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# Mass Media's Potential to Increase Climate Anxiety, Self-Efficacy, and Pro-Environmental Behaviour: A Research Protocol

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**Abstract**

**Introduction:** As the frequency of hazardous weather events increases due to climate change, mental health around the world is impacted both directly and indirectly. Specifically, young adults are experiencing an increase in climate anxiety. Typically, people gain information on climate change from mass media, which may have the potential to influence levels of climate anxiety as well as self-efficacy beliefs. To better understand this relation, this study will examine whether mass media can increase adaptive climate anxiety and self-efficacy to increase intention to engage and actual engagement in pro-environmental behaviour.

**Methods:** University students will be invited to participate in a study on climate change and will be randomized to one of three conditions. In the first condition, students will read a science-based news article with a call-to-action. In the second condition, students will read a science-based news article without a call-to-action. In both conditions, the students will fill out items measuring climate anxiety, self-efficacy, and intended pro-environmental behaviour after reading the article. In the third condition (i.e., the control), students will fill out the same items without reading an article. Two weeks after completing the survey, participants will be contacted to confirm whether they engaged in pro-environmental behaviour.

**Results:** It is expected that students in the science-based call-to-action condition will experience an increase in adaptive climate anxiety, self-efficacy, and intended and performed pro-environmental behaviour. Those in the science-based no call-to-action group are predicted to report an increase in maladaptive climate anxiety after reading the article. However, they are also predicted to experience a decrease in self-efficacy and intended and performed pro-environmental behaviour. The control condition will not experience an increase in any of these measures.

**Discussion:** The findings of this study will clarify what factors in the media encourage adaptive responses to climate anxiety. Specifically, this study will examine whether media can increase self-efficacy, thereby increasing intention to engage in and engagement in pro-environmental behaviours.

**Conclusion:** Overall, this research will provide insight into best practices for encouraging pro-environmental behaviour among young adults and will ultimately support the mitigation of climate change.

**Keywords** climate change; climate anxiety; self-efficacy; pro-environmental behaviour; mass media; media; climate change media; environmental psychology

## Introduction

In their recent 2023 synthesis report, the Intergovernmental Panel on Climate Change (IPPC) shared that over three billion people live in an area of the world that will be facing natural disaster due to climate change [1]. Indeed, climate change is one of the greatest threats the world currently faces. The seriousness of this threat directly and indirectly impacts mental health across the globe [2]. The terms 'eco-anxiety' and 'climate anxiety' have arisen to describe the effects of climate change on mental health. These terms refer to psychological discomfort that occurs when considering or experiencing the consequences of human-caused climate change [2].

Like any type of anxiety, climate anxiety has the potential to be adaptive or maladaptive [3]. Maladaptively, anxiety leads to overexaggerating perceived threats as well as rumination [3]. Adaptively, climate anxiety facilitates climate activism [3]. The literature is divided on whether climate anxiety is more greatly associated with positive or negative outcomes. One study revealed that climate anxiety is positively correlated with pro-environmental behaviours (PEBs), such as taking the bus or wasting less food at home [4]. Another study showed climate change to be positively

associated with eco-paralysis, in which people choose to ignore environmental issues rather than act on them [5]. There is a need to determine exactly what circumstances influence climate anxiety to increase PEBs.

One influencing factor directly related to climate anxiety is mass media. This is where people most often interact with information related to climate change. Previous research has shown the effects of media on public behaviour. For example, a review of studies on mass media public health campaigns suggests that these campaigns positively influence public health behaviours such as lessening tobacco use [6]. Therefore, it is logical to assume that mass media could also promote PEBs.

Despite having the power to promote societal change, climate change media more often creates "confusions and uncertainties" that act as barriers to change [7]. Typically, mass media has taken two routes for sharing information on climate change; one route being misinformation that feeds climate skepticism and the other route being misinformation that leads to 'climate alarmism,' whereby consumers feel hopeless after viewing the devastating effects of climate change [8].

Thankfully, the frequency of science-based climate media is increasing. Happer and Philo suggest that in order to be effective, climate media must include reputable, scientific sources and communicate risk that is personal to viewers [7]. Science-based climate media is a step in the right direction; however, even this media lacks a key ingredient that is essential to effectively encourage PEBs.

Self-efficacy could be the missing ingredient when it comes to climate media and climate anxiety motivating PEBs. According to Bandura, a lack of self-efficacy, or feeling a lack of control in one's life, leads to "apprehension," "apathy," and "despair" [9]. These states parallel the negative effects of climate anxiety. Research has shown that Americans feel that they have little control over climate outcomes [7]. Kellstedt's study suggests that exposure to climate media is related to an increase in climate anxiety and a reduction in self-efficacy [10]. Interestingly, Hibberd and Nguyen found that even climate media that includes reputable sources and highlights the work of scientists and engineering in mitigating climate change is associated with a decrease in self-efficacy among young adults [11]. However, there are mixed findings in the literature when it comes to climate media and self-efficacy. In contrast to the previous studies, Maran and Begotti found that exposure to climate media was related to an increase in self-efficacy [7]. Although their study did not address the content of the media, which could influence this relationship [7].

Based on the literature, for mass media to effectively inspire PEBs, it must increase adaptive climate anxiety by communicating imminent risk while also increasing the media consumer's self-efficacy. Without self-efficacy, media campaigns will be ineffective in motivating PEBs in the public. More research is needed on this topic, specifically on the power of mass media to influence behaviour related to climate change [2]. More specifically, research is needed to understand the contexts in which media increases self-efficacy. Additionally, young adults are disproportionately impacted by climate anxiety [18]. Thus, further research is needed to address how to help young adults respond to climate change anxiety adaptively [18]. The current study aims to address these knowledge gaps using an online survey that assesses the influence of a media on adaptive vs. maladaptive climate anxiety, self-efficacy, and intended and performed PEBs among university students between the ages of 18 to 25 years old.

## Methods

### Objectives

The objective of this study is to examine the effects of two types of science-based climate change media—one with a call-to-action and one without—on climate anxiety, self-efficacy, and engagement in PEBs.

### Hypothesis

We hypothesize that exposure to science-based climate change media with a call-to-action will increase adaptive climate anxiety, self-efficacy, and PEBs. In contrast, exposure to science-based climate change media without a call-to-action will increase maladaptive climate anxiety and lower self-efficacy and PEBs.

### Participants

Participants between the ages of 18-25 of any gender or ethnicity will be included. Participants will be recruited through posters on a university campus in the United States. The posters promote a fifteen-minute survey on climate change and will include a QR code that the participants scan to begin the survey. To facilitate engagement, the posters will be posted at the beginning of term before participants are overwhelmed with schoolwork. The posters will remain for six months to allow a large window of opportunity to participate. Posters will be posted in high traffic areas of campus and will also be shared once a month through the university's online learning management system. Finally, the posters will note a remuneration of the participant's choice of a gift card to the campus bookstore or a Starbucks gift card for participating. Participants will be given a $10 gift card for completing an initial survey and a $10 gift card if they respond to a follow up survey two weeks later.

### Procedure

The study will take place fully online. At the beginning of the survey, all participants will be directed to a consent form that emphasizes the anonymity of survey responses. After providing consent, participants will fill out a demographics form including items to identify if they have any pre-existing mental health conditions, such as anxiety, that could influence the outcomes of the study (e.g., Have

you ever been diagnosed with anxiety?; In the past three months how often have you felt anxious?). Participants will also respond to items on gender (e.g., What is your gender?), ethnicity ('What race do you identify as?'), and education level (e.g., 'How many years of education have you completed to date?'), and an item on their belief in climate change (e.g., Do you believe in climate change?).

After completing the demographics form, participants will be randomly assigned to one of three conditions in a 1:1:1 ratio using a computer-generated sequence: science-based climate change article with a call-to-action, science-based climate change article with no call-to-action, or the control condition (no article). Participants will not know which condition they have been assigned to. Participants assigned to the science-based climate change article with a call-to-action condition will read a revised news article by *The Guardian* (see Appendix) [12]. This article highlights the negative impacts of climate change in the United States based on a recent scientific report. A few paragraphs have been omitted due to political references as these would distract from the focus of the study. A call-to-action was not present in the original article. This was added to the end of the article for the purpose of this study. The call-to-action reads:

While it is crucial that the findings of this report are taken into consideration by policymakers, the seriousness of these findings should be considered by every American. Everyone has the power to contribute to the goal of reducing carbon emissions, whether it be by taking the bus, biking to work, eating less red meat, or shopping second-hand. As the country moves forward in the face of a warming climate, every small action adds up to have a large impact.

Participants in the science-based climate change article with no call-to-action condition read the same article as the first condition but without the added call-to-action statement. Participants in the control condition do not read anything. In every condition, participants will be instructed to answer items that will measure climate anxiety, self-efficacy, and PEB after reading the article.

## Instruments

### *Climate Change Anxiety Scale (CCAS)*

The Climate Change Anxiety Scale (CCAS) created by Clayton and Karazsia is made up of 13 items that assess climate anxiety (e.g., "Thinking about climate change makes it difficult for me to sleep;" "My friends say I think about climate change too much") [13]. The items are rated on a 5-point Likert scale, ranging from 1 (*Never*) to 5 (*Almost Always*) (Clayton & Karazsia, 2020) [13]. The scale has structural and discriminant validity and is recommended for American populations [14].

### *Generalized Self-Efficacy Scale (GSE)*

The Generalized Self-Efficacy Scale (GSE) created by Schwarzer and Jerusalem (1995) is made up of 10 items that assess general self-efficacy (e.g., "I can always manage to solve difficult problems if I try hard enough;" "I can remain calm when facing difficulties because I can rely on my coping abilities") [15]. The items are rated on a 4-point Likert scale, ranging from 1 (*Not true at all*) to 4 (*Exactly true*) [15]. The scale is one of the most used self-efficacy scales and has been validated in many studies [16]. This scale has also been effective in measuring self-efficacy in other climate change research [5].

### *Pro-Environmental Behaviour (PEB)*

As part of the study, participants will be provided with an opportunity to sign up for one of four timeslots to volunteer with a campus club to pick up garbage at a local park. Participants will read the following text:

We are partnering with a university environmental impact club to provide an opportunity to sign up to pickup garbage at *name of local park.* If you would like to sign up for one of four volunteer timeslots, please leave your email:

The above question specifically measures intended PEB. At the end of the survey, participants will be asked for their consent to be contacted two weeks post-survey. If consenting, participants will leave an email address which will be used to send them a follow-up survey approximately two weeks after completion of the initial survey. The second five-minute survey will simply ask whether they volunteered with the university environmental impact club. This survey will measure performed PEB. The second $10 gift card will prevent attrition from the initial survey to follow-up survey by providing an incentive to participate.

## Statistical Analysis

Descriptive statistics will be used to summarize participant demographics. Participant demographics at baseline will be compared between all three groups (i.e., science-based media with a call-to-action condition, science-based media without a call-to-action, and control) to identify potential confounds such as pre-existing mental health illnesses, gender, and climate change belief. Potential confounds will be further addressed by performing stratification to assess the confounds' effect on pro-environmental behaviour across strata. However, it is anticipated that random assignment will evenly distribute these demographic characteristics between groups. A power calculation based on average scores taken from the literature [17] indicates that a sample size of 279 (93 participants per group) is required to detect a difference in self-efficacy (at least a 1-point change in the GSE score) between each of the experimental conditions and the control with 80% power. Between-group differences in climate change anxiety, self-efficacy, and intended and performed PEBs will be assessed using the Student's *t*-test. A Bonferroni-corrected *p*-value of 0.017 ($\alpha$ = 0.05/3) will be used to indicate statistical significance.

## Results

Participants in both groups, excluding the control condition, are expected to experience an increase in climate anxiety. However, participants in the "science-based climate change article with a call-to-action" condition are predicted to have adaptive climate anxiety that leads to a higher level of self-efficacy and intended and performed PEB than the control group whereas participants in the "science-based climate change article with no call-to-action" will have maladaptive climate anxiety that leads to lower self-efficacy and lower levels of intended and performed PEB.

## Discussion

This study aims to examine the influence of climate change media that includes a call-to-action on the relationship between adaptive vs. maladaptive climate anxiety, self-efficacy, and PEBs. The results of this study will inform the production of climate change media. If the expected results are congruent with findings, mass media should continue communicating risk while adding calls to action, which will reduce barriers caused by climate anxiety and increase self-efficacy, thereby increasing the viewer's engagement in PEBs. Consequently, the environment will benefit from this action.

Further, the findings of this study will increase our understanding of young adults' experience with climate change. A key feature of this study is its focus on the general young adult population. A study of 16–25-year-olds across ten countries reported that 45% of youth have thoughts related to climate change that negatively impact their day-to-day functioning [18]. At the same time, young adults are the ones currently leading the climate movement [19]. Therefore, it is clear more research targeting this age group is needed [18].

Another strength of this study is its attention to mass media, self-efficacy, adaptive vs. maladaptive climate anxiety, and PEB in a single experimental study. While there is research on these topics, there is a lack of experimental research that considers the effects of mass media on internal factors such as anxiety and self-efficacy that can influence a person's willingness to engage in PEBs.

When analyzing the study's data, an imbalance in participant demographics could create unintended effects. For example, studies have found anxiety disorders to be more prevalent in women than men [20]. An imbalance in this area could lead to a more dramatic difference between groups. Yet, this is not a major concern as random assignment will reduce imbalances and statistical analysis will consider any significant unintended differences between groups.

This study is limited to print media. However, audio, or visual media may have different effects. Therefore, future research is needed on how different types of media can affect people's feelings about climate change and their subsequent behaviour. Future research should also address whether an increase in engagement in PEB is associated with a decrease in climate anxiety.

## Conclusions

As the consequences of a warming climate increase, it is important to consider how these changes to the environment impact people's mental health in their everyday life. The results of this study will lay the foundation for improving psychological wellness in light of the negative effects of climate change and can contribute to the development of a framework for effectively responding to the threats of climate change while also prioritizing mental health.

## List of Abbreviations

PEB: pro-environmental behaviour
CCAS: climate anxiety scale
GSE: generalized self-efficacy scale

## Conflicts of Interest

The author(s) declare that they have no conflict of interests.

## Ethics Approval and/or Participant Consent

This study has not been submitted for research ethics approval. However, anyone who uses this study design will have to submit the study details for review of their research ethics board (REB). Consent of participants is included in the study design. Participants will read a consent form at the beginning of the online survey, after which they will respond to items testing for knowledge and understanding of the consent form's content. Only participants who answer these items correctly will be able to proceed to the survey.

## Authors' Contributions

RNS: made contributions to the design of the study, drafted the manuscript, revised the manuscript, gave final approval of the version to be published.

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## References

[1] Lee H, Calvin K, Dasgupta D, Krinner G, Mukherji A, Thorne P, et al. Climate change 2023 synthesis report [Internet]. Geneva (CHE): IPCC; 2023 [cited 2023 Dec 2]. Available from: https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf

[2] Maran DA, Begotti T. Media exposure to climate change, anxiety, and efficacy beliefs in a sample of Italian university students. International Journal of Environmental Research and Public Health. 2021 Sept 4;18(17):9358. https://doi.org/10.3390/ijerph18179358

[3] Clayton S. Climate anxiety: psychological responses to climate change. Journal of Anxiety Disorders. 2020 Aug;74:102263. https://doi.org/10.1016/j.janxdis.2020.102263
[4] Ogunbode CA, Doran R, Hanss D, Ojala M, Salmela-Aro K, van den Broek KL. Climate anxiety, wellbeing and pro-environmental action: correlates of negative emotional response to climate change in 32 countries. Journal of Environmental Psychology. 2022 Dec;84:101887. https://doi.org/10.1016/j.jenvp.2022.101887
[5] Innocenti M, Perilli A, Santarelli G, Carluccio N, Zjalic D, Maran DA. How does climate change worry influence the relationship between climate change anxiety and eco-paralysis: a modern study. Climate. 2023 Sept 13;11(9):190. https://doi.org/10.3390/cli11090190
[6] Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behaviours. The Lancet. 2010 Oct 15; 376(9748):1261-71. https://doi.org/10.1016/S0140-6736(10)60809-4
[7] Happer C, Philo G. New approaches to understanding the role of the news media in the formation of public attitudes and behaviours on climate change. European Journal of Communication. 2015 Nov 4;31(2):136-151. https://doi.org/10.1177/0267323115612213
[8] Treen KM d'I, Williams HTP, O'Neill SJ. Online misinformation about climate change. WIREs Climate Change. 2020 June 18;11(5):665. https://doi.org/10.1002/wcc.665
[9] Bandura A. Self-efficacy in changing societies. Cambridge University Press; 1995.
[10] Kellstedt PM, Zahran S, Vedlitz A. Personal efficacy, the information environment, and attitudes toward global warming and climate change in the United States. Risk Analysis: An International Journal. 2008 Feb 25;28(1):113-26. https://doi.org/10.1111/j.1539-6924.2008.01010.x
[11] Hibber M, Nguyen A. Climate change communications & young people in the Kingdom: a reception study. International Journal of Media and Cultural Politics. 2013 Mar 1;9(1):27-46. https://doi.org/10.1386/macp.9.1.27_1
[12] Milman O. The Science is Irrefutable: US Warming Faster than Global Average, says Report [Internet]. The Guardian. 2023 Nov 14 [cited 2023 Dec 2]. Available from: https://www.theguardian.com/environment/2023/nov/14/us-national-climate-assessment-global-warming-report
[13] Clayton S, Karazsia BT. Development and validation of a measure of climate change anxiety. Journal of Environmental Psychology. 2020 Jun 1;69:69:101434. https://doi.org/10.1016/j.jenvp.2020.101434
[14] Cruz SM, High AC. Psychometric properties of the climate change anxiety scale. Journal of Environmental Psychology. 2022 Dec;84:101905. https://doi.org/10.1016/j.jenvp.2022.101905.
[15] Schwarzer R, Jerusalem M. Self-efficacy measurement: generalized self-efficacy scale (GSES). In: Johnston M, Wright SC, Weinman J, editors. Measures in health psychology. Windsor: NFER-NELSON; 1995. p. 35-37.
[16] Lazic M, Gavrilov-jerkovic V, Jovanovic V. The general self-efficacy scale: new evidence of structural validity, measurement invariance, and predictive properties in relationship to subjective well-being in Serbian samples. Current Psychology. 2021 Feb;40(2):699-710. https://doi.org/10.1007/s12144-018-9992-6.
[17] General Self-Efficacy Scale [Internet]. Shirley Ryan Ability Lab. 2020 Aug 18 [cited 2023 Dec 2]. Available from: https://www.sralab.org/rehabilitation-measures/general-self-efficacy-scale#mental-health
[18] Nadarajah K, David JC, Brun L, Bordel S, Moyon L, Foll DL. We are running out of time: temporal orientation and information seeking as explanatory factors of climate anxiety among young people. Psych. 2022 Sept 6;4(3):550-573. https://doi.org/ 10.3390/psych4030043
[19] Young People will be Key to Climate Justic at COP26 [Internet]. Nature. 2021 Oct 20 [cited 2023 Dec 2]. Available from: https://www.nature.com/articles/d41586-021-02843-6
[20] McLean CP, Asnaani A, Litz BT, Hofmann SG. Gender differences in anxiety disorders: prevalence, course of illness, comorbidity and burden of illness. Journal of Psychiatric Research. 2011 Aug;45(8):1027-35. https://doi.org/10.1016/j.jpsychires.2011.03.006

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