RESEARCH PAPER

How to increase engagement with environmentalism: Perceived threat, behavioural control, and subjective norms as psychological predictors of eco-activism

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New paper statement
The authors confirm that the paper has not been
published elsewhere and is not under consideration in
any other publication.

Abstract

Background: Climate change-related worry is increasing, with more people taking part in environmental activism over time. Despite its increasing prevalence, there are several gaps in the literature in terms of psychological predictors of activism. Thereby, this study examined Health Belief Model (HBM) and Theory of Planned Behaviour (TPB) variables in relation to five dimensions of environmental activism. Six additional variables conceptually related to activism were also included as potential predictors: eco-anxiety, climate self-efficacy, rebelliousness, eudaimonic well-being, depression, and coping strategies.

Method: The study included 142 participants, predominantly females (71%), from a variety of socio-economic backgrounds and countries of origin, with a mean age of 36 years (S.D. +/- 14.34). Bivariate correlational and subsequent multiple regression analyses were run against each of the five dependent variables.

Results/Discussion: It was found that: joining an environmentalist organisation or donating money for these purposes were predicted by eco-anxiety, specifically cognitive-emotional and functional impairment due to climate change, and by the TPB attitudes toward climate action. Also, it was found that: the intention to take part in activism was predicted by attitudes, subjective norms, and perceived behavioural control TPB variables; the severity and barriers variables from the HBM model, along with denial and the TPB attitudes variable predicted the belief that acting now to mitigate climate change would be beneficial; perceived susceptibility to the deleterious effects of climate change, knowledge about such, and perceived severity variables from the HBM predicted direct pro-environmental behaviours, along with attitudes; and, past environmental action was predicted only by the attitudes toward climate action variable.

Conclusion: In conclusion, the unique contribution of this paper is demonstrating that perceived threat, behavioural control, and subjective norms are all important in predicting activism.

Keywords: *Environment, psychology, climate change, health belief model, theory of planned behaviour*

INTRODUCTION

Climate Change and Pro-Environmental Behaviours

Climate change was listed as one of the biggest threats of the 21st century (WHO, 2021), and climate change concerns reached record highs in recent years. With 67% of Britons worrying about climate change and 51% thinking that individual actions can contribute significantly to saving the planet (Morris, 2022), the need to examine motivators behind activism is urgent. Although solutions

to mitigate the effects of climate change have been outlined by frameworks such as the UN Framework Convention on Climate Change, there are serious obstacles for their implementation, such as climate change denial or the financial costs of climate policies (Buiter, 2020).

Without adequate change at policy making levels, climate change activists have taken control to motivate people to take part in pro-environmental behaviours and put pressure on policy makers. Although environmental activism has grown over the last few years with movements such as Extinction Rebellion or Fridays for Future (Ares & Bolton, 2020), research is still unclear about the motivators of environmental activism (Fisher & Nasrin, 2020). Several variables have been linked to climate change as well as activist intentions, but so far these have not been studied together. In this paper we ask the question: which psychological variables jointly or independently predict environmental activism? Potential predictors of environmental activism are reviewed here, starting with eco-anxiety and depression.

Eco-anxiety and depression

Eco-anxiety refers to feelings of distress related to environmental issues, including climate change consequences (Clayton, 2020; Pikhala, 2020). However, it has various names (such as, global warming worry, climate anxiety) and lacks a unified definition. Consequently, conceptual clarity and reliable measurement has been an issue in eco-anxiety studies, as outlined in a systematic scoping review (Coffey et al., 2021). A gap identified in this study was the lack of research on eco-anxiety as a potential climate change-induced trauma response. However, anxiety itself is an adaptive function (Pikhala, 2020), and eco-anxiety can be used to predict pro-environmental behaviours. An extensive review of the literature shows that eco-anxiety and activism are rarely studied together, but some studies have investigated other forms of pro-environmental behaviours.

Verplanken et al. (2020) found that global warming worry can be constructive, because it positively correlates with pro-environmental behaviours and green identity. They also found a connection between global warming worry and emotion clusters representing anxiety and anger. They concluded that in some cases, worry was unconstructive and detrimental for the individual, but in others, it correlated with pro-environmental action. Measuring past behaviour was an advantage because actual action is arguably stronger than intention to act, however, their sample was quite limited, because 83% of their participants were students, somewhat limiting the generalisability of the findings. The study was correlational, so they could not conclude that global warming worry leads to pro-environmental action, but their study indicates a relationship between these variables.

Whitmarsh et al. (2022) measured the relationships between climate change concern, climate anxiety, environmental values, and pro-environmental behaviours, like recycling. Their sample was remarkable with 1338 participants and a nearly equal proportion of genders and a mean age of 47 years. Climate concern predicted some aspects of pro-environmental action, such as renting items or saving energy, but activism was not measured. It was an advantage that they measured worry and anxiety separately, because while worry was widespread, anxiety was not, consequently, this study suggested that people are not yet so concerned about climate change impacts on their own lives.

Looking at climate change and depression, Khafaie et al. (2019) argued that among other issues, such as anxiety about facing an existential threat, air pollution can worsen the symptoms of depression. Majeed and Lee (2017) concluded that climate change particularly impacts young people, due to the degradation in their environment and that it exacerbates already existing vulnerabilities to depression. They also suggested that climate fluctuations can contribute to the onset of depression, although a review of the literature indicates that empirical research is still scarce on this topic. Furthermore, depression makes any kind of action more difficult, so this variable could influence the extent to which people take part in activism. It is clear from research that climate change can have an adverse effect on people's mental health. However, the role of different coping strategies in dealing with climate change, and their possible roles in predicting activism is a relatively unexplored area, as only a few studies have been conducted to date.

Coping strategies

As Mah et al. (2020) outlined in their literature review, climate change can negatively impact stress levels and coping responses. Promoting adaptive coping strategies is crucial for overcoming the stress induced by climate change and they highlight practical recommendations for clinicians and policy advocates. Similarly, Taylor (2020) argued that adaptive anxiety could motivate climate activism and pro-environmental behaviours, while maladaptive anxiety responses can lead to internalising the fear and negative mental health effects.

A study by Rochford and Blocker (1991) measured activism after flood-control lakes built by a company overflooded and caused

significant damage. They surveyed 180 flood victims with a nearly equal ratio of males and females and performed a regression analysis. Their study included appraisal, threat of future flooding and coping strategies as independent variables, distinguishing between problem-focused and emotion-focused coping. They found that those who viewed the flood as a controllable event felt threatened by a future catastrophe and were likely to take part in protests. They were unlikely to adopt emotion-focused coping, while those who saw it as an uncontrollable natural disaster chose emotion-focused coping and were unlikely to participate in protests. These findings suggest that the appraisal and interpretation of the event, as well as different coping styles predict activism. They included different activities as indicants of activism from signing a petition to attending hearings, which was a notable advantage. Although this study contributes towards using different styles of coping to predict activism, the literature is still scarce on this topic, as the review of current literature shows a gap in this area. Building on successful coping strategies, well-being can also be a potential predictor of activism, with studies including eudaimonic well-being.

Eudaimonic well-being

Eudaimonic well-being is about living up to one's best potential and finding meaning in one's actions (Waterman et al., 2010), which is relevant to activism given that it is arguably motivated by an effort for improvement. However, as the following studies outline, there are contrasting findings as to whether activism is related to better or worse well-being outcomes, and whether eudaimonic well-being predicts activism.

Klar and Kasser (2009) conducted three studies on the relationship between political activism and different dimensions of well-being (eudaimonic, hedonic and social). Firstly, they examined the relationship between activism and well-being in a sample of 341 students and found that activist identity and intention to engage in activism were strongly related to well-being. The second study yielded similar findings in a national activist sample matched with a community sample of 718 people, and the final study of 296 respondents examined a causal relationship between activism and well-being by assigning participants to take part in a short activist behaviour, a non-activist one or neither, then assessed their well-being. The activist behaviour participants showed higher levels of vitality, although the causal effects were weak. The results were similar across the three studies on all dimensions of well-being, suggesting generally a positive effect of activism on eudaimonic well-being.

Contrastingly, Ibanez-Ruada et al. (2020) examined the relationship between pro-environmental behaviours and well-being among 973 students and found a negative relationship between activism and life satisfaction, which contradicts previous literature on this topic, although it is possible that dissatisfaction was a facilitator of activism. Individual behaviours, such as eating less meat, had a positive relationship with well-being, so separating individual and collective behaviours in the study was informative. This study, along with the review of relevant literature, suggests that even though most studies indicate that low-risk activism and well-being have a positive relationship, it is not necessarily that simple. Another variable which may predict eco-activism is individual differences in oppositionality, non-conformity, or what might simply be called rebelliousness.

Rebelliousness

Although the literature review suggests that the relationship between rebelliousness and activism is a very under-researched area, rebelliousness has been linked to several environmental movements, such as the Extinction Rebellion and Fridays for Future. However, some argue that actions taken by Extinction Rebellion are not efficient in achieving change (Matthews, 2020), because they misuse the research their strategy is based upon, and their goal of civic and economic disruption in capital cities can alienate members of society. Furthermore, Moor et al. (2021) argued that through these movements, which aim at achieving collective and large-scale change, individual-focused action is gaining more dominance. Because of this new form of rebellion, more studies are needed to investigate the relationship between rebelliousness and activism to fill in this gap in the literature.

McDermott and Apter (1985) developed a questionnaire measuring rebelliousness, consisting of two subscales, proactive and reactive rebelliousness. Proactive rebelliousness refers to a playful form of rebelliousness, focused on getting excitement and pleasure from oppositional behaviour, while reactive rebelliousness is a reaction to some interpersonal disappointment, and emphasises retaliating and hostile emotions. Although this measure has been used to predict different kinds of behaviours, like health behaviours and outcomes (Klabbers et al., 2009), no study has used it yet to predict environmental activism, a gap which this study aims to fill. Furthermore, various models can be adapted to measure pro-environmental behaviours, such as the Health Belief Model.

The Health Belief Model in pro-environmental behaviours

The Health Belief Model (HBM) by Becker (1974) was developed to examine motivations for health behaviours. Its constituent variables are susceptibility, severity, duration, knowledge, benefits, and barriers, and it builds on individuals' perceptions of threat. It has been widely used and modified to predict other behaviours, such as recycling (Lindsay & Strathman, 1997). Their study was based on telephone interviews with 317 Missouri residents, who were asked about their recycling behaviours based on the HBM, with the frequency of recycling being the criterion variable. It was a random sample, and involved asking to speak to the adult household member whose birthday was most recently, to provide an equal chance of participation. The HBM predicted the frequency of recycling, and that barriers and susceptibility were the behaviours driving the effect. This study successfully tested the HBM in predicting a pro-environmental behaviour, and the method of randomisation to select the sample was an advantage. However, recycling is only one of the various environmental behaviours, and the study could have measured other aspects too, such as saving energy, which is another gap in the literature.

In terms of pro-environmental behaviours, the HBM also has been used to predict green advertising attitudes and behavioural intentions for buying green products among 385 university students (Yoon & Jung, 2016). In addition, they measured past experience and perceptions about green products, as well as general attitudes towards environmentalism. The HBM successfully predicted green advertising attitudes, with response efficacy being the strongest variable driving green consumerism. For behavioural intentions, however, only barriers emerged as a predictor from the HBM, aside from past behaviour and green advertising attitude. They also found age a significant predictor, arguing that younger people care more about pro-environmental behaviours. Although this sample was not necessarily generalisable based entirely on university students, both studies were novel and successful in using the HBM to predict some pro-environmental behaviours, which shows the utility of this model other than for health behaviours. The extent to which people feel threatened by climate change can determine how likely they are to take part in activism, but to date, the literature review outlines that no study has used the HBM to predict environmental activism. Another model commonly adopted to predict behaviours is the Theory of Planned Behaviour, which has been more widely used in activism research.

The Theory of Planned Behaviour and Activism

The Theory of Planned Behaviour (TPB) is a model developed by Ajzen (1991), who argued that behaviours are influenced by intention, which is shaped by attitudes, subjective norms, and perceived behavioural control. This model has been used to predict health behaviours, such as physical activity (Armitage, 2005), and some studies have used it to understand activism.

Fielding et al. (2008) used the TPB with additional social and self-identity measures to predict activist intentions in a sample of 169 participants. Many of them were students in higher education, 71 of them were members of environmental groups, and most of them were left-wing supporters. The model predicted the intention to engage in activism, and environmental group membership and activist self-identity were independent predictors, which is not surprising because the core of these groups is to promote pro-environmental behaviours. An important limitation of the study is that they did not measure actual, past, or present activist behaviour, and most of the sample consisted of students, once again raising the issue of generalisability.

Jew and Tran (2020) examined low and high-risk activist intentions (one with little to no danger to the self, the other more dangerous, possibly illegal actions) using the TPB model. They targeted a sample with activist interests, and recruited 385 participants from various demographic backgrounds, although only 19% of them were male. TPB predicted activist intentions, but the subjective norm items were not individual predictors. Distinguishing between low and high-risk activism was a novelty, and the study highlighted some differences between these two activist intentions. Both studies show the utility of TPB in predicting activism, however, these looked at participants already interested in activism, so their findings are not necessarily applicable to the wider population. The literature review indicated another variable possibly associated with activism is the extent to which people feel able to take action to mitigate climate change, namely climate self-efficacy.

Climate self-efficacy

Self-efficacy is a variable articulated by Bandura (1997), and it outlines the individual's perceived ability to perform certain tasks to achieve a goal. It is widely used in research, for instance, self-efficacy predicted anticipatory and reactive climate change adaptation among coastal communities in Cambodia (Ung et al., 2015). 1823 participants were interviewed, and the sample was chosen because Cambodia experienced huge losses due to climate

change in recent years. The number of participants and the technique of multi-stage random sampling were methodological strengths, however, more than twice as many female participants were recruited than men. Education was significant at bivariate and multivariate levels of analysis, which suggests that education is an important factor in adapting to climate change.

Based on the review of the literature, self-efficacy has not been widely used in pro-environmental behaviour studies, however, with Bostrom et al. (2018) finding it predictive of supporting climate change policies, there is reason for applying it to the prediction of activism. They developed a measure of climate change mitigation efficacy with different subscales, including personal and government/collective self-efficacy, and the same for response efficacy. The personal self-efficacy scale consisted of different ways of mitigating climate change, including reducing energy use, or voting for candidates devoted to acting against global warming. However, all the items were very specific (for example, reducing air travel by 50%) and the scale only included five items. Nevertheless, the reliability estimates for the scales were high, and government and collective response efficacy and personal self-efficacy were associated with increased climate change policy support. The scale used in the study was not publicly accessible, but the above studies show the importance of self-efficacy in predicting pro-environmental behaviours. From reviewing these studies and the wider academic literature, it is clear that several variables are associated with activism, and they typically predict different dimensions of it. Consequently, it is important to look at what exactly activism entails.

Activism

Environmental activism can be defined in different ways, from demonstrations to conservation activism where the aim is to protect species and natural habitats, but overall, its main aim is to take action to protect the environment.

Activism has a very important role in mitigating the effects of climate change, including raising awareness of climate-related issues, educating people on how to be more environmentally friendly, putting pressure on companies to use eco-friendly technologies, and urging government officials to create climate change policies (Fisher & Nasrin, 2020). Taking part in activism can be very straightforward for an individual and can yield substantive results, for example indigenous communities stopping the Keystone pipeline extension (Greenpeace International, 2021).

The current study

The study reported here aims at incorporating different aspects of activism and pro-environmental behaviours, such as direct actions like recycling, joining an environmental activist group, acting within the last three months to mitigate climate change, and agreeing that acting right now to reduce climate change is important.

Although there is a growing number of research studies in this area during the past couple of years alone, there are still several gaps in the literature, with variables such as rebelliousness or coping strategies not being measured in relation to activism. Since climate change is a very present world problem, a greater understanding of the range of precursors of pro-environmental attitudes and activism is needed. Furthermore, no study has included all these variables together before, nor is there one that has compared both the TPB and the HBM in predicting activism. The current study aims to test both models, as well as the other variables as mentioned.

The research question was as follows: Do eco-anxiety, depression, different coping strategies (active coping, suppression of competing activities, behavioural disengagement, denial, use of instrumental social support, mental disengagement) eudaimonic well-being, rebelliousness, the Theory of Planned Behaviour, the Health Belief Model, and climate self-efficacy jointly or independently predict environmental activism?

It was hypothesized that eco-anxiety, active coping, use of instrumental social support, suppression of competing activities, eudaimonic well-being, rebelliousness, TPB variables, HBM variables and climate self-efficacy would positively correlate with activism measures. The following variables were expected to negatively correlate with activism: depression, denial, behavioural disengagement, and mental disengagement. Finally, it was also hypothesized that these variables would jointly and independently predict activism.

METHOD

Participants

142 participants took part in the study (36 men, 101 women, 2 trans men, 3 non-binary / third gender). They had a mean age of 36 years (S.D. = 14.34) and a range of 18 to 78 years, with a mode of 20. 67% of the participants had an undergraduate or postgraduate diploma, and 75% were White / European. Most participants were either British (53) or Hungarian (36), and the

other participants' nationalities varied. In terms of relationship status, 47 (33%) of participants were single, 42 (30%) were in a relationship, 38 (27%) were married, 10 (7%) were co-habiting, and the other 5 (4%) were either separated, divorced, or widowed. In terms of their socio-economic status, 28% of participants earned between £0-£5000 annually, 15% of them earned between £11000-£15000 and 11% between £16000-£20000. The other percentages varied between £0-£5000 and over £46000.

The participants were mainly university students or members of the researchers' personal network. They were recruited during university lectures, in social media groups dedicated for sharing research surveys (for example, SurveyCircle) and by using the snowballing technique. There were no inclusion requirements besides being aged over 18 to take part in the study.

Design

The present study employed a cross-sectional, correlational multivariate design, using self-report measures. The predictor variables were eco-anxiety, depression, coping strategies, eudaimonic well-being, rebelliousness, anticipated impact of climate change, climate self-efficacy and attitudes towards climate change. The outcome variables were climate change behavioural engagement containing direct actions such as trying to reduce behaviours contributing to climate change or recycling, an environmental activism measure about joining an environmentalist group or donating money to protect the environment, intention to engage in activism (TPB), believing that acting now to reduce climate change would be beneficial (HBM), and past behaviour taken within the last three months to reduce climate change.

Materials

The Hogg Eco-Anxiety Scale (Hogg et al., 2021) was one of the measures of eco-anxiety, and it is comprised of 13 items. There were two subscales, 'anxiety about personal impact' (Cronbach's alpha .91), which contains items focused on worries about climate change and 'behavioural difficulties' (Cronbach's alpha .78), that concentrate on anxiety about personal behaviours. Answers ranged from 0 (Not at all) to 3 (Nearly every day) on a Likert scale. An example item is - *Unable to stop thinking about losses to the environment.* Along with the study that developed the measure, Hogg et al. (2023) further demonstrated the validity and reliability of the measure in a sample of 530 Australian participants.

The Climate Change Anxiety Scale (Clayton & Karazsia, 2020) was also measuring eco-anxiety, and it contains 22 items across 3 subscales. The first subscale is 'impairment because of climate change awareness' (Cronbach's alpha .92), measuring cognitive-emotional and functional impairment attributable to climate change. The second one is 'climate change experience' (Cronbach's alpha .80), focusing on whether climate change affected the individual directly or indirectly. Finally, the 'climate change behavioural engagement' subscale (with 6 items) was used as one of the dependent variables. It focuses on direct behaviours to mitigate climate change, such as recycling, but item 17 from this subscale *(I wish I behaved more sustainably)* was removed to improve Cronbach's alpha from .73 to .77. Answers ranged from 1 (Never) to 5 (Almost always) on a Likert scale. An example item is - *I turn off lights.* Cruz and High (2022) found the scale generally valid and reliable.

The Patient Health Questionnaire-9 (Kroenke et al., 2001) measured depression, and it contained 9 items (Cronbach's alpha .92) Answers ranged from 0 (Not at all) to 3 (Nearly every day) on a Likert scale. An example item is - *Feeling down, depressed, or hopeless.* This measure is commonly used to measure depression, and among others, Seo and Park (2015) found it valid and reliable in a sample of 132 participants with migraine.

From the COPE Inventory (Carver, 2013), six subscales were chosen to measure different coping strategies: active coping (Cronbach's alpha .75), supression of competing activities (Cronbach's alpha .79), denial (Cronbach's alpha .85), behavioural disengagement (Cronbach's alpha .86), use of instrumental social support (Cronbach's alpha .88), and mental disengagement (Cronbach's alpha .71). These together contained 24 items. Answers ranged from 1 (I usually do not do this at all) to 4 (I usually do this a lot) on a Likert scale. An example item is - *I try to get advice from someone about what to do.* In the original version of COPE, the items from the different subscales are mixed. However, because this study did not include all the subscales, the items appear in blocks according to each subscale, notwithstanding the risk of response sets.

The Questionnaire for Eudaimonic Well-Being (Waterman et al., 2010) measured eudaimonic well-being and it contained 21 items (Cronbach's alpha .84). Answers ranged from 0 (Strongly disagree) to 4 (Strongly agree) on a Likert scale, and 7 of them were reverse scored. An example item is - *I can say that I have found my purpose in life.* The study of Schutte et al. (2013) also validated this measurement.

The Social Reactivity Scale (McDermott & Apter, 1985) was used to measure rebelliousness, and it contained 18 items

(including four filler items). It had two subscales for proactive (Cronbach's alpha .56) and reactive (Cronbach's alpha .50) rebelliousness. Answers ranged from 0 to 2, with three different answer options. The conformist answers were scored 0, the rebellious scores were 2, with 1 being 'not sure'. An example item is - *I enjoy the thrill I get from being difficult and awkward*. Klabbers et al. (2009) in a large study of Dutch respondents demonstrated that the questionnaire has good validity and reliability.

A subscale from the Environmental Efficacy Scale (Sellers et al., 2013) was used as one of the dependent variables in this study, which was 'Section 6: Activism', and it originally contained 6 items, but item 4 was removed to improve Cronbach's alpha from .71 to .79. Answers ranged from 1 (Completely disagree) to 7 (Completely agree) on a Likert scale. An example item is - *I would like to join and actively participate in an environmentalist group*.

A demographics questionnaire was also included, measuring age, gender, partnership status, level of education, annual earnings, ethnicity, nationality, and country of residence.

There were three author derived measures, for the HBM, the TPB and a climate self-efficacy scale *(see Results, Questionnaire development section)*.

Procedure and Ethics

Participants were given an information sheet and gave written consent before participating in the study. They completed an online survey hosted on Qualtrics (Provo, UT), consisting of 11 sections of questionnaires in the order outlined in the materials. The study took approximately 35 minutes to complete, and after completing the study, respondents were given a debrief form containing further information about the study, the researcher's contact information and access to well-being resources.

The study was fully anonymous, and no identifying information was collected. Participants provided a 4-digit identifier to be able to withdraw from the study up to 3 weeks after completing the survey. The data was stored on password-protected laptops, only the researchers had access to it, and it was analysed in a secure place. The study has been fully approved by the UEL School of Psychology Ethics Committee.

RESULTS

The completed cases of data were exported from Qualtrics (Provo, UT) to SPSS. Reverse scoring was instigated for items in the relevant measures and variables were computed to create total scores for each of the subscales and scales. Given the unequal proportion of men and women, potential sex differences were examined by conducting independent t-tests across the five dependent variables and found no such differences. Therefore, the sample was treated as one.

Development of author-devised questionnaires

Climate self-efficacy Climate self-efficacy is about the extent you feel able to take action to mitigate climate change, and 8 items were generated in relation to this definition based on Bandura's guidance on constructing self-efficacy scales (Bandura, 2006). The answers ranged from 1 (Strongly disagree) to 7 (Strongly agree) on a Likert scale (Cronbach's alpha .73). The lead item is *'I am able to contribute to slowing global warming'*, followed by the remaining 7 items in descending order of importance.

The Theory of Planned Behaviour An author derived measure was constructed based on the Theory of Planned Behaviour (Ajzen, 2019), and constructed based on the guidelines from Fishbein and Ajzen (2010) and it contained 8 items (see Table 1). Answers ranged from 1 to 7 on a Likert scale with various answer options, higher scores indicating higher engagement (Cronbach's alpha .82). The item about intention was a dependent variable - *I intend to use my ability to take action to reduce climate change*, as well as the item about past behaviour - *In the past three months, I was involved in direct action that seeks to persuade others to reduce climate change.*

The Health Belief Model An author derived measure was created based on the Health Belief Model (Becker, 1974) and it contained 6 items measuring the different dimensions of HBM: susceptibility, severity, duration, knowledge, benefits, and barriers (see Table 2). This model was chosen because it is useful for determining future action based on the perceived threat, and it was adaptable to climate change. It also included an additional question about past traumatic experience attributable to climate change, and one about how distressing that event was (Cronbach's alpha .65). Answers ranged from 1 to 5 on a Likert scale, with varying answer options, lower scores indicating higher engagement. The Benefits item was a dependent variable - *To what extent do you agree or disagree that acting now to combat climate change is a good thing?*

Table 1:
TPB Questionnaire items

Items	TPB variables
For me, having the ability to take action to reduce climate change would be good/bad; pleasant/unpleasant	Attitude: Instrumental and experiential aspects
Most people who are important to me would be in favour of my ability to take action to reduce climate change.	Subjective norm: Injunctive and descriptive aspects
Most people like me are able to take action to reduce climate change.	Subjective norm: Injunctive and descriptive aspects
People around me tend to believe strongly that action to reduce climate change is needed.	Subjective norm: Injunctive and descriptive aspects
I am confident that I am able to take action to reduce climate change.	Perceived behavioural control: Capacity and autonomy aspects
My ability to take action to reduce climate change is up to me.	Perceived behavioural control: Capacity and autonomy aspects
I intend to use my ability to take action to reduce climate change.	Intention
In the past three months, I have used my ability to take action to reduce climate change.	Past behaviour

Table 2:
HBM Questionnaire items

Items	HBM variables
How vulnerable to the effects of climate change do you feel you are in the next five years?	Susceptibility
How severe do you think climate change is going to be over the next five years?	Severity
How long do you think climate change is going to affect personkind?	Duration
How knowledgeable do you think you are about climate change?	Knowledge
To what extent do you agree or disagree that acting now to combat climate change is a good thing?	Benefits
To what extent do you agree that barriers to reducing climate change can be overcome?	Barriers
Have you ever experienced a traumatic event that is directly attributable to climate change? (For example, wildfire, flood, extreme heat, damage to personal property)	Past traumatic event
If you have specified an answer to the question above, how distressing was this event?	Past traumatic event

Bivariate correlations For each of the five dependent variables, Pearson product moment correlation coefficients were calculated for all independent variables. The results of these analyses are shown in Table 3.

In terms of the salient features of the correlations, the HBM scores are negative because these variables were not re-coded, hence the lowest score equals extremely severe, and the highest score equals not at all severe, which explains the negative correlations. Interestingly, none of the correlations with the demographic variables were significant. Anxiety about personal impact, which is an eco-anxiety subscale was significant across all dependent variables, while behavioural difficulties, the second subscale of the same measure was not. Impairment because of climate change awareness was significant across three dependent variables, and climate change experience was significant across all measures. Depression and rebelliousness were not related to activism, and eudaimonic well-being was significant across three activism measures. The TPB measures were significant across all dependent variables. Although denial was significant for one dependent variable, coping strategies were not related to activism. The HBM variables were significant across most measures, with severity being significant across all of them.

Table 3:

Bivariate Pearson's r correlations between the independent and the five dependent variables, with p values for one-tailed tests

Variable	Behavioural engagement	Sellers activism	Intention (TPB)	Past action	Benefits (HBM)
Age	.10	-.16	-.04	-.03	.02
Gender	-.08	.10	-.03	.02	-.16
Annual earning	.07	-.07	-.14	-.00	.03
Anxiety about personal impact	.28***	.45***	.43***	.25**	-.20*
Behavioural difficulties	.01	.04	.01	.11	.11
Impairment because of climate change awareness	.13	.34***	.29***	.18*	.06
Climate change experience	.22*	.35***	.36***	.21*	-.24**
Depression	-.05	.098	.04	.09	-.15
Eudaimonic well-being	.28***	.24**	.24**	.15	-.13
Proactive rebelliousness	-.12	-.05	.07	.06	.14
Reactive rebelliousness	-.10	-.13	-.04	-.01	.09
Attitude (TPB)	.41***	.43***	.51***	.39***	-.43***
Subjective norms (TPB)	.32***	.34***	.57***	.4***	-.32***
Perceived behavioural control (TPB)	.32***	.34***	.53***	.35***	-.13
Active coping	.14	.06	.21*	.16	-.11
Suppression of competing activities	.11	.02	.15	.16	-.02
Denial	-.12	.001	-.06	-.05	.23**
Behavioural disengagement	-.09	.05	-.06	-.05	.14
Use of instrumental social support	.02	.13	.11	.04	-.20*
Mental disengagement	-.04	.14	.01	-.01	-.07
Susceptibility (HBM)	-.17*	-.33***	-.37***	-.16	.28***
Severity (HBM)	-.33***	-.35***	-.32***	-.25**	.45***
Duration (HBM)	-.20*	-.19*	-.16	-.06	.33***
Knowledge (HBM)	-.31***	-.30***	-.17*	-.19*	-.06
Barriers (HBM)	-.14	-.14	-.18*	-.12	.32***
Past experience	.17*	.21*	.25**	.21*	-.14
Climate self-efficacy	.31***	.29***	.35***	.20*	-.16

Note. *p < .05. **p < .01.   *** p = < .001.

Table 4:

Significant predictors of the dependent variables across the five regression analyses

Independent variables	Beta	t	P
(1) DV = Climate Change Behavioural Engagement			
Attitude (TPB)	0.24	2.71	.008
Susceptibility (HBM)	0.24	2.35	.02
Severity (HBM)	-0.27	-2.75	.007
Knowledge (HBM)	-0.29	-2.44	.016
R = .611, R square = .373, Adjusted R square = .315			
(2) DV = Environmental activism			
Impairment because of climate change awareness	0.23	1.97	.05
Attitude (TPB)	0.10	1.03	<.001
R = .664, R square = .441, Adjusted R square = .384			
(3) DV = Intention (TPB)			
Attitude	0.27	3.53	<.001
Subjective norms	0.25	3.25	.001
Perceived behavioural control	0.23	3.13	.002
R = .752, R square = .566, Adjusted R square = .521			
(4) DV = Past action			
Attitude	0.25	2.64	.009
R = .534, R square = .285, Adjusted R square = .230			
(5) DV = Benefits (HBM)			
Attitude	-0.24	-2.85	.005
Denial	0.15	2.02	.046
Severity	0.28	2.88	.005
Barriers	0.20	2.64	.009
R = .632, R square = .399, Adjusted R square = .353			

The variable that was only significant across two measures was barriers. Overall, there is more variation compared to TPB variables but still much significance. Past experience was also significant across four measures, as well as climate self-efficacy.

Multivariate correlations (regression analyses) A series of regression analyses (one for each dependent variable) were carried out based on the significant bivariate correlates of the dependent variables (see Table 4).

The adjusted coefficient for Climate change behavioural engagement, R-squared, revealed that the regression model accounted for 37% of the variance, which was significantly better than the mean alone ($F(12,128) = 6.36$, $p < 0.001$). It is worth noting that the HBM variables in this aspect of activism were much better predictors than the TPB ones, although it was surprising that none of the eco-anxiety measures predicted activism.

The adjusted coefficient for Environmental activism, R-squared, revealed that the regression model accounted for 44%

of the variance. The regression model successfully fit the data better than the mean ($F_{(13,127)}$ =7.71, $p < 0.001$). This activism measure was about joining environmentalist groups and donating money to protect the environment. This aspect of activism was predicted by cognitive-emotional and functional impairment due to climate change, such as having nightmares or concerns interfering with one's life, and by thinking that the ability to action to reduce the effects of climate change would be beneficial.

The adjusted coefficient of Intention, R-squared, revealed that the regression model accounted for 57% of variance in the data, which was significantly better than the mean alone ($F_{(13,127)}$ = 12.74, $p < 0.001$). This dependent variable was about the intention to take action to reduce the effects of climate change, and it was predicted by the TPB items.

The adjusted coefficient of Past action, R-squared, revealed that the regression model accounted for 29% of variance in the data, which was significantly better than the mean alone ($F_{(10,130)}$ = 5.17, $p < 0.001$). This measure of activism was entirely about action taken in the last three months to reduce climate change. Although the nature of the action was not specified, it seems that in this sample, believing that taking action is beneficial was the only significant predictor.

The adjusted coefficient of Benefits, R-squared, revealed that the regression model accounted for 40% of variance in the data, which was significantly better than the mean alone ($F_{(10,131)}$ = 8.70, $p < 0.001$). This measure of activism was about the belief that acting now to combat climate change would be beneficial. An interesting finding is the fact that denial, which is a coping mechanism about pretending and acting like an issue did not happen, is predictive of believing that acting now is necessary. Strangely, eco-anxiety did not predict this form of activism, but the HBM variables were predictive, although Benefits is also a part of the HBM model.

DISCUSSION

Summary of results
This study examined how eco-anxiety, depression, different coping strategies, eudaimonic well-being, rebelliousness, the TPB, the HBM and climate self-efficacy relate to different dimensions of environmental activism. It was hypothesized that eco-anxiety, active coping, use of instrumental social support, suppression of competing activities, eudaimonic well-being, rebelliousness, TPB, HBM and climate self-efficacy would positively correlate with activism measures. The following variables were expected to negatively correlate with activism: depression, denial, behavioural disengagement, and mental disengagement. It was also hypothesized that these variables would jointly and independently predict environmental activism.

Bivariate correlational analyses
When looking at the correlations, the hypotheses for eco-anxiety were partially supported, as anxiety about personal impact positively and significantly correlated with all dependent variables except for benefits, where the correlation was negative. Three correlations were weak (<.2) and two were moderate (>.4). Behavioural difficulties, however, was not significant across variables, despite being part of the same eco-anxiety measure. Impairment because of climate change awareness had weak positive and significant correlations across three activism measures, and climate change experience significantly and positively correlated across all measures, although the correlations were weak, except for benefits, where the correlation was negative.

Depression was not related to activism, suggesting that depression is not necessarily a barrier to acting against climate change, so the hypothesis for this variable was not supported.

Eudaimonic well-being positively and significantly correlated across three measures of activism, so the hypothesis for this variable was partially supported, although these correlations were weak too.

Proactive and reactive rebelliousness were not related to activism at all, so the hypotheses for these correlations were rejected. These findings suggest that activism is not about the need to rebel against social norms nor about playful, excitement-seeking rebelliousness. The rebellion is principled rather than driven by disaffection or sensation-seeking.

The coping strategies were generally unrelated to activism. Active coping positively correlated with intention, but the correlation was rather small, and denial positively related to benefits. The other coping strategies, however, were not significant across dependent variables, so the hypotheses for these variables were not supported.

The hypotheses for the TPB measures were partially supported, given attitude and subjective norms were significant across all dependent variables with mainly moderate and positive correlations, except for the negative correlations with the benefits variable. Perceived behavioural control positively correlated with four dependent variables except for benefits, where the

correlation was not significant. These correlations were typically weak apart from a moderate one.

The HBM variables were generally related to activism measures, with susceptibility, duration, and knowledge correlating across four dependent variables, and severity correlating across all. The barriers item was the least related as it only correlated with two activism measures. Generally, the correlations were small and negative, but the direction of the correlation is explained by the fact that these items were scored in a way that lower scores indicated higher engagement. The hypotheses for these variables were partially supported.

Finally, climate self-efficacy positively and significantly correlated across all dependent variables, except for the negative correlation with the barriers item, so the hypotheses for this variable were supported, but the correlations were somewhat weak.

Regression analyses

The regression analysis for climate change behavioural engagement showed that attitude, susceptibility, severity, and knowledge were independently significant predictors. This suggests that the HBM variables, which are related to the perception of climate change threat predict direct behaviours such as recycling or turning off lights.

For Seller's environmental activism measure, the regression analysis identified impairment because of climate change awareness and attitude as predictors of joining environmentalist groups and donating money to protect the environment. Although attitude is part of the TPB measure, none of the two models seem to work particularly well in predicting this form of activism.

The regression analysis for intention showed that the TPB variables, namely attitude, subjective norms and perceived behavioural control were independent predictors of the intention to take part in action to reduce climate change effects. This finding shows that for intention, TPB is more applicable than the HBM framework.

For past action, attitude was the only variable that was a significant predictor, although subjective norms were approaching significance. This finding suggests that although eco-anxiety was prevalent in the sample, it did not yet reach that point where people not only felt they had to act but actually took part in behaviours to reduce climate change. It is surprising that eco-anxiety or the severity of climate change threat did not contribute to this action.

The regression analysis for benefits showed that attitude, denial, severity, and barriers were all independent predictors of

this variable. Consequently, the HBM variables predicted this form of activism better than the TPB.

Across the five regression analyses, attitude was the only item that significantly predicted activism. Climate self-efficacy, which correlated with all dependent variables did not emerge as a significant predictor for either of them. Age, gender, and socio-economic status did not correlate with any of the measures. Socio-economic status might not be perfectly representative in this sample, as the national living wage in the UK is higher compared to other countries included in this study, for example Hungary, so that might explain why there was no connection.

Links to other studies

The findings related to eco-anxiety are somewhat inconsistent with previous findings in the literature. As Coffey et al. (2021) outlined, conceptual clarity around eco-anxiety can be an issue, as different measures of eco-anxiety in this study yielded different results. While eco-anxiety measures from the Clayton and Karazsia (2020) scales correlated with either three of the five dependent variables or all of them, one measure from Hogg et al. (2021) correlated with all dependent variables, and the other one with neither of them. As it was expected based on Pikhala (2020), eco-anxiety could be an adaptive function predicting activism, but in this study, only impairment because of climate change awareness was a significant predictor for Seller et al.'s (2014) activism measure. In this sample, however, eco-anxiety was typically low as the maximum values observed were 2.80 and 2.33 for the Hogg et al. (2021) scales and 3.46 and 5.00 for the Clayton and Karazsia (2020) measures. This finding is in line with previous studies, as the mean age of the sample was 36, so it was not a relatively young sample. Among younger people however, climate change concern and depression are typically higher (Khafaie et al, 2019; Majeed and Lee, 2017), which was not demonstrated in this study. This could be because studies usually include participants from the same country, while in this study, participants were recruited from mainly two different ones. As climate change concerns can be influenced by each country's politics and a government's views on climate change (Kousser & Tranter, 2018), such could offer a potential explanation for this finding.

As for eudaimonic well-being, the findings are consistent with Klar and Kasser (2009) because this variable positively correlated with activism measures, contrastingly to the findings of Ibanez-Ruada et al. (2020). Interestingly, however, in regression it did not predict any of the activism measures. Since to date there

has been no study found that has used eudaimonic well-being to predict activism, this is a new finding, suggesting that in this sample, activism was not one of the activities that would bring fulfillment to participants. This relationship should be tested further in future studies focused on participants who are more pro-environmentalist.

Rebelliousness scores were not high in this sample and this variable did not show a connection to activism at all. Such a finding is interesting because two different types of rebelliousness were measured, and neither the playful nor the disaffected forms of rebelliousness related to activism. As rebelliousness is under-researched, the relationship between this variable and activism has not been studied previously. Although these findings suggest that there is no connection between these phenomena, further studies could examine this in other samples. If activism is not related (in regression analyses) to either rebelliousness or eudaimonic well-being, this suggests that there is still a lot to learn about the underlying motivators behind activism.

Coping strategies also generally were unrelated to activism. However, denial was an independent predictor of the benefits of activism, which suggests that even though these participants suppress negative feelings as an attempt to escape them, perhaps subconsciously they still feel that urgent actions should be taken to reduce climate change. This is in line with Mah et al. (2020) who argued that climate change can negatively impact coping responses, as well as Taylor (2020) who found that maladaptive coping responses, such as denial, lead to internalising negative feelings. This might explain why denial did not predict actual activist behaviours or intentions, only the belief that acting now is important. The lack of findings related to denial, behavioural and mental disengagement support those of Rochford and Blocker (1991), who concluded that people who choose individual, emotion-focused coping are less likely to get involved in activism. The finding that not even problem-focused coping mechanisms, such as suppression of competing activities or use of instrumental social support, were related to activism was surprising, apart from active coping correlating with the intention to take part in such activity.

Lindsay and Strathman (1997) found the HBM predictive of recycling, and the present study supported these findings. Climate change behavioural engagement, which was about direct actions such as recycling, was predicted by susceptibility, severity, and knowledge from the HBM. Severity and barriers were also predictors of the benefits variable. Yoon and Jung (2016) found the barriers and past behaviour items were predictive of the intention to buy green products. In this study here, none of the HBM items nor past action predicted the intention to take part in environmental activism.

The findings relating to the TPB are partly in line with Fielding et al. (2008) who found that attitudes and subjective norms were independent predictors of the intention to take part in activism, but perceived behavioural control was not. In this study, attitudes predicted the likelihood of joining an environmentalist group, donating money to mitigate the effects of climate change, past action taken and believing that acting now would be beneficial. Attitudes, perceived behavioural control and subjective norms independently predicted the intention to engage in activism. In relation to Jew and Tran (2020), their findings were similar to Fielding et al. (2008) because they did not find subjective norms to be an independent predictor of activism either, only the other TPB variables.

Since there are not many studies that have used climate self-efficacy to predict activism, only the findings of Bostrom et al. (2018) can be examined in relation to those of the study here. They found climate self-efficacy to be predictive of activism, however, the present study did not support this finding. Even though climate self-efficacy correlated with four activism measures, it did not predict either of them in regression analyses when statistically controlling for the effects of other variables.

Methodological strengths, limitations, and further directions
The present study produced three measures, the TPB and HBM models adapted for climate change and a scale for climate self-efficacy. Furthermore, it made contributions in several areas as it examined possible relationships that were previously unknown, such as between rebelliousness and activism, and if eco-anxiety, coping strategies, HBM or climate self-efficacy could be used to predict activism. Despite the various measures included, the size of the study sample was adequate and included participants from different countries and socio-economic backgrounds, although it was skewed towards female respondents. Also, it included two measures of eco-anxiety to assess different dimensions of this construct, and multiple measures of activism which showed that the variables predicting intentions to engage in activism vary based on the way in which the latter is measured.

However, there are some limitations to the study. As already acknowledged, the unequal proportion of men and women in this sample, while not ideal, should be addressed in further research, albeit that in preliminary analyses we did not find evidence of

pervasive sex differences for the dependent variables. Secondly, political views could have been included in the demographic questionnaire because previous studies have observed an effect of this variable: for example, Bostrom et al. (2019) found conservative ideology to be associated with reduced support for climate change policies. As many participants were either from the UK or Hungary, and both of those countries have a conservative government incumbency, this might explain to some degree the levels of support for participating in activism and relatively low eco-anxiety scores. In Hungary, the governmental party's voters have been found to be ambivalent regarding the dangers of climate change, which is in line with the findings of this study, although most of them believed that the government should take more action towards reducing the impact of climate change (DemNet, 2019). Finally, some variables might have been replaced with others: for instance, eco-anger could have been included instead of rebelliousness, which has been found to have a connection with participating in pro-environmental behaviours and actions (Stanley et al., 2021).

This research could be extended by looking at the correlations between the other variables that are to be found in the literature, for example looking at the relationship between different coping strategies and eudaimonic well-being and depression, and by replicating this study with a sample of respondents who are avowedly more interested in activism, such as protest groups members (for example, Just Stop Oil, or Extinction Rebellion).

IMPLICATIONS AND CONCLUSIONS

The findings of this study imply that despite the growing popularity of environmentalist movements, the knowledge of what predicts activism is still limited, so more studies are needed. The present study contributed to the research field by creating new measures, shedding a light on previously not explored relationships, showing that both the TPB and the HBM models are useful for predicting activism, and that different forms of environmental activism are not necessarily predicted by the same variables.

In terms of real-world implications, this study has shown that the extent to which people view climate change as a threat, measured by the HBM model, greatly determines their intention to take part in activism, doing direct actions such as recycling and their actions in the past. The study also showed that the belief of having the ability to take action to reduce climate change is beneficial predicts all aspects of activism, which has important implications for educating people about their pro-environmental and activism-related options. The study also implies that social norms measured by the TPB are quite important predictors of activism and people are influenced by what others think around them. To achieve changes, it is evident that local cultures which support these movements would need to be established.

In conclusion, this study shows that different aspects of activism are not predicted by the same variables, but both the TPB and the HBM can be utilised in activism research. The unique contribution of this paper is demonstrating that perceived threat, behavioural control, and subjective norms are all important in predicting activism. Thus, people need to understand the nature of the threat from climate change, that they are able to take action that will make a difference, and that they should come together with like-minded individuals so that environmentalism becomes ever more socially contagious. ■

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