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## The Effect of Climate Change Threat on Public Attitudes towards Ethnic and Religious Minorities and Climate Refugees

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*How does climate change threat affect attitudes towards ethnic and religious minorities and climate change refugees? We show that threatening climate change can have deep psychological effects even among social majority groups in relatively prosperous and peaceful societies. Using three survey experiments with self-identified White British participants (N=616, N=587, and N=535), we demonstrate that social majority members who are exposed to threatening information about climate change (vs. neutral information) and, at the same time, feel little national efficacy over climate change, evaluate more negatively certain ethnic and religious minorities, especially Muslims and Pakistanis. We found the same trend in the evaluation of climate refugees, although it reached statistical significance only in one of the experiments. We explain these reactions as pertaining to groups that are perceived as threatening the salient ingroup and its collective agency. Our research significantly contributes to the literature on the social and political implications of (climate change) threat, especially by focusing on boundary conditions, namely the perception of collective control in case of complex and large threats.*

Keywords: climate change, threat, minorities, refugees, experiment, collective control

Climate change has the potential to create or aggravate conflicts by negatively impacting socio-structural conditions in a direct and material way. Weather extremes and the rise of average temperatures contribute to the depletion of natural resources such as water and arable land, which can lead to conflict over these resources and mass migration that is also predictive of inter-group hostilities (Koubi, 2019; Miles-Novelo & Anderson, 2019; Plante et al., 2017). The psychological well-being of people caught up in these conflicts or natural disasters caused by climate change suffers as well (Doherty & Clayton, 2011).

However, climate change may also have more subtle, negative psychological effects on people who live far away from regions that are most severely impacted by it. In the relatively new and still underexplored line of research on the social psychological effects of climate change, scholars have

found that merely reminding people in Europe or North America about climate change threat increased ethnocentrism, authoritarianism, conformity to ingroup norms, racism, and tendencies to derogate certain social groups such as drug dealers (Barth et al., 2018; Fritsche et al., 2012; Uenal et al., 2021; Uhl et al., 2018).

These findings point to a potential sinister effect of climate change that can exacerbate intergroup conflicts globally and not just in the most severely affected regions. All the more so, as the reminders of climate change threat abound in daily life.<sup>1</sup> In the light of this global prominence of negative climate change news, it is important to further extend the existing research on the social-psychological effects of climate change threat.

Beyond assessing these effects, it is important to better understand their specific psychological causes and underlying processes. We suggest that climate change threat undermines people's sense of personal control, thereby eliciting automatic responses of demonstrating control on the group level (Fritsche, 2022) such as discrimination against those minorities who potentially hamper ingroup agency. These effects might be most pronounced when people perceive their group (e.g., their own nation) as lacking efficacy in tackling climate change ("double threat hypothesis"; Fritsche et al., 2013, 2017). As a result, demonstrating collective agency through discrimination against adverse minorities might help majority members of the society to symbolically restore control on the group level.

In this research, we investigated across three pre-registered studies with independent samples whether climate change threat had a negative impact on relations between 1) social majority – ethnic/religious minorities and 2) social majority – climate refugees. We also included a third configuration of intergroup relations by re-testing the negative effect of climate change threat on

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<sup>1</sup> The LexisNexis database shows that in year 2020, there was almost 170 000 mentions of the phrase "climate change" in English-speaking newspapers around the world and over 35 000 of these was labelled as "negative news" by the software. That's around 100 negative news on climate change per day, globally, in a year when news was dominated by the Covid-19 pandemic – statistics that only take into account English sources and a very narrow (and business-tailored) algorithm for defining negative news.

social majority's attitudes towards "dangerous social groups", which was reported by Fritsche et al. (2012). Our hypothesis was to find a negative effect of climate change threat on social majority's attitudes towards all three categories of minority groups.

Although we did not find statistically significant main effects of climate change threat on any of these groups, following our pre-registered exploratory analysis of Study 1 we did find climate change threat to increase discrimination against certain minority groups and climate refugees among those participants who perceived national climate efficacy to be low. This moderation effect was in line with our group-based control reasoning: When people whose personal control is threatened due to salient climate change realize that their salient ingroup lacks control as well, they should be motivated to demonstrate collective control in a different way, such as lashing out against potentially threatening minorities. We attempted to replicate these findings in two additional preregistered studies. As in Study 1, both additional studies found no main effect of climate change threat on attitudes towards various minority groups but replicated the moderation effect of national climate efficacy for certain minority groups. The moderation effect was most pronounced in the case of attitudes towards Muslim and Pakistani minorities in the UK, which we theorise in the paper as likely reflecting a high perceived threat of the two groups to salient ingroup's agency, relative to other minorities.

Before we describe our present research and explain the choices of our key dependent variables, we elaborate in more detail on the theoretical argument for why climate change threat can negatively affect intergroup relations and why perception of collective efficacy (control) can moderate this effect, respectively.

### **1. Climate Change Threat Effects on Intergroup Relations**

Climate change has been described as a *catastrophic* (Kopits et al., 2013), even *existential* (UN News, 2018) threat to humanity. There is a vast body of research showing that threats elicit automatic psychological defences in people (for a review see Jonas et al., 2014). This happens

because threat-induced anxiety undermines basic human psychological needs (e.g., control, certainty, self-esteem), which activates automatic mental processes that help to defend or restore satisfaction of these needs (Jonas et al., 2014).

One prominent defence mechanism leads people to define themselves more strongly in terms of group membership, or *social* identity, as compared to their *personal* identity, and then act based on such membership to demonstrate control through their social self (Fritsche, 2022; Fritsche et al., 2011). This is expressed in authoritarian and ethnocentric responses to threat. A number of experimental (e.g., Duckitt & Fisher, 2003; Stenner, 2005), correlational (e.g., De Keersmaecker et al., 2017; Sibley & Duckitt, 2010) and archival studies (e.g., Doty et al., 1991; McCann, 1997; Perrin, 2005; Sales, 1973) found that threat increases authoritarian and ethnocentric tendencies which are linked to prejudice towards outgroups (Cohrs & Asbrock, 2009; Duckitt & Sibley, 2010). At the same time, people who are already predisposed to view outgroups negatively, for example by holding strong right-wing authoritarian and social dominance attitudes, are more sensitive and reactive to threat cues, which can further exacerbate their negative attitudes towards outgroups (Lepage et al., 2022; Onraet et al., 2014).

An array of different types of threats have been investigated for their effects, ranging from mortality reminders (e.g., Greenberg et al., 2003; Routledge & Vess, 2019) and relationship insecurities (e.g., Gable, 2006) to economic crisis threat (Fritsche et al., 2017) and terrorism (e.g., Pyszczynski et al., 2003). A relatively few studies explored the effects of climate change threat (Barth et al., 2018; Fritsche et al., 2012; Uenal et al., 2021; Uhl et al., 2016, 2018). They found the same psychological reaction in the form of heightened ethnocentric and authoritarian attitudes. Crucially, Fritsche et al. (2012) demonstrated in experimental studies that reminding German and UK participants of threatening climate change increased their general authoritarian aggression and their derogation of socially “deviant” or dangerous groups such as drug dealers or violent offenders (see Uhl et al., 2016 for a replication in Austrian participants). Closer to our present focus, Uenal et al.

(2021) showed that threatening climate change news increased modern racism (towards ethnic minorities as an aggregate, general category) and perceived threat from immigration. Other experimental studies found increased conformity with salient group norms (in Germans; Barth et al., 2018) and general ethnocentrism (in Austrians; Uhl et al., 2018) following climate change threat. These findings underscore that the effect of threat is not necessarily specific to the source of the threat, which implies that the psychological defence mechanisms set in motion after the exposure to climate change threat can target any social outgroup, particularly those perceived as potentially threatening to the ingroup.

## **2. Threat and Perceived Control**

Explanations for the group-based reactions to perceived threat have been mostly rooted in social identity theory (Hogg, 2020; Tajfel, 1974), which posits that our identity is shaped by and partially reflects the characteristics of social groups we belong to when these are salient and personally relevant in a situation. These social identities become particularly relevant in times of crisis or threat as they can serve as a mental resource to satisfy basic psychological needs (Correll & Park, 2005). They may give us sense of order (Kay et al., 2009), meaning (Proulx & Inzlicht, 2012), certainty (Hogg, 2000), continuity or “symbolic immortality” (Castano & Dechesne, 2005), self-esteem (Sherman et al., 2007), or control (Fritsche, 2022; Fritsche et al., 2013). Threat (as compared to challenge) can be defined as a demanding situation that a person considers uncontrollable through the self (see Blascovich & Tomaka, 1996). Thus, restoring a sense of control through group membership might be pivotal for people under conditions of threat. Feeling in control, defined as “the perceived potential to affect important aspects of the environment through the autonomous self” (Stollberg et al., 2015, p. 2), has been described as one of the fundamental human needs (Hornsey et al., 2015).

Building on the centrality of control to mental well-being, Fritsche and colleagues (2022; 2011, 2013) proposed group-based control theory to explain the mechanism behind the link between threat and extreme authoritarian and ethnocentric reactions, which include the derogation of both

ingroup and outgroup members seen as negatively affecting the integrity, and thus the agency, of the ingroup. According to the model, people heuristically conceive of social groups as agents instead of merely descriptive categories. Also, collectives can act upon issues that seem futile to be addressed by isolated individuals, such as climate change. When people define themselves in terms of group membership (social identity) this sense of collective agency becomes a feature of their own self. In fact, being reminded of group membership increased people's sense of control through their self and buffered effects of personal control threat on control perceptions (Czepluch et al., 2023; Greenaway et al., 2015; Relke et al., 2024; Stollberg et al., 2015). Thus, when control seems threatened on the personal level of the self (e.g., when reflecting on personal helplessness in face of devastating global climate change), people are assumed to automatically and unconsciously take efforts of restoring their subjective sense of control through identifying with salient social ingroups and joining in group-based action (i.e., acting in terms of ingroup norms and goals). Accordingly, when reminded of low (vs. high or neutral) personal control over important aspects of their life, people have been shown to identify more strongly with social ingroups, such as their own nation (Fritsche et al., 2008) especially when they considered these groups being agentic (Stollberg et al., 2015). Also, when threat to control was salient people conformed more with salient ingroup (vs. outgroup or neutral) norms (Stollberg et al., 2017) and increased their readiness to engage in collective action (Fritsche et al., 2008) and to derogate outgroups (Fritsche et al., 2013). Outgroup prejudice was also found to be the result of a high-threat low-control context in both experimental and cross-sectional research designs (Greenaway et al., 2014).

Of importance, the collective action responses to personal control threat have been found to be most intense when people were also made to doubt whether their group is in fact agentic ("double threat hypothesis"; Fritsche et al., 2013, 2017). This indicates that under conditions of threatened control people may symbolically demonstrate collective agency of the group through actions that are clearly group-based, such as ingroup norm conformity (Stollberg et al., 2017), derogating outgroups (Fritsche et al., 2013), actively supporting the restoration or maintenance of ingroup

agency through own actions, such as supporting intra-group hierarchy (Lautenbacher & Fritsche, 2023) or aggressing towards ingroup deviants who endanger ingroup consensus and joint action (i.e., authoritarian response; Barth et al., 2018).

### **3. The Present Research**

Previous research has established a “collective shift” in how people think and act as a consequence of climate change threat cues (Barth et al., 2018; Fritsche et al., 2012; Uenal et al., 2021; Uhl et al., 2016, 2018). However, this research never directly tested one of its most crucial implications for assessing the impact of accelerating climate change on domestic or even international conflict: the effect of climate change threat on attitudes towards specific ethnic and religious minorities and those who are forced to migrate due to globally deteriorating environmental conditions. One exception is the research done by Uenal et al. (2021) that focused on modern racism towards unspecified “ethnic minorities”. Also, previous research did not investigate the specific psychological processes and boundary conditions of these effects.

In the present research we fill these gaps. Specifically, we tested whether climate change threat had a negative effect on the ethnic majority’s attitudes towards ethnic and religious minorities and climate change refugees. Also, we aimed to replicate climate change threat effects on the derogation of dangerous social groups (Fritsche et al., 2012).

Furthermore, to investigate whether processes of group-based control can explain climate change threat effects on authoritarian and ethnocentric responses, we tested the moderating role of perceived collective efficacy. We suggest that ethnocentric responses to climate change threat occur due to people’s efforts to restore their threatened sense of control through demonstrating control through their ingroup. Therefore, we expected that perception of low collective climate efficacy (control) would aggravate the negative effect of the climate change threat on intergroup relations.



We tested these hypotheses in three online experimental studies in the UK using independent samples of self-identified White British respondents. While the UK is a country that is not immediately and severely affected by climate change, it arguably represents a critical case study because the climate change threat is relatively salient in the population. For the past several years, around 70 to 75 percent of British respondents of nationally representative surveys have said they were somewhat, very, or extremely worried about climate change (Office for National Statistics, 2022; Phillips et al., 2018). Before the 2019 UK general elections, three quarters of UK voters declared climate change as the biggest issue facing humanity (Carrington, 2019). Therefore, manipulating climate change threat by raising its salience among British respondents could be a difficult task and finding significant effects should increase our confidence in the results.

With respect to the effect of climate change threat on attitudes towards ethnic and religious minorities, our analysis in this paper is particularly focused on Muslim and Pakistani minorities living in the UK. Following group-based control theory, these two groups should elicit the strongest negative reaction to climate change threat because they are likely to be perceived as the most detrimental to the ingroup's collective agency through which threatened members of the ingroup need to restore their sense of control.

Muslim minorities in the UK have been viewed by large segments of the public as “suspect communities” with alien values that failed to integrate in the mainstream society (Elahi & Khan, 2017; Pantazis & Pemberton, 2009). A recent nationally representative survey found British Muslims to be the country's “second ‘least liked’ group, after Gypsy and Irish Travellers”, with some 26% of its respondents expressing negative feelings about them (Jones & Unsworth, 2022, p. 7). It is argued that Muslims' negative “hypervisibility” in the media and public discourse in the West, including in the UK, makes them a potent source of both realistic and symbolic threat to the majority society (Jaspal & Cinnirella, 2010; Obaidi et al., 2018). According to official statistics, the largest Muslim ethnic group in the UK are people of Pakistani immigrant background, numbering over 1.6 million

and forming the second largest ethnic minority in general in England and Wales. The Muslim and Pakistani identities have been fused in the public discourse and associated with parallel society of alien values, large scale riots, and terrorist attacks in the country (Abbas, 2013; Bagguley & Yasmin Hussain, 2016). This “hybridized” (Jaspal & Cinnirella, 2010), multifaceted nature of threat that Muslim and, by extension, Pakistani minorities came to be associated with in the UK is likely higher than threat elicited by other less related and numerous ethnic and religious minorities in the country. The “deviant” status attached to the Muslim and Pakistani minorities in the UK in combination with their apparent capability to pursue “deviant goals” (given their size) likely results in perceived threat to the cohesion and likeminded collective goal pursuit of the majority population and, hence, its collective agency.

We also tested the effect of climate change threat on attitudes towards climate refugees, for both political and theoretical reasons. Politically, it is important to investigate potential reactions of the social majority to this group because both the salience of climate change threat and the number of climate refugees (or, technically, climate immigrants, since international law does not acknowledge climate-induced refugee status) will most likely rapidly increase in the coming decades. Theoretically, in the context of the prevailing negative public discourse on asylum seekers in the UK, we can expect that climate refugees invoke images of culturally deviant and socio-economically inferior people from developing countries who represent an economic burden and threat to national integrity and, hence, easily attracting derogation at times of heightened perception of (climate) threat. There are few studies on attitudes towards climate refugees (e.g., Arias & Blair, 2022; Gillis et al., 2023; Raimi et al., 2024; Stanley et al., 2022), but to our knowledge this is the first experimental test of whether such attitudes are affected by climate change threat.

### **Study 1**

The main aim of Study 1 was to test the direct climate change threat effect on attitudes of self-identified White British participants towards various UK ethnic and religious minorities, climate

refugees, and dangerous social groups (replication of Fritsche et al. 2012). We hypothesized that the exposure to the climate change threat condition would worsen the attitude of the majority towards these groups. We also investigated, in a preregistered exploratory analysis, whether collective efficacy perceptions would moderate this effect.

### *3.1. Method*

#### *3.1.1. Participants and Design*

We contracted the survey company Qualtrics to recruit a sample of self-described White British UK citizens, which would reflect the age and sex composition of the White British population (ethnic, age, and sex quota were built into the survey to achieve this). Regarding sample size, the Fritsche et al. (2012) study registered a large effect size of climate change threat on attitudes towards dangerous social groups with only 55 participants, using an almost identical research design. However, since it was likely that the standard deviation (SD) of mean attitudes towards ethnic/religious minorities would be higher than in case of dangerous groups (which was below .8 in Fritsche et al. 2012), we conducted an a priori power analysis using G\*Power software (Faul et al., 2007) to determine the minimum sample size required to achieve lower effect size than in the 2012 study. Results indicated the required sample size to achieve 80% power for detecting a medium effect ( $f=.25$ ), at a significance criterion of  $\alpha = .05$ , was  $N = 128$  for one-way ANOVA. For a small effect ( $f=.10$ ), the required sample size under the same configuration was  $N=788$ . Therefore, we aimed at a final size of  $N>800$ .

The study consisted of two survey waves.<sup>2</sup> The first wave (T1; September 2020) included socio-demographic questions and a number of items measuring various social and political attitudes including the potential moderators of collective climate efficacy. The respondents ( $N=890$ ; 445 female, 445 male, mean age = 45.5 (SD= 15.7)) were re-contacted for the second wave two weeks

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<sup>2</sup> All surveys used in this paper as well as the datasets are accessible at the Mendeley Data under DOI: 10.17632/kmhgrg4rpz.1

later (T2; October 2020) with another survey, which consisted of the main experimental part of the study. Given budgetary limitation, the re-contact wave was concluded after reaching 616 completed submissions. This unfortunately fell short of our goal of recruiting more than 800 respondents, but the final sample size was still much higher than the one required to detect a medium effect.

The sample of 616 participants was almost evenly split by sex (298 female, 318 male) and had a mean age of 46 years. About half of the sample had graduate or post-graduate degree. The sample is thus considerably larger and socio-demographically more diverse than in the previous similar studies (e.g., Fritsche et al., 2012; Barth et al., 2018). The participants were financially rewarded in the framework of their panel membership scheme. The experimental part of the survey (T2) consisted of two conditions (climate change threat vs. neutral topic). Several standard measures employed by Qualtrics were in place to assure data quality in T1, including the elimination of surveys completed below one third of the median completion time in the soft launch. The study was pre-registered at AsPredicted.org ([https://aspredicted.org/S8X\\_13Z](https://aspredicted.org/S8X_13Z)) before data collection.<sup>3</sup> All participants first read an ethical declaration and were asked to provide informed consent. Those who participated in the experiment were fully debriefed at the end.

### 3.1.2. Procedure

In the first wave of the survey (T1), after a socio-demographics section we measured different perceptions of collective efficacy using one item each: 1) general national efficacy (“The British are capable of shaping the world in line with their own shared goals”), 2) national climate efficacy (“I think that we, in the UK, can manage to reduce carbon emissions substantially in order to contribute

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<sup>3</sup> The pre-registration includes hypotheses and variables intended for multiple studies in different publications (e.g., one focused on the effect of the climate change threat on extremism with associated variables of interest such as authoritarian aggression and social dominance orientation). For this article, we focused on the pre-registered main hypothesis of the main effect of the climate change threat on public attitudes towards ethnic and religious minorities, climate refugees and dangerous social groups as well as the exploratory analysis of the moderating role of the “national climate change agency” (section 8 in the pre-registration form). For theoretical reasons, we decided to explore perceived general and global climate efficacy alongside national climate efficacy too.

to the global effort to tackle climate change”), and 3) global climate efficacy (“I think that globally, humanity will manage to reduce carbon emissions substantially to avoid the worst scenarios of climate change”). The respondents indicated the extent of their agreement with these statements on a 7-point Likert scale (7=strongly agree).

The re-contact survey (T2) employed an experimental manipulation of climate change threat directly taken from Fritsche et al. (2012), only updated with new estimates of climate change consequences where relevant. In the climate change threat condition participants were asked to indicate whether they knew (or did not) 18 facts about the impact of climate change on Britain in the next decades, seemingly for the purpose of developing a knowledge test for future studies. Example facts are: “In the absence of adaptation, annual UK heat-related mortality is projected to increase by two-thirds by the 2020s, by around 250% by the 2050s, and by more than 500% by the 2080s from a current baseline of 2,000 heat-related deaths per year”, “It will rain less during summer in the UK causing increasing drought periods”, or “Current crop production in areas of eastern England and Scotland could become unviable due to the combination of drying soils and lack of dependable water supplies for use on farms.” In order to make climate change threat even more salient, we added (in contrast to Fritsche et al., 2012) one more additional visual item – a map showing areas of Britain threatened by sea level rise in 2050 under moderate emission cuts – asking the respondents if they had seen a similar map before.

The respondents in the control condition (no climate change threat salient) were also told that they were helping to develop a knowledge test, but the 18 facts they read concerned their general knowledge about geographical, historical and political facts related to Britain, also directly transplanted (and updated where relevant) from Fritsche et al. 2012. Examples are: “UK’s longest river is the Severn - 200 miles long (322 km)”, “The UK is the home of nearly 230 kinds of birds and a temporary home to 200 migrating birds”, or “The GDP of the United Kingdom was GBP 2.21 trillion

in 2019.” As in the treatment condition, a map also followed these items and the respondents were asked whether they had seen it before, but this time the map displayed British national parks.

After the experimental manipulation, we introduced a delay task because threat effects are thought to be most pronounced when people are no longer consciously aware of the threat but cope with it on the unconscious level (Jonas et al., 2014). The delay was again modelled on the example used by Fritsche et al. (2012) and consisted of the 20-item positive and negative affect scale (The Positive and Negative Affect Schedule - PANAS) followed by 12 questions on sleep patterns.

After the delay, the respondents were asked to evaluate a number of (randomly ordered) social groups *living in the UK* on the classical “thermometer” 10-point scale (1=least positive evaluation, 10=most positive evaluation). Average scores of seven items representing “dangerous groups” ( $\alpha=.92$ ; e.g., violent offenders, drug dealers, terrorists) were carried over from Fritsche et al. (2012) for the purpose of replication. The rest of the items were made up of various ethnic and religious minorities, including Muslims and Pakistanis ( $\alpha=.93$ ), whose average scores are the main focus of the present analysis.<sup>4</sup>

After the thermometer evaluation, the respondents were to indicate their support for granting asylum to six types of refugee groups on a 10-point scale (where 1=least support and 10=greatest support).<sup>5</sup> These groups were differentiated based on the life-threatening reasons that made them apply for asylum: political persecution, poverty, war, widespread violence, water scarcity and rising

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<sup>4</sup> Here, we deviate from the pre-registration where we indicated that average scores for the following minority groups would constitute the dependent variable: Muslims, Jews, Arabs, Chinese, Poles, Pakistanis, Indians, Black/Caribbean/Afro-Caribbean, illegal immigrants, and refugees. We report the results for this amalgamated group as well as for all additional ethnic groups (Australians, Americans, and Germans) included in the questionnaire individually, but we think that for theoretical reasons detailed in the introduction it makes more sense to concentrate on Muslims and Pakistanis, since other groups are either less numerous or perceived as less problematic, or both.

<sup>5</sup> Other variables measured at T2 were: authoritarian aggression, British identity, support for extremist pro-climate action, support for eco-fascist action, and ecofascist ideology. These variables were intended for a publication with a different thematic focus (Shanaah et al., 2024).

sea levels. The last two reasons are most directly associated with climate change and their average scores (Spearman correlation = .84) formed another main variable, support for “climate refugees”.

### 3.2. Results

Table 1 displays the descriptive statistics of the main measures for each of the experimental conditions. A simple imbalance test (a series of logistic regressions with the binary condition assignment as the dependent variable and socio-demographic items as independent variables) revealed that the randomization of respondents was successful (balanced) with respect to their basic socio-demographic characteristics (sex, age, education, income). However, politically left-wing leaning respondents were significantly overrepresented in the threat condition. Therefore, we controlled for political ideology (7-point scale where 1=extreme left and 7=extreme right) in all models in Study 1.

**Table 1. Descriptive statistics of the main variables by conditions (Study 1)**

Climate Change Threat not Salient (Control)			
Variables	N	Mean	Std. Dev.
General national efficacy	307	4.44	1.40
National climate efficacy	307	4.90	1.31
Global climate efficacy	307	4.25	1.41
Muslims and Pakistanis	307	5.96	2.63
Climate refugees	307	5.44	2.59
Dangerous groups	307	2.38	1.78
Climate Change Threat Salient			
Variables	N	Mean	Std. Dev.
General national efficacy	309	4.25	1.40
National climate efficacy	309	4.78	1.35
Global climate efficacy	309	4.14	1.35
Muslims and Pakistanis	309	6.03	2.49
Climate refugees	309	5.80	2.62
Dangerous groups	309	2.37	1.50

#### 3.2.1. The Main Effect of Climate Change Threat

As already visible from Table 1, the mean scores (evaluation) of the dependent variables (Muslims and Pakistanis, climate refugees, dangerous groups) are almost identical in both

experimental conditions. We used one-way ANCOVAs to test the climate change threat effect while controlling for political ideology. We did not find statistically significant main effect of climate change threat on the attitude towards Muslims and Pakistanis,  $F(2,613)=.17, p=.683$ , or towards any of the minority groups listed in the questionnaire individually or in an aggregate form. We also did not find any statistically significant main effect on support for climate refugees,  $F(2,613)=.96, p=.329$ , or attitudes towards dangerous social groups,  $F(2,613)=.06, p=.802$ . Removing political ideology as a covariate from the models did not produce significant results either. As an indirect manipulation check we used the average score of the ten negative affect terms from PANAS. The 309 participants primed with the climate change threat ( $M = 1.97, SD = .05$ ) compared to the 307 participants in the control group ( $M = 1.50, SD = .04$ ) demonstrated significantly higher negative affect,  $t(614) = 7.39, p<.001$  (Cohen's  $d = .6$ ).

### 3.2.2. *Collective Efficacy as a Moderator*

To test the potential moderating role of perceived collective efficacy, we conducted three multiple regression analyses for each of the three dependent variables. Each of these analyses included manipulated climate change threat, one of the three collective efficacy measures (general national efficacy, national climate efficacy, and global climate efficacy), and the respective interaction term as predictors, controlling for political ideology as a covariate. We found that climate change threat and perceived *national climate efficacy* interactively predicted the evaluation of Muslims and Pakistanis ( $p = .029$ ) and support for climate refugees ( $p = .001$ ), but not the evaluation of dangerous groups ( $p = .225$ ) (Table 2). We calculate Cohen's  $f^2$  following the procedure suggested by Selya and colleagues (2012) to estimate the effect sizes of the two interaction models and found the effect size to be small ( $f^2 = 0.01$  for Muslims/Pakistanis and  $f^2 = 0.05$  for climate refugees).

General and global climate efficacy, respectively, did not produce statistically significant interaction effects for Muslims and Pakistanis ( $p=.314$  and  $p=.375$ ), climate refugees ( $p=.218$  and  $p=.058$ ), and dangerous groups ( $p=.919$  and  $p=.264$ ). Removing political ideology as a covariate from



the interaction models produced the same results, only with higher coefficients and smaller p-values.

With respect to attitudes to other minority groups living in the UK, we found a statistically significant interaction effect (of the same direction) of climate change threat and national climate efficacy in the case of Arabs ( $p=.039$ ), Chinese ( $p=.014$ ), Indians ( $p=.002$ ), Blacks ( $p=.042$ ), Germans ( $p=.001$ ), illegal immigrants ( $p=.003$ ), refugees ( $p=.021$ ), and Australians ( $p=.028$ ). We did not find statistically significant interaction effect in case of attitudes towards White British ( $p=.589$ ), Jews ( $p=.233$ ), Poles ( $p=.183$ ), Americans ( $p=.109$ ).

**Table 2. Multiple regression of the evaluation of Muslims and Pakistanis, support for climate refugees, and evaluation of dangerous groups over the interaction effect of climate change threat and perceived national climate efficacy, controlled for political ideology (unstandardized  $b$ -coefficients; standard errors in parentheses) – Study 1.**

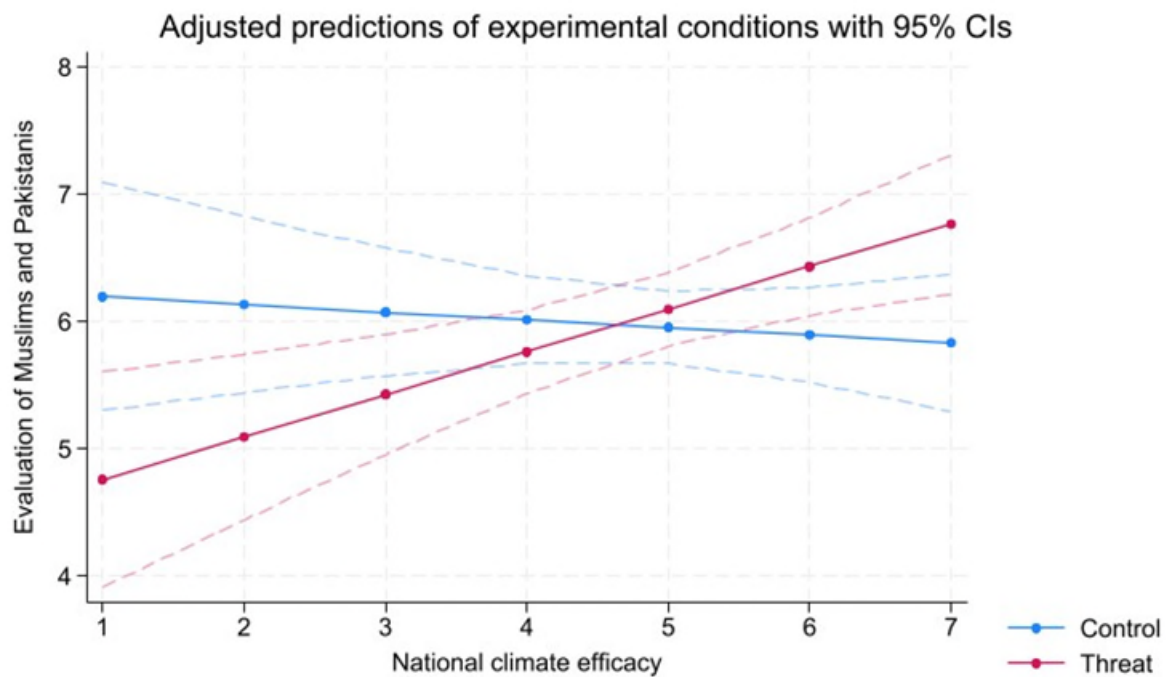
	Muslims and Pakistanis	Climate refugees	Dangerous groups
Climate change threat	-1.63* (.74)	-2.18** (.73)	-.62 (.50)
National climate efficacy	-.08 (.11)	.06 (.10)	-.05 (.07)
Threat x national climate efficacy	.32* (.15)	.50** (.15)	.12 (.10)
Political ideology	-.62*** (.08)	-.68*** (.08)	-.09 (.06)
Constant	8.88*** (.64)	7.87*** (.63)	3.01*** (.43)
Observations	616	616	616
R-squared	.10	.16	.01

\*\*\*  $p<.001$ , \*\*  $p<.01$ , \*  $p<.05$

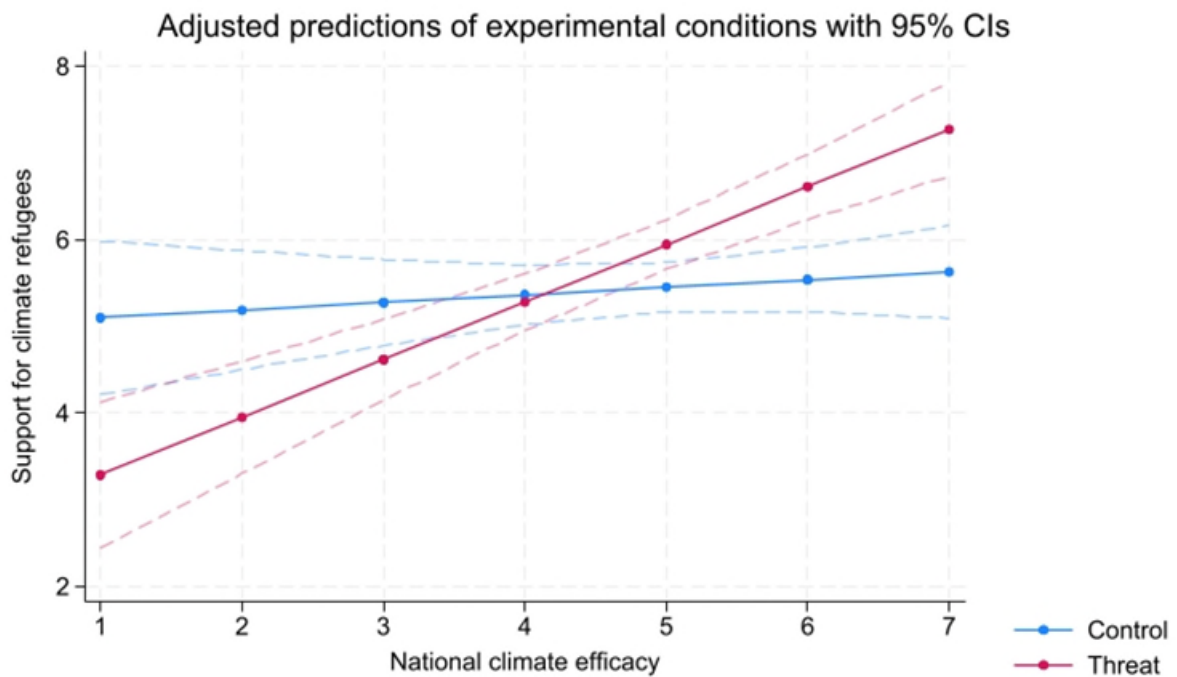
In order to better visualise the moderation effect of national climate efficacy on the relationship between climate change threat and attitudes towards Muslims and Pakistanis on the one hand, and support for climate refugees on the other hand, we present Figure 1 and Figure 2, respectively.

We used the Johnson-Neyman technique (Lin, 2020) to investigate the borders of statistical significance of this effect ( $p < .05$ ). In Figure 1, the decrease in positive attitudes towards Muslims and Pakistanis following climate change threat (vs. neutral condition) was statistically significant for respondents who reported low levels of perceived national climate efficacy of up to 2.7. The increase in positive attitudes towards Muslims and Pakistanis following climate change threat (vs. neutral condition) was significant for respondents who reported high levels of perceived national climate efficacy of 5.9 or above. Figure 2 shows the same trend in support for climate refugees, where the respective boundary values of statistical significance were (below) 2.9 and (above) 4.8 on the national climate efficacy scale.

**Figure 1. The effect of climate change threat on attitudes towards Muslims and Pakistanis across different values of national climate efficacy.**



**Figure 2. The effect of climate change threat on support for climate refugees across different values of national climate efficacy.**



### 3.3. Discussion

In Study 1, we did not find evidence for the hypothesized main effect of climate change threat on the central dependent variables – attitudes towards Muslims and Pakistanis (or any other minority groups) and support for climate refugees. We were also not able to replicate the negative effect of climate change threat salience on the evaluation of dangerous social groups found in Fritsche et al. (2012).

However, Study 1 shows that salient climate change threat did worsen attitudes towards Muslims and Pakistanis as well as some other UK minorities and support for climate change refugees, but only among those White British respondents who perceived national climate efficacy to be low. These results are in line with our proposition that perceptions of threatening climate change may subtly catalyse climate-change induced migration conflicts. On the one hand, this supports the double threat hypothesis of group-based control that the effects of threatened control on demonstrating

collective agency through group-based action (such as devaluing deviant outgroups) are strongest when control through the salient ingroup is uncertain. On the other hand, perceiving low climate change efficacy of the national ingroup may have simply increased the threatening quality of the climate change threat manipulation. Nevertheless, the fact that it was national climate efficacy and not global climate efficacy that catalysed negative climate change threat effects speaks against this latter explanation and rather supports the former “double threat” account. The missing moderation by participants’ perceptions of *general* national efficacy might go back to climate change being highly salient as the source of personal lack of control in the present study. Thus, collective climate efficacy should have been more relevant to people’s situational goals and, therefore, to people’s estimation of collective efficacy compared to efficacy perceptions in other action realms. However, given that each of the collective efficacy variables were measured only by one item, the result pattern might go back to chance effects. This is why we intended to replicate the interaction effect of climate change threat and national climate efficacy belief for a more reliable measure of efficacy in Study 2.

Concerning the reason for not finding the same moderation pattern of national climate efficacy when it comes to the climate change threat effect on attitudes towards dangerous groups, there are several possible explanations. One explanation could be that the perception of which groups are deemed dangerous changed during the decade since the Fritzsche et al. 2012 study. A factor analysis indicated that three of the seven items making up the dangerous groups – attack dog breeders, addicts, and traffic rowdies – rather load on separate factors. However, even when excluding the three from the analysis, we still did not receive significant effects involving climate change threat on the evaluation of the rest of the dangerous groups. Nevertheless, public discourse may have changed regarding the intensity or relative prominence of dangers emanating from these groups compared to other groups. For instance, the discourse on Brexit may have shifted focus on migrant groups as threatening the country’s integrity (Cap, 2017; Morrison, 2019).

Another potential reason for the non-replication could be that the 2012 study was based on data collected via paper surveys from a samples of university students, in contrast to the present data collected online from much more diverse participants. These groups may differ with regard to which societal groups they consider as threatening or as a relevant comparison outgroup. At the same time, social discourse concerning the malleability of these groups may have changed across time. In fact, control group participants in the present study evaluated these groups in a more negative, and less homogeneous, fashion ( $M=2.38$ ;  $SD=1.78$ ) than control group participants in the samples of the 2012 survey that used the identical rating scale from 1 to 10 ( $M=3.66$ ;  $SD=0.78$ ;  $M=3.46$ ;  $SD=0.52$ ;  $M=2.48$ ;  $SD=0.75$ ;  $M=2.46$ ;  $SD=0.84$ ), strongly suggesting a floor effect preventing the detection of a threat effect in the present study.

Yet another explanation could be that the content of the online survey (the map of Britain and items featuring ethnic and religious minorities) primed the respondents with national identity, which made the boundaries of the dangerous groups less sharp and rather highlighted other outgroups with more “collective” qualities as potentially dangerous to ingroup integrity and agency.

#### **4. Study 2**

The first aim of Study 2 was to test, once again, the main effect of climate change threat on social majority’s attitudes towards ethnic and religious minorities, climate refugees, and dangerous social groups. Our hypothesis was (still) that this effect would be negative.

The second aim was to test and replicate the moderation effect of national climate efficacy, using a more reliable and sophisticated efficacy measure. According to group-based control research (e.g., Fritsche, 2022; Stollberg et al., 2015) people may infer that their group is an agent, instead of a mere collection of people, from at least three different indicators: (1) The existence of shared and autonomous group goals, (2) goal-directed action of the group, and (3) effects of the group on the environment. The 1-item measure employed in Study 1 did not allow for differentiating and fully

capturing these different facets of collective agency (control), and thus we replaced it by a more sophisticated multiple item measure.

#### *4.1. Method*

##### *4.1.1. Participants and Design*

As in Study 1, we contracted the survey company Qualtrics to distribute an online survey to a new sample of self-classified White British respondents, which would reflect the age and sex composition of the White British population. We aimed at securing similar sample size as in Study 1 (N=616) in order to achieve sufficient power (80%) to detect medium size direct effect ( $f=.25$  for a one-way ANOVA test) of climate change threat on our three categories of dependent variables (targeting  $\alpha = .05$ ). The final sample had 587 respondents (294 female, 293 male) with the mean age of 43, of whom 47% had graduate or post-graduate degree. Given budgetary constraints, the survey had only one wave (February 2021). The experimental design was identical to that of Study 1 (two conditions: climate change threat salient and neutral topic). The study was pre-registered at AsPredicted.org ([https://aspredicted.org/ZXZ\\_SXQ](https://aspredicted.org/ZXZ_SXQ)).<sup>6</sup> All participants first read an ethical declaration and were asked to provide informed consent. Those who proceeded with the survey were fully debriefed at the end.

##### *4.1.2. Procedure*

After questions on sex and age that were needed for the quota targets of the sample (to resemble the composition of the White British population), the participants were randomly divided in the two experimental conditions, whose content was identical to Study 1.

As in Study 1, the experimental manipulation was followed by a delay (including the PANAS), after which the respondents were asked to evaluate a number of social groups living in Britain. The number of ethnic and religious minorities was reduced and more “neutral” groups (e.g., bus drivers or doctors) included in the mix to avoid a potential social desirability bias that could have also

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<sup>6</sup> As in the case of the first pre-registration, we included in this pre-registration form variables (e.g., neuroticism) that are the focus of another study on the effect of the climate change threat on extremism.

resulted in finding no direct effect of climate change threat in Study 1 on the evaluation of minorities.

In the present analysis, we again focus on a composite measure of attitudes towards “Muslims and Pakistanis” ( $\alpha=.94$ ) as dependent variable, constructed as an average score of the two groups on a thermometer (1=least positive evaluation, 10=most positive evaluation), but we also report the results for all other minority groups. The second dependent variable “Climate refugees” (Spearman correlation = .85) was formed by averaging scores for asylum seekers fleeing sea level increase and water scarcity. For replication purposes we also included the dependent variable “Dangerous groups”, this time consisting of the four items ( $\alpha=.92$ ) that were shown as loading most strongly on the same factor in Study 1 (violent protestors, violent offenders, drug dealers, and terrorists).

The most important addition in Study 2 was a new 6-item measure of national climate efficacy at the end of the survey. We conceptualized national climate efficacy as having three dimensions: the perception of the collective (national) will to pursue climate goals (“People in the UK agree upon fighting climate change together” and “I believe that this country is committed to decreasing its emissions of greenhouse gases in order to tackle climate change”), the perception of climate goal-oriented actions (“People in the UK pursue the reduction of carbon emissions” and “I think that the UK is actually making a strong collective effort to tackle climate change”), and the perception of the likelihood of reaching climate goals/managing climate change (“People in the UK will successfully mitigate climate change” and “I think the UK will cope well with impacts of climate change”). The items were measured on a 7-point Likert scale (7=strongly agree) and their average values formed the final variable ( $\alpha=.847$ ).<sup>7</sup>

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<sup>7</sup> Another variable that was tested in the context of the present study as a potential moderator of climate change threat on the main dependent variables was *perceived life/personal control* measured by three items from Greenaway et al. (2015). We did not find any significant results, which underscores the importance of collective (versus personal) and threat-specific (versus general) perception of control to the psychological outcome when one is exposed to large, complex threats. Other pre-registered variables were used for a different publication and were not used in exploratory analyses in this paper.

## 4.2. Results

The overview of the main variables and their characteristics used in Study 2 is displayed in Table 3. An imbalance analysis (a series of logistic regressions with condition assignment as the dependent variable and the socio-demographics as well as political ideology as independent variables) showed that the two experimental conditions were balanced with respect to the basic socio-demographic characteristics of the participants, including political ideology, which means that the randomization was successful and there is no need to control for one of these characteristics in the subsequent analyses.

**Table 3. Descriptive statistics of the main variables by conditions (Study 2)**

Climate Change Threat not Salient (Control)			
Variables	N	Mean	Std. Dev.
National climate efficacy	293	4.34	.98
Muslims and Pakistanis	293	5.96	2.54
Climate refugees	293	5.56	2.79
Dangerous groups	293	2.03	1.75
Climate Change Threat Salient			
Variables	N	Mean	Std. Dev.
National climate efficacy	294	4.36	1.00
Muslims and Pakistanis	294	5.85	2.34
Climate refugees	294	5.54	2.75
Dangerous groups	294	2.22	1.94

### 4.2.1. Main Effect of Climate Change Threat

Similarly to Study 1, one-way ANOVAs revealed no statistically significant effect of climate change threat on the attitude towards Muslims and Pakistanis,  $F(1,585)=.04$ ,  $p=.585$  or any other minority group, support for climate refugees,  $F(1,585)=.01$ ,  $p=.928$ , and attitudes towards dangerous social groups,  $F(1,585)=1.45$ ,  $p=.229$ . An indirect manipulation check using the PANAS negative affect in the same way as in Study 1 showed that the 294 participants primed with the climate change threat ( $M = 2.25$ ,  $SD = .97$ ) compared to the 293 participants in the control group ( $M = 1.80$ ,  $SD = .85$ ) demonstrated significantly higher negative affect,  $t(585) = 5.96$ ,  $p < .001$  (Cohen's  $d = .49$ ).



#### 4.2.2. Moderating Role of National Climate Efficacy

We tested the interaction effect of climate change threat and perceived national climate efficacy on the evaluation of Muslims and Pakistanis, climate refugees and dangerous groups by conducting three multiple regressions displayed in Table 4.

As predicted, the results show a statistically significant interaction effect in the expected direction on the evaluation of Muslims and Pakistanis ( $p=.024$ ). As in the previous study, the interaction effect size was rather small ( $f^2 = 0.01$ ). For attitudes towards Arabs ( $p= .044$ ) and illegal immigrants ( $p= .051$ ), the interaction effect is significant, or approaching significance, respectively, but not in the case of Australians ( $p= .117$ ), Germans ( $p= .412$ ), Jews ( $p= .995$ ), Chinese ( $p= .683$ ).

In contrast to Study 1, we did not find a statistically significant interaction in the case of support for climate refugees ( $p= .216$ ). As in Study 1, there was no statistically significant effect on the evaluation of dangerous groups ( $p= .528$ ). The overall pattern, however, was similar to Study 1 in that climate change threat (vs. neutral condition) tended to result in less support for climate refugees among people who considered national climate efficacy to be low (-1SD) ( $b=-.30$ ,  $t(587)= -.94$ ,  $p=.348$ ) but not among those who considered it to be high (+1SD) ( $b=.26$ ,  $t(587)=.81$ ,  $p=.416$ , reversed descriptive effect).

**Table 4. Multiple regression of the evaluation of Muslims and Pakistanis, support for climate refugees, and evaluation of dangerous groups over the interaction effect of climate change threat and perceived national climate efficacy (unstandardized *b*-coefficients; standard errors in parentheses) – Study 2.**

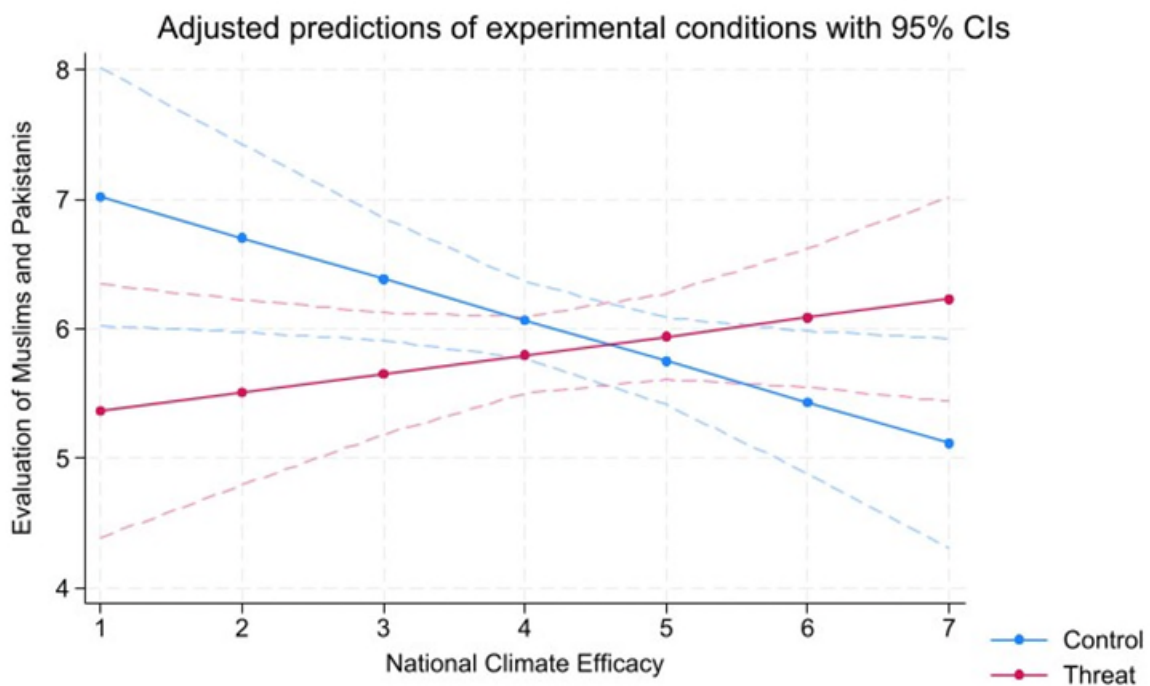
	Muslims and Pakistanis	Climate Refugees	Dangerous Groups
Climate Change Threat	-2.11* (.91)	-1.27 (1.03)	-.23 (.69)
National Climate Efficacy	-.32* (.15)	-.15 (.17)	.12 (.11)
Threat x National Climate Efficacy	.46* (.20)	.29 (.23)	.10 (.15)
Constant	7.34***	6.20***	1.54

	(.65)	(.74)	(.49)
Observations	587	587	587
R-squared	.010	.003	.011

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

We show the effect of climate change threat on attitudes towards Muslims and Pakistanis across different values of national climate efficacy perception in Figure 3. The Johnson-Neyman procedure revealed that, as in Study 1, that the decrease in the evaluation of Muslims and Pakistanis following climate change threat (vs. neutral condition) was statistically significant ( $p < .05$ ) for respondents who reported less than 3.4 score on the national climate efficacy perception.

**Figure 3. The effect of climate change threat on the evaluation of Muslims and Pakistanis across different values of national climate efficacy.**



#### 4.3. Discussion

In Study 2, we found that climate change threat decreased the evaluation of Muslims and Pakistanis (as well as Arabs) in those people who perceived national efficacy to fight climate change

to be low (vs. high). This is in line with our proposition that the negative effect of threat on inter-group relations would be the strongest among those who feel that their ingroup collective control (efficacy) is already weak and hence they would attempt the most to manifest unconsciously group control through heightened group-centred, authoritarian psychological response, including derogation of groups that are perceived as most challenging or diverging from the dominant social order, norms, and values.

However, the evidence for such a moderation was weak when it came to attitudes towards climate refugees and no effects were found for the evaluation of dangerous social groups. As discussed in Study 1, the latter could have been caused by the (nationally oriented) context of the online survey and the offline Brexit-dominated physical world, both of which might have highlighted ethnic and religious outgroups as the main source of threat to ingroup integrity.

To increase our understanding of and confidence in the results of Study 1 and 2, we conducted a third and final study, in which we aimed at replicating the previous findings and clarifying their boundary conditions as well as underlying mechanisms.

### **5. Study 3**

As in the previous studies, the aim of Study 3 was to test the main effect of climate change threat on social majority's attitudes towards ethnic and religious minorities, climate refugees, and dangerous social groups. In addition, we hypothesized to replicate the moderation we found in the previous studies: We expected climate change threat to worsen attitudes towards minorities and climate refugees particularly among those participants who perceived collective efficacy to be low (rather than high). To replicate this interaction effect was the first main objective of the study.

The second main objective of Study 3 was to assess the degree to which various minority groups in the UK are perceived as subverting the agency of the ingroup, whether thought of as the nation, the White British ethnic group, or a combination of both. If the groups deemed to be most

subversive overlap with those that consistently receive lower evaluations following salient climate change threat by people perceiving low collective climate efficacy, it would support the expectations of group-based control theory.

The third main objective of Study 3 was to test the unique role of national climate efficacy (as opposed to other types of efficacies such as global climate efficacy or unspecific national efficacy) for people's response to salient national climate threat. According to the group-based control reasoning, the moderation should most likely occur for national climate efficacy, because the manipulation of climate change threat to the UK made the nation the salient ingroup and climate action the salient context of control effects.

### *5.1. Method*

#### *5.1.1. Participants and Design*

In this study, we used the Prolific platform to recruit participants for a two-wave online survey. We invited participants who were born in the UK, held UK citizenship, and identified their ethnicity as "White". We aimed at reaching similar sample size to the previous two studies, but given budgetary constraints compounded by the need to conduct two survey waves, we secured a slightly lower sample size of  $N=550$ , this time. The first wave of the survey was opened in late August 2023 and was completed by 550 respondents (259 male, 289 female, and 2 non-binary). It consisted of socio-demographic and political ideology questions and items that measured different types of collective efficacy as well as perceptions of the contribution of minority groups to national unity and cohesion (subversive groups). The participants were re-contacted two weeks later with an invitation to the second wave of the survey, which they had known about before they agreed to participate in the first wave. The re-contact was highly successful (participants were financially rewarded for completing each separate wave according to Prolific guidelines of the best practice) and the final sample comprises 535 respondents (251 male, 283 female, and 1 non-binary) with a mean age of 42, of whom 62% held a graduate or post-graduate degree. The second wave included an experimental

condition identical with those used in the previous two studies. The study was pre-registered at AsPredicted.org (<https://aspredicted.org/6ka4k.pdf>)<sup>8</sup> and received approval from the Humanities and Social Sciences Research Ethics Committee (reference: HSSREC 176/22-23).

### 5.1.2. Procedure

The first, non-experimental, wave of Study 3 survey primarily focused on measuring different types of collective efficacy and perceived subversiveness of different minorities with respect to ingroup integrity.

We measured five types of collective efficacy: 1) national climate efficacy, which was measured in the same way as in Study 2 ( $\alpha = .884$ ,  $M=3.81$ ,  $SD=1.14$ ); 2) national non-climate efficacy ( $\alpha = .907$ ,  $M=4.72$ ,  $SD=1.09$ ), which was measured by rewording the six items used for national climate efficacy but replacing climate change with “violent extremism” as the main threat (e.g., “I think the UK will manage to reduce the level of violent extremism in the country”); 3) global climate efficacy ( $\alpha = .903$ ,  $M=3.55$ ,  $SD=1.22$ ), which was measured by rewording the six items used for national climate efficacy but replacing the national level (“UK” and “people in the UK”) with a global one (“countries in the world” and “people around the world”) (e.g., “I think that countries around the world are actually making a strong collective effort to tackle climate change”); 4) global non-climate efficacy ( $\alpha = .894$ ,  $M=4.17$ ,  $SD=1.17$ ), which was measured by rewording the six items used for global climate efficacy but replacing climate change with “deadly global pandemic” as the main threat (e.g., “I believe that countries around the world are committed to preventing a deadly global pandemic”); 5) national general efficacy ( $\alpha = .898$ ,  $M=3.82$ ,  $SD=1.24$ ), which was composed of four items: “People living in

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<sup>8</sup> In the present analyses, we deviated from the pre-registration by primarily analysing the group of Muslims and Pakistanis and reporting the results for other minority groups individually, instead of conducting Exploratory Factor Analysis (EFA) to determine the groupings or focusing on the groups of Muslims and Arabs. This is because EFA would produce slightly different groupings for each study, thus lessening the overall consistency and losing information on other groups, and because the substitution of Arabs with Pakistanis makes more theoretical sense as it is them who are the most numerous Muslim ethnic group in the UK (the second are Bangladeshis) and historically problematized as posing economic, cultural, and security challenge to the country, as opposed to Arabs who are a far smaller community concentrated in London.

the UK are committed to tackling great societal challenges”, “The UK as a country is already making strong collective efforts to address great societal challenges”, “This country, the UK, will be successful in dealing with great societal challenges”, and “People in the UK are capable of shaping the world in line with their own shared goals”.

Perceived subversiveness of different minority groups in the UK was measured by asking respondents the following questions: “According to you, what is the impact of the following social groups and minorities living in the UK on national cohesion and unity of the country?” The groups listed included ethnic and religious minorities from the previous studies (e.g., Muslims, Pakistanis, Jews, and Germans) mixed with some of the dangerous and “system supportive” groups (e.g., violent offenders and doctors). Respondents could rate the impact of these groups on a 7-point Likert scale (1=extremely negative, 2=moderately negative, 3=slightly negative, 4= neither negative nor positive, 5= slightly positive, 6= moderately positive, 7=extremely positive).

The second survey wave consisted of an experimental component, which had the same exact design as in the previous two studies. The groups listed for rating on a thermometer following the experimental and control conditions were identical to the groups rated for their subversiveness in the first wave. As in the previous studies, we focus on “Muslims and Pakistanis” ( $\alpha=.95$ ) as the first dependent variable, constructed by averaging scores of the two groups on the thermometer (1=least positive evaluation, 10=most positive evaluation) and the support for “Climate refugees” (Spearman correlation = .85) as the second dependent variable, measured by averaging scores for asylum seekers whose life is threatened by sea level increase and water scarcity. The third dependent variable “Dangerous groups” ( $\alpha=.71$ ) consists of average scores for the evaluation of violent offenders, drug dealers, attack dog breeders, and terrorists.<sup>9</sup>

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<sup>9</sup> The survey also included additional components of dangerous groups taken from the original study by Fritsche et al. (2012) – prostitutes and traffic rowdies. We removed the last one from our analyses after several respondents indicated to us that because they did not know who “traffic rowdies” were they scored them with the neutral value, which was reflected in a much higher mean of this variable in comparison to the

## 5.2. Results

First, we conducted an imbalance analysis (a series of logistic regressions with condition assignment as the dependent variable), which showed that the randomization was successful with respect to age, sex, education, political ideology, and national climate efficacy. Then, we proceeded with the analysis of direct effect of climate change threat, interaction effects of national climate efficacy and other types of collective efficacy, and, finally, perceptions regarding subversiveness of various social and minority groups in the UK.

### 5.2.1. Main Effect of Climate Change Threat

We conducted one-way ANOVAs and, in line with the previous two studies, found no statistically significant main effect of climate change threat on attitudes towards Muslims and Pakistanis,  $F(1,535)=.05, p=.926$  or any other minority group. Similarly, we found no significant effect on the support for climate refugees,  $F(1,535)=6.69, p=.335$ , and attitudes towards dangerous groups,  $F(1,535)=.17, p=.888$ .

An indirect manipulation check using the PANAS negative affect in the same way as in Study 1 and Study 2 showed that the 266 participants primed with climate change threat ( $M = 1.78, SD = .77$ ) compared to the 269 participants in the control group ( $M = 1.32, SD = .51$ ) indicated significantly higher negative affect,  $t(535) = 8.06, p < .001$  (Cohen's  $d = .69$ ).

### 5.2.2. Moderating Role of National Climate Efficacy and Other Types of Collective Efficacy

To probe our core hypothesis, and as in the previous two studies, we tested the interaction effect of climate change threat and perceived national climate efficacy on the evaluation of Muslims and Pakistanis, climate refugees and dangerous groups by conducting three multiple regressions displayed in Table 5.

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others. We also removed prostitutes because they lowered Cronbach's alpha below the acceptable level of internal consistency (.70).

The results show a statistically significant interaction effect in the hypothesized direction on the evaluation of Muslims and Pakistanis ( $p=.045$ ). The effect size was similar to those in the previous two studies ( $f^2 = 0.01$ ). We did not find significant interaction effect on attitudes towards Arabs ( $p=.265$ ), Australians ( $p= .756$ ), Germans ( $p= .214$ ), Jews ( $p= .059$ ), Chinese ( $p= .487$ ), Poles ( $p= .057$ ), Indians ( $p= .296$ ), refugees ( $p= .667$ ), and illegal immigrants ( $p= .118$ ).

As in Study 2, the interaction effect on support for climate refugees ( $p= .083$ ) missed significance but showed the same pattern of the hypothesised effect in that climate change threat (vs. neutral condition) tended to result in less support for climate refugees among people who considered national climate efficacy to be low (-1SD) ( $b=-.61, t(535)= -1.88, p=.061$ ) but not among those who considered it to be high (+1SD) ( $b=.19, t(535)=.58, p=.560$ ).

As in Study 1, there was no statistically significant effect on the evaluation of dangerous groups ( $p= .265$ ).

**Table 5. Multiple regression of the evaluation of Muslims and Pakistanis, support for climate refugees, and evaluation of dangerous groups over the interaction effect of climate change threat and perceived national climate efficacy, controlled for political ideology (unstandardized  $b$ -coefficients; standard errors in parentheses) – Study 3.**

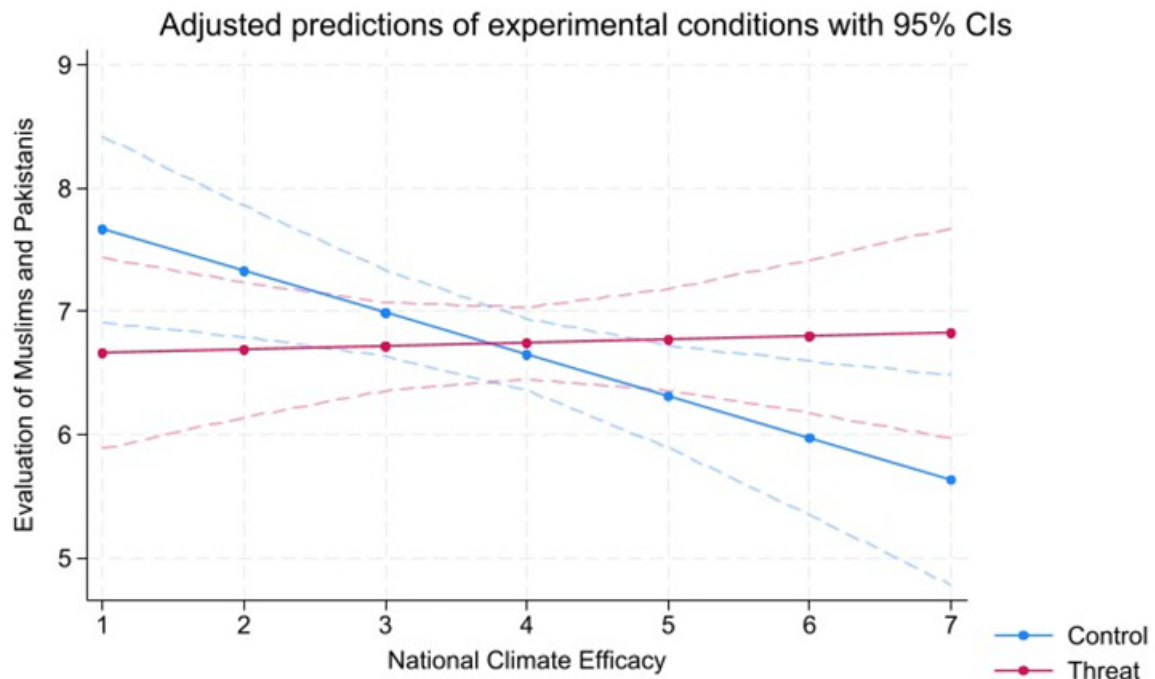
	Muslims and Pakistanis	Climate Refugees	Dangerous Groups
Climate Change Threat	-1.37 (.72)	-1.53 (.80)	.29 (.28)
National Climate Efficacy	-.34** (.13)	-.56*** (.14)	.00 (.05)
Threat x National Climate Efficacy	.37* (.18)	.35 (.20)	-.08 (.07)
Constant	8.00*** (.51)	8.47*** (.56)	1.58 (.19)
Observations	535	535	535
R-squared	.013	.004	.004

\*\*\*  $p<.001$ , \*\*  $p<.01$ , \*  $p<.05$



In Figure 4, we visualise the effect of climate change threat on attitudes towards Muslims and Pakistanis across different values of national climate efficacy perception. We can observe the same trend as in the previous two studies, whereby respondents with low perceived national climate efficacy tend to evaluate Muslims and Pakistanis worse following climate change threat than after the neutral condition and those with high perceived national climate efficacy better. Although the interaction term as such was statistically significant, the Johnson-Neyman procedure has not identified statistically significant regions of difference within the standard .05 level.

**Figure 4. The effect of climate change threat on evaluation of Muslims and Pakistanis across different values of national climate efficacy.**



Further analysis showed that substituting national climate efficacy with other types of collective efficacy did not yield significant results for the interaction effect with climate change threat on attitudes towards Muslims and Pakistanis: global climate efficacy ( $p=.529$ ), national non-climate efficacy ( $p=.807$ ), global non-climate efficacy ( $p=.130$ ), and national general efficacy ( $p=.237$ ). No significant interaction was found for other minority groups as well. In case of the interaction effect

on support for climate refugees and attitudes towards dangerous groups, none of these additional types of collective efficacy produced significant results.

### 5.2.3. Perception of subversiveness of social groups in the UK

Out of all listed minority ethnic and religious groups (Table 6), respondents rated Muslims as a group with the lowest contribution to national cohesion and unity, closely followed by Arabs and Pakistanis. While paired t-test showed no statistical difference between the rating of Muslims and Arabs,  $t(534) = .27, p=.789$ , the mean differences between Muslims/Arabs and Pakistanis and then between Pakistanis and all other groups were statistically significant.

Groups that made up the dependent variable “Dangerous groups” in this study were rated, on average, as having the most negative impact. Illegal immigrants and refugees occupy the position between dangerous groups and the least scored ethnic and religious minorities (i.e., Muslims, Arabs, and Pakistanis).

**Table 6. Perceived impact of social and minority groups on national cohesion and unity of the country. (1=extremely negative, 2=moderately negative, 3=slightly negative, 4= neither negative nor positive, 5= slightly positive, 6= moderately positive, 7=extremely positive).**

<b>Social and Minority Groups</b>	<b>Mean</b>	<b>SD</b>
Muslims	4.36	1.59
Arabs	4.37	1.49
Pakistanis	4.54	1.50
Chinese	4.74	1.33
Indians	4.81	1.33
Poles	4.85	1.36
Jews	4.90	1.32
Germans	4.94	1.22
Australians	5.15	1.18
Refugees	3.85	1.62
Illegal immigrants	2.87	1.52
Terrorists	1.23	0.71
Violent offenders	1.48	0.78
Drug dealers	1.62	0.94
Attack Dog Breeders	1.75	1.03

### 5.3. Discussion

Study 3 replicated the findings of the previous two studies by showing that climate change threat and perceived national climate efficacy interacted in predicting the evaluation of Muslim and Pakistani minority groups in the UK. Although the statistically significant interaction effect of national climate efficacy and climate change threat on attitudes towards Muslims and Pakistanis was weaker than in the previous two studies, the descriptive pattern again shows that salient climate change threat (vs. no threat) led to less positive attitudes towards these groups for those people who considered national climate efficacy to be low but not for those with high perceptions of collective climate efficacy. This supports the notion that people try to maintain or restore their sense of control through ethnocentric responses to threatened personal control (due to threatening climate change) which are most intense when collective control seems threatened as well (i.e., when people perceive national climate efficacy to be low).

Moreover, we systematically tested whether the moderator effects were specific for collective efficacy perceptions of participants' *nation* (vs. all humanity) and regarding *climate change* (vs. other threats), which seems to be true. This illuminates the situated nature of group-based control responses which primarily refer to the ingroup that is situationally salient and relevant (Fritsche et al., 2013), which, in our experiments was the national ingroup, given that people were initially made to think about their own nation (in terms the national consequences of climate change or of national geography). Of interest, also the context of threatened control matters, as suggested by the fact that in the present study only perceptions of collective *climate* efficacy (and not beliefs about collective efficacy in other areas) seemed to moderate the effect of climate change threat. Obviously, when people experience lacking control in a specific context (e.g., climate change), group-based agency in this very context seems to be primarily important for them to regain a sense of control, resulting in exaggerated responses (e.g., of derogating agency-thwarting sub-groups) when for them collective

agency in this area (i.e., climate change) seems questionable. Future research is required to further investigate the context specificity of group-based control efforts (see Potoczek et al., 2022).

Importantly, we were also able to show in this study that the minority groups likely to be the primary target of derogation under the condition of combined perceived climate change threat and lack of national climate efficacy are those viewed as undermining or not contributing to the cohesion and integrity of the ingroup.

Although “dangerous groups” were perceived as much more subversive of national cohesion than Muslims and Pakistanis, as in Studies 1 and 2, we again did not replicate climate change threat effects that had been shown in studies with student participants about 11 years ago (Fritsche et al., 2012). This is most likely due to a floor effect, given that these groups received extremely negative evaluations, also compared to the earlier studies. At the same time, attitudes about these groups may have changed across the years or may differ across population groups (the present samples were much more representative of the overall population). The participants in the present studies perhaps conceived of the dangerous groups as posing an individualised security challenge rather than questioning the normative and agentic foundations of society, thus triggering their personal, instead of their collective self. Muslims and Pakistanis, on the other hand, might represent a group that seems to challenge the dominant society on multiple fronts. Thus, derogating them might indicate an effort of defending and demonstrating *collective* agency when both personal and collective agency seem thwarted by threatening climate change, as the double-threat hypothesis suggests.

## **6. General Discussion**

We conducted three experimental studies with large independent samples of the White British population and found that a reminder of climate change threat to the UK worsened the attitude of the ethnic majority towards certain ethnic and religious minority groups, especially Muslims and Pakistanis. This effect only occurred among those members of the majority who felt national

collective efficacy in dealing with climate change to be low (vs. those who perceived it to be high). We found the same pattern regarding support for climate refugees, although it was statistically significant only in one of the three studies. We also provided some preliminary evidence that this effect is to a degree connected to the perception of how threatening various social groups are to ingroup agency.

### *6.1 Climate Change as a Driver of Intergroup Conflict*

These results indicate that climate change can subtly drive domestic intergroup conflicts beyond the competition over material resources. Climate change can aggravate intergroup conflict over water or land (Koubi, 2019; Miles-Novelo & Anderson, 2019; Plante et al., 2017). But these “realistic” conflicts might be further fuelled by people’s propensity to authoritarian and ethnocentric thinking as a motivated reaction to threatening climate change. This subtle vicious effect might gain in importance as 1) clear indications proliferate in public discourse that threatening climate change is already here, given increasing reports about extended droughts, burning forests, and severe flooding after extreme rainfall even in those regions with historically mild climates, such as the UK or central Europe, and 2) if more and more people start to believe that their respective countries are not able to deal with climate change repercussions.

### *6.2 Climate Change and the Quest for Group-Based Control*

Connected to the second point, the present results for the first time provide a closer understanding of the socio-psychological process underlying social-identity responses to climate change threat. Specifically, the moderating role of collective climate efficacy beliefs suggests that processes of group-based control may be central for explaining authoritarian and ethnocentric responses to climate change threat. The concept of national climate efficacy is an expression of collective efficacy, or the “[p]eople’s shared beliefs in their collective power to produce desired results” (Bandura, 2000, p. 75), which is “a key ingredient of collective agency” (Bandura, 2000, p. 75), or collective control. Climate change can obviously pose a threat to perceived *personal* control,

since climate change mitigation and adaptation can only be effectively addressed collectively. Thus, according to the model of group-based control (Fritsche, 2022; Fritsche et al., 2013) people may try to maintain or restore a sense of control on the level of their ingroup. However, when the ingroup's agency, or control, is uncertain, people should be motivated to signal and experience ingroup agency through their own action as a group member ("double threat" hypothesis; (Fritsche et al., 2013)<sup>10</sup>).

Aggressing towards or derogating groups of people who challenge ingroup cohesion and integrity, and hence agency, are such potential expressions of control assertion. Reflecting on the threatening consequences of climate change for their own country likely primed participants with their national identity, which thus constituted the ingroup. Consequently, authoritarian and ethnocentric threat responses targeted those minority groups that represented the most immediate and serious challenge to *national* cohesion and integrity such as Muslims and Pakistanis, who might be seen by the majority as "dissident groups" (Jedinger & Eisentraut, 2020) that pose high realistic and symbolic threat to the ingroup and that have the size for seriously challenging collective unanimity and agency.

Of importance, climate change threat did not increase hostile responses towards these groups for *all* participants, as we initially expected on the ground of earlier studies (Fritsche et al., 2012). Instead, the effect did not occur for people who believed in their country's effective pursuit of adapting to, or even mitigating, climate change. Possibly, this might be due to a changed public and political recognition of climate change as a collective challenge, and collective project, in the course of the past 15 years. Indeed, we live in the times of national and multi-national action plans for a sustainable transformation (e.g., UK's "Green Industrial Revolution" or EU's "Green Deal"). Obviously, collectives begin to actively respond to climate change. At least this might be perceived by a considerable number of citizens. Therefore, for those people, the perceived collective pursuit of

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<sup>10</sup> Note that in the present studies the "low" collective efficacy participants scored below the absolute scale mean but most of them did not strongly reject the notion of national efficacy. Thus, participants might still have considered their national in-group to be a potential source of group-based control, perhaps, in a different domain of action, such as demonstrating superiority over out-groups.

climate action might buffer the self-threatening quality of salient climate change and may motivate pro-climate action as a problem-focussed response (Fritsche & Masson, 2021). Instead, those who do not perceive collective climate action (e.g., of their own nation) may resort to other group-based defences, such as derogating minorities.

It has been proposed in previous research that climate threat effects on prejudice towards minorities were driven primarily by individuals who score high on right-wing authoritarianism (RWA) and social dominance orientation (SDO) as they are negatively predisposed towards immigrants (Duckitt & Sibley, 2009; Graça, 2021) and, at the same time, sensitive to threat cues (Lepage et al., 2022; Onraet et al., 2014), which can then aggravate their negative predisposition. Indeed, Uenal and colleagues (2021) showed that SDO moderated the effect of climate change threat on racist attitudes towards ethnic minorities in US and UK samples. However, we re-examined our data collected in Study 1, where we also measured SDO, RWA, and identification with the UK (in the first non-experimental survey wave) for use in other research (Shanaah et al., 2024), and found out that the interaction effect of climate change threat and national climate efficacy was statistically significant and stronger for those participants who scored below-average on all these three measures but not for those who scored above. In other words, it was the less authoritarian, socially dominant, and less strongly identified with the nation who seem to have driven the derogatory effect in Study 1. This suggests that group-based control reaction to threat is a situational process that drives prejudice in people who are typically not particularly prejudiced, thus accelerating intergroup conflict across society even where there is little pre-existing inclination towards such conflict.<sup>11</sup>

Not all societal groups are equally likely to become targets of derogation following climate change threat. This is indicated by the fact that across the three studies we only found consistent effects for the evaluation of Muslims and Pakistanis but not towards climate refugees, “dangerous

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<sup>11</sup> It is also reminiscent of the “reactive-liberals hypothesis” where liberals are suggested to be more reactive to threats than conservatives (Nail et al., 2009; Van de Vyver et al., 2016).

groups” in the society such as violent offenders and drug dealers, and certain minorities such as Australians, Germans, Jews, and Poles.

The entitativity, size, and hypervisibility of UK Muslim and Pakistani communities as well as the multifaceted nature of threat the majority society might associate them with could also explain why illegal immigrants and refugees did not consistently produce statistically significant outcomes across all three studies, despite the fact that the participants in Study 3 rated their impact on national cohesion and unity more negatively than the impact of Muslims and Pakistanis.

First, refugees and illegal immigrants are general categories that could evoke different ethnic, religious, and cultural groups to different people, which in turn triggers different levels of threat perception. Second, these different levels of threat perception are caused by the fact that different groups may trigger different types of threat. For example, the Racial Position Model proposes that minority groups are evaluated along two dimensions of perceived *inferiority* and perceived *cultural foreignness*, each linked to different types of threat (Zou & Cheryan, 2017). There is little doubt that Muslim and Pakistani communities in the UK are mostly perceived as culturally foreign (Elsayed, 2023; Modood, 2006, 2009; Saeed, 2007), and so are illegal immigrants and refugees in general (Lynn & Lea, 2003; Thomas, 2020). However, some Muslim Pakistanis have managed to rise to prominent positions in the UK society: Sadiq Khan (the mayor of London), Baroness Sayeeda Warsi (the first Muslim to serve in a British Cabinet), or Sir Mohammed Anwar Pervez (a Pakistani-born British billionaire). These successes indicate potential threat to the status and superiority of the ethnic majority ingroup (Mutz, 2018; Zou & Cheryan, 2017), which is not matched by the decidedly inferior status of illegal immigrants and refugees.

The Intergroup Threat Theory distinguishes between realistic and symbolic threats (Rios et al., 2018; Stephan et al., 2009) and the Differentiated Threat Model categorises minority groups into deviant (threatening social order and values), competing (threatening material resources), and dissident (threatening both values and resources) (Jedinger & Eisentraut, 2020; Meuleman et al.,



2019). In this respect, Muslims and Pakistanis in the UK likely score high in all types of threat simultaneously as they are routinely associated in the public discourse with terrorism, extremism, and alien values (Jaspal & Cinnirella, 2010; Petley & Richardson, 2011). And although they still occupy an economically disadvantaged position in society on average (Office for National Statistics, 2020), they likely represent higher threat to the majority in terms of competition over resources and status than illegal immigrants and refugees do. This is because most Muslim and Pakistani minority members have deeper roots and more rights in the UK (hence, higher social capital) relative to refugees and illegal immigrants.

The difference in the magnitude and immediacy of the threat to ingroup integrity and agency posed by different groups could also be the reason why attitudes towards Arabs, although viewed as equally subversive as Muslims, did not decrease consistently across all three studies. The fact that Arabs in the UK make up around five times smaller community than Pakistanis, are generally better-off, geographically concentrated in London, and, unlike Pakistanis, not linked to large scale disturbances such as riots and terrorist attacks in the country, might not make them the primary target of authoritarian and ethnocentric reactions to climate change threat. In a similar vein, inconsistent findings regarding the support for climate refugees could be caused by the indetermined magnitude and immediacy of their challenge to the ingroup – they are of indetermined cultural and ethnic backgrounds and come in undetermined numbers at indetermined times in the future.

In the light of the abovementioned considerations, it is possible that our measure of “subversiveness”, which relied on rating the impact of various groups on national cohesion and unity, captured only some aspects of the overall threat perception that drove the effect of the climate change threat manipulation.

We acknowledge, however, that our explanation for why some societal groups but not others become the target of derogation – based on different perceptions of the highest combined threat to

the ingroup and its agency – remains to be tested in further research. What is worth noting, nevertheless, is that groups on the receiving end of authoritarian and ethnocentric reactions do not have to be necessarily linked to the source of the threat, due to the symbolic nature of group-based control (Greenaway et al., 2014) and given that UK Muslims or Pakistanis can hardly be blamed for climate change.

### *6.3 Limitations*

One of the limitations of our results is the measurement of the key moderator, national climate efficacy, especially in Study 1 where it consisted of only a single and quite general item. We tried to improve on this in Study 2 and Study 3 by devising a multiple-item measure which also allowed for differentiating between different components of collective agency. However, its validation awaits further research.

Another limitation also related to the moderator is that it was measured after the experimental condition in Study 2 for fear of priming the participants in the control condition with climate change threat. However, its items came at the very end of the survey where a possible effect of the manipulation would have dissipated, as the virtually identical efficacy values across conditions indicate.<sup>12</sup>

Finally, our results are limited by uncertainty as to what the salient ingroup was for the participants. We think that the survey questions and the experimental manipulation task likely primed national, UK, identity, but we did not directly check this. Alternatively, given the selection of white UK citizens and their task to evaluate non-white ethnic groups, participants may have identified with white ethnicity. Although both types of salient identity should not fundamentally affect our results, it might be possible that the more inclusive national identity attenuates some of the negative effects and drives the positive ones (increased warmth towards Muslims and Pakistanis

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<sup>12</sup> A regression analysis with the perception of national climate efficacy as the dependent variable and the assignment to one or another experimental condition as the independent variable contributes to our belief that the manipulation did not significantly affect participants' responses to the national climate efficacy items ( $b=-.02$ ,  $t(587)=-.25$ ,  $p=.803$ ).

following climate change threat for participants with high perception of national climate efficacy in Study 1). Uncertainty about salient ingroup identity is higher in Study 3, in which we could not pre-screen participants for “White British” identity, but only for being born in the UK, having UK citizenship, living in the UK, and identifying as “white”, which could have qualified, for example, participants with Irish or Scottish identities.

#### *6.4 Implications for Climate Communication*

Our results may have implications for climate change communication. Past research showed that the effect of threat is highly contextual, depending on which ingroups and norms are made salient (Barth et al., 2018). It was pointed out that careful climate change communication, for example one that avoids ethnocentric vocabulary and emphasizes norms of solidarity and inclusiveness, may reduce, or even turn the effect of climate change threat on intergroup hostility (Fritsche et al., 2012). After all, our results show that participants who reported high levels of national climate efficacy and were confronted with climate change threat tended to improve their attitude towards Muslims and Pakistanis, perhaps because they felt empowered and in control, on the collective level, allowing them a more inclusive and cooperative outlook in pursuit of shared goals on the national level.

Also, group-based responses to large-scale environmental threats may even motivate pro-environmental action when people perceive this to be the collective project of a relevant ingroup, for instance, when the fight against climate change is credibly embodied by authorities (Fritsche et al., 2010, 2018). To this our results could add that communication, which would highlight the inability of the state to address climate change, perhaps in the attempt to mobilise people to action and promote international solidarity, could backfire in that it would decrease people’s perception of national collective efficacy and in combination with the almost everyday threatening information about climate change trigger those adverse psychological responses investigated in this paper.

## **7. Conclusion**

Several studies published in the last decade came to the significant conclusion that climate change does not only impact communities directly through, for example, drought or rising sea level, but it can also negatively impact societies living in relative safety and wealth on a psychological level by increasing authoritarian, ethnocentric, and racist attitudes (Barth et al., 2018; Fritsche et al., 2012; Uenal et al., 2021; Uhl et al., 2018). This article brings further empirical evidence of a potential negative effect of climate change on majority-minority relations in so-far relatively unaffected developed countries in the West. Majority members who are exposed to threatening information about climate change and, at the same time, feel little collective efficacy or control over climate change and its impact seem to adopt more negative attitudes towards ethnic and religious minorities that are seen as most challenging to their ingroup agency. Such an effect, although statistically small, can exacerbate an already tense and polarized social atmosphere in many countries around the world and facilitate potential inter-group conflicts. The rise of the so-called far-right environmentalism, which tries to capitalize on growing climate change anxiety by redirecting it against immigrants and minorities, might be an extreme symptom of this process.

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