-.35, -.19] | <.001 | -.02 [-0.03, -.02] | 0.002 | -.48 [-.54, -.42] | <.001 |
| Conservative political orientation<br>-> climate depression                                  | -.02 [-0.02, -.01]   | 0.002 | -.28 [-.37, -.21] | <.001 | -.02 [-0.03, -.02] | 0.002 | -.51 [-.57, -.45] | <.001 |

formed an internally consistent scale in both Australia ( $\alpha = .92$ ) and NZ ( $\alpha = .89$ ), so we used this as a general measure of the intensity of negative climate emotions, which differs from Study 1 where we had multi-item measures of climate anger, anxiety, and depression.

**Political orientation.** We used the item: “Political orientations are often classified on a left-right spectrum or a liberal-conservative spectrum. Please indicate your political orientation.” Participants responded by rating their political orientation from 1 (strongly left-leaning) to 5 (strongly right-leaning), which was a less sensitive scale as compared to the 101-point sliding scale used in Study 1. In Study 1, we used both terms left-wing/liberal and right-wing/conservative because these terms are common in the UK and US, however in Australia, the main right-wing political party is called the Liberal party, and thus this term can cause confusion within a measure of political orientation. Participants also had the option to respond “don’t know”, which was treated as missing data for analyses including political orientation (see details in [section 3.1.3](#) below).

### 3.1.3. Analysis strategy

Our research questions, hypotheses, method, and analysis plan were preregistered on the Open Science Framework: <https://osf.io/vwzxb>. Data and R syntax are also available on the OSF: <https://osf.io/xb6ce/>. We did not employ post-stratification weights in our analyses, and therefore our descriptive statistics differ slightly to those reported in [Cologna et al. \(2025\)](#). We used listwise deletion to remove participants in each analysis where they had missing data or where they gave ‘not applicable’ or ‘don’t know’ responses. This resulted in a slightly smaller sample size for analyses with climate emotions (between 0–4 and 0–1 missing cases per emotion in Australia and NZ, respectively). Additionally, 214 and 152 participants did not give their political orientation

in Australia and New Zealand, respectively, which was almost entirely due to “don’t know” responses (only 2 Australian and 1 NZ participant did not respond to the political orientation question). We report Pearson’s correlations between variables. Preregistered multiple linear regression models show that associations do not substantially change when controlling for age, gender, residence, and education (see Supplementary Materials). We preregistered that we would test our mediation models using path modeling. However, we instead conducted structural equation models that included latent variables to account for measurement error and thus better estimate associations between variables ([McCoach et al., 2007](#)). These models were specified in the same way as in Study 1 and using the same criteria to evaluate model fit. We present the preregistered models in the Supplementary Materials, which shows the same pattern of findings when mean scores are used in path models. We also deviated from our preregistration by excluding SDO from our analyses based on poor internal consistency (see Supplementary Materials for details).

## 3.2. Study 2 results and discussion

### 3.2.1. Descriptive statistics and correlations

Scores in [Table 4](#) revealed that on average, participants in Australia and New Zealand slightly agreed that climate change is an inequality issue and indicated moderate support for international and domestic climate aid.

Correlations are presented in [Table 4](#) and show that stronger right-wing political orientation was weakly negatively related to climate inequality beliefs in both countries (supporting H1). Interestingly, political orientation was *not* significantly related to support for international climate aid, however there was the expected negative association

**Table 4**

Correlation matrix between key variables in Australia (below the diagonal) and New Zealand (above the diagonal).

|                                     | 1.          | 2.          | 3.          | 4.          | 5.          |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|
| 1. Climate inequality beliefs       | —           | .45***      | .45***      | .36***      | -.09**      |
| 2. International climate aid        | .54***      | —           | .53***      | .41***      | .02         |
| 3. Domestic climate aid             | .49***      | .53***      | —           | .29***      | -.07*       |
| 4. Climate emotions                 | .44***      | .47***      | .29***      | —           | .17***      |
| 5. Right-wing political orientation | -.11***     | -.03        | -.11***     | .17***      | —           |
| M (SD) – Australian sample          | 5.26 (1.23) | 4.80 (1.48) | 5.46 (1.29) | 3.04 (1.10) | 3.46 (1.08) |
| M (SD) – NZ sample                  | 5.41 (1.10) | 5.02 (1.29) | 5.46 (1.18) | 3.14 (1.00) | 3.50 (1.10) |

Note. Correlations presented are Pearson's, except we present Kendall's tau b correlations for climate mitigation policy support items. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

with domestic climate aid, albeit weak. Thus H2 was supported only partially. Hypothesis 3, which predicted a negative relationship between right-wing political orientation and climate emotions, was not supported. Instead, the more right-wing participants identified as, the *higher* the intensity of their negative emotions regarding climate change (weak effect sizes). Stronger climate inequality beliefs were related to more intense climate emotions (supporting H4, with weak effect sizes). We also found weak positive associations between climate inequality beliefs and international and domestic climate aid policy (supporting H5).

### 3.2.2. Mediation models

The model of climate aid policy support fit the data well in both Australia ( $\chi^2(15) = 127.77, p < .001$ , CFI = .97, TLI = .95, RMSEA = .08, 90% CI [.07, .09], SRMR = .03) and New Zealand ( $\chi^2(15) = 59.10, p < .001$ , CFI = .98, TLI = .97, RMSEA = .06, 90% CI [.04, .07], SRMR = .02). As shown in Fig. 2 (left panel) and Table 5, right-wing political orientation was negatively associated with climate inequality beliefs, and these beliefs strongly related to greater support for both international and domestic climate aid policy. Political orientation had a significant, small, negative indirect effect through climate inequality beliefs on international and domestic climate aid, supporting our mediation prediction (H6). Right-wing political orientation had a significant *positive* direct relationship with international climate aid in NZ, and no significant direct relationship in Australia. There was no significant direct effect of political orientation on support for domestic climate aid in either sample. Total effects indicated weak negative effects of right-wing political orientation on support for domestic climate aid, and no significant total effect of right-wing political orientation on support for international climate aid. Thus, stronger right-wing political orientation predicted lower support for domestic climate aid overall, and this effect can be attributed to the negative indirect effect via climate inequality beliefs, with no direct effect observed in either

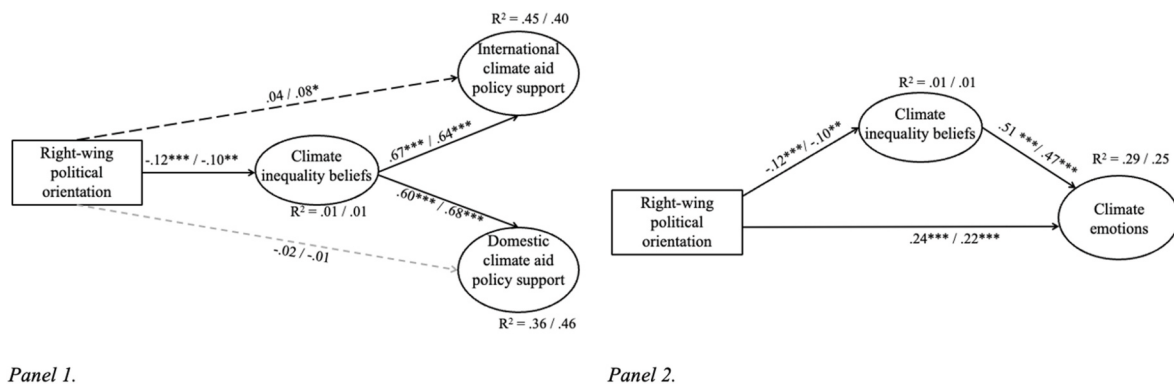
country.

Model fit for the mediation model on climate emotion was acceptable in both Australia ( $\chi^2(33) = 196.35, p < .001$ , CFI = .98, TLI = .97, RMSEA = .06, 90% CI [.06, .07], SRMR = .04) and New Zealand ( $\chi^2(33) = 154.20, p < .001$ , CFI = .97, TLI = .96, RMSEA = .07, 90% CI [.06, .08], SRMR = .04). Fig. 2 (right panel) and Table 6 shows that right-wing political orientation was negatively associated with climate inequality beliefs, and these beliefs were associated with reporting more intense negative emotions about climate change. The indirect effect was significant and negative, supporting H7. However, right-wing political orientation had positive direct and total effects on climate emotion. The positive total effects indicated that the direct effect was stronger than the indirect effect, such that overall, greater right-wing political orientation was associated with reporting stronger climate emotions in these samples.

To summarise, most of our hypotheses were supported in Study 2 and conceptually replicate our Study 1 findings, with a notable exception: the positive direction of the association between right-wing political orientation and intensity of climate emotions in our Australian and NZ samples contradict those findings from Study 1 and H3. To further explore this finding, Table S18 reports correlations with each climate emotion separately, which consistently show greater reported intensity of negative emotions among those closer to the right of the political spectrum.

## 4. General discussion

Climate change has fundamental justice implications because it disproportionately affects vulnerable individuals and societies while being caused by those with greater wealth. Climate aid policies could go some way towards correcting the disproportionate burden climate change places on those already facing disadvantage. We found that



**Fig. 2.** Associations between political orientation and climate aid policy support (panel 1) and climate emotions (panel 2), as mediated by climate inequality beliefs, in Australia/New Zealand.

Note. Values shown are fully standardized. For each path, the first value presents results for Australia and the second value for New Zealand. For simplicity, latent variables (ovals) are shown without composite items and factor loadings, and outcome variables in panel 1 without the covariance (see Supplementary Materials). In Panel 1, the lighter dashed line denotes a non-significant association in both countries; the darker dashed line denotes a significant association in New Zealand and a non-significant association in Australia. All indirect paths are significant (see Tables 5 and 6).

**Table 5**

Results from structural equation model whereby climate inequality beliefs mediate the associations between right-wing political orientation and support for climate aid policy in Study 2.

|                                                                                                      | Australia            |       |                   |       | New Zealand           |       |                    |       |
|------------------------------------------------------------------------------------------------------|----------------------|-------|-------------------|-------|-----------------------|-------|--------------------|-------|
|                                                                                                      | b                    | SE    | $\beta$           | p     | b                     | SE    | $\beta$            | p     |
| <b>Direct paths</b>                                                                                  |                      |       |                   |       |                       |       |                    |       |
| Right-wing political orientation<br>-> Climate inequality beliefs                                    | −0.11 [−0.17, −0.05] | 0.031 | −.12 [−.18, −.05] | <.001 | −0.09 [−0.17, −0.02]  | 0.038 | −.10 [−.18, −.02]  | .014  |
| Right-wing political orientation<br>-> international policy support                                  | 0.05 [−0.01, 0.12]   | 0.031 | .04 [−.01, .09]   | .090  | 0.10 [0.02, 0.17]     | 0.039 | .08 [.02, .15]     | .014  |
| Right-wing political orientation<br>-> domestic policy support                                       | −0.02 [−0.08, 0.04]  | 0.032 | −.02 [−.07, .04]  | .536  | −0.01 [−0.08, 0.06]   | 0.037 | −.01 [−.07, .05]   | .736  |
| Climate inequality beliefs<br>-> international policy support                                        | 0.90 [0.76, 1.06]    | 0.077 | .67 [.61, .73]    | <.001 | 0.82 [0.63, 1.05]     | 0.107 | .64 [.54, .73]     | <.001 |
| Climate inequality beliefs<br>-> domestic policy support                                             | 0.74 [0.61, 0.89]    | 0.070 | .60 [.52, .66]    | <.001 | 0.92 [0.74, 1.14]     | 0.10  | .68 [.60, .75]     | <.001 |
| <b>Indirect paths</b>                                                                                |                      |       |                   |       |                       |       |                    |       |
| Right-wing political orientation<br>-> climate inequality beliefs<br>-> international policy support | −0.10 [−0.16, −0.04] | 0.030 | −.08 [−.12, −.03] | .001  | −0.07 [−0.15, −0.01]  | 0.033 | −.06 [−.12, −.01]  | .017  |
| Right-wing political orientation<br>-> climate inequality beliefs<br>-> domestic policy support      | −0.08 [−0.13, −0.03] | 0.025 | −.07 [−.11, −.03] | .001  | −0.08 [−0.16, −0.02]  | 0.036 | −.07 [−.12, −.01]  | .015  |
| <b>Total effects</b>                                                                                 |                      |       |                   |       |                       |       |                    |       |
| Right-wing political orientation<br>-> international policy support                                  | −0.05 [−0.12, 0.03]  | .040  | −.04 [−.10, .03]  | .249  | 0.02 [−0.07, 0.11]    | 0.047 | .02 [−.06, .10]    | .664  |
| Right-wing political orientation<br>-> domestic policy support                                       | −0.10 [−0.18, −0.03] | .039  | −.09 [−.15, −.02] | .010  | −0.10 [−0.19, −0.004] | 0.048 | −.08 [−.15, −.003] | .044  |

climate aid policies were more palatable to people closer to the liberal (or left-wing) side of the political spectrum, who tend to also be more emotionally engaged with climate change in the UK and US (but not in Australia or NZ). We put forward a theoretical model whereby perceptions of climate change as an inequality issue may help to explain why political conservatives are less supportive of climate aid policy and report less intense climate emotions. Although our research design succeeded in developing a way to measure climate inequality beliefs and support for climate aid policies, we can only speculate about this theorized process from our mediation models. Based on these, and with the caveat that they are assessed within cross-sectional data where we have

assumed (and cannot test with these data) this direction of causality or exclude all unmeasured confounds, we found that political conservatism was associated with lower climate change inequality beliefs, which in turn was related to lower policy support and (in the UK and US) less intense climate emotions. We urge further research on public perceptions of climate inequality, including with more rigorous tests of our theoretical reasoning.

Our findings align with previous research showing that people who are more sensitive to justice and compassion concerns are more willing to make personal changes to address climate change (Dickinson et al., 2016). They also complement findings that those who accept unequal

**Table 6**

Results from structural equation model whereby climate inequality beliefs mediate the associations between right-wing political orientation and climate emotions in Study 2.

|                                                                                                   | Australia            |       |                   |       | New Zealand          |       |                   |       |
|---------------------------------------------------------------------------------------------------|----------------------|-------|-------------------|-------|----------------------|-------|-------------------|-------|
|                                                                                                   | b                    | SE    | $\beta$           | p     | b                    | SE    | $\beta$           | p     |
| <b>Direct paths</b>                                                                               |                      |       |                   |       |                      |       |                   |       |
| Right-wing political orientation<br>-> Climate inequality beliefs                                 | −0.11 [−0.17, −0.05] | 0.030 | −.12 [−.18, −.06] | <.001 | −0.09 [−0.16, −0.02] | 0.037 | −.10 [−.18, −.02] | .013  |
| Right-wing political orientation<br>-> Negative climate emotions                                  | 0.26 [0.20, 0.33]    | 0.032 | .24 [.19, .29]    | <.001 | 0.23 [0.16, 0.31]    | 0.037 | .22 [.16, .29]    | <.001 |
| Climate inequality beliefs -> Negative climate emotions                                           | 0.61 [0.52, 0.70]    | 0.047 | .51 [.45, .57]    | <.001 | 0.54 [0.44, 0.65]    | 0.054 | .47 [.39, .54]    | <.001 |
| <b>Indirect paths</b>                                                                             |                      |       |                   |       |                      |       |                   |       |
| Right-wing political orientation<br>-> climate inequality beliefs<br>-> Negative climate emotions | −0.07 [−0.11, −0.03] | 0.020 | −.06 [−.10, −.03] | .001  | −0.05 [−0.09, −0.01] | 0.021 | −.05 [−.09, −.01] | .018  |
| <b>Total effect</b>                                                                               |                      |       |                   |       |                      |       |                   |       |
| Right-wing political orientation<br>-> Negative climate emotions                                  | 0.19 [0.12, 0.26]    | 0.035 | .17 [.11, .24]    | <.001 | 0.18 [0.11, 0.26]    | 0.040 | .18 [.10, .25]    | <.001 |

societal conditions (i.e., score higher in SDO) are more likely to deny climate change and oppose pro-climate action (Stanley & Wilson, 2019) by showing that a stronger belief that climate change is an inequality issue is a significant correlate of support for policy that would aim to ameliorate the inequality. The associations with negative emotions about climate change, which indexed feelings of anger, anxiety, and sadness, among others, supports expanding models of collective action that position anger as a close correlate of perceived injustice. Intellectual engagement with climate change – in the form of understanding how it disproportionately affects certain groups – might facilitate emotional engagement with the issue. This is relevant because people who experience climate emotions are more likely to take action on climate change (Ogunbode et al., 2022; Stanley et al., 2021b). An important next step is to examine whether those who recognise the inequality of climate change also feel (and take) responsibility for addressing it (Diekmann & Faist, 2025).

Although we found the expected negative association between conservatism and climate emotions in our first study among those recruited from the UK and US (Study 1), endorsement of a stronger right-wing ideology among Australians and New Zealanders unexpectedly related to more intense climate emotions (Study 2). The indirect effect of right-wing political orientation on climate emotions replicated our Study 1 findings in showing a negative mediation pathway via climate inequality beliefs, such that a reduced belief in climate inequality partly explains the lower intensity of climate emotions among right-wing adherents, yet other factors unrelated to this mediator must be at play which contribute to an overall greater emotional response among conservatives in our Australian and New Zealand samples. Our measures of climate emotions did not explore the *focus* of the emotions, which is likely to depend on participants' existing views about climate change. That is, the predictors of denial-based anger likely differ to predictors of anger about inaction on climate change (e.g., Gregersen et al., 2023). We recruited more politically conservative samples in Study 2, and it is possible that their emotional responses focused on different aspects of climate change. This difference between our Study 1 and 2 samples could help to explain why right-wing views predicted a stronger emotional response overall in Study 2, however this unexpected finding warrants further investigation. Another difference between studies is in the way climate emotions were measured, with multi-item measures of three discrete climate emotions in Study 1 versus an index of the intensity of negative emotions in Study 2. However, this difference cannot explain why right-wing political orientation was positively associated with climate emotions in Study 2 because these associations were consistent across all negative emotions studied (see Supplementary Materials). Although the difference in measurement approaches between studies can be considered a weakness of our research, the consistency in findings despite measurement differences can support the robustness of key findings.

Our findings have possible applications that warrant further investigation. For example, it is possible that communicating about the inequality in the causes and consequences of climate change may promote public support for climate aid policies by increasing awareness of climate inequality. The correlational nature of this study means that these suggestions are only speculative, and experimental research to investigate reactions to climate justice messaging is necessary before this becomes a strong recommendation. Tsai and Pearson (2022) warn that exposure to information about the inequalities surrounding climate change could lead people to justify, rather than challenge, the system that maintains the injustice. One proposed solution they draw on comes from the recommendations by Hetey and Eberhardt (2018), to give context about *why* the disparities exist (thus forestalling victim blaming) and highlight ways that institutions cause *and can address* the injustice.

Efforts to test the success of such messaging also ought to examine responses across diverse audiences. In particular, climate justice appeals must be designed and tested carefully because they may not resonate with conservative audiences (Whitmarsh & Corner, 2017). That said,

recent evidence has shown that climate messages designed to leverage conservative values may be ineffective, and could even backfire to decrease liberals' engagement with environmental issues (Kim et al., 2021, 2023; Stanley et al., 2021c). Therefore, it is worthwhile to investigate climate justice and inequality-based frames further, including their effects across the political spectrum. One possibility is that such messaging is effective for the majority of people, who are *not* strongly invested in denying climate change. Thus, rather than tailoring messages to appeal to the minority who are staunchly against pro-climate action, communications research could test frames that could motivate people who are attitudinally sympathetic to climate change and justice concerns to become advocates for climate aid. Messaging may be particularly effective at spurring climate action if it provokes anger about the injustice of climate change (Stanley et al., 2021b). However, acknowledging the inequality of climate change could be a necessary, though unlikely sufficient, condition for endorsing redistributive policy (see also Nielsen et al., 2024). People may also need to view the injustice as a moral violation, and feel that policy action will successfully address it, which could be examined as additional variables in future research.

Another contribution of this research is that it presents a brief measure of climate inequality beliefs. The items within our recommended short scale are largely concerned with the awareness of an inverse relationship between the main contributors to causing climate change and those who are disproportionately burdened. This represents only one aspect of climate justice concerns, and is thus incomplete, though was the domain most of interest for our research. This measure can be included in future surveys and experiments to learn how these beliefs develop, both over time and in response to messaging. Future research endeavours could also delineate perceptions of climate inequality by participant's personal circumstances. This would allow examination of whether one must feel *personally* aggrieved by climate inequality to report heightened policy support and emotional responses. Social psychological theories of collective action propose that perceiving a situation as unfair can trigger anger and prompt people to engage in protest (e.g., van Zomeren et al., 2008). However, we can also experience injustice and the anger it arouses *on behalf of others*, including in the context of climate change (e.g., Barth et al., 2015). Investigations that focus on individuals' sociodemographic backgrounds and include a wider range of nations can explore these outstanding questions in future.

In future research, it will also be interesting to examine emotive reactions to the *inequality* of climate change itself, rather than emotions experienced in relation to climate change more broadly as we captured in our surveys, where the same emotion may be experienced for a range of reasons (e.g., Gregersen et al., 2023). Additionally, people differ in their support for social inequality (indexed by SDO), which is associated with lower support for climate migration policy (Stanley & Williamson, 2021; Stanley et al., 2023a). We hoped to expand our analysis of the links between ideology and climate aid support in Study 2 through including SDO as a specific conservative ideology, however measurement issues precluded our analyses of this construct. Further research, with improved measurement (e.g., Ho et al., 2015) could examine whether those endorsing SDO are more likely to deny climate-related inequality, or whether they are just as aware that climate change is driven by (and drives) inequality, and they tolerate this because they are simply more tolerant of inequality (e.g., Jylhä & Akrami, 2015; Jylhä et al., 2016).

We chose to initially recruit participants in the United Kingdom and United States as nations that have each contributed substantially to climate change, yet with high emissions disparity between high- and low-income residents (Chancel, 2022; Van Houtan et al., 2021). However, most of our findings were conceptually replicated using different measures in Australia and New Zealand, where there has been some progress made in negotiating climate finance and migration with climate-vulnerable nations (e.g., McAdam, 2023; Peters, 2018). Specifically, Australia and New Zealand are well suited geographically and in

terms of existing connections to support climate adaptation in the nearby Pacific Island nations (Wyett, 2014). Recently, Australia announced a climate migration pathway from Tuvalu and funding for a land reclamation project to reduce the low-lying coastal nation's vulnerability to sea-level rise (McAdam, 2023). While both actions could be viewed as forms of climate aid as conceptualised in our study, the agreement has been rejected by some academics as a way to achieve climate justice, in part due to the belief that there was not adequate consultation with Tuvaluans, many of whom do not want to leave the islands (e.g., Kitara & Farbotko, 2023). This critique demonstrates the importance of other forms of climate justice, such as procedural justice, to ensure climate adaptation solutions are those most suitable to affected communities.

Our focus on these non-representative samples from four nations limits the generalisability of findings to other nations. Our samples come from Western, Educated, Industrialised, Rich, and Democratic societies (Henrich et al., 2010) and where the associations between self-rated political orientation and climate opinions are markedly stronger than in other nations (Bergquist et al., 2022; Hornsey et al., 2018). Thus, there are reasons to expect differences in replications of this research in different nations, including that political orientation is not as relevant to climate-related views in other nations, and that left-right or liberal-conservative political orientation may not have the same meaning everywhere or throughout all points in history (e.g., Wojcik et al., 2021). It is also plausible that climate inequality beliefs are less relevant in shaping support for climate aid in different contexts. For example, among citizens of lower income nations, or where historic emissions are low, perceptions of one's nation's capacity or responsibility to provide climate aid may be stronger predictors of policy support. Additionally, in these contexts climate inequality beliefs may more strongly predict support for other nations offering climate aid, or nations forming international agreements regarding climate aid, rather than one's own nation implementing such policies. These possibilities ought to be investigated in future research. Other correlates of policy support and climate emotions could also be considered, such as acceptance of the reality, human causes, and serious risk posed by climate change (Goldberg et al., 2021), and experience of climate change (e.g., Ogunbode et al., 2022).

The most important limitation of this research is that although we were interested in the possible role of climate inequality beliefs in explaining differences between the climate emotions and policy support of political conservatives and liberals, our research design does not allow us to draw conclusions about any causal processes at play. This is because mediation models using cross-sectional data do not provide evidence for the causal relationships proposed here (e.g., Rohrer et al., 2022). Hence, we offer our theoretical reasoning and these findings as initial steps in the long journey towards causal inference. Our research ought to be built on with methods and analyses more suited to causal inference, such as graphical causal models (Rohrer, 2018), longitudinal approaches, and experimental research. It is important to note that alternative explanations are possible, such as that people deny that climate change is an inequality issue in order to justify their opposition to climate aid (thus implying a causal process from policy stance to climate inequality beliefs, for example; see also Campbell & Kay, 2014). Our intention is to use this work to draw research attention to possible differences in the extent people across the political spectrum perceive climate change as an inequality issue. This can add to current models of conservative climate attitudes (e.g., Stanley et al., 2023b) and begin to form a research base at a time where coverage of climate displacement often appeals to the inequality in who faces the consequences of climate change and calls on the Global North to provide aid (Ransan-Cooper et al., 2015).

Population movement due to environmental disaster is already common (Internal Displacement Monitoring Centre, 2019), and numbers of those displaced are expected to increase as climate impacts intensify (Bhowmik, 2020). The international community has not yet

settled on a solution to support those displaced, and discussion of a Loss and Damage Fund to compensate nations most affected by climate change are in early stages (United Nations Climate Change, 2022; Wynn, 2023). This research demonstrates that people in the UK, US, Australia, and NZ tend to be more supportive of such policy solutions the more that they agree there is an inequality problem exacerbated by climate change. It also provides preliminary cross-sectional evidence and theoretical rationale for climate inequality beliefs as another possible mechanism by which political conservatism impedes engagement with climate solutions, and highlights that the relationships between ideology and climate emotion may be more complex than we assumed. These insights pave the way for further research on the predictors of climate inequality beliefs, climate aid support, and emotional engagement with climate change.

## CRediT authorship contribution statement

**Samantha K. Stanley:** Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Omid Ghasemi:** Writing – review & editing, Investigation, Formal analysis, Data curation. **John R. Kerr:** Writing – review & editing, Validation, Investigation, Formal analysis, Data curation. **Robert M. Ross:** Writing – review & editing, Project administration, Investigation. **Mathew D. Marques:** Writing – review & editing, Investigation, Funding acquisition. **Niels G. Mede:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation. **Sebastian Berger:** Writing – review & editing, Investigation. **Mark Alfano:** Writing – review & editing, Investigation, Funding acquisition. **Neil Levy:** Writing – review & editing, Investigation, Funding acquisition. **Marinus Ferreira:** Writing – review & editing, Investigation. **Viktoria Cologna:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jenvp.2025.102679>.

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