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The effects of communicating climate change threat: mobilizing anger and authoritarian affect displacement

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ABSTRACT

Research on climate change communication has made important contributions to our understanding of how to effectively inform and mobilize the public for climate action and yet open questions remain, not least because existing results are at times inconclusive or incomplete. The climate crisis poses an existential threat. But what effect does communicating that threat have? To what degree can communicating the threat invoke anger and how does anger interact with individual values predispositions? In this study, we conducted a survey experiment (N = 570) to better understand effects of communicating climate change threat. We find that exposure to climate change threat makes people angrier, and anger makes them more willing to act on climate change mitigation, confirming previous findings. However, our study adds a novel insight, the findings do not apply to people with authoritarian predispositions. They display lower levels of anger and willingness to act, while exposure to climate change threat results in increased authoritarian attitudes. This suggests that climate change threat can lead to affect displacement in people with authoritarian predispositions, where anger (typically directed at those in power, who have failed to tackle climate change) is redirected at non-conforming groups.

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climate change threat; anger; climate action; survey experiment; values; authoritarianism; affect displacement; climate change communication


1. Introduction


The IPCC (2021) report suggests that the window of opportunity to act to prevent catastrophic climate change is rapidly closing. It is therefore paramount to mobilize the public to support and adopt pro-environmental behavior and policy. However, there is considerable debate as to how we can best mobilize the public (Moser 2016) as awareness of the threats inherent to climate change can induce negative psychological and socio-psychological side effects such as anxiety or intolerance (Clayton 2020; Fritsche et al. 2012; Mah et al. 2020; Uenal et al. 2021) as well as mobilizing action (Stollberg and Jonas 2021). Research and advice on mobilization must determine how to inform and mobilize the public without creating a hostile socio-political environment that can undermine climate action (Hine et al. 2016).

Framing climate change communication is complicated (Moser 2016). How climate change information is presented has a substantive impact on individual attitudes toward climate change policies (Luong, Garrertt, and Slater 2019; Myers et al. 2012). Framing climate action in terms of cherished values and involving in-group spokespersons can increase the perceived threat from and need to act to mitigate climate change (Goldberg et al. 2021) as can emotional appeals

(Chapman, Lickel, and Markowitz 2017; Moser 2016). However, different value frames resonate with different types of people (Birkenbach and Egloff 2024; van den Broek, Bolderdijk, and Steg 2017) and any potential threat produced by the messages can induce emotional states capable of producing varying attitudinal and behavioral outcomes (Davidson and Kecinski 2022), some of which can undermine the purpose of the message (Prinzing 2023; Wullenkord and Reese 2021). If societies are to rally pro-environmental attitudes and behaviors among publics without (further) undermining intergroup relations, it is critical that we understand how different individuals will respond to climate change communication that accurately portray the existential threats inherent to climate change (Huggel et al. 2022).

In this study, we surveyed 570 UK residents in July 2021 to better understand the effects of communicating climate change threat. Using an experimental design, we explore the extent to which climate change communication focusing on climate change threat can mobilize climate action and how value orientations, attitudes, and anger can moderate and/or mediate that effect. We focus particularly on social conformity versus individual autonomy values (an individual's authoritarian predisposition), as research suggests that this value orientation is particularly reactive to

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sociotropic threats (Stenner 2005; Stevens and Vaughan-Williams 2014) such as climate change.

1.1. Values and threat from climate change

Climate change is a threat to human wellbeing (Costello et al. 2023; Reser, Morrissey, and Ellul 2011) and is perceived that way by large majorities of publics around the world (Pew Research Center 2022). However, people's perception of threat and how they respond to those perceptions can vary substantially depending on their values (Deason and Dunn 2022; Stevens and Banducci 2022). Understanding people's values and how those values motivate their perceptions of and responses to environmental concerns is therefore a critical concern if we wish to successfully engage the public in pro-environmental behaviors (Jagers, Martinsson, and Matti 2016; van der Linden 2015).

Values are trans-situational goals that vary in relative importance and serve as guiding principles in people's lives (Schwartz and Cieciuch 2022). Values express the motivations for why people act as they do and can be ordered around a circumplex with some values motivating avoidance of or defense against undesirable outcomes (avoidance) and others motivating pursuit of desired outcomes (approach) (Scholer, Cornwell, and Higgins 2019). Both avoidance and approach motivations have implications for personal and social attitudes and behaviors. This two-dimensional (avoidance-approach, personal-social) circumplex is represented in four higher-order value clusters: self-transcendence (approach, social), openness to change (approach, personal), self-enhancement (avoidance, personal), and conservation (avoidance, social). In their circular structure, self-enhancement values fall opposite self-transcendence values while conservation values fall opposite openness to change values.

While it is possible that any given social or political concern could relate to only a single value cluster, it is more likely two or more clusters will be relevant. People's attitudes and behaviors may therefore be influenced by competing values clusters that provide distinct motivations. All societies must cope with social, economic, and political challenges that stem from value conflict (Schwartz 2014). When values conflict, the relevant point of analysis to determine their most likely attitudes or behaviors is people's value orientations, their preference for one value or value cluster over a competing value or value cluster.

Much of the research linking values to pro-environmental behaviors focuses on self-transcendence vs. self-enhancement values (Steg 2023). We, however, are particularly interested in the trade-off between a subset of openness to change and conservation values; what we refer to as an authoritarian vs. libertarian

predisposition (S. Feldman 2003). The primary argument for focusing on self-transcendence vs. self-enhancement values is grounded in the argument that taking pro-environmental action often sets the immediate interests of the individual against the long-term interests of human society and civilization (De Groot and Steg 2007). Though there is certainly validity in this perspective, as the oft-found relationships testify to, it does overlook other value-relevant considerations; in particular, how pro-environmental behaviors and policies are seen in relation to social norms (Farrow, Grolleau, and Ibanez 2017) and whether people are predisposed to engage with or disengage from the threats posed by climate change (Wullenkord and Reese 2021).

1.2. The authoritarian predisposition and threat from climate change

The authoritarian predisposition is a values orientation that places social conformity values (conservation values excluding security values, i.e. tradition and conformity values) against individual autonomy values (openness to change values excluding hedonism values, i.e. self-direction and stimulation values) (Dunn, Spaiser, and Dodds 2020). A more authoritarian value orientation corresponds to inhibition-based avoidance motivations (Janoff-Bulman, Sheikh, and Baldacci 2008), a normative identity style (Soenens et al. 2005), and an intuitive-experiential cognitive style (Kemmelmeier 2010). Inhibition-based avoidance motivations promote self-restraint and a focus on social order; individuals inhibit their and other's behaviors to ensure that the ingroup is capable of protecting itself, and, therefore, them (Eigenberger 1998). The integrity of the self is thereby entangled with the integrity of the ingroup creating hypervigilance and reactivity to violations of ingroup norms or authority. The more authoritarian are thereby more attentive and reactive to ingroup cues (an intuitive-experiential cognitive style) and passively follow the lead of ingroup authorities (a normative identity style). An authoritarian predisposition thereby motivates increased submission to ingroup authority and adherence to ingroup norms, as well as aggression toward those who defy ingroup authority or norms (i.e. right-wing authoritarianism (RWA)) (Cohrs et al. 2005; Duckitt 2001); particularly when threatened (Stenner 2005).

Although values and attitudes are correlated (Sagiv et al. 2017), attitudes are more amenable and sensitive to context changes than values (Schwarz 2007). And while studies have shown that climate change threat can lead to increased right-wing authoritarian attitudes (Fritsche et al. 2012; Stanley and Wilson 2019) they have not examined to what extent the effect differs depending on people's value predispositions.

1.3. Emotional responses to threat

Perceptions of threat provoke emotional responses that influence how people respond to the threat. Threat can provoke anxiety or anger (Lerner and Keltner 2000; Lerner et al. 2003). Anxiety stems from threats that leave people feeling unsure of the source or nature of the threat and therefore powerless to do anything about it. People feel angry in response to threat when they can determine the source of the threat and identify action that they believe can be taken to prevent it. The determination of emotional response therefore lies in whether the person believes they understand and can combat the threat (Huddy and Feldman 2011; Valentino et al. 2011).

Anxiety and anger produce different responses to threat (Marcus et al. 2019). When threat makes people anxious, they tend to disengage from the situation or become more defensive in their reactions (Eisenman et al. 2009). When people become angry in response to a threat, they are more likely to directly engage with the threat (Best and Krueger 2011; Carver and Harmon-Jones 2009). Anxiety and anger thereby motivate avoidance and approach behaviors, respectively (Bossuyt, Moors, and De Houwer 2014; Carver and Harmon-Jones 2009).

Anxiety and anger tend to provoke value-neutral or value-adherent behaviors. When people are anxious, they are motivated to avoid the threatening stimuli (Bandura 1988), divorcing their behavior from their values. Threat that produces anxiety may therefore produce behaviors that may or may not align with their predominant value orientations (Marcus et al. 2019). When threat provokes anger, people's attitudes and behaviors tend to become more firmly attached to relevant value priorities (Marcus et al. 2019; Webster, Connors, and Sinclair 2022). When angry, those with a preference for social conformity values over individual autonomy values become more reliant on ingroup authority and norms, and intolerant of those who are perceived as different; those who prioritize individual autonomy over social conformity values become more critical of authority and social norms, and more tolerant toward those perceived to be different. Exposure to threatening information that produces anger can therefore polarize attitudes toward authorities, norms, and those who are perceived to be different (Marcus et al. 2019; Webster, Connors, and Sinclair 2022).

1.4. The authoritarian predisposition, anger, and incongruent motivations

Those with an authoritarian predisposition are motivated, based on their values orientation, to act defensively in support of their goals to maintain social order in their ingroup (Janoff-Bulman, Sheikh, and Baldacci

2008; Stenner 2005). When threatened and anxious, their (avoidance) motivations from their values orientation align with the (avoidance) motivations produced by their anxiety. The threat should therefore do little to change their attitudes or behaviors (Hetherington and Suhay 2011). When threat provokes anger among authoritarians, however, the (avoidance) motives from their value orientations conflict with the (approach) motives of the anger creating psychological dissonance, particularly if the anger is targeted at the ingroup or ingroup authorities (Osborne, Milojev, and Sibley 2017; Radkiewicz 2022).

In order to maintain their positive view of the ingroup, the more authoritarian are motivated to suppress their anger toward the ingroup (Lewis and Bates 2014). This leaves the person with unresolved and unexpressed anger that requires an outlet (Keinan et al. 1992). Discomfort with outgroups can serve as a trigger to allow the redirection and expression of that anger (Miller et al. 2003). The anger is therefore displaced onto 'hostile' outgroup members (Adorno et al. 1950; Milburn and Conrad 2016; Milburn, Niwa, and Patterson 2014) providing a psychological resolution for the motivational conflict (Van Hiel and De Clercq 2009).

Threats from climate change that provoke anger can therefore trigger increased adherence to ingroup authority and greater intolerance toward members of outgroups among the more authoritarian (Fritsche et al. 2012) and even though this may be offset in the aggregate by increased tolerance from the more libertarian (Barth et al. 2018), it nevertheless creates a dangerous environment for any who are considered to be different (Obaidi et al. 2022).

1.5. Emotions and mobilization of climate action

Emotions play an important role in mobilizing pro-environmental action, even after the emotion has subsided (Morris et al. 2019). Anger provides strong emotional motivation for political action generally (Jasper 2011, 2014) and climate action more specifically (Gregersen, Andersen, and Tvinnereim 2023; Kleres and Wettergren 2016). The Anger Activism Model indicates that anger can motivate action when combined with a sense of efficacy and attitudes in support of the issue (Turner 2009). However, anger can also hinder persuasion among those opposing an issue. This model aligns with our above theoretical framework. As anger causes people to increase the alignment between their values and attitudes (Marcus et al. 2019; Webster, Connors, and Sinclair 2022) those whose values predispose them toward pro-environmental attitudes and behaviors will become more likely to express pro-environmental attitudes and engage in pro-environmental behaviors; those who are predisposed to oppose pro-

environmental attitudes, will more strongly adhere to this position.

Recent research provides evidence for this framework. Research from the US demonstrates that the effect of anger on taking climate action is conditional on partisanship and political ideology, both a result of value orientations (Caprara et al. 2017; Lupton, Smallpage, and Enders 2017), with liberals responding to anger with greater support for climate policies and conservatives reacting with decreased support for climate mitigation policies (L. Feldman and Hart 2018), in effect polarizing the public (Huber et al. 2015; Nguyen, Mayer, and Veit 2022; Webster, Connors, and Sinclair 2022).

1.6. Hypotheses

Climate change is anthropogenic, and solutions exist (IPCC 2021). Research suggests that exposure to threat, where solutions to that threat are known, will likely result in anger. We therefore expect that:

H1: Exposure to climate change threat will result in higher levels of anger.

Given research on the mobilization potential of anger reported above, we also expect that heightened levels of anger would lead to greater willingness to adopt climate action. Specifically:

H2: Exposure to climate change threat will result in greater willingness to mitigate climate change.

H3: Anger will mediate the relationship between exposure to climate change threat and greater willingness to act to mitigate climate change.

As people with authoritarian predispositions tend to suppress anger against their governments and ingroup, and research suggests that climate change anger is often directed at governments/politicians (Gregersen, Andersen, and Tvinnereim 2023), we anticipate that respondents with authoritarian predispositions will display lower levels of anger in response to the threat intervention compared to other respondents.

H4: Exposure to climate change threat will result in lower levels of anger among respondents with a more authoritarian predisposition compared to those with a more libertarian predisposition.

The tendency for those with authoritarian predispositions to transform their anger against their ingroup/ingroup authorities into anger against outgroups suggest that climate change threat exposure may increase their authoritarian attitudes while keeping climate

anger low, as climate anger has been displaced. We therefore assume, that:

H5: Exposure to climate change threat will result in higher levels of authoritarian attitudes among individuals with authoritarian predispositions.

H6: In respondents with an authoritarian predisposition, lower levels of climate change anger will result in higher levels of authoritarian attitudes.

Finally, we assume that the more authoritarian are less likely to engage with climate change solutions because their affect (anger) displacement leads to lower levels of mobilizing climate anger. Instead of facing climate change threat and seeking solutions, they turn their attention to maintaining ingroup social order. We therefore hypothesize that:

H7: Higher levels of authoritarian attitudes will correlate with lower levels of willingness to mitigate climate change.

2. Data and methodology

2.1. Sample

To test our hypotheses, we collected survey experiment data generated through an online survey experiment using Qualtrics and recruiting study participants on Prolific, a platform for online participant recruitment for surveys and market research that produces high-quality samples (Peer et al. 2021). The only restriction on participation was that the participants were UK residents. Participants were paid £3.75 upon completion of the 30-minute survey that included a 5:55/5:29 minute intervention/control video. The data collection was conducted on 13 July 2021.

This study is an experimental study exploring the relationships between climate change threat, anger triggered by climate change threat, values, attitudes, and willingness to take up climate action. Given the explorative nature of the study, our goal was not to generate a representative sample. However, for robust statistical hypothesis testing, we aimed for a large enough sample to detect meaningful trends in our data. We conducted a sensitivity power analysis in G*power (Faul et al. 2009). Based on a two-group comparison (control vs. treatment), a power of 0.90, an alpha of 0.05, and a minimum detectable effect of 0.1, the minimum sample size for each group is 252 with a combined sample total of 504. Our actual sample size, 570, is sufficiently large for testing the main hypotheses.

Participants were between the ages of 18 and 75 ($M = 33.05$, $SD = 11.83$). More than half (68.95%) were

women and 82.95% were white. Around half of the respondents (51.58%) were married and 40.88% had children. Just over half of the respondents (51.93%) had a university-level education. The income distribution approximately followed the UK household income distribution, though with a slight over-representation of the two income brackets to the right of (higher than) the median (see Figure S1, Supplementary Information). We note that the non-representative sample with a bias towards female, white and university-educated participants, limits our ability to draw generalizable conclusions, however we believe the explorative results are nevertheless insightful in terms of motivating future research.

2.2. Procedure

Respondents were randomly assigned to one of two conditions that differed only on the treatment they received. Before responding to any questions, respondents were given an information sheet about the general purpose and risks of participating in the survey and asked to give their informed consent. Once consent was given, respondents were asked a set of pre-treatment questions measuring the Schwartz Values Circumplex. Hence, authoritarian predisposition was measured in the survey before the experimental intervention, as values have been shown to be rather stable and difficult to shift (Milfont et al. 2016). Following these value items, the respondents were shown one of two videos assigned based on the treatment condition.

Those who were randomly assigned to the experimental group ($N = 286$) watched a video that was intended to provoke threat from climate change. The climate change threat video (5:55 min) was the video 'Returned to the sea: the village that could be lost to climate change' produced by Greenpeace UK (<https://www.youtube.com/watch?v=3E-xSXb9s0k>). The video showcases two coastal villages in Wales that will be 'decommissioned' and returned to the sea as rising sea levels due to climate change make it impossible to preserve the villages. In the video, affected residents explain how climate change is destabilizing their homes and their lives. This video was selected because it highlights the immediate threat that climate change poses to the UK in a very accessible manner. We also explicitly selected a video that contained human stories, as a previous study on the effectiveness of climate change threat communication through videos resulted in null effects and the authors suggested that this may have been the consequence of a lack of stories in the video (Ettinger et al. 2021).

Those who were assigned to the control group ($N = 284$) were exposed to a non-emotive, scientific video on climate change. This video (5:29 min), 'Evidence for Climate Change: Why is the Atmosphere Warming?'

(<https://www.youtube.com/watch?v=AaY36yxFb1o>) produced by the Perimeter Institute for Theoretical Physics, shows a controlled experiment that uses thermal imaging to explain how greenhouse gases absorb infrared light and then extend the results to satellite measurements of our atmosphere. This video was selected because it lacks any overtly threatening content and discusses, in purely scientific terms, the physical processes that result in climate change.

We did not pretest the two videos, as the study is explorative, but we used the open text responses from study participants to check the validity of our categorization of the two videos in terms of threat. Specifically, we asked participants to write down how they feel about climate change, having watched the video. We found that respondents exposed to the climate change threat video were significantly more likely to use words that are linked to experiencing threat (see 2.3 and Supplementary Information S3).

Following the video, respondents were asked to describe how they feel about climate change, including, more specifically, to what extent they feel angered. This was followed by a number of question batteries intended to measure, amongst other concepts: respondents' levels of authoritarian attitudes and their willingness to engage in climate action (individual and political behavior) to mitigate climate change, and a series of demographic questions. This data allowed us to explore to what extent anger could lead to greater willingness to act and whether this relation is mediated by an authoritarian predisposition, something not examined in previous studies. At the end of the survey, respondents were debriefed on the specific purpose of the survey and thanked for their time and effort (see Supplementary Information for full questionnaire).

2.3. Measurement

2.3.1. Climate Action Type

Our dependent variable is a summary measure of an inventory of 12 items asking respondents 'Would you be willing to do the following things in order to curb climate change?'. The behaviors range in 'difficulty' from 'Buy second-hand products' to 'Campaign for ambitious climate change policies'. Respondents could respond in the affirmative (yes) or negative (no) (see Table S3, Supplementary Information, for specific inventory items along with the respective percentage of 'yes' responses). We analyzed these data using Latent Class Analysis to group respondents probabilistically based on their responses to the 12 items. This analysis (see S2, Supplementary Information) resulted in the ordinal variable Climate Action Type, with three categories (latent classes): the 'Committed', the 'Interested', and the 'Disengaged'. The Committed ($N = 245$, 42.98%) are much more willing to engage in behaviors following the

1.5-degree lifestyle (Akenji et al. 2021) and to engage politically, in particular through voting, to halt climate change. The Interested ($N=277$, 48.60%), the largest group, are ready to adopt some 1.5-degree lifestyle behaviors, particularly those that do not require deep lifestyle changes, but are not politically engaged when it comes to climate change. The Disengaged ($N=48$, 8.42%), the smallest group, are not willing to adjust their behaviors, including their political behavior, to respond to the climate crisis.

2.3.2. Climate Change Threat

This is a simple binary indicator as to whether the respondent was exposed to climate change threat, i.e. whether the respondent was in the control condition (coded 0) or the experimental (threat) condition (coded 1). Running a Fisher's Exact Test for Count Data revealed that the odds for respondents in the experimental condition to express feelings associated with threat (e.g. frightened, threat, terrified, danger, scary, etc.) in the open-text response following the video exposure were 2.86 (95%-CI: 1.62, 5.22, $p < 0.001$) times higher compared to respondents in the control condition (see also S3 in Supplementary Information). This confirms the validity of the threat intervention.

2.3.3. Climate Change Anger

We measured anger in response to climate change via a 0–100 scale sliding bar in response to the statement: 'People often feel either worried or angry or both when they think about climate change. On a scale from 0 to 100, where would you place yourself on the following scales?'. Each emotion had its own slider that respondents could move to any value on the scale between 0 and 100. We anchored the sliders with values in increments of 10 with 0 labelled as 'not at all', 50 labelled 'moderately', and 100 labelled 'very'. Values closer to zero therefore indicate no anger, values in the middle range indicate moderate anger, and values closer to 100 indicate a high level of anger. As feeling worried turned out to have no predictive value (see S3 Supplementary Information), we will not further elaborate on this variable.

2.3.4. Authoritarian Predisposition

We measured the authoritarian predisposition following the Social Conformity – Individual Autonomy Values approach (SC-IA; S. Feldman 2003) validated in cross-national research (Dunn, Spaiser, and Dodds 2020). We measured personal values using eight items from the 20-item Schwartz Values Inventory (Sandy et al. 2017). However, the religion item was replaced by a tradition item from the 57-item PVQ-RR (Schwartz and Cieciuch 2022) as we do not wish to conflate religiosity with tradition. The introduction to the values items reads: 'We would like to start by asking about certain characteristics that can be used

to describe people. Please read each description and think about how much each person is or is not like you.' Participants responded on a scale from 0 ('not like me at all') to 5 ('very much like me'). An exploratory factor analysis of the eight items, using a polychoric correlation matrix, demonstrated that the eight items fall onto two factors with eigenvalues of 2.35 and 1.52. The first factor contains the individual autonomy items, while the second contains the social conformity items (see Table S1, Supplementary Information). Averaging the four items for each factor, we created two sub-indices measuring each value cluster: social conformity ($M=3.55$, $SD=1.08$, $\alpha=0.81$) and individual autonomy ($M=4.14$, $SD=0.86$, $\alpha=0.71$). The individual autonomy scale was then subtracted from the social conformity scale to create the Authoritarian Predisposition Index, with scores ranging from -5 to $+3$ ($M=-0.59$, $SD=1.43$) and higher scores indicating a higher degree of authoritarianism. The zero-point on this index divides those who prefer individual autonomy values to social conformity values (libertarians) from those who prefer social conformity values to individual autonomy values (authoritarians).

2.3.5. Authoritarian Attitudes

Authoritarian attitudes are measured using the 18-item Aggression-Submission-Conventionalism (ASC) Scale (Dunwoody and Funke 2016), a variant of Altemeyer's (1996) Right-Wing-Authoritarianism Scale that was developed to remove the confounding contextual elements of that scale and to facilitate the separation of the three subscales if theoretically necessary. The introduction to the items reads: 'The next set of items asks your opinion on a variety of social issues. You will probably find that you agree with some of the statements and disagree with others. Please indicate your reaction to each statement.' Participants responded on a scale from 0 ('strongly disagree') to 6 ('strongly agree'). An exploratory factor analysis of the 18 items, using a varimax rotation, indicated that the 18 items load onto three factors representing the three subscales – authoritarian aggression, authoritarian submission, and conventionalism – with variances of 2.32, 2.63, and 2.89, respectively (see Table S2, Supplementary Information). For each subscale, we averaged each of the six items together to create the three core authoritarian attitudes scales: conventionalism ($M=3.57$, $SD=1.04$, $\alpha=0.84$), submission ($M=2.69$, $SD=0.93$, $\alpha=0.81$), and aggression ($M=3.43$, $SD=1.01$, $\alpha=0.77$). A factor analysis of the three subscales indicates a single factor with an eigenvalue of 1.09. We averaged all three subscales to create the overarching Authoritarian Attitudes Scale ($M=3.23$, $SD=0.78$, $\alpha=0.68$). The scale ranges from 1.06 and 5.56, with higher values indicating more authoritarian attitudes.

The variables described in this section were used to test the seven hypotheses in 1.6 by estimating

a multiple mediator model for an ordered outcome variable using a structural modelling approach (Rosseel 2012). The Randomized Control Trial design allows us to make cautious causal conclusions. We tested the main model with control variables as a robustness check (see Supplementary Information S5).

3. Results

We first explore the effect of our experimental intervention. Our analysis of the climate change anger variable shows that the climate change threat intervention video made respondents significantly angrier about climate change than those who watched the control video ($M(\text{control}) = 64.07$, $M(\text{intervention}) = 72.24$, $t = -3.89$, $p < 0.001$). This confirms our hypothesis H1. We have investigated the open-text responses in our data and find similar tendencies as reported by Gregersen et al. (2023) for directing anger primarily at government/authorities, and secondarily at people in general (see S6 in Supplementary Information).

Having established that our threat manipulation does provoke an anger response in our treatment group and that hypothesis H1 holds, we now test our remaining hypotheses H2-H7. Figure 1 shows the results for the multiple mediator model with LCA Climate Action Type as the ordered outcome variable and with climate change anger and authoritarian attitudes as the two mediators. Moreover, authoritarian predisposition is included as the moderator for the relation between climate change threat treatment and authoritarian attitudes. When we remove the

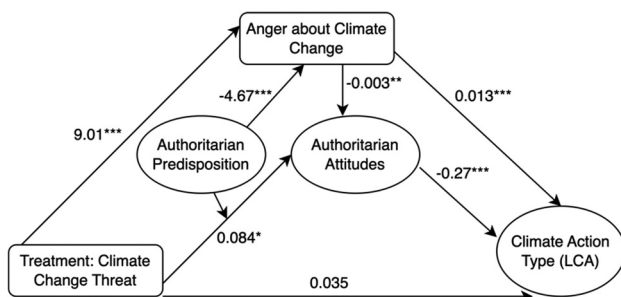


Figure 1. Multiple Mediator Model for LCA Climate Action Type ordered outcome, with climate change anger and authoritarian attitudes as mediators. In the sub-model for second mediator, authoritarian attitudes, we included the moderator authoritarian predisposition. Shown is the coefficient for the interaction term (0.084*), the coefficient for treatment is -0.008 and for authoritarian predisposition is 0.279^{***} . The indirect effect of the threat treatment via the first mediator (climate change anger) is 0.117^{***} . The indirect effect of threat treatment via the second mediator (authoritarian attitudes) is -0.023^* . The indirect effect of authoritarian predisposition on authoritarian attitudes via the first mediator (climate change anger) is -0.001^{**} . Model Fits: CFI = 0.983, TLI = 0.983, RMSEA = 0.024, SRMR = 0.015). $^{***} p < 0.001$, $^{**} p < 0.01$, $^* p < 0.05$. Estimator: DWLS. Optimization method: NLMINB.

moderator authoritarian predisposition in our model, threat had no significant effect on authoritarian attitudes. We also tested a model where authoritarian predispositions were moderating the treatment effect on climate change anger, testing hypothesis H4. However, while there were direct significant effects from treatment and authoritarian predispositions on climate change anger, the moderation effect was not significant and inclusion of such a moderation effect decreased the model fits (see S5, Supplementary Information). We therefore included in the model below a direct effect from authoritarian predisposition on climate change anger, but not the moderation effect.

This model provides evidence in support of some of our hypotheses. Supporting H1, exposure to climate change threat increased feelings of anger, as discussed before. Differently from our expectation expressed in hypothesis H2, exposure to climate change threat has no direct effect on willingness to adopt climate action. However, as predicted by hypothesis H3, exposure to climate change threat has an indirect effect on willingness to embrace climate action, mediated by climate change anger. The effect from climate change threat exposure on willingness to act is indirect and fully mediated by feelings of anger. Hence, only as much as exposure to climate change threat can make people angry, can it potentially mobilize climate action.

Hypothesis 4 is not supported, as authoritarian predisposition does not moderate the effect from climate change threat exposure on climate change anger. Instead, there is a direct, negative effect from authoritarian predisposition on climate change anger. This means people, irrespective of their predispositions, get angry about climate change when exposed to climate change threat. However, we still find support for our assumption that people with authoritarian predispositions suppress their climate change anger, likely directed at those in power as explained earlier. But this suppression of anger is a continuous process rather than a reaction to climate change threat exposure. The increased anger in response to the threat stimuli could generate additional psychological pressure to displace the affect in the more authoritarian.

Supporting H5, exposure to climate change threat makes individuals with an authoritarian predisposition somewhat more authoritarian in their attitudes, though the effect is rather weak. We also find support for hypothesis H6 and hence for the affect displacement assumption, as we establish a significant indirect effect. The effect of authoritarian predisposition on authoritarian attitudes is mediated through climate change anger: an authoritarian predisposition lowers climate change anger, and lower climate change anger is correlated with higher levels of authoritarian attitudes. This might indicate that people with

authoritarian attitudes indeed suppress their climate change anger directed at those in power and channel their suppressed emotions towards groups they perceive as non-conforming. This manifests itself in authoritarian attitudes demanding, for instance, harsher penalties against criminals or using force against threatening groups. Increased authoritarian attitudes also means that they re-affirm their obedience to leaders, which might aid continued anger suppression.

Finally, the model confirms hypothesis H7 that authoritarian attitudes are negatively correlated with willingness to act to mitigate climate change. The indirect effect from treatment on willingness to act through the mediator authoritarian attitudes is significant, albeit weak, and means that individuals with authoritarian predispositions are less likely to respond to climate change threat by embracing climate action and instead affirm their authoritarian tendencies. This lends further support to the affect displacement thesis, as these people suppress their climate change anger, which seems to be an important mobilizing force, and instead focus on re-affirming their authoritarian attitudes.

4. Discussion

As assumed in hypothesis H1 exposure to climate change threat results in higher levels of anger. While threat can provoke anxiety or anger, our study shows that people react to climate change threat with increased anger, most likely because they believe they understand the source of threat and that action can be taken to prevent it (Huddy and Feldman 2011; Valentino et al. 2011). And while contrary to hypothesis H2, exposure to climate change threat does not lead directly to greater willingness to embrace climate action, in alignment with hypothesis H3 and the Anger Activism Model, that emphasize the central role of anger in encouraging action, there is an indirect effect from climate change threat exposure to willingness to combat climate change, mediated through anger. Hence, our study confirms the Anger Activism Model and previous studies that demonstrated the mobilizing effect of anger for (climate) action (Gregersen, Andersen, and Tvinnereim 2023; Kleres and Wettergren 2016; Turner 2009).

However, previous studies have not considered to what extent value orientations may interfere with processes described in the Anger Activism Model. Our analysis provides some initial evidence that a libertarian vs. authoritarian predisposition influences how climate change threat is processed. In accordance with theory that suggests people with authoritarian predispositions tend to suppress anger against their governments and ingroup (Adorno et al. 1950; Milburn and Conrad 2016) we found that respondents with

authoritarian predispositions displayed lower levels of climate anger, which is typically directed towards those in power (Gregersen, Andersen, and Tvinnereim 2023, Supplementary Information S6). However, contrary to hypothesis H4, exposure to climate change threat increased the levels of anger also among those with authoritarian predispositions. This does not disprove the suppression of anger assumption though, as the suppression mechanism is likely a habitual mechanism, rather than a situational, temporary response to a given stimulus (Milburn, Niwa, and Patterson 2014; Peters et al. 2020). Indeed, the situational increase of climate anger in response to climate change threat will likely cause psychological tension and increase the need for affect displacement in those with authoritarian predisposition. As proposed in hypotheses H5 and H6, we find tentative evidence for affect displacement (Milburn, Niwa, and Patterson 2014; Van Hiel and De Clercq 2009) among the more authoritarian in response to climate change threat. Specifically, the more authoritarian divert their suppressed climate anger toward non-conforming individuals and outgroups in order to maintain social order within the ingroup. Expanding previous studies that did not consider authoritarian predispositions (Fritsche et al. 2012; Uenal et al. 2021), we show that climate change threat can indeed lead to greater right-wing authoritarian attitudes, but predominantly among those with authoritarian predispositions, which we link to the affect displacement mechanism. We also show that affect displacement may have some behavioral implications, as these respondents were less likely to express willingness to engage in climate action, confirming hypothesis H7. These findings suggest limited applicability of the Anger Activism Model for individuals with authoritarian value predispositions, who are likely to engage in anger suppression and displacement instead of embracing action to respond to the original threat.

However, alternative explanations for some of the observed effects are conceivable. The described responses to climate change threat by respondents with authoritarian predispositions may also be linked to the worldview defense mechanism proposed by the Terror Management Theory and recently confirmed empirically in the context of climate change (Smith et al. 2022). An alternative explanation to affect displacement could be that low levels of climate anger among authoritarians are linked to them being more climate skeptic and the increase in anger in response to the climate change threat intervention could be linked to anger about climate mitigation measures and emotive climate change communication (Gregersen, Andersen, and Tvinnereim 2023), though we do not find any evidence for this in the open-text responses to the threat intervention. Bespoke

measurements in future research (e.g. specific anger measurements) could help to clarify affect displacement mechanisms. We would also argue that adopting a climate skeptic stance could be linked to the affect displacement mechanism, as denying climate change threat facilitates suppression of anger at ingroup elites because of inadequate climate change threat response. Further research is needed to test this assumption. This is an initial explorative study based on a non-representative Prolific sample and should be bolstered by a representative sample and a refined set of measures. We also encourage future longitudinal research using, for instance, panel data in combination with survey experiments to study long-term consequences of climate change communication strategies and the anger they produce.

5. Conclusion

This paper investigated the extent to which climate change communication focusing on climate change threat can mobilize climate action by invoking anger and the role that value orientations and attitudes play in this process. Our video experimental intervention intended to induce a sense of climate change threat that is concrete, local, and immediate. And, indeed, those who were exposed to the climate change threat video were notably angrier about climate change than those in the control group. Moreover, the threat intervention had a substantive effect on the willingness of people to become more active to combat climate change, but this effect was entirely mediated through anger about climate change. We also found that value orientations play an important role in this process. Exposure to climate change threat may result in higher levels of authoritarian attitudes among individuals with authoritarian predispositions. Authoritarian predisposition, in turn, is related to substantively lower levels of climate change anger and lower willingness to commit to behavioral and political adjustments required to address climate change. Our research therefore suggests that illustrating the threatening immediate and local impacts of climate change may increase people's willingness to support and adopt climate change responses. However, it may also backfire among people with authoritarian predispositions, who may respond to the threat by suppressing their anger about climate change and displacing it onto non-conforming outgroups.

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Data availability statement

The dataset, the full questionnaire, as well as the Stata and R scripts for the analyses are available on OSF, URL: <https://osf.io/k9bf3/>

Ethical approval

The study has received ethical approval by the Business, Environment and Social Sciences (AREA) Research Ethics Committee (FAHC 20–150).

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