RESEARCH ARTICLE

Motivational factors predicting pro-environmental policy support and behavioural engagement

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Abstract

Understanding the determinants of human engagement with the climate and ecological emergency (CEE) will be essential to any future policy design and implementation. The present study ($N = 1951$) investigates some of the most relevant psychosocial variables associated with environmental policy support and pro-environmental behavioural engagement: descriptive norms, negative affect, perceived self-efficacy and outcome expectancy of pro-environmental actions, personal values and beliefs, risk perception, and political orientation. More specifically, we investigate how these factors predict support or opposition for a range of real UK environmental policies as well as self-reported behaviour reflecting engagement with the issue. We find that negative affect, outcome expectancy, universalism value, and political orientation are key predictors of environmental policy support and/or proxy behavioural engagement. In addition, we find that negative affect partially mediates the relationship between benevolence, universalism, political orientation, and the outcome measures, highlighting emotional responses as a central pathway to psychosocial engagement with the CEE.

Introduction

Background and research question

Despite significant scientific consensus on the anthropogenic causes and potentially catastrophic consequences of climate change [1], a persistent gap remains between public awareness and concrete action [2]. Addressing this gap is critical for achieving effective mitigation policy and implementation of pro-environmental strategies. Here, we investigated whether descriptive norms, negative affect, self-efficacy and outcome expectancy, risk perception, beliefs and basic values would predict support for environmental policies and pro-environmental decisions in a large sample of UK residents.

The present work originates from the observation that affective and motivational responses to the planetary emergency have become progressively more central to

the scientific assessment of mitigation and adaptation strategies, as testified by the recent inclusion of mental health within the IPCC Assessment Report 6 (AR6) [3]. The escalating urgency of the climate and ecological emergency (CEE) necessitates a comprehensive understanding of the factors that influence public support for environmental policies, engagement in environmental actions, and willingness to undertake high-impact actions (see S1 Table for definitions of key terms).

Motivational factors such as negative affect, descriptive norms, efficacy beliefs, risk perception, and underlying personal values have all been identified as key drivers of pro-environmental attitude (e.g., [4,5,6]). The investigation of citizens' attitude towards pro-environmental behaviours is important because as our societies move further into the CEE, governments and financial institution will increasingly need to implement effective mitigation and adaptation measures. It is therefore paramount that we understand the extent to which motivational factors play a role in environmental policy and proxy behavioural engagement (e.g., expressing preference or likelihood to engage in a specific pro- environmental decision). Investigating the role of motivational factors will provide essential evidence base for potentially effective but unpopular mitigation and adaptation measures. For example, curbing energy demand could contribute to significant improvement in addressing some of the national risks [7]. In addition, recent experimental research seems to suggest that some of the most relevant psychological interventions have little effectiveness on climate mitigation attitude and behaviour, especially in sceptics [8] and conservative individuals [9]. For example, a second order meta-analysis, synthesizing 10 meta-analyses and 430 primary studies, found that several types of interventions only produced a 7% increase in pro-environmental behaviour compared with no intervention. Importantly, only social norming interventions—those that leverage the perception that others are already engaging in pro-environmental behaviours—seemed to be effective amongst the psychological interventions [10].

While experimental research and interventions are crucial for establishing causality and developing effective strategies, this cross-sectional study aims to identify associations and predictors at a single point in time, laying groundwork for future longitudinal or experimental investigations.

The present study

We aimed to achieve a better understanding of the basic affective and motivational processes associated with pro-environmental engagement. Additionally, we were interested in their unique contributions to identify the most important variables. This knowledge could then have cascade effects on more research into public policies and communication/behaviour change campaigns. For example, if the surveyed populations would reveal that increased self-efficacy, combined with increased worry, would predict increased support for environmental policies and greater behavioural engagement in individual and collective action, then these findings might inform targeted public campaigns and governmental policies.

As the CEE continues to pose an existential threat, elucidating the role of cognitive, affective, and value-based predictors of pro-environmental attitude

and behaviour is vital for developing effective climate communication and policy strategies. Specifically, there is an urgent need to integrate these factors into a comprehensive model that explains variations in environmental policy support, engagement, and high-impact actions [11].

This research is very timely, as it addresses current policy and communications gaps in the UK. The government has identified several high risk areas that will impact significant policy domains (as of January 2022) [12]. Surprisingly, the Climate Change Committee found that the governmental effort in prioritising climate change adaptation in England reduced over the past ten years [13]. Nonetheless, public sentiment is shifting from scepticism to concern and anxiety, increasingly supporting actions to mitigate the risk [14].

Here we asked which of the motivational factors (defined in the supplementary glossary S1 Table) most strongly associated with pro-environmental behaviour would be key predictors of policy support, engagement, and willingness to undertake high-impact actions related to the CEE. To achieve this goal, we identified six motivational factors: descriptive norms, negative affect, risk perception, belief about climate change, as well as perceived self-efficacy and outcome expectancy of adaptive actions. Amongst these factors, van Valkengoed and Steg found that self-efficacy, negative affect, outcome expectancy and descriptive norms were the strongest predictors of different types of adaptive behaviour [15]. Note that van Valkengoed and Steg refer to outcome efficacy in their work [15,16], but their definition is more compatible with the concept of expectancy as originally outlined by Maddux and Rogers [17]: the belief that a certain behaviour will lead to a specific outcome. This is also the definition we used for our survey items, and we will then use the term expectancy henceforth.

Previous research highlights that descriptive norms, or perceptions of whether others are engaging in adaptive behaviours, are potent motivators in shaping individuals' own environmental actions (e.g., [12]). Seeing others engaged in pro-environmental actions can reinforce one's intention to act similarly, creating a social pressure to conform to perceived norms (e.g., [15]). Negative affect, such as feelings of worry or distress about the CEE, has been repeatedly associated with pro-environmental attitude and behaviour (e.g.,[18–20]), possibly via a compensatory mechanism aimed to buffer emotional discomfort, thus supporting the role of emotions in influencing pro-environmental responses [21,22]. Perceived self-efficacy can be conceived as one's ability to meaningfully contribute to pro-environmental solutions. Research suggests that higher self-efficacy encourages active engagement in pro-environmental behaviours, as individuals are more likely to act if they believe their efforts will have impact (e.g., [23]). Expectedly, this is believed to be the same mechanism through which outcome expectancy, or the belief in the effectiveness of specific pro-environmental actions to address climate change, strengthens the likelihood of engagement [16,24].

In addition to these motivational factors, risk perception and beliefs about climate change also play key roles. In this context, risk perception is defined as an individual's assessment of personal and societal risk posed by climate and ecological impacts. Higher risk perception often correlates with greater support for proactive actions, as individuals motivated by perceived threats tend to favour proactive policies and personal precautions (e.g., [20]). Climate beliefs, particularly belief in human-caused climate change, also predict support for policy and personal engagement, as individuals' views on the origins and severity of climate change shape their willingness to act (e.g., [25]). For all these motivational factors we expected to observe a positive relationship between participants' responses to survey items measuring these constructs and responses measuring participants' attitude towards environmental policy, engagement with both low and high impact proxy pro-environmental actions.

Finally, we also investigated the predictive role of values, which are defined as abstract ideals that guide people's behaviour [4,26]. Previous research established that benevolence and universalism predict behaviour that self-transcends individuals such as altruism and pro-environmental behaviour (e.g., [25]), whereas hedonism and achievement have a stronger personal focus and were not or were negatively associated with these behaviours. However, there is limited evidence on whether values are also related to policy support (for an exception see [26]) and support

for different types of proxy pro-environmental actions [27]. We predicted that universalism is more strongly related to support for environmental policies and proxy pro-environmental actions, because both are beneficial for the individual and the collective. Relatedly, we predict a positive association between benevolence and our three outcome variables because benevolence expresses a motivation to care for other people [4]. Additionally, we included hedonism and achievement for exploratory purposes without having specific hypotheses around them, for previous research found overall weak correlations between them and pro-environmental behaviour [28]. Hedonism, which expresses pleasure and sensuous gratification [29], can be experienced in various contexts and hence can be considered as unrelated to the value protecting the environment [4]. Achievement, which expresses valuing success, can be demonstrated through actions that help the environment (e.g., building offshore-wind parks) or negatively impact the environment (e.g., lobbying for a large fossil fuel company).

Further, the underlying mechanisms of the values-environmental support link are unclear. We predicted that participants who value universalism and benevolence will be more likely to feel negative emotions when thinking about the environment, which in turn will motivate them to support pro-environmental policies and proxy actions. Hence, we set out to explore whether negative affect mediates the relationship between these values and the outcome variables, providing insights into the emotional mechanisms underlying environmental attitude.

In keeping with van Valkengoed and Steg's suggestion to integrate the protection motivation theory' key components (risk perception, self-efficacy and outcome expectancy) with other motivational factors such as descriptive norms and negative affect [15], we developed a cross-sectional web survey to quantify the role of these predictors and address two open questions: Which motivational factors most robustly predict environmental policy support and proxy measures of pro-environmental behaviour? Do emotional responses suggest a mediating role between personal values (e.g., universalism and benevolence) and these dependent variables? Answering these questions not only advances our theoretical understanding but also informs the design of more effective communication strategies and policy interventions in the face of the CEE.

Materials and methods

Ethics statement

This study was approved by the University of Essex ethics committee (project code ETH2223–1378). Respondents gave their written informed consent before beginning the study.

Sample

Sample size was determined by funding availability. A sensitivity analysis revealed that the final sample size of 1951 participants would be large enough to detect an effect size of r = .08 with a power of.95. Of the initially recruited 1995 participants, 44 completed less than 50% of the survey and were excluded. We aimed to recruit a sample that was representative for the adult population in United Kingdom in terms of age and gender (see S2 Table for a comparison with the available Census). Participants were recruited via Prolific, an online crowdsourcing platform, from 23/05/2023 to 06/06/2023. The mean age was 49.92 years, median = 51.00, SD = 16.18, range = 18–90 (967 men, 970 women, 11 non-binary, 3 prefer not to say). A majority of 1,785 identified as White, 82 as Asians, 34 as Black, 34 as mixed, 10 as other, and 6 preferred to not disclose their ethnicity. The average social status, as measured with a ladder ranging from 1 (worst off in terms of money, education, and job) to 10 (best off), was M = 5.61, SD = 1.60. The average political orientation, as measured with a 7-point slider ranging from 1 (extremely liberal) to 7 (extremely conservative), was M = 3.58, SD = 1.31. 1,593 participants had heard of the climate and nature emergency, 358 had not. The survey materials, structure, and data analysis files are available in the Open Science Framework, where the hypotheses were pre-registered (https://osf.io/754qp/?view_only=a45413059309496aaeae8c7535a44fc6).

Independent variables

Before completing any of the other measures, which were presented in a random order, participants read a 280-word extract from UK government guidance and Climate and Ecology Bill Executive Summary to ensure that participants had at least a basic understanding of the CEE.

Descriptive norms

Respondents were tasked with expressing their agreement on normative behaviour concerning energy consumption using a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). Following de Groot et al.'s [30] approach, two items measured dynamic norms towards reducing energy consumption (DDN), adapted-to the UK sample: "*Compared to two years ago, more and more British people have reduced their domestic energy consumption*" and "*Reducing domestic energy consumption is a trend among British people*"(α =.83). We also measured static norms and perceived self-efficacy with two items, respectively. However, because of low internal consistencies (αs <.41) we dropped both scales. Two items measured static norms towards reducing energy consumption: "*The minority of the British population has reduced their energy domestic consumption*" and "*The majority of the British population has increased their energy consumption*"(α = .40). However, given the low internal consistency, which was further supported by a modest correlation between both norms types, r = .25, we decided to exclude the scale from further analyses. Further, the internal consistency for the two items measuring perceived self-efficacy, "*Overall, how confident are you that you could use less energy than you do now?*" and "*How confident are you that large numbers of people will actually limit their energy use to try reducing climate change?*" was even lower (α = .29, r = .17).

Negative affect

Negative affect was assessed by asking the respondents to express the intensity of seven categorical emotions when they think about the nature and climate emergency. Respondents were asked to rate the intensity of seven emotions using a 7-point Likert scale, ranging from 1 not at all to 7 very strongly, α = .93. Specifically, participants were instructed: "*Please rate the intensity of the different emotions you feel when you think about nature and climate change*". They were asked to respond to seven descriptors selected out of twenty emotions used in a recent study [20]. These were angry, worried/concerned, disappointed, sad, anxious, fearful, disgusted.

Efficacy beliefs and outcome expectancy

As per our hypothesis, we set out to investigate both self- and collective outcome expectancy using the following two questions: "*How likely do you think it is that limiting your own energy use would help reduce climate change?*" was used as an indicator of personal outcome expectancy. Finally, the following question was used to measure collective outcome expectancy: "*Now imagine that large numbers of people limited their energy use. How likely do you think it is that this would reduce climate change?*". The last two questions were answered on a scale from 0 (Not at all likely) to 10 (Extremely likely), α = .81.

Personal values, beliefs, and risk perception

As further exploratory analyses we also investigated the role of values, beliefs, and risk perception as predictors of policy preference and engagement. To this aim, we selected four items from the Portrait Value Questionnaire [31]: "*It is important to them to be influential*" (achievement)*, "It is important to them to have fun*" (hedonism)*, "It is important to them to take care of those who are worse off*" (benevolence)*,* and *"It is important to them to protect the environment"* (universalism)*. In environmental research, researchers sometimes also refer to the universalism item as biospheric value and to the benevolence item as altruistic value. Previous research established that measuring each value type with a single item in a

reliable manner is possible [32]. Participants were asked to indicate how much the person described by the questionnaire items is like them using a Likert scale from 1 (totally not like me) to 7 (totally like me).

We also selected items from Goldberg et al. [33]. Specifically, we asked respondents if they believe in climate change and how much confidence they have in their belief that climate change is or is not happening, separately for those who were believing in climate change ($n = 1,860$) and those who were not believing in it. The latter measure consisted of a scale ranging from – 4 (extremely sure that climate change is not happening) to 4 (extremely sure that climate change is happening).

We also asked respondents using an 8-item scale to think on how much the inaction on climate and nature emergency will harm different entities such as them personally, their family, and future generations, again using items developed by Goldberg et al. [33]. Responses were given on a 7-point scale ranging from 1 (Not at all) to 7 (A great deal, $\alpha = .95$). Thus, higher values are indicating that the nature and climate emergency is greatly harming many people.

Dependent variables

Environmental policy support. Respondents were tasked with expressing their support for or opposition to a variety of policies aimed at tackling the environmental crisis using a 0–100 rating from 0 completely oppose to 100 completely support. The respondents were asked "*How much do you support or oppose the following policies?*" and then respond to a total of 14 items (including 1 attentional control). Policies were taken from three sources (see Hignell et al./22 for more detail on this material): the Conservative 's 'ten-point plan for a green industrial revolution' [34], the Green New Deal's 'Decarbonisation and Economic Strategy Bill' [35], and the Climate and Ecology Bill (C&E) [36]. However, since one of the items, "UK government to invest in new large and smaller-scale nuclear plants" was not or weakly negatively correlated with the other items, $-.16 \leq r s \leq .01$, we excluded it. The internal consistency of the remaining 12 items was excellent, $\alpha = .91$.

Behavioural engagement

High-impact actions and pro-environmental engagement. To measure engagement with individual and collective pro-environmental behaviour change, we asked respondents to select some UK-relevant common concrete actions as well as indicate the likelihood of undertaking high-impact actions in a hypothetical scenario. These items are extracted from recent work by Hignell et al. [20]. The high impact scenarios scale required participants to imagine a hypothetical scenario where a direct, factual threat to the wellbeing of their closest loved ones due to the nature and climate emergency is occurring. They were then tasked to rate the likelihood of them undertaking four-high impact actions, measured on a five-point Likert scale from 'no way' [1] to 'for sure' [4]. These items were derived from Wynes and Nicholas [37], who recommended these actions to promote systemic change and a decline in personal emissions, $\alpha = .67$. The "no way" to "for sure" anchors were chosen to capture a direct and intuitive assessment of likelihood in a hypothetical, high-stakes scenario.

In addition, participants were asked to select actions they are willing to take today to help with the nature and climate emergency. A measure of environmental engagement was developed by totalling the quantity of actions selected for each participant. A total of five items were devised; respondents also had the options of choosing 'none of the above', thus, the scale ranged from zero to five. Example items included "signing a Friends of Earth's petition" and "joining a local Extinction Rebellion group." Participants were later redirected to the websites of the actions they selected at the end of the study.

Results

The data was overall of high quality. No participant failed all three test items and only three participants failed two test items, while 68 participants failed one test item. We therefore decided not to exclude any participants. Excluding

participants who failed two test items did not change the pattern of results. Pearson's correlations between all variables, including demographics, are reported in Table 1.

Multiple regression analyses

In a next step, we tested which of the variables predicted policy support/opposition and behavioural engagement across three multiple regression analyses. Multicollinearity was not an issue: VIFs < 2.72. Negative affect, dynamic norms, outcome expectancy, risk perception, belief in climate change, universalism, benevolence, hedonism, and achievement values, having heard of the climate and nature emergency, gender, age, social status, political orientation, and ethnicity were added together as predictors in the three models. In all three models, negative affect, outcome expectancy, and universalism positively predicted the outcome variables, whereas political orientation was a negative predictor, suggesting that politically left-leaning people were more likely to score higher on each of the three outcome variables (Table 2 and Figs 1–3). Moreover, having heard of the emergency, hedonism, benevolence, belief in climate change, and risk perception explained additional variance in policy support (all positive); lower social status, lower achievement and hedonism values, higher belief in climate change, and higher risk perception explained additional variance in high-impact actions; higher social status and being younger explained additional variance in pro-environmental engagement.

Mediation analyses

Finally, we ran three mediation models to test whether negative affect would mediate the link between achievement, benevolence, hedonism, universalism, and political orientation with policy support, high impact actions, and engagement, respectively. We included achievement, benevolence, hedonism, universalism, and political orientation simultaneously as

Table 1. Means, standard deviations, and correlations between all variables.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Environmental policy support	71.04	19.77																	
2. High impact actions	3.06	0.95	.52																
3. Engagement	1.04	1.23	.43	.35															
4. Negative Affect	8.25	2.17	.64	.46	.45														
5. Dynamic Norms	4.77	1.2	.1	.03	.01	.08													
6. Outcome expectancy	6.53	2.48	.53	.31	.31	.45	.13												
7. Risk perception	5.24	1.31	.68	.43	.38	.69	.13	.55											
8. Belief	3.24	1.46	.51	.32	.27	.47	.08	.38	.59										
9. Universalism	5.26	1.44	.49	.39	.31	.57	.13	.41	.52	.37									
10. Benevolence	5.09	1.41	.4	.26	.26	.39	.08	.34	.39	.24	.45								
11. Hedonism	4.85	1.39	.11	-.07	.05	.04	.06	.07	.06	.03	.07	.09							
12. Achievement	2.95	1.63	.04	-.11	.08	.07	.02	.14	.07	.02	.15	.14	.18						
13. Heard of emergency (0: Yes, 1: No)	0.18	0.39	-.02	-.08	-.08	-.09	-.04	.04	-.05	-.07	-.1	-.05	.03	-.02					
14. Gender (0: Men, 1: Women)	0.5	0.5	.14	.15	.09	.18	.06	.15	.19	.04	.08	.15	-.03	-.12	.09				
15. Age	49.92	16.18	-.09	-.04	-.15	-.04	.17	-.01	-.09	-.09	.07	0	-.23	-.11	-.04	0			
16. Social status	5.61	1.6	-.04	-.13	.02	-.02	.05	.06	0	.02	.04	-.03	.06	.17	-.03	-.04	.14		
17. Political orientation	3.58	1.31	-.44	-.35	-.32	-.35	.01	-.18	-.36	-.27	-.18	-.32	-.07	.05	.1	-.11	.25	.14	
18. Ethnicity (0: White, 1: Other)	0.09	0.28	-.02	-.03	.01	-.05	-.05	.03	.01	.01	-.05	.04	.04	.11	.08	-.06	-.25	-.04	0

Note. M and *SD* are used to represent mean and standard deviation, respectively. All |*rs*| ≥ .05 are significant at *p* < .05, |*rs*| ≥ .06 are significant at *p* < .01, and |*rs*| ≥ .07 are significant at *p* < .001. Definitions for predictors included in the tables are provided in the supplementary glossary S1 Table. Using the Spearman correlation for categorical variables (i.e., 13, 14, 18) leads to no difference between correlation coefficients (mean difference of .007; median = .005). IQR: .012 - -.002.

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Table 2. Results of three multiple regression analyses.

	Environmental policy support		High-impact actions		Engagement	
	B	p	B	p	B	p
Negative Affect	1.99	<.001	.08	<.001	.16	<.001
Dynamic norms	0.13	.614	-.02	.226	-.02	.294
Outcome expectancy	1.38	<.001	.04	<.001	.05	<.001
Risk	3.69	<.001	.06	.009	.03	.389
Belief	1.45	<.001	.03	.056	.00	.998
Universalism	1.22	<.001	.12	<.001	.05	.024
Benevolence	0.57	.021	.00	.897	.02	.359
Hedonism	0.68	.002	-.06	<.001	-.02	.296
Achievement	-0.37	.049	-.07	<.001	.02	.146
Heard of C&N (0: Yes, 1: No)	2.45	.001	-.08	.110	-.12	.066
Gender (0: M, 1: F)	-0.87	.155	.06	.103	.00	.993
Age	0.00	.981	.00	.904	-.01	<.001
Social status	-0.24	.210	-.05	<.001	.04	.022
Political orientation	-2.81	<.001	-.12	<.001	-.15	<.001
Ethnicity (0: White, 1: Other)	-1.26	.246	.01	.878	-.02	.820
F-value	187.00		62.54		46.39	
Degrees of freedom	15, 1907		15, 1906		15, 1907	
R^2/adj. R^2	.60/.59		.33/.32		.27/.26	

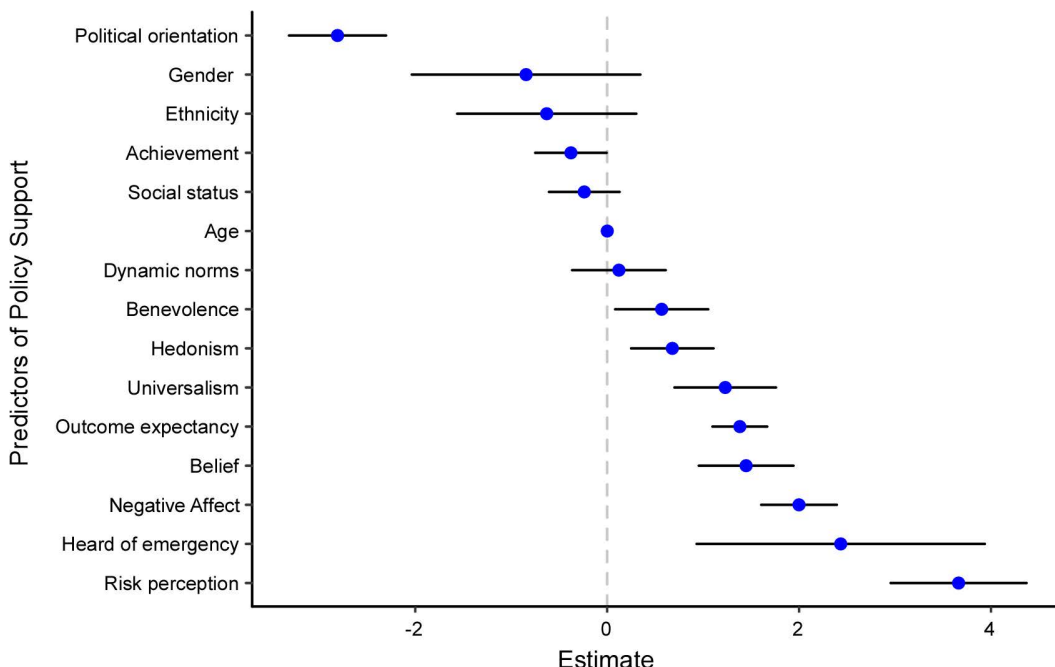https://doi.org/10.1371/journal.pclm.0000622.t002

Fig 1. Unstandardised regression coefficients for environmental policy support. Model-based predictions of policy support as a function of motivational factors and other key predictors. Horizontal bars indicated 95% confidence intervals, and the dashed vertical line marks a null effect. Coding details: Gender (0: Men, 1: Women); Ethnicity (0: White, 1: Other); Heard of emergency (0: Yes, 1: No). AIC=15,233, BIC=15,327. Definitions for predictors included in the figures are provided in the supplementary glossary S1 Table.

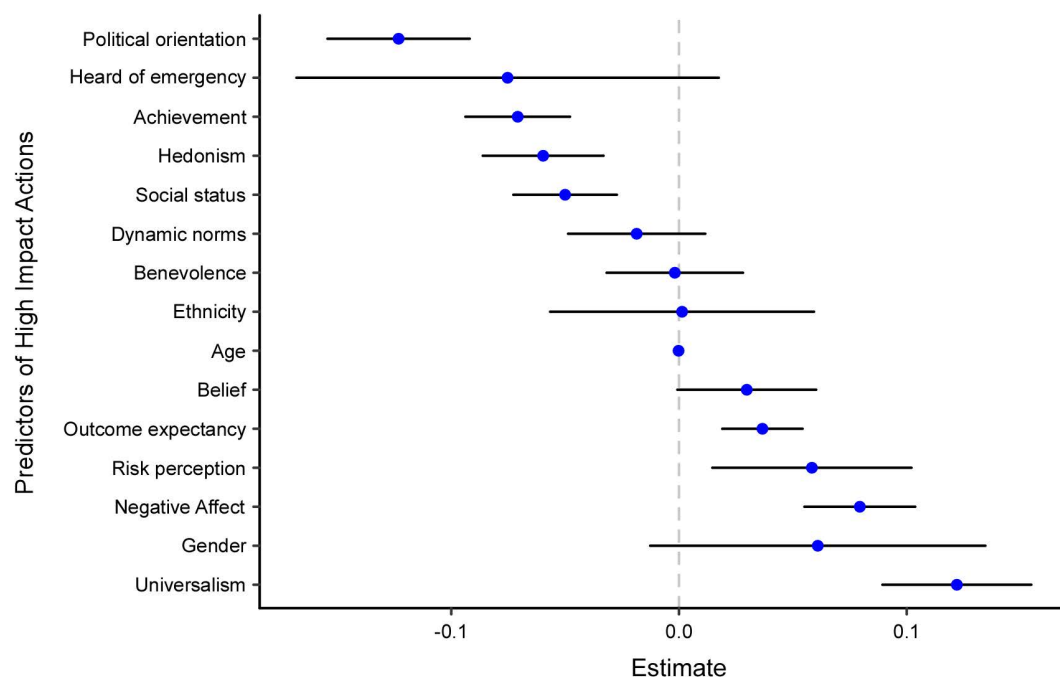https://doi.org/10.1371/journal.pclm.0000622.g001

Fig 2. Unstandardised regression coefficients for high-impact actions. Model-based predictions of high impact actions likelihood as a function of motivational factors and other key predictors. Horizontal bars indicated 95% confidence intervals, and the dashed vertical line marks a null effect. Coding details: Gender (0: Men, 1: Women); Ethnicity (0: White, 1: Other); Heard of emergency (0: Yes, 1: No). AIC = 4,522, BIC = 4,616.
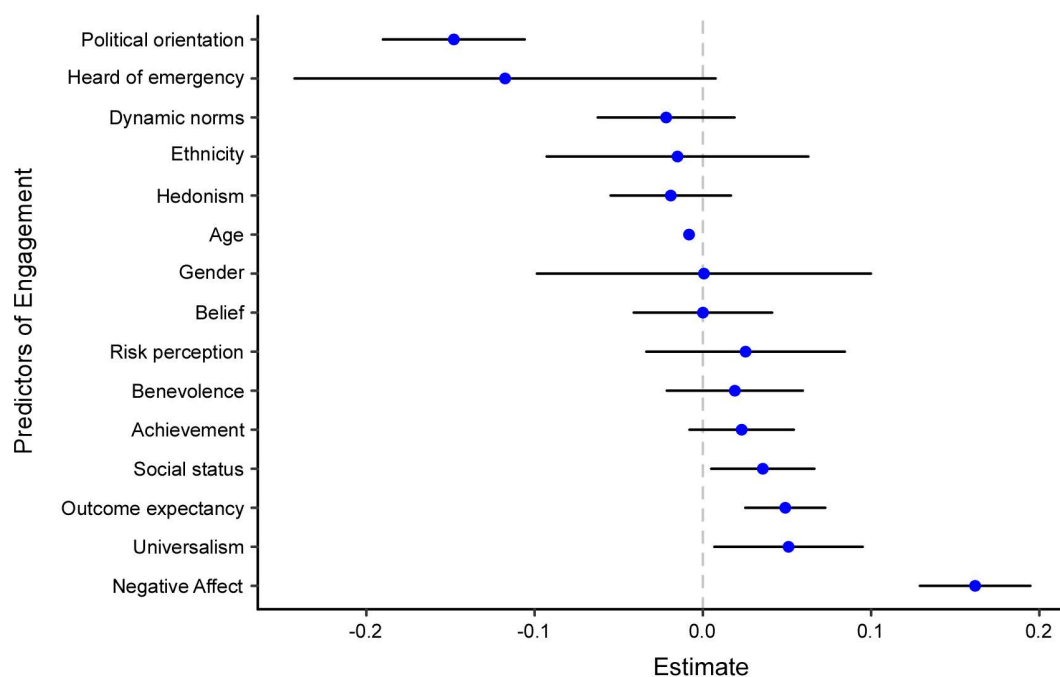
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Fig 3. Unstandardised regression coefficients for pro-environmental engagement. Model-based predictions of engagement choices as a function of motivational factors and other key predictors. Horizontal bars indicated 95% confidence intervals, and the dashed vertical line marks a null effect. Coding details: Gender (0: Men, 1: Women); Ethnicity (0: White, 1: Other); Heard of emergency (0: Yes, 1: No). AIC = 5676, BIC = 5771.

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predictors (Figs 4–6). Mediations were run using the R-package psych, version 2.2.9 [38]. Negative affect partially mediated the effect for benevolence, universalism, and political orientation for all three dependent variables (Table 3).

Discussion

The present study offers new insights into the psychosocial underpinnings of pro-environmental engagement with the CEE. Our findings contribute to an emerging consensus on the importance of integrating affective and cognitive predictors in models of pro-environmental behaviour. As detailed in Table 2 and illustrated in Figs 1–3, our regression analyses reveal that negative affect, outcome expectancy, and universalistic values are robust predictors of environmental policy support and proxy measures of behavioural engagement. In addition, political orientation emerged as a significant predictor, with left-leaning individuals displaying stronger pro-environmental responses. Notably, our mediation analyses (Figs 4–6) indicate that negative affect partially mediates the relationship between core personal values, such as universalism and benevolence, and pro-environmental outcomes.

Our results align with previous research showing that negative affective responses, such as worry and anxiety, can serve as catalysts for pro-environmental actions [5,6,10]. In line with protection motivation theory [8,9], which posits that an individual's risk perception, self-efficacy, and outcome expectancy are central to motivating protective behaviours, individuals who perceived a high risk from the CEE and who believed that pro-environmental actions would yield positive outcomes, were more likely to support environmental policies. This pattern mirrors the effect sizes reported by van Valkengoed and Steg [15].

Moreover, the mediation analyses suggest that negative affect is not merely an ancillary factor but appears to serve as a conduit through which values such as universalism and benevolence relate to proxy measures of pro-environmental behaviour. This is in keeping with the notion that emotional responses may not only directly influence policy support but also serve as mechanisms through which deeper value systems are translated into action, according for example to the Value-Belief-Norm framework [39]. Our findings suggest that values shape behaviour not only through cognitive pathways (e.g., beliefs in efficacy) but also through affective channels, a mechanism underexplored in prior research [6,20], and that
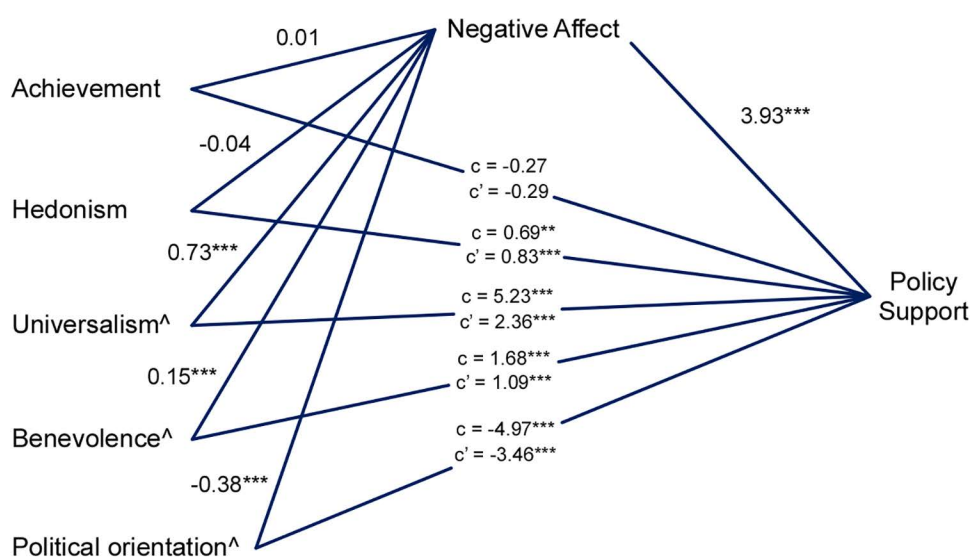

Fig 4. Mediation model predicting policy support. The diagram shows how negative affect partially mediates the relationships between benevolence and universalism, political orientation, and policy support. *Note*. ^: Indirect effect (ab) is significant (Table 3 for detailed results); c: total effects; c': direct effect.
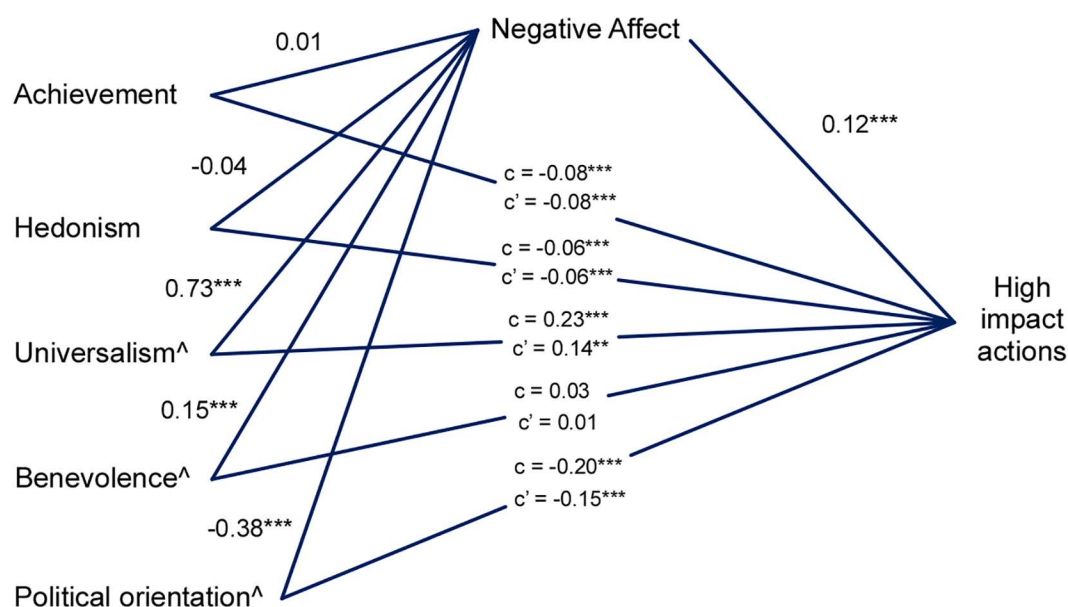
Fig 5. Mediation model predicting high impact actions. The diagram shows how negative affect partially mediates the relationships between benevolence and universalism, political orientation, and pro-environmental high impact actions. *Note*. ^: Indirect effect (ab) is significant (Table 3 for detailed results); c: total effects; c': direct effect.
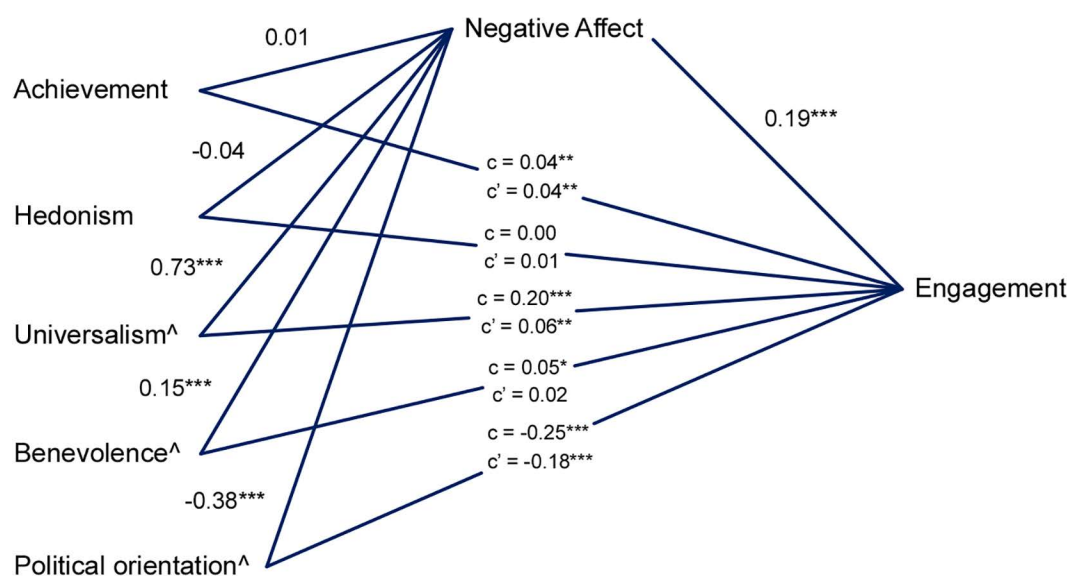
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Fig 6. Mediation model predicting pro-environmental engagement. The diagram shows how negative affect partially mediates the relationships between benevolence and universalism, political orientation, and pro-environmental engagement. *Note*. ^: Indirect effect (ab) is significant (Table 3 for detailed results); c: total effects; c': direct effect.

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resonate with calls to integrate emotional and value-based approaches in climate communication [8]. However, based on the social intuitionist model [40], we acknowledge that affective reactions may impact policy support, or behaviour, through cognitive mechanisms. In our mediation model, we assumed that cognitive variables may influence affective reactions

Table 3. Indirect effects (a*b) from the mediation analyses (cf. Figs 4–6).

Policy support	Engagement			High impact actions					
	B	SE	95%-CI	B	SE	95%-CI	B	SE	95%-CI
Achievement	0.02	0.10	-0.18, 0.23	0.00	0.00	-0.01, 0.01	0.00	0.00	-0.01, 0.01
Hedonism	-0.14	0.12	-0.38, 0.08	-0.01	0.01	-0.02, 0.00	0.00	0.00	-0.01, 0.00
Universalism	2.87	0.20	2.48, 3.27	0.14	0.01	0.12, 0.16	0.09	0.01	0.07, 0.11
Benevolence	0.60	0.15	0.31, 0.89	0.03	0.01	0.01, 0.04	0.02	0.00	0.01, 0.03
Political orientation	-1.50	0.16	-1.83, -1.21	-0.07	0.01	-0.09, -0.06	-0.05	0.01	-0.06, -0.04

Note. 95%-CI: Bootstrapped 95%-confidence interval. Indirect effect is significant if 95%-CI does not include 0.

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because this potential causal direction is more often assumed by value researchers [41], even though some longitudinal research also found evidence in the opposite direction [42]. Thus, future longitudinal or experimental research is needed to shed more light on causal trajectories.

In our study, descriptive norms also played a supporting role. As shown in Figs 1–3, perceptions that others are engaging in pro-environmental behaviours appear to bolster individual intentions to act, consistent with the social norming interventions highlighted in previous research [43]. This is particularly encouraging given the potential for tailored communication strategies and psychological interventions that leverage social proof to mobilise public engagement in mitigation efforts [10].

Political orientation consistently predicted engagement, with left-leaning individuals exhibiting stronger support for environmental policies. This mirrors previously observed westernised polarisation in environmental attitudes [44–46] that may extend to pro-environmental behaviours. It underscores the challenge of mobilising conservatives, a demographic often resistant to mitigation messaging [9].

Based on our findings, we surmise that information campaigns and collective interventions emphasizing the tangible risks of climate inaction (e.g., harm to families, future generations) could amplify negative affect and risk perception, thereby mobilising support [33]. Simultaneously, fostering outcome expectancy by showcasing successful community pro-environmental actions or policy efficacy, may enhance self-efficacy and collective action [47]. Moreover, tailoring messages to universalistic (e.g., environmental stewardship) and benevolence values (e.g., protecting vulnerable communities) could further stimulate positive emotional and cognitive restructuring of the psychological challenges posed by the CEE across diverse audiences [48].

In line with our expectation and previous findings (e.g., [31]), universalism and benevolence values were positively correlated with all three outcome variables, whereas the other two values, achievement and hedonism, were not. Interestingly, however, universalism and benevolence were also positively correlated with negative affect. This seems at odds with previous research showing that values are not or only weakly associated with wellbeing related variables (e.g., [42,43]). However, this discrepancy may be accounted for by how we measured affect: We asked participants *"Please rate the intensity of the different emotions you feel when you think about nature and climate change?"* By asking about affect in this specific way, we made it more relevant to universalism and benevolence, focusing on climate-specific emotions rather than general emotional states. Thus, our findings advance the literature by suggesting that measuring our emotions in a specific way that align more with one's values can lead to stronger associations between values and emotions. This might be because specific feelings are more closely related to attitudes [49], which in turn are more strongly associated with values [50].

The positive associations between universalism and benevolence with negative affect as well as the three outcome variables can also explain why negative affect mediated the associations between the two value types and the dependent variables. People who score high on self-transcendence values (i.e., care more about other people and the environment

[4]), out of their caring motives, will display greater intention to reduce the harm towards other people due to climate change through supporting actions that reduce its impact. This might also explain why negative affect mediates the association between political orientation and the three outcome variables: Left-wingers score higher on universalism and benevolence [51].

Limitations and future research

Our work relies on a cross-sectional design; hence we cannot draw any causal inference despite the large sample size. Likewise, reliance on self-report measures may introduce social desirability or other response biases. Future studies may want to adopt longitudinal or experimental designs, such as testing emotion-focused interventions over time, thus validating the observed pathways. Likewise, akin to past research (e.g., [25]), in asking to report emotions concerning climate change we could not avoid the conceptual ambiguity of eliciting both emotions toward the effects of the CEE and those directed at policy measures (or lack thereof). Hence, future studies may specifically address this further critical element. Moreover, while our sample was broadly representative of the UK population, additional studies in diverse cultural and political contexts are needed to assess the generalisability of our findings, particularly in regions disproportionately affected by climate impacts and ecological degradation. Additionally, exploring interactions between values and demographic factors (e.g., socioeconomic status) could refine targeted strategies.

Conclusions

Our results highlight the centrality of psychosocial drivers of pro-environmental engagement with the CEE. They indicate that negative affect, outcome expectancy, and universalistic values significantly predict both environmental policy support and behavioural engagement, while political orientation consistently predicts these relationships. Critically, negative affect partially mediates the relationship between personal values (benevolence, universalism) and pro-environmental outcomes, suggesting emotion as a conduit through which deeply held values translate into beliefs and actions.

By elucidating the pathways linking negative affect, efficacy beliefs, and personal values to environmental policy support and behavioural engagement, this study provides initial evidence base for developing targeted communication and policy interventions. As the urgency of the CEE intensifies, such insights may be invaluable for mobilising public support and fostering resilient pro-environmental strategies.

Supporting information

S1 Table. Glossary of Key Terms (in alphabetical order).
(DOCX)

S2 Table. Comparison between the Demographic Distribution of Participants in Each Wave and the Population of England.
(DOCX)

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