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The case for longtermism: concern for the far future as a catalyst for pro-climate action

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Amid escalating climate challenges, we examine relationships between longtermism beliefs with policy-level and grassroots climate-protective attitudes and actions. Across four primary pre-registered studies ($N = 4451$) and two supplementary pilots ($N = 1858$), we find that a significant portion, approximately 25% of our participants, who endorse the longtermism ethical philosophy, report heightened climate change concerns. Furthermore, longtermists show stronger support for pro-climate policies, advocate for initiatives in line with climate justice for future generations and present-day minoritized groups and make proactive contributions to environmental causes and initiatives. Moreover, we find that responsibility to distant future generations drives these associations. Through a targeted intervention, we boosted intergenerational responsibility and increased donations to an environmental charity. These findings highlight how longtermism beliefs shape pro-environmental attitudes and actions, offering valuable insights for climate advocacy strategies and cultivating more widespread support for comprehensive environmental policies.

As our planet grapples with the aftermath of the hottest summer on record¹ and a sobering prognosis for its future, as outlined by the IPCC's 2023 AR6 Synthesis Report², a critical question emerges: Who recognizes and feels responsible for addressing the impending threat of escalating climate crisis? That is, what tools do we have at our disposal to identify those ready and willing to undertake the individual and collective action necessary to mitigate anthropogenic climate-related threats facing the global ecosystem for the sake of our collective future^{3,4}? With people in distant future generations likely to bear the brunt of these threats^{5,6}, to address the core of this issue, a necessary starting point may be first identifying those who see the value in every life, whether existing now or in generations yet to come. The longtermism ethical philosophy and social movement specifically advocates equal valuation for the lives and well-being of present and future generations alike⁵⁻⁷. Although people show a prevailing tendency to discount the welfare of future generations⁸⁻¹³, the number of people who endorse the core principles of the longtermism philosophy⁷ and show resilience to this trend is promisingly substantial. Here, we set out to systematically investigate the diagnostic utility of longtermism beliefs in predicting top-down (i.e., collective) and bottom-up (i.e., individual) climate-protective attitudes and actions, explore the psychological mechanisms that underpin these potential linkages, and harness insights to investigate scalable, low-cost interventions to nurture environmentally-conscious action.

Longtermism rests on three key principles: (1) Present and future generations should be treated with equal moral consideration. (2) Because the future population will be larger than today's, future well-being should be prioritized. And, (3) our present actions can play a key role in positively shaping the long-term future⁵⁻⁷. Longtermism's emphasis on safeguarding a larger future population tacitly implies reallocating resources from the present population to future causes, which has drawn criticism both in academic discourse^{14,15} and in mainstream media¹⁶. Yet, the social movement that puts longtermist ideology into action boasts a modest yet dedicated following⁷. Moreover, recent lines of inquiry employing the Longtermism Beliefs Scale (LBS¹¹) have consistently revealed that roughly 25% of the US population highly endorses longtermist ideology for near- and distant-future generations alike, with these respondents being empirically classified as longtermists by the scale's developers^{10,11,17}.

While certain existential threats, such as those related to artificial intelligence⁶, are likely to most severely impact future generations, others, like climate change, are already having adverse impacts on the current population⁷. Consequently and in light of the aforementioned criticisms of longtermism, pro-climate action may represent an arena where longtermists can do considerable good for future generations without incurring costs for the present. But do longtermists exhibit greater environmental concern, and can longtermist principles be used to promote more pro-environmental actions in the general population? While these questions haven't been

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directly addressed, emerging research on the psychology of intergenerational concern and the extensive literature on environmental psychology offer support for this possibility.

Recent findings suggest that longtermists have a heightened ability to transcend multiple dimensions of psychological distance, the perceived separation between individuals and events in terms of emotional, cognitive, or temporal proximity^{18,19}. People generally tend to discount the subjective value of future relative to immediate rewards (i.e., temporal discounting^{20,21}), and the needs of future generations relative to the current generation (i.e., intergenerational discounting^{8–13}). Yet, empirically identified longtermists show a departure from this trend, exhibiting markedly reduced discounting behavior across spans of temporal distance into the future¹⁰. What's more, longtermists, relative to controls, express increased prosociality, moral regard, and empathy across spans of social distance, demonstrating larger circles of moral concern^{10,17} and greater endorsement of effective altruism beliefs¹¹. This is notable, as a prevalent argument in science and society suggests that bridging the psychological distance people feel from the negative impacts of climate change can encourage greater pro-climate action (see refs. 22,23 for review). However, more recent analysis of this literature suggests that this candidate mechanism for pro-climate engagement may be vastly overestimated²⁴. So, while transcending psychological distance may help to account for some aspects central to endorsing the principles of longtermism, it alone is likely not sufficient to explain potential linkages between longtermism beliefs and climate attitudes and actions.

Nonetheless, indirect indications of the potential predictive potency of longtermism beliefs for climate-related outcomes can be gleaned from research linking LBS scores to a factor already known to influence climate-related attitudes and behaviors more consistently than psychological distance considerations alone: an increased sense of *responsibility* for addressing collective, intergenerational challenges^{10,11,17,25–28}. More precisely, correlational and experimental research has reliably demonstrated that feeling responsibility to future generations, a factor that is *predicted* by longtermism alignment^{11,17}, is also a robust *predictor* of pro-environmental intentions, climate change beliefs, charitable donations to pro-environmental organizations, support for pro-environmental public policy initiatives, and willingness to personally engage in conservation efforts^{27–32}. Indeed, even if an individual does not feel emotionally connected or psychologically proximal to the long-term consequences of climate change, a sense of intergenerational responsibility fosters a mindset that values the preservation of the planet and its resources for the benefit of future generations. This perspective encourages long-term thinking and motivates individuals to develop pro-environmental attitudes^{26,33}, endorse pro-environmental policies^{27,28}, and adopt sustainable behaviors^{29,34}. It transcends immediate concerns, emphasizing the moral duty to ensure a habitable and thriving world for those who will inherit it.

Collectively, this initial evidence suggests that individuals within the general population who strongly endorse longtermism ideology, perhaps supported by a heightened sense of responsibility to protect the welfare of future generations, may constitute a group ready to take proactive measures to safeguard our climate and shared future. Should this hold true, the LBS could prove to be a pivotal diagnostic instrument for identifying promising candidates for initiatives aimed at promoting climate action and garnering support for climate-related public policies, even if such action and policy serves to benefit only future generations. Moreover, by decoding the features enriched in the psychological profiles of longtermists that underlie their affinity for the environment, we can chart a path to instill these values in the broader population by developing targeted interventions.

The present pre-registered studies endeavor to uncover the link between longtermism beliefs and a range of individual and collective climate-related attitudes and behaviors. We aim to discern whether those embracing longtermism, and those who are exposed to longtermism principles alike exhibit a more robust commitment to pro-climate policies,

heightened concerns about climate change, and a greater willingness to take concrete actions. Delving deeper, we seek to uncover the mechanisms driving these relationships and leverage this knowledge to craft targeted interventions to promote environmentalism in the general population. In doing so, our research not only advances our comprehension of longtermism and longtermists but offers actionable insights for fostering pro-environmental attitudes and actions in the rest of us. Such insights may be valuable in pursuit of effective solutions to combat the looming threat of climate change.

Results

In a pre-registered survey of 790 Prolific workers, those who were identified to be a longtermist ($N = 220$) based on their responses to the LBS were 2.25 times more likely to believe that global warming was caused by humans, 2.99 times more likely to believe that there is scientific consensus for global warming, and 4.39 times more likely to believe that global warming is happening right now compared to the non-longtermist population ($N = 570$). Importantly, longtermists also expressed greater worry about global warming, they thought that global warming would affect the US on average 10 years sooner than non-longtermists, and believed that global warming is affecting the weather, that it will harm other entities (themselves, other Americans, developing countries, animals and nature, and future generations) more and experienced the impacts of global warming more. Longtermists believed to a greater degree that we are not doing enough to address global warming and that addressing global warming should be a priority. Perhaps most importantly, they were more likely to support policies that sought to address global warming and engaged in discussions about global warming significantly more. These effects were relatively sizeable ranging from $d = 0.34$ to $d = 0.73$ (see Supplementary Table 2 for the full results), and robust to the inclusion of different demographic characteristics as covariates (see Fig. 1; see Supplementary Table 3 in SOM). Finally, the only characteristic that longtermists and non-longtermists did not differ on was how much they had heard about global warming in the media, suggesting that exposure to content related to global warming did not necessarily drive these effects.

In a second pre-registered investigation, we found that longtermists ($N = 178$) reported significantly higher levels of moral responsibility to protect future generations ($t(440.35) = 11.96, p < 0.001, d = 0.91$) compared to the non-longtermist population ($N = 590$). They also reported significantly more engagement in pro-environmental behaviors ($t(766) = 3.99, p < 0.001, d = 0.34$) and pro-climate collective action participation ($t(765) = 2.05, p = 0.041, d = 0.17$).

In a third preregistered study conducted on Prolific ($N = 769$), we compared longtermists ($N = 186$) to the general population ($N = 583$) to determine whether longtermists also tend to endorse climate justice principles and support policies that seek to elevate climate justice initiatives to a larger degree. Compared to non-longtermists, longtermists believed in climate justice, had heard about it more, supported policies that seek to address issues relevant to climate justice, expressed that they would be more likely to vote for a politician that cares about climate justice, and reported greater intentions to participate in campaigns that are relevant to climate justice. These findings (see Fig. 2; see Supplementary Table 5 in SOM) emerged with respect to climate justice for minoritized (d s ranged from 0.20 to 0.60) and future people (d s ranged from 0.48 to 0.62). All effects except for climate justice beliefs relevant to minoritized people remained significant after accounting for age, political orientation, SES and gender (see Supplementary Table 6).

The increased responsibility to protect future generations felt by longtermists fully explained the effect on engagement in pro-environmental behaviors ($b = 0.20, SE = 0.02, 95\% \text{ C.I. } [0.16, 0.24]$) and pro-climate collective action participation ($b = 0.46, SE = 0.05, 95\% \text{ C.I. } [0.35, 0.56]$) via significant indirect effects (see Fig. 3). Similar significant indirect effects (see Fig. 4) were observed for pro-climate justice attitudes, beliefs and policy

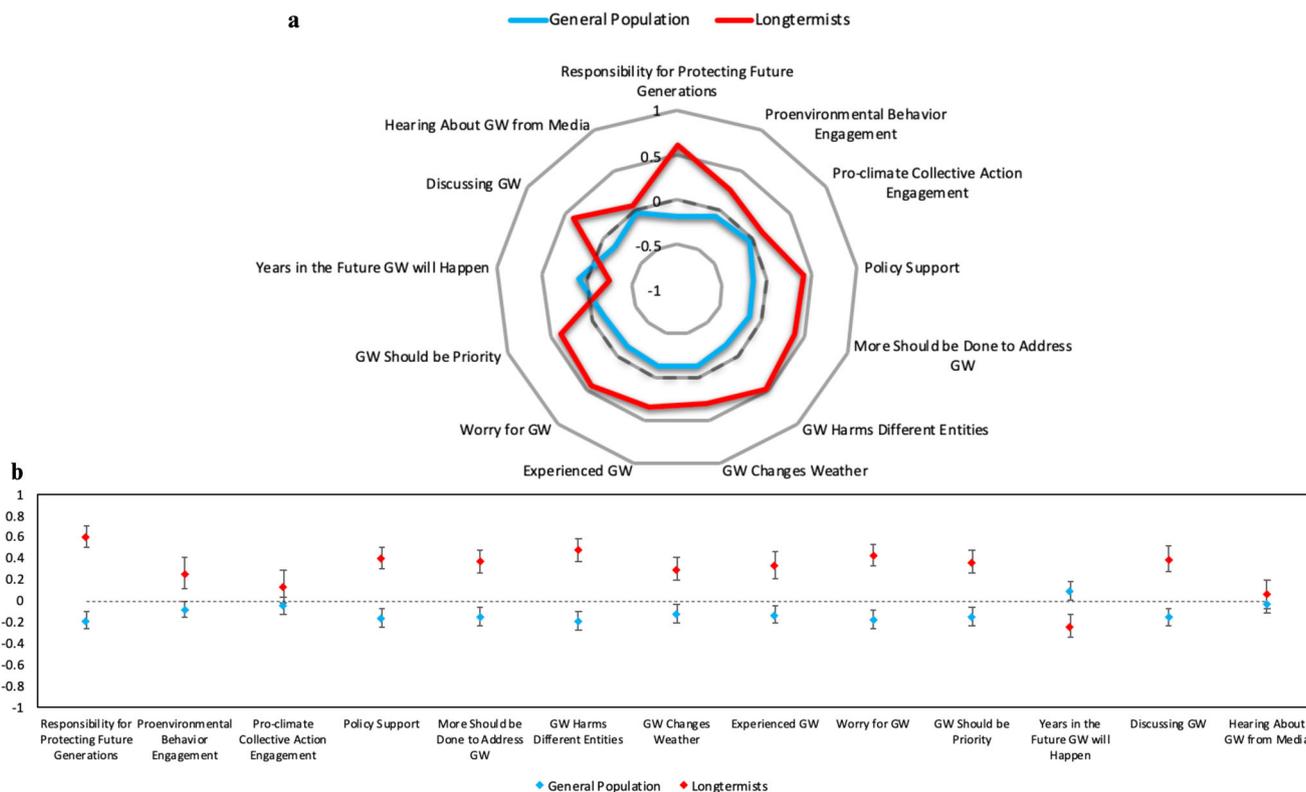


Fig. 1 | Architecture of environmentalism in longtermists versus general population controls. a Radar plot displaying standardized averages for longtermists and the general population for all self-report outcomes. Scores above the mean (standardized to be 0; displayed as dashed line) are represented by positive values and scores below the mean are represented by negative values. **b** Same as (a) with error

bars depicting 95% confidence intervals. For all outcomes (other than predictions for when in the future global warming will occur), longtermists score higher than the mean on average, whereas general population controls score below the mean on average. These data indicate a prevailing pattern for longtermists to exhibit greater self-reported environmentalism across a multitude of outcomes.

opinions for minoritized people ($b = 0.34$, $SE = 0.03$, 95% C.I. [0.27, 0.40]) and for future people ($b = 0.36$, $SE = 0.04$, 95% C.I. [0.29, 0.44]).

In a highly-powered ($N_{\text{final}} = 2135$) pre-registered study we tested the effectiveness of four piloted interventions (See Supplementary Study 2 for the pilot results). These interventions were different attempts to increase responsibility to protect future generations in the distant future. An overview of all conditions is given in the SOM. A common feature of all interventions was that they emphasized that present generations can greatly and positively influence the lives of future people. Importantly, what differed between conditions was the manner in which this was emphasized. Longtermism as a philosophy proposes that we today can greatly influence the lives of future generations⁷, and our goal was to focus directly on making this principle salient.

Briefly, the first intervention was a thought-exercise adapted directly from a foundational text associated with the longtermism philosophy and social movement⁷, where the potential to prevent harm for future people was made salient (future generation harm reduction condition). Specifically, participants imagined finding broken glass on a hiking trail, deliberating whether to pick it up to prevent future harm, reflecting on whether preventing harm in the near versus distant future was any more important. Previous studies have demonstrated the effectiveness of a similar thought exercise adapted directly from a foundational text associated with the effective altruism philosophy and social movement³⁵ in nurturing cost-effective donation behavior^{36,37}.

The second condition involved writing a letter from the year 2500 to the present, in which participants detailed the risks that should be averted to ensure a flourishing world (letter to past condition) and how these risks could be averted through actions taken today in 2023. Earlier research has indicated that similar interventions, such as inducing an intergenerational perspective by asking participants to write a letter to their future children,

can promote a heightened sense of responsibility toward protecting future generations and encourage pro-climate action. In the current investigation, we adapted this manipulation with the aim of cultivating a more expansive sense of intergenerational concern that extends to more distant timeframes beyond just the generations of one’s children.

In a third condition, participants contemplated three specific challenges they anticipated would worsen by the year 2500 (future challenges condition). They were subsequently prompted to brainstorm potential solutions for these challenges, again making salient the potential for the present generation to have a positive impact on future generations. Our adaptation of this intervention was inspired by the empirical literature on mental contrasting theory^{38–40}. This research has demonstrated that not only considering desired future outcomes but also identifying the obstacles that may obstruct those outcomes, along with potential solutions, can enhance goal achievement and facilitate goal-directed behaviors.

Next, in the fourth condition, participants were asked to imagine themselves as the head of a newly-founded bipartisan committee that seeks to protect future generations. They were then given the goals of this committee and asked to write a speech highlighting these goals and what they thought the committee could accomplish (future generations committee condition). This condition was more akin to a role-playing exercise, where people placed themselves in the role of a leading politician who had to argue about what we can do today to help future generations. Similar role-playing interventions placing people in the perspective of a role that demands impartiality (e.g., an agent of an organization, a hospital director) have been shown to cultivate more impartial prosocial behavior and related moral judgments than when people make personal decisions for themselves^{41–43}. Finally, in the control condition, no manipulation was presented.

Each of the four conditions significantly increased responsibility to protect distant future generations relative to the control condition: for the

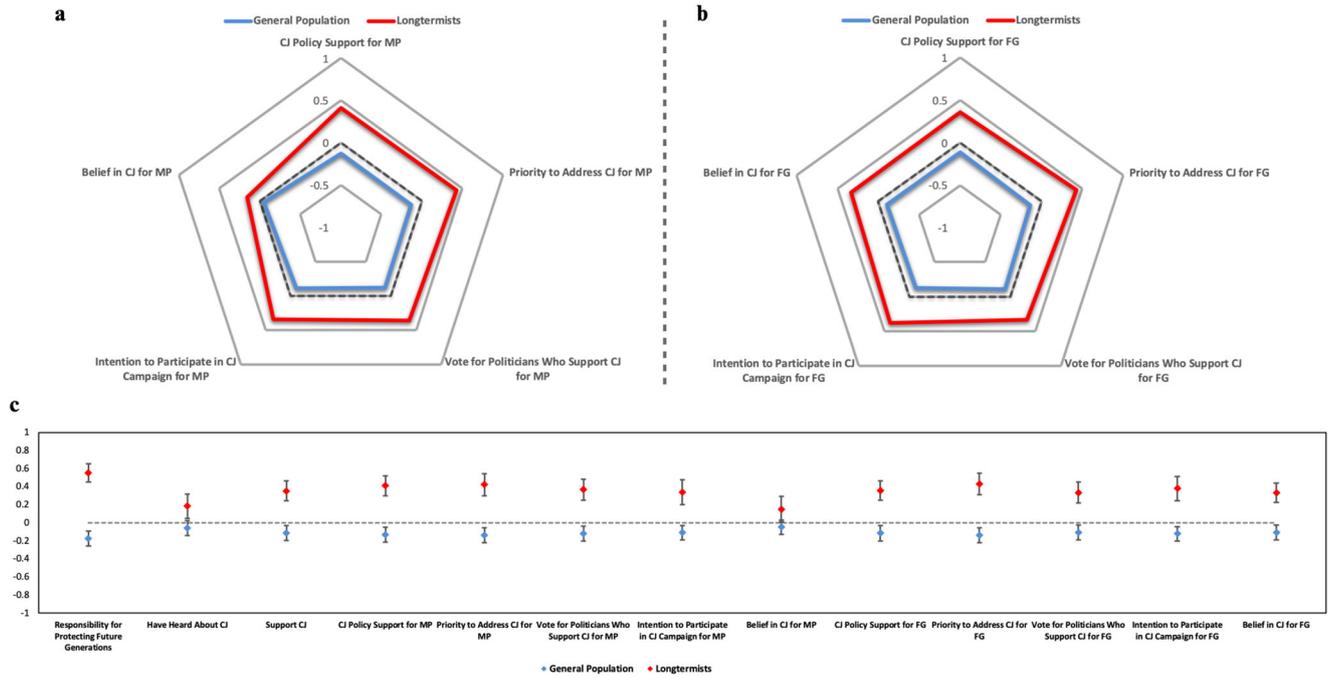


Fig. 2 | Architecture of climate justice (CJ) for minoritized people (MP) and future generations (FG) in longtermists versus general population controls. Radar plots displaying standardized averages for longtermists and the general population for self-report outcomes related to climate justice for minoritized people (a) and future generations (b). Scores above the mean (standardized to 0; displayed as dashed line) are represented by positive values and scores below the mean are represented by negative values. c Same as (a, b) with error bars depicting 95%

confidence intervals and including additional outcomes of responsibility for protecting future generations, and awareness of and support for climate justice in the general sense. For all outcomes, longtermists score higher than the mean on average, whereas general population controls score below the mean on average. These data indicate a prevailing pattern for longtermists to exhibit pro-climate justice attitudes, behaviors, and policy opinions with respect to minoritized people and future generations across a multitude of outcomes.

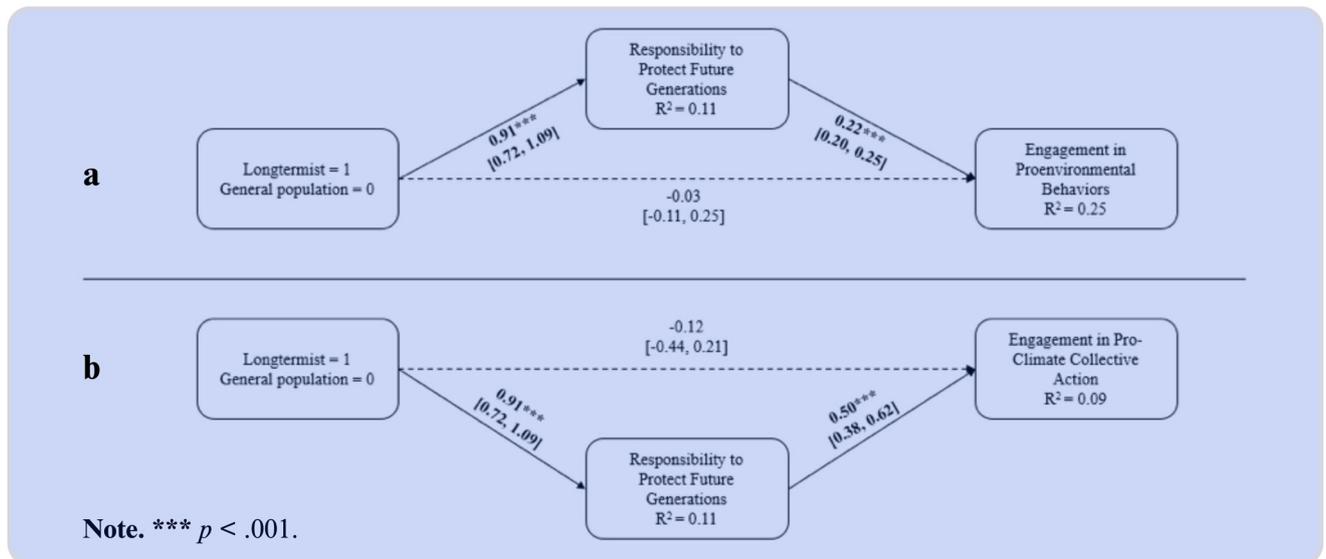


Fig. 3 | Longtermists' elevated sense of responsibility for future people explains their heightened engagement in proenvironmental behaviors and collective action. Pre-registered mediation models showing that longtermists' heightened sense of responsibility for the welfare of future generations accounts for the

relationship between longtermism beliefs and engagement in (a) proenvironmental behaviors and (b) proenvironmental collective action. Models were estimated using PROCESS Macro, Model 4, with 10,000 bootstrapped samples.

future generation harm reduction condition: $t(942) = 9.67, p < 0.001, d = 0.63$; for letter to past condition: $t(874) = 5.71, p < 0.001, d = 0.39$; for the future challenges condition: $t(910) = 4.57, p < 0.001, d = 0.30$; and for the future generations committee condition: $t(840) = 6.55, p < 0.001, d = 0.45$ (see Fig. 5a). All of these effects were robust to the inclusion of demographic covariates (see Supplementary Table 10 in the SOM).

We also included a donation task which asked participants whether they were willing to donate part of a potential \$10 bonus to a charity whose goal is to protect forests for future generations (Trees for the Future)¹⁷. Across the four conditions, a significant effect was observed solely for the future generation harm reduction condition: $t(942) = 2.20, p = 0.028, d = 0.14$ (see Fig. 5b). This effect remained significant after

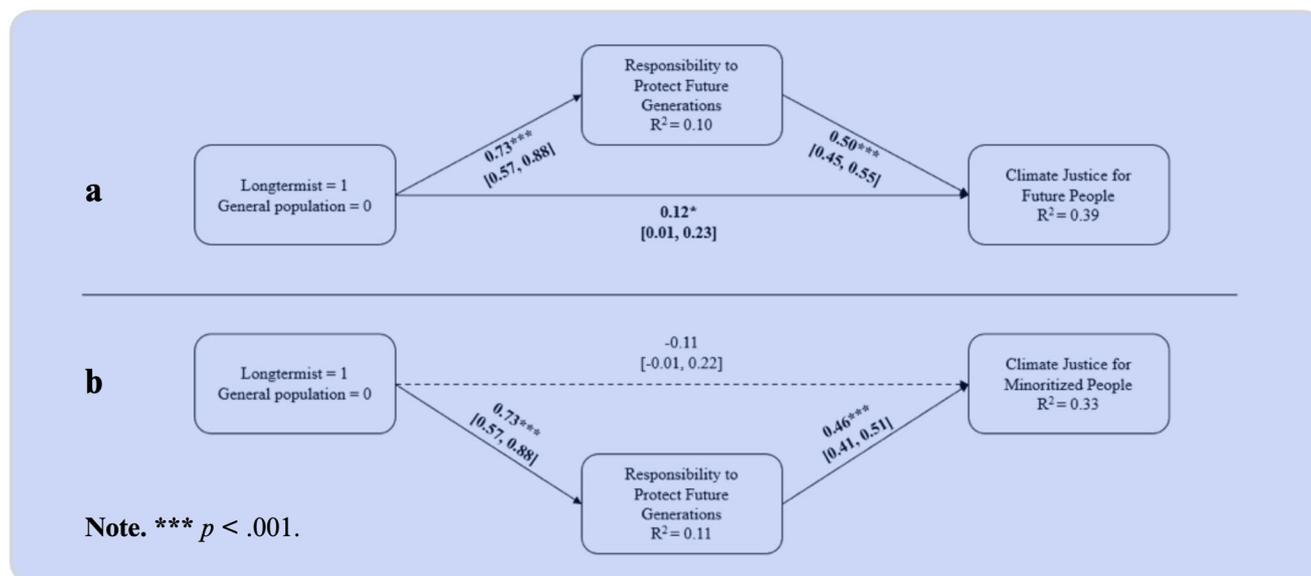


Fig. 4 | Longtermists' elevated sense of responsibility for future people explains their pro-climate justice attitudes, beliefs, & policy opinions for future and minoritized people. Pre-registered mediation models showing that longtermists' heightened sense of responsibility for the welfare of future generations accounts for the relationship between longtermism beliefs and pro-climate justice attitudes,

beliefs, & policy opinions for (a) future and (b) minoritized people. Models were estimated using PROCESS Macro, Model 4, with 10,000 bootstrapped samples. All future and minoritized people related measures were standardized and averaged into two separate and reliable ($as > 0.88$) constructs.

adjusting for demographic covariates: $b = 0.45$, 95% C.I. [0.03, 0.86], $p = 0.034$.

Responsibility to protect future generations significantly predicted increased donations ($b = 0.02$, 95% C.I. [0.01, 0.02], $\beta = 0.18$, $p < 0.001$; see Fig. 5c), even after adjusting for demographic covariates ($b = 0.01$, 95% C.I. [0.01, 0.02], $\beta = 0.15$, $p < 0.001$).

An indirect effect test suggested that the effect of the future generation harm reduction condition on donations to Trees for the Future was fully explained by increased responsibility to protect distant future generation: $b = 0.33$, SE = 0.08, 95% C.I. [0.19, 0.49]. Importantly, similar indirect effects were also observed for all other conditions. However, given the lack of a direct effect of the other conditions on the donation task directly, these results were interpreted as correlational in nature (see Supplementary Table 12 and Supplementary Fig. 5).

Discussion

Across a series of studies, we find consistent evidence of a robust architecture of environmentalism in longtermism aligners or “longtermists”—roughly 25 percent of subjects across Studies 1–3, a proportion aligning with findings from other recent research^{11,17,44}. In contrast to the general population, longtermists exhibit heightened concern about global warming. They back both grassroots and systemic solutions, actively partake in individual and collective climate preservation measures, and advocate for policies that promote climate justice for both future generations and today's marginalized communities.

Moreover, longtermists possess an amplified sense of moral responsibility towards safeguarding the welfare and well-being of future generations. Perhaps even more critically, this deep-seated moral duty, often understated in the general populace^{9,10,13,45}, underpins longtermists' robust involvement in both personal and communal pro-climate endeavors, as well as their advocacy for climate justice initiatives benefiting minoritized groups and forthcoming generations. At first blush, it may seem counterintuitive that responsibility felt for distant future people underlies actions to protect marginalized people in the present day. Nevertheless, recent research suggests that individuals utilize a common cognitive and neural framework when mentally transcending spans of social and temporal distance^{18–20,46,47}. Specifically, both social and temporal discounting behaviors are linked to

similar patterns of brain activity in the temporoparietal control network, default network, and mesolimbic reward network, with neural profiles distinguishing between high and low discounters showing considerable overlap across both forms of the discounting task. This perspective is corroborated by studies indicating that longtermists consistently demonstrate broad-minded attitudes towards individuals, irrespective of their social or temporal remoteness^{10,17}. Such insights help to shed light on the observed findings.

It is important to note that if feeling a sense of responsibility towards future generations was simply an inherent trait that couldn't be influenced, then harnessing the insights of these studies to bolster real-world environmental endeavors would be challenging. Consequently, it's crucial to understand whether this mindset can be cultivated or if it's innately fixed in certain individuals such as longtermists. We ventured to elucidate precisely this quandary in two large-scale supplementary pilot studies. Specifically, we undertook a rigorous investigation of numerous potential interventions aimed at fostering intergenerational responsibility by combining distinct insights from popular writings related to the longtermism philosophy^{6,7} with strategies identified across diverse lines of psychological inquiry into persuasion, cognitive dissonance, mental contrasting, perspective-taking, imagination, and empathic and rational appeals^{36–38,48–52}. Rather than representing an immutable individual difference, we were able to induce enhancements in intergenerational responsibility above baseline levels across multiple intervention types (see Fig. 5a). Encouragingly, a brief imaginative exercise focused on mitigating harm in the near-term future not only amplified participants' sense of duty towards long-term future generations, but also led to a tangible rise in their actual monetary contributions to an environmental charity, an effect which was explained entirely through increases in responsibility owing to the intervention. While we demonstrate the malleability of intergenerational responsibility and longtermism beliefs through intervention, future longitudinal research could explore their intrapersonal stability over time, distinguishing between state and trait manifestations, as seen in other psychological constructs⁵³.

These findings suggest that by tapping into the capacities for empathic emotion, ethical reasoning, and imagination, which exist in ordinary healthy adults (see for a relevant review), it's possible to foster a stronger sense of

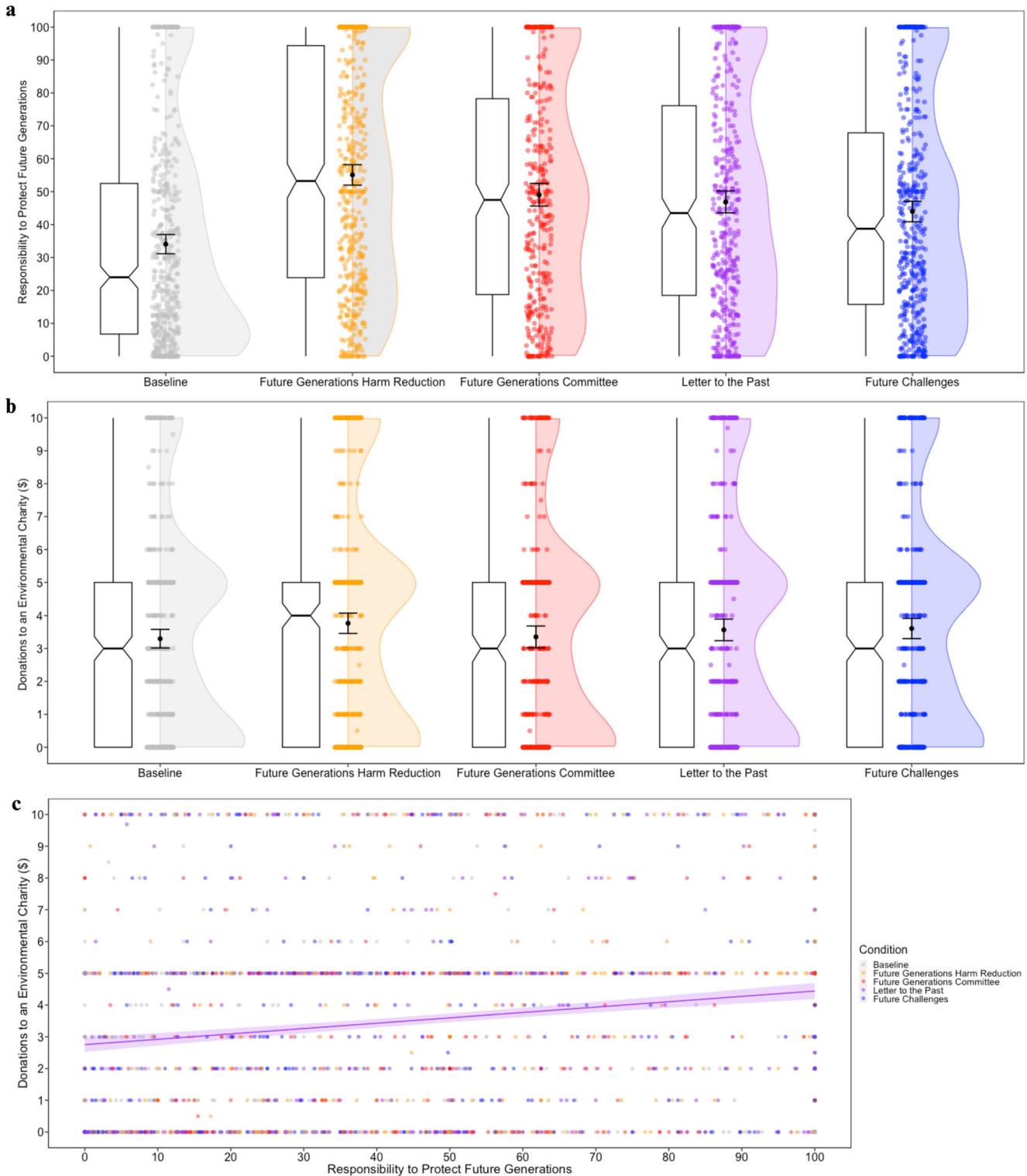


Fig. 5 | Responsibility to future generations, environmental donations, and their relationship by intervention type. **a, b** Plots depicting responsibility to future generations and donations to an environmental charity by intervention type. Colored dots correspond to individual data points and are jittered for readability, with split violin plots overlaid to show the relative distribution of scores across conditions. Error bars depict $\pm 1.96 \times \text{SEM}$. Notched boxplots are included, with notches depicting a confidence interval around the median with a value of

$\pm 1.58 \times \text{IQR} / \sqrt{n}$. **c** Plot depicting the relationship between responsibility to future generations and donations to an environmental charity in USD. Colored dots correspond to individual data points, with overlapping data points appearing darker and more saturated. The purple line represents the overall regression relationship between the two variables, with the shaded region representing the 95% CI, irrespective of condition.

duty towards future generations and motivate tangible actions in support of environmental causes. Pivotal, we attained practically meaningful outcomes from a relatively brief (around 7 min), online, and cost-effective (\$1.30 per participant) manipulation. This suggests that our intervention is highly scalable and can be easily deployed on a wide scale. The heightened effectiveness of this intervention in fostering pro-environmental action compared to the others we tested may be due to its instructing participants to vividly imagine mitigating harm in a relatable scenario, particularly in the short-term future. Indeed, people find it easier to vividly imagine proximal or relatable hypothetical scenarios, as opposed to more distant or unrelatable ones⁴⁶. Moreover, studies have shown that the vividness of one's imagination is associated with increased prosocial behavior⁵⁴. Subsequent studies might further explore this possibility and transform the current approach into more immersive formats in educational or digital platforms, such as specialized courses or workshops. Another promising direction could be to assess whether the current intervention results in long-lasting shifts in environmental attitudes and corresponding behavioral changes, such as transitioning careers⁵⁴ or actively participating in impactful collective environmental initiatives in daily life. Finally, given that longtermism is at times presented in terms of positively shaping the future but at others in terms of preventing harm to future generations⁷, forthcoming intervention studies could investigate which framing elicits greater proenvironmental behavior and intergenerational beneficence more broadly.

Despite the contributions of the present work, it's important to acknowledge its limitations. Our data collection efforts were limited to online samples of Americans. Thus, our results cannot speak to whether the observed phenomena are present in other cultures, constraining the generalizability of our findings⁵⁵. Future work should attempt to replicate this work in other countries, and also consider the role of cultural values highlighting interdependence and collectivism in shaping intergenerational concern. Another important cultural value that could potentially play a key role in explaining endorsement of longtermism beliefs and intergenerational concern more broadly, is long-term orientation, as nations characterized by this value to a higher degree tend to be more future-oriented⁵⁶.

Further, we elected to measure the mediator (i.e., responsibility) alone rather than additionally including a direct measurement of longtermism beliefs in Study⁴. Although we cannot guarantee that the interventions had the desired impact on longtermism beliefs, we are confident in their effectiveness given the strong correlation between responsibility and longtermism identified in prior research¹¹. A final noteworthy limitation that can and should be addressed in future investigations is that we cannot determine whether the interventions tested in Study 4 are more or less effective for those who already show high intergenerational concern. Understanding whether pre-existing levels of longtermism beliefs moderate these effects can help researchers create interventions that are more well-suited to specific segments of the population. Therefore, future research using a longitudinal design could explore this hypothesis.

In summary, the current research reveals that alignment with the longtermism philosophy, whether as a personal trait or a result of targeted interventions, can impact attitudes and behaviors related to environmentalism. The influence of longtermism beliefs on climate-protective outcomes can be largely attributed to a broader sense of responsibility for future people. Importantly, these positive effects can be cultivated with minimal time and cost investments. Forthcoming research building upon the present findings may further explore the latent capacity of longtermism beliefs to bring about deeper and enduring change in individuals and broader society, paving the way for a more sustainable future.

Methods

All studies received IRB approval from the Boston College Institutional Review Board. For all studies, participants provided consent online at the beginning of the questionnaire. Formal documentation of consent was waived to ensure anonymity of participants. Demographic information for all studies can be found in Supplementary Table 1 in the SOM.

Study 1

For study 1 data collection was conducted on Prolific. Participants signed up for a 10-min study, which paid \$1.70 in exchange for participation. We pre-registered that we would recruit a sample of 800 participants allowing us to detect effect sizes as small as $d = 0.24$ with power of 0.80. Importantly, this sample size would also allow us to observe this effect size, considering that roughly 20%–23% of the sample would be identified as longtermists. After applying exclusions, which included removing participants with duplicate IP addresses ($N = 1$) and participants who failed our attention check ($N = 9$) 790 participants were retained.

Participants completed the LBS¹¹ and the questions used by the Yale Program from Climate Change Communication (YPCCC) to examine attitudes towards climate change. Questions were shown in two groups (i.e., longtermism and global warming related questions), with the order of each group randomized. Further, all questions within each groups were also randomized.

The LBS is a measure consisting of 7 items. Each item is shown four times, with the four different versions of the item simultaneously displayed. Each of the four versions asked participants to respond to the specific item (for the full scale see the SOM), with a different timeframe/timepoint in mind. These timeframes focused on the far future (i.e., 1000, 10,000, 100,000, and 1,000,000 years in the future). Scores were captured on slider scales ranging from 0 = strongly disagree – 100 = strongly agree. Following previous investigations using the LBS^{11,17} we identified participants as longtermists based on the following criteria: (1) scoring higher than 75 the mean for the closest timeframe (i.e., 1000 years), and (2) having the same (or a higher) score for all other timeframes. These criteria reflect the longtermist philosophy, which states that future people matter equally, regardless of when they live, and that their lives should matter as much as ours today⁷. The measure displayed high reliability ($\alpha = 0.97$). The full-scale, and an example of these items is provided in the SOM.

Materials for all the global warming related outcomes can be found online on the YPCCC website, <https://climatecommunication.yale.edu/visualizations-data/ycom-us/>⁵⁷. In short, we included every single measure, in an identical fashion to the YPCC. These measures included: (1) the belief that global warming is happening; (2) the belief that global warming is caused mostly by human activities; (3) the belief that there is scientific consensus about global warming; (4) the belief that global warming is affecting the weather in the US; (5) worry about global warming; (6) the five items capturing perceived risk for specific entities (plants and animals, future generations, developing countries, one's self, people in the U.S.) from global warming; (7) the perception of when global warming will harm people in the U.S.; (8) personal experience of the effects of global warming; (9) support for nine different policies addressing global warming; (10) perception that different entities are doing enough to address global warming; (11) whether addressing global warming should be a priority and (12) how much one is discussing global warming with others or hearing about global warming in the media. The only changes in measurement were for the questions on risk perceptions and when global warming is happening, which we captured on a slider scale ranging from 0 to 100.

All aspects of the study were pre-registered, https://aspredicted.org/KDJ_NHB. All analyses were conducted in SAS. We evaluated H1 by running an independent samples t-test for each continuous outcome and chi-square tests for binary outcomes. Analyses controlling for gender, age, subjective SES and political orientation are reported in the SOM (see Supplementary Table 3). Finally, averaging across all items generated reliable measures (all $\alpha \geq 0.93$).

Study 2

For Study 2 data collection was conducted on Prolific. Participants signed up for a 10-min study, which paid \$1.70 in exchange for participation. We pre-registered that we would recruit a sample of 800 participants. allowing us to detect effect sizes as small as $d = 0.24$ with power of 0.80. Importantly, this sample size would also allow us to observe this effect size, considering that roughly 20%–23% of the sample would be identified as longtermists. After

applying exclusions, which included removing participants with duplicate IP addresses ($N = 5$) and participants who failed our attention check ($N = 27$) 768 participants were retained.

Participants completed the LBS ($a = 0.96$) a short five-item measure of responsibility to future generations ($a = 0.93$, adapted from⁵⁸), the 21-item recurring pro-environmental behavior scale ($a = 0.82$ ⁵⁹), and a 13-item measure ($a = 0.82$) capturing engagement in pro-climate collective action, generated by the research team. All measures were shown in a randomized order.

All aspects of the study were pre-registered, https://aspredicted.org/LM9_2RB. All analyses were conducted in SAS. We evaluated H1a, H1b, and H2 by running independent samples t test. Analyses controlling for gender, age, subjective SES and political orientation are reported in the SOM (see Supplementary Table 4). Mediation tests were estimated using the PROCESS Macro⁶⁰ Model 4 with 10,000 bootstrapped samples.

Study 3

For Study 3 data collection was conducted on Prolific. Participants signed up for a 10-min study, which paid \$1.70 in exchange for participation. We pre-registered that we would recruit a sample of 800 participants allowing us to detect effect sizes as small as $d = 0.24$ with power of 0.80. Importantly, this sample size would also allow us to observe this effect size, considering that roughly 20%–23% of the sample would be identified as longtermists. After applying exclusions, which included removing participants with duplicate IP addresses ($N = 2$) and participants who failed our attention check ($N = 29$) 769 participants were retained.

Participants completed the LBS ($a = 0.96$) and the same short five-item measure of responsibility to future generations ($a = 0.93$; identical to Study 2). To measure support for climate justice we used the items used in the most recent report by the Yale Program for Climate Change Communication⁶¹. Specifically we included six items ($a = 0.87$) capturing belief that global warming has disproportionate impact on minoritized groups (1–5 Likert scale), a single item capturing how often people have heard about climate justice (1–4 Likert-type scale), a single item capturing support for climate justice (1–5 Likert-scale), a single item capturing the belief that climate justice should be a national priority for the president and congress (1–4 Likert-type scale), seven items ($a = 0.90$) capturing support for policies addressing climate justice (1–4 Likert scale), a single item capturing engagement in pro-climate justice campaigns (0–4 Likert-type scale) and a single item capturing likelihood of voting for a candidate who supports climate justice (1–5 Likert -type scale). Two of the disproportionate harm items ($a = 0.74$), four of the policy items ($a = 0.83$), and the priority, campaign, and voting items were adapted and framed with future generations as the recipient group (all on identical scales).

All aspects of the study were pre-registered, https://aspredicted.org/S6D_XSS. All analyses were conducted in SAS. We evaluated H1 and H2 by running independent samples t test. Correlations evaluating H3a and H3b are reported in the SOM. Mediation tests were estimated using the PROCESS Macro, Model 4 with 10,000 bootstrapped samples. Analyses controlling for gender, age, subjective SES and political orientation are reported in the SOM (see Supplementary Table 6).

Study 4

For Study 4 data collection was conducted on Prolific. Participants signed up for a 7-min study, which paid \$1.30 in exchange for participation. We pre-registered that we would recruit a sample of 2200 participants allowing us to detect effect sizes as small as $d = 0.20$ with power of 0.90. After applying exclusions, which included removing participants with duplicate IP addresses ($N = 12$) and participants who failed our attention check ($N = 50$) 2143 participants were retained.

Participants were randomly assigned to one of five conditions. These conditions were: the longtermist thought-exercise condition, for which the potential to prevent harm for future people was made salient (future generation harm reduction condition; $N = 467$, 21.8% of the sample); The letter to the past condition ($N = 399$, 18.6% of the sample); the future challenges

condition ($N = 435$, 20.3% of the sample); the future generations committee condition ($N = 365$, 17.0% of the sample); or the control condition ($N = 477$, 22.3% of the sample). After completing all condition-specific tasks, participants responded to the items capturing responsibility to protect distant future generations (4 items; $a = 0.96$; 0–100 slider scale), followed by the donation task. They then provided demographic information and were subsequently debriefed about the purpose of the study.

All aspects of the study were pre-registered, https://aspredicted.org/blind.php?x=SB8_43Y. All analyses were conducted in SAS. We evaluated H1 and H2 by running independent samples t -test. A linear regression model evaluated H3. Mediation tests were estimated using the PROCESS Macro, Model 4 with 10,000 bootstrapped samples. Analyses controlling for gender, age, subjective SES and political orientation are reported in the SOM (see Supplementary Table 10).

Data availability

Data from each study are available on the Open Science Framework: https://osf.io/anrxy/?view_only=78007b1ad3234846b09228a6bdf5fdc9.

Code availability

All relevant materials, including code for all analyses in each study are available on the Open Science Framework: https://osf.io/anrxy/?view_only=78007b1ad3234846b09228a6bdf5fdc9.

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Competing interests

The authors declare no competing interests.

Additional information

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