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Exploring climate change-related emotional experiences in Scottish students and the British public

Chiara Katharina Victoria Hill-Harding

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School of Psychology and Neuroscience

College of Medical, Veterinary & Life Sciences

University of Glasgow

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Abstract

Across three empirical projects, I aimed to develop a detailed understanding of how individuals in the UK experience climate change emotionally. I was particularly interested in climate anxiety as an emotion and the situational experiences that predict it, as well as understanding how university students experience and cope with the emotional impacts of climate change.

In the first project, I developed and evaluated a novel situated measure for climate anxiety that captures individuals' levels of climate anxiety for different relevant situations. I evaluated this measurement in a quantitative survey study with adults from the general UK public (N = 303). Results showed patterns for some situations that tended to be associated with higher climate anxiety across participants (e.g., "Hearing about climate catastrophes on the news", "Thinking about the future that children in the current generation may experience"), while other situations tended to be associated with lower climate anxiety (e.g., "Visiting a loved place in nature", "Seeing news on advances in green energy production"). There were also large differences between individuals in how much climate anxiety they experienced on average. Participants further showed intra-individual variability, meaning that the same individual typically reported low climate anxiety for some situations, moderate levels for others, and high climate anxiety for yet others.

In the second project, I conducted a mixed-methods online survey study on University of Glasgow students (N = 869). I built on the first project and adapted the situated measure to a university student context by including situations particularly relevant to the life of students and young people (e.g., "Talking about the emotional impacts of climate change in class", "Thinking about pursuing a career that is related to climate change"). I additionally assessed a number of other climate change emotions, climate change-related thoughts, and beliefs about the university's climate actions to get a more holistic understanding of how students experienced climate change emotionally. Findings revealed that students experienced high levels of negative climate change-related emotions and thoughts, moderate but infrequent climate anxiety, and had mixed views of their university's climate actions. Qualitative findings from open-ended questions further suggested that students would like to have more climate change-related teaching across subject areas and that they would like the university to pursue more sustainable investments. Findings suggested that this may even benefit students' mental wellbeing by reducing anxiety.

The third project was largely qualitative, and I analysed existing data from project 2 (N = 823) to investigate how students coped with climate change and the types of situations that required coping. I used conceptual content analysis to extract these types of triggering situations from participants' open-ended text responses. I found four situation types that required students to cope, including navigating climate change information, climate justice issues, climatic changes and environmental losses, and climate change dismissal. I further applied the framework method to analyse how participants tended to cope with climate change. I found four overarching coping strategies: reducing the mental load of climate change, doing something constructive about climate change, seeking social support and meaning, and doomist thinking and behaviour.

Taken together, these findings provide a much more nuanced understanding of climate anxiety and related emotions by showing their variability depending on the situation and the individual. Similarly, the types of triggering situations related to climate change that require active coping also seem to relate to a specific set of situational characteristics. The effects of these distressing emotions on university students' mental health should be taken seriously, and universities may wish to investigate further the links between institutional climate actions and their students' mental wellbeing.

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Hill-Harding, C. K. V., Barsalou, L. W., & Papies, E. K. (in press). Beyond symptomatic support: Students' emotional experiences with climate change and how universities can help [Author Accepted Manuscript]. *Global Environmental Psychology.* https://doi.org/10.23668/psycharchives.16201

Hill-Harding, C. K. V., Klein, M. D., von Stackelberg, C., Papies, E. K., & Barsalou, L. W. (2026). Developing and evaluating a situated psychometric instrument for assessing climate anxiety: The SAM2 CAM. *Applied Psychology: Health and Well-Being*, e70125. https://doi.org/10.1111/aphw.70125

Available as Preprint

Hill-Harding, C. K. V., Papies, E. K., Barsalou, L., & Reid, K. (2025). *From hope and action to giving up: Students' stories of coping with climate change.* PsyArXiv. https://doi.org/10.31234/osf.io/e28hj_v1

Author's Declaration

This thesis contains the work conducted by Chiara K. V. Hill-Harding at the School of Psychology and Neuroscience, University of Glasgow, under the supervision of Prof. Lawrence Barsalou between October 2022 and November 2025. I hereby declare that, except where stated, the work included in this thesis is my own and has not been submitted to any other university degree.

Parts of the data used in Chapter 2 were part of my MSc dissertation, submitted to the University of Glasgow in May 2022. Since then, I have collected further data and recruited additional participants during my PhD studies and have run extensive additional analyses to investigate this project at a larger scale and in more detail. After a detailed review, the University of Glasgow's Higher Degree Committee has, therefore, permitted me to include this project as an empirical chapter in this thesis.

Contributors Statement

Below are the contribution roles for each chapter of this thesis. Contributions are listed following the Contributor Roles Taxonomy (CRediT) format.

Key

CHH: Chiara K. V. Hill-Harding; LWB: Lawrence W. Barsalou; EKP: Esther K. Papies; KR: Kate Reid; MDK: Marissa D. Klein; CS: Constantin von Stackelberg

Chapter 1

CHH: Conceptualisation, Writing ‑ Original draft, Writing ‑ Review & Editing

LWB: Conceptualisation, Writing ‑ Review & Editing

Chapter 2

CHH: Conceptualisation, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Visualisation, Writing ‑ Original draft, Writing ‑ Review & Editing

LWB: Conceptualisation, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Visualisation, Writing ‑ Review & Editing

EKP: Conceptualisation, Writing ‑ Review & Editing

MDK: Conceptualisation

CS: Conceptualisation

Chapter 3

CHH: Conceptualisation, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Visualisation, Writing ‑ Original draft, Writing ‑ Review & Editing

EKP: Conceptualisation, Data Curation, Methodology, Project Administration, Writing‐Review & Editing

LWB: Conceptualisation, Methodology, Writing‐Review & Editing

Chapter 4:

CHH: Conceptualisation, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Visualisation, Writing‐Original draft, Writing‐Review & Editing

KR: Conceptualisation, Formal Analysis, Methodology, Writing‐Review & Editing

EKP: Conceptualisation, Methodology, Writing‐Review & Editing

LWB: Conceptualisation, Writing‐Review & Editing

Chapter 5

CHH: Conceptualisation, Writing‐Original draft, Writing‐Review & Editing

LWB: Conceptualisation, Writing‐Review & Editing

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Abbreviations

SAM²	Situated Assessment Method
SAM² CAM	Situated Assessment Methods Climate Anxiety Measurement
ICC	Intraclass Correlation Coefficient
H	Hypothesis
IQR	Interquartile Range
SD	Standard Deviation
S	Situation
SM	Supplementary Material
OSF	Open Science Framework
FM	Framework Method (chapter 3)

1.   Chapter 1: General Introduction

1.1   Introduction

Climate change already affects many people's mental wellbeing and everyday functioning. Climate disasters (Sharpe & Davison, 2021) and gradual but chronic changes in temperature and ecosystems (e.g., Ayta, 2024; Ogunbode et al., 2021; Trombley et al., 2017) cause some individuals to develop serious mental disorders like post-traumatic stress disorder (PTSD) and depression. But even with lower risk of direct exposure to catastrophes, like in the UK and Europe, young people in particular feel worried and anxious about climate change (Hickman et al., 2021; Ojala et al., 2021). Such negative climate change emotions can impact mental health, even in Western and less vulnerable countries (Ogunbode et al., 2021).

For the UK context, it is therefore important to understand what types of experiences trigger negative emotions and distressing climate anxiety in UK residents and what coping strategies are effective. This would allow the support of individuals' emotional adaptation and could inform systemic changes to governance, communities, education, and healthcare provision (e.g., Watts et al., 2015). Current psychometric scales used in research do, however, not account for specific situational experiences (e.g., Clayton & Karazsia, 2020; Hogg et al., 2021), which have been argued to largely contribute to how emotions are experienced (e.g., Feldman Barrett, 2017; Lebois et al., 2020; Wilson-Mendenhall et al., 2013). Likewise, research available on how individuals cope with climate change-related negative emotions, focuses mainly on adolescent populations (e.g., Ojala, 2013; Ojala & Bengtsson, 2019; Wullenkord & Ojala, 2023).

Therefore, this thesis aims to provide a better understanding of what types of situations and experiences are associated with negative climate change emotions in the UK, and to explore coping strategies for climate change-related emotions in university students. I hope this work can inform future climate emotion research and provide new ideas for individualised support and system-level implementations.

1.2   Chapter Overview

This chapter aims to provide an in-depth overview of important terms, concepts, and research findings that I use and build on throughout this thesis. First, I will discuss the different ways climate change can impact mental health, including direct impacts, indirect impacts, and vicarious impacts. I then go on to discuss specifically the emotional impacts of climate change, with a particular focus on climate anxiety. I continue by reviewing some

limitations of existing research on climate anxiety and climate change-related emotions and therefore provide some justifications for this thesis. I then outline the overarching aims of this thesis, the theoretical perspectives that have informed the research presented, and how this thesis addresses the aforementioned research limitations. Finally, I will give an overview of the empirical chapters, detailing their aims and content.

Throughout this thesis, I will use the term *climate change* to refer to anthropogenic climate change. Climate change generally refers to "long-term shifts in temperatures and weather patterns" (United Nations, 2025). Anthropogenic climate change, more specifically, refers to human-made changes in weather patterns, temperatures, and consequently vegetation and biodiversity that is mainly due to the burning of fossil fuels that has rapidly increased since the 1800s (United Nations, 2025). This means that high amounts of greenhouse gases like carbon dioxides and methane are released into the atmosphere, which drastically accelerates shifts in environmental and climatic changes (United Nations, 2025). These lead to endangering consequences, such as droughts, sea level rises, floods, disastrous storms, and a global decline in biodiversity (United Nations, 2025). Evidently, this has major impacts on living conditions (e.g., storm damage to housing), working conditions (e.g., building closures due to extreme heat), and public health (e.g., increase of airborne diseases). It can additionally impact mental health and wellbeing.

1.3   Direct climate change impacts on mental health

1.3.1   Extreme weather events (acute)

Extreme weather events (EWEs) caused by climate change include wildfires, floods, storms, and heatwaves, and they are recently becoming more frequent and intense (AghaKouchak et al., 2020; Khadke et al., 2024) . Experiencing EWEs first-hand can cause individuals to develop serious mental illness. For instance, floods can lead to significant increases in posttraumatic stress disorder (PTSD), anxiety, and depression (Fernandez et al., 2015; Liu et al., 2024). EWEs are further associated with increases in psychotropic drug prescriptions and general decreases in people's wellbeing in affected areas (Fernandez et al., 2015). In the UK specifically, Waite et al. (2017) studied flooding effects on mental health, using data from widespread floods in England in 2013 and 2014 and assessed the floodings' effects on mental health one year later. They found that among those flooded, 20% showed depressive symptoms, 28% anxiety symptoms, and 36% PTSD. These rates were significantly lower in less affected and non-affected individuals. Property damage due to flooding was linked to seven times higher likelihood of developing PTSD. Those

who lost access to healthcare or social care were nine times more likely to report PTSD symptoms one year after the floods.

Across studies identified in a scoping review, wildfires have also been shown to impact mental health negatively, including significant rises in acute fear, psychological distress, and uncertainty (Charlson et al., 2021). Longer-lasting impacts included long-term negative impacts on mental and emotional wellbeing overall (Charlson et al., 2021). Despite such evidence, however, there is often little research on the mental health impacts of wildfires, which would be particularly relevant in countries like Australia, where wildfires are experienced quite regularly (Charlson et al., 2021).

Although different from the above described climate disasters, heatwaves and above-average hot days are, indeed, one of the most concerning climate change-induced causes for mental disorders, especially as they become so frequent in all areas of the world (AghaKouchak et al., 2020; Watts et al., 2017). Heatwaves and above-average hot days have been linked to poor mental health outcomes, including increased reports of insomnia, mood disorders, increasing numbers of mental health hospitalisations, and reduced effectiveness of some psychoactive medications (e.g., Ayta, 2024; Berry et al., 2018; Watts et al., 2017). Evidently, this poses major challenges for healthcare systems and provision.

1.3.2   Slower climatic changes (subacute and chronic)

On the other hand, subacute climatic changes are less visible and appear more slowly than EWEs, but they can still affect mental health. Subacute changes that impact mental health include increases in average outdoor temperature and humidity, droughts, altered snow patterns, and excessive precipitation (e.g., Charlson et al., 2021; Crane et al., 2022; Thompson et al., 2023; Vergunst & Berry, 2021). Chronic climatic changes are gradual changes resulting from long-term climate change exposure. These include, for example, rising sea levels, land degradation, and loss of biodiversity (Bourque et al., 2014; Burrows et al., 2024). Subacute and chronic changes have both been shown to impact mental health. For instance, rises in temperature, sea levels, and hot weather have been linked to higher rates of mood disorders, increased acute stress responses, PTSD, alcohol and drug abuse, and even suicidal ideation (Bourque et al., 2014; Burrows et al., 2024). They are further associated with particular increases in depression and anxiety symptoms, and generic psychological distress (Burrows et al., 2024). Rises in temperature and humidity have also been linked to poorer mental health outcomes across the world, independent of pre-existing mental illness like anxiety disorders or depression (Charlson et al., 2021). Overall, however, more evidence exists for EWEs than slower climatic changes

and further research is needed in this field to establish long-term causal relationships (Burrows et al., 2024; Hayes & Poland, 2018).

1.4 Indirect climate change impacts on mental health

Climate change also affects mental health via indirect pathways, which are closely linked with social justice issues, as marginalised groups such as indigenous peoples, ethnic minorities, low-income households, women, children, elderly individuals, outdoor workers, rural and remote communities, and anyone with pre-existing health conditions are most at risk (Hayes et al., 2018; Hayes & Poland, 2018; Niedzwiedz et al., 2024). Climate change is, for instance, affecting people's mental health by weakening people's physical health due to increased spreads of disease vectors or air pollution (e.g., Newman et al., 2024; Paz et al., 2021; Watts et al., 2015). It also affects mental health by creating poverty through food insecurity and displacement (Paz et al., 2021; Watts et al., 2015). Climate change-related destruction of infrastructure and political conflict can likewise impact people's mental health (Hayes et al., 2018).

Carleton (2017) presented findings that strikingly show the interaction between climatic changes and mental health, as well as climatic changes indirectly impacting mental health. They reported findings on suicide rates in India, where they observed significant increases in suicide rates by 3.5% per 1 degree temperature increase above a 20-degree average. This was *specifically* true for food growing seasons but not for non-growing seasons. Thus, climate change-related heatwaves can be *directly* linked to poorer mental health. However, climate change-related temperature rises also *indirectly* affect mental health through creating food insecurity and food poverty, particularly augmenting suicidal ideation during food growing seasons. The risk for climate change-related mental illness thus disproportionately affects vulnerable groups – those who have pre-existing health conditions, low socioeconomic status, experience political conflict, or live in most vulnerable areas, such as island nations. Thus, climate change mental health impacts augment existing (social) inequalities (Hayes et al., 2018; Niedzwiedz et al., 2024).

1.5 Vicarious (overarching) climate change impacts on mental health

In addition to direct and indirect effects, climate change can also impact mental wellbeing through overarching, vicarious encounters. These can include (social) media reports on climate change (e.g., Parry et al., 2022), climate change education (e.g., Kelly, 2017; Khalaim & Budziszewska, 2024), government inaction (e.g., Hickman et al., 2021), or general awareness and knowledge of climate change (Ogunbode et al., 2020; Usher et

al., 2019; although some research suggests inverse correlations; Zacher & Rudolf, 2023). When considering the UK context, these vicarious impacts are likely to be experienced most commonly, given the relatively rare occurrence of direct exposures like climate catastrophes or indirect exposures like destruction of infrastructure. Although direct and indirect climate change events are increasing in both frequency and intensity in the UK, like everywhere in the world (AghaKouchak et al., 2020), vicarious encounters are most probable to impact mental wellbeing in daily life in the UK at present. It is, therefore, important to consider vicarious impacts, in particular and in addition to, direct and indirect impacts when researching these in UK residents.

1.6   Emotional impacts of climate change

As mentioned earlier, climate change events can have serious consequences for mental health, including the manifestation of mental disorders. However, climate change also elicits a range of distressing emotions that may persist over longer time periods. While not in themselves mental disorders, such distressing emotions can intensify to become threats to individuals' mental wellbeing. These climate change emotions often include feelings of anger, powerlessness, guilt, helplessness, grief, fear, and sometimes hope (Hickman et al., 2021; Neckel & Hasenfratz, 2021; Voşki et al., 2023). Climate change emotions can negatively affect mental wellbeing, as they have been linked to poor sleep and poorer self-rated mental health (Ayta, 2024; Ogunbode et al., 2021). Some emotions have been identified in the literature that are unique to the climate crisis and ecological changes. These include, for instance, solastalgia, ecological grief, climate worry, and climate anxiety.

1.6.1   Solastalgia and "earth emotions"

Environmental philosopher Glenn Albrecht introduced what he calls "earth emotions" and his notions of *psychoterratic* and *somaterratic* emotional experiences. *Psychoterratic* experiences describe the relationship between the mind (psyche) and the physical natural environment, whereas *somaterratic* experiences relate to the connection between the body and the physical natural environment (Albrecht, 2019; Albrecht et al., 2007). Solastalgia, specifically, derives from the word 'solace', which relates to the comfort or strength a person can be provided with in difficult times (Albrecht et al., 2007). Albrecht argues that natural places and landscapes provide a special form of solace to humans that other places or people cannot. Solastalgia is thus the pain or distress one experiences when a loved natural place is lost or altered due to climatic or environmental changes (Albrecht et al., 2007). When applied to climate change, it is apparent that

"[c]limate change for one, might, unfortunately, be a globally significant source of []
solastalgia" (Albrecht et al., 2007; p. 98). Solastalgia is thus related to a longing and a form
of homesickness while still in the environment one regards as home (Albrecht, 2019;
Albrecht et al., 2007).

1.6.2 Eco-anxiety and climate anxiety

While solastalgia describes a longing, climate change can also elicit anxiety, which
may have more worrisome consequences for mental health. There is some debate in the
literature regarding terminology, as some scholars refer to this anxiety as *eco-anxiety*,
while others use *climate anxiety*, and yet others use these terms interchangeably. In this
thesis, I view eco-anxiety and climate anxiety as distinct constructs, based on Pihkala's
(2021) work. Pihkala was one of the first scholars to provide a comprehensive taxonomy of
environmental and climate change-related emotions. He makes the distinction between
eco-anxiety as an environmental emotion that can arise from changes to the natural
environment and other ecological changes, not necessarily linked to climate change.
Climate anxiety, on the other hand, describes an anxiety that is specific to anthropogenic
climate change (Pihkala, 2021; Vaškovic, 2023).

Different philosophical perspectives have been proposed in efforts to explain the
phenomenon of climate anxiety, including perspectives from theology, sociology,
education, and psychology (Vaškovic, 2023). The specific term of "climate anxiety" is
more recent, however, and as the research around it has progressed, more scholars describe
it as an existential anxiety (Ojala et al., 2021; Passmore et al., 2023). In this thesis, I, too,
regard climate anxiety as an existential anxiety, since it exacerbates humans' main
existential worries, including questions of happiness, identity, meaning in life, freedom,
death, and social isolation (Passmore et al., 2023).

Climate anxiety can be experienced by anyone, regardless of the types of
encounters a person has had with climate change – be it direct, indirect, or vicarious
(Clayton, 2020; Niedzwiedz et al., 2024; Taylor, 2020). Climate anxiety is perhaps the
climate change emotion most worrying for mental health, as it can manifest as serious
symptoms and disrupt individuals' daily functioning (e.g., Clayton & Karazsia, 2020).
Although it can have negative effects on daily functioning and wellbeing, climate anxiety
is not generally regarded as a pathological anxiety, since it is a rather rational response to a
realistic threat and can even motivate climate action (Clayton, 2020; Crandon et al., 2024;
Pihkala, 2021). Indeed, "[i]t would seem irrational not to have a heightened state of
concern and anxiety when living with such ominous threats. In essence, [climate anxiety]

is an indicator that our relationship with the beyond-human natural world is changing – quickly, significantly, and on many levels" (Passmore et al., 2023; p. 140). While climate anxiety is distinct from generalised pathological anxiety in that it can be attributed to a realistic threat climate anxiety can still present in ways that impact functioning when it becomes too strong (e.g., Clayton & Karazsia, 2020; Pihkala, 2021). If this is the case, interventions may help support individuals' mental wellbeing to reduce anxiety and allow adaptive action.

1.7   Climate mental health adaptation and the role of higher education

To protect and promote societal health, it is vital to successfully mitigate and adapt to climate change and its health consequences. Currently, however, most advice from health professionals and researchers asks individuals to focus on their personal resilience and coping strategies (Berry et al., 2018). This is, of course, very important for protecting an individual's resilience and can likely improve that individual's mental wellbeing (Berry et al., 2018). However, an individual's ability to follow that advice and implement it in their actions largely depends on the availability of support services and structures, as well as social determinants (Berry et al., 2018). Such individual-focused advice neglects and disregards the importance of social policy and collective action for mitigating and adapting to climate change (Berry et al., 2018). Thus, the dynamics of existing system structures need to be understood, as well as how these can change depending on context and time to allow necessary adjustments for climate change mental health adaptation.

Such adaptation could include better clinical assessment methods for climate change related mental ill-health, as well as increasing mental health professionals' training to include climate change mental illness (Bourque et al., 2014; Cunsolo et al., 2020). Existing group therapy approaches could be usefully included to reduce feelings of loneliness in those affected (Cunsolo et al., 2020). Since much of the training and practice of health professionals happens at higher education institutions, it is important that climate change-related research be interdisciplinary and that climate literate researchers become climate change (mental health) advocates (Bourque et al., 2014; Papies et al., 2024). Universities naturally seem an ideal starting point for this, given their central role in the creation, distribution, and digestion of much of the knowledge around climate change (Henritze et al., 2023; Thierry et al., 2023).

Holistic climate change education may present co-benefits for students' mental health and provide student safeguarding. While climate change is an ongoing stressor that negatively impacts young people's mental health and wellbeing, climate change education

can provide opportunities for students to voice concerns, learn about progress, and impact future career paths that benefit them and the planet (Newberry Le Vay et al., 2024). However, to prevent further distress, climate change education should not only be threat-focused, but allow conversations around emotional and mental wellbeing (Newberry Le Vay et al., 2024). This could be achieved by co-designing climate change education with students, parents, and educators, by strengthening knowledge through climate-relevant research, and addressing siloed investments that focus on climate mitigation/ adaptation *or* mental health, but rarely its intersection (Newberry Le Vay et al., 2024).

Providing such emotionally supportive climate change education would directly invest in climate-aware future researchers, healthcare providers, and policy makers: "By bringing mental health and wellbeing into [climate change education], we can better achieve the important outcomes of preparing children and young people to live in an uncertain future and take sustainable climate action." (Newberry Le Vay et al., 2024). This is crucial for achieving some of the main goals set out by the United Nations, including No Poverty, Zero Hunger, Good Health and Well-Being, Reduced Inequalities, Sustainable Cities and Communities, Climate Action, and more (United Nations Department of Economic and Social Affairs, 2025).

1.8   Limitations of existing research

As the previous section outlines, to effectively address the varying mental wellbeing impacts of climate change, it is necessary to target both the individual and system levels. To achieve this, it is important to understand factors that influence an individual's climate change emotions and mental wellbeing, as well as factors that exist within systems that contribute to negative climate change impacts on mental wellbeing or that could support effective adaptation.

Based on the constructivist view of emotion, an individual's emotions are constructed from their learned experiences of bodily, cognitive, perceptive, and interoceptive processes in the context of specific situations (L. Feldman Barrett, 2017a; Lebois et al., 2020). From this standpoint, an individual's experiences of climate change emotions should differ depending on the type of situation, since even the same emotion may be experienced differently based on that emotion's situational adaptation (e.g., worry about livelihood vs. worry about public speaking; Lebois et al., 2020). However, existing research does not consider the varying situational contexts that may contribute to an individual's emotional experience of climate change (e.g., "I find myself crying because of climate change"; "I think, "why do I react to climate change this way?""; Clayton &

Karazsia, 2020). This is a major shortcoming, since it seems likely that different types of situational experiences should elicit different forms and intensities of emotions, given that individuals who experience different forms of climate change exposure express different emotions and mental health profiles (e.g., Waite et al., 2017).

Secondly, research shows that intervention attempts to support individuals who struggle with climate change-related mental ill-health or overwhelming climate anxiety are not particularly effective (Taylor, 2020). Identifying unique situational triggers for an individual may thus provide a promising basis for more holistic and personalised support. To allow the design of such support, it is important to identify effective ways in which individuals cope with distressing climate change emotions. Existing research on coping with climate change-specific emotions has, however, focused primarily on adolescents (see e.g., Ojala, 2013; Ojala et al., 2021; Ojala & Bengtsson, 2019). This research is, of course, important to understand and support children and adolescents who are one of the most vulnerable groups affected by climate change (e.g., Crandon et al., 2024; Hickman et al., 2021; Rousell & Cutter-Mackenzie, 2020). It is equally important, however, to research coping strategies in other vulnerable populations to inform a more balanced theoretical framework on climate change coping, as well as to inform effective support that can be used by a larger proportion of the general population.

Finally, little research exists that focuses on universities as part of the educational system, the role universities play in climate change, knowledge dissemination, but also support provision and student safeguarding. There is some research that shows that university students feel the need for climate change education that goes beyond scientific teaching, that actively involves students' views, and considers the emotional impacts of climate change (education) on students' wellbeing (Khalaim & Budziszewska, 2024). Yet, no existing studies take into account situational factors that may affect students' climate anxiety or how universities' climate actions relate to students' mental wellbeing. To be able to provide high-quality teaching and research, while also protecting students' mental wellbeing, it is important, however, to investigate what types of situations in a student's life affect their climate anxiety and how they think universities can support them.

1.9   The current thesis

1.9.1   Aims and theoretical framework

Based on the identified limitations of existing research, this thesis aims to address some of these drawbacks over three empirical research studies. Specifically, this thesis

aims to provide an understanding of the types of situational experiences associated with higher and lower levels of climate anxiety; to develop an insight into the types of situations that require individuals to actively cope with climate change; to understand what coping strategies are typically used to cope with climate change; how university students experience climate change emotionally; how this relates to their university's climate actions and support for students. As an overall contribution to the field, this thesis thus aims to provide an understanding of climate change emotions, especially climate anxiety, and effective coping strategies from a situated and individual-focused perspective.

To address these issues, this thesis adopts the theoretical perspective of the constructivist approach to emotion (see Feldman Barrett, 2017; Lebois et al., 2020; Wilson-Mendenhall et al., 2013), where climate change emotions, and climate anxiety in particular, are viewed as constructed emotions. This thesis is also partly based on the methodological work of the Situated Assessment Method (SAM²; see e.g., Dutriaux et al., 2023; Roger et al., 2024; Taylor Browne Lūka et al., 2024). This provides an alternative to traditional psychometric approaches that assesses a construct across relevant situations, providing situational and individual profiles of an emotion (instead of abstracting over situations and only assessing individuals). This thesis thus views the situational context as critically important to understanding climate anxiety and related emotions.

Thus, though various definitions of climate anxiety exist, I adopt Pihkala's (2021) definition throughout this thesis, which views climate anxiety as non-pathological, context-dependent, and distinct from generalised anxiety. This ties in with this thesis' theoretical views of emotions as being socially constructed and situational, while also different from general trait anxiety.

1.9.2 Overview of the empirical chapters

In collaboration with colleagues, I conducted three empirical research studies to understand and address the gaps in literature discussed. I use the pronoun "we" instead of "I" in the following section to acknowledge the contributions of my co-authors involved in all three of these studies:

We conducted a survey study (Chapter 2) to develop and validate a situated assessment method of climate anxiety in a sample of UK citizens ($N = 303$). We assessed what types of situations were typically linked to high (versus low) climate anxiety across participants, including situations like *Hearing about climate change on the news* or *Thinking about my future*. We also investigated different factors that may be related to

climate anxiety, such as how threatened someone may feel by a particular situation or how effectively participants were able to cope with a situation. We additionally explored individual differences in participants' climate anxiety profiles, which allowed us to generate unique profiles for different individuals. We aimed to provide a situated, more nuanced measure of climate anxiety and to get a better understanding of climate anxiety in the UK context, relative to unstituated assessment approaches.

We next conducted a mixed methods study (Chapter 3) to assess climate anxiety, climate change emotions, and climate change-related thoughts in university students ($N =$ 869). We used self-report surveys to assess climate anxiety intensity for several specific situations, along with non-situational frequency of climate anxiety symptoms, climate change emotions and thoughts, and students' beliefs about their university's climate actions and support for students. We also included open-ended questions to explore what students thought the university should or should not do with regards to climate change and students' views on climate change teaching and related mental health support. We thus aimed to provide a more holistic picture of university students' emotional experiences of climate change and their perceptions of the university's role in this.

Finally, we conducted a largely qualitative mixed-methods study (Chapter 4) using existing data from study 2. Here, we briefly assessed university students' ($N = 823$) support-seeking tendencies for climate change-related mental health. The main focus of this study was on how students cope with distressing climate change emotions and the types of situational experiences where they needed to actively cope. We used the framework method, based on thematic framework analysis (Gale et al., 2013), and content analysis (Neuendorf, 2017) to explore participants' qualitative survey responses. Overall, this study aimed to provide an understanding of climate change coping in a student population and the types of situations that require students to cope with climate change.

We prepared Chapters 2, 3 and 4 as separate journal articles, so that their content is likely to overlap with this chapter, particularly in their Introduction sections. Chapter 2 is in revision at *Applied Psychology: Health and Well-Being*. Chapter 3 is in print and has been published as Author Accepted Manuscript at *Global Environmental Psychology*. Chapter 4 is under review at *Applied Psychology: Health and Well-Being*.

2. Chapter 2: Developing and evaluating a situated psychometric instrument for assessing climate anxiety: The SAM² CAM

This chapter is an exact copy of the following journal article, which is published in Applied Psychology: Health & Wellbeing:

Hill-Harding, C. K. V., Klein, M. D., von Stackelberg, C., Papies, E. K., & Barsalou, L. W. (2026). Developing and evaluating a situated psychometric instrument for assessing climate anxiety: The SAM2 CAM. *Applied Psychology: Health and Well-Being*, e70125. https://doi.org/10.1111/aphw.70125

2.1. Abstract

Although increasing research examines climate anxiety, little is known about the situational factors related to it. To assess these factors, we developed and evaluated a situated psychometric instrument for assessing how much climate anxiety individuals recall experiencing in 31 situations where climate anxiety is likely (e.g., hearing about climate catastrophes on the news). Of interest was how climate anxiety is experienced in a country like the UK, where climate disasters are mostly heard about in the media and anticipated in the future, relative to countries where climate disasters are experienced directly and regularly. In an online survey (N = 303; 50.8% female), we investigated how much climate anxiety individuals recall experiencing in situations where climate anxiety is likely to occur, along with how much they recall experiencing 13 factors potentially related to climate anxiety (e.g., threat, violation, rumination). An individual measure of climate anxiety, averaged across situations, exhibited high reliability, construct validity, and content validity. Climate anxiety varied widely across situations, with individuals further varying in how much climate anxiety they remembered experiencing in each situation. As predicted, the 13 situational factors tended to correlate significantly with climate anxiety across situations, explaining a median 75% of its variance in individual regressions.

2.2. Introduction

In response to threats posed by climate change, people increasingly experience diverse forms of climate anxiety that potentially challenge their mental health and wellbeing. Here we define climate anxiety as anxiety specific to anthropogenic climate change and its experienced or anticipated consequences for ecosystems, biodiversity, and human life (Pihkala, 2020). Climate anxiety has many dimensions and is often related to worry and fear, although it expresses as a distinct construct (Pihkala, 2020). Climate anxiety can also be understood as an existential anxiety that challenges humans' core existential experiences, including happiness, identity, meaning, death, freedom, and isolation (Passmore et al., 2023). It can arise from direct impacts, such as physical experience with climate change, from indirect impacts such as climate change impacting politics and local weather, or from overarching impacts such as knowledge, education, and awareness of climate change, which can come from vicarious encounters, including media reports and anticipated threats (e.g., Clayton, 2020; Maran & Begotti, 2021; Pihkala, 2020). Hence, anyone can be affected by climate anxiety as the result of diverse influencing factors (Clayton, 2020).

While extremely high levels of climate anxiety can impact a person's functioning and wellbeing, climate anxiety is not in itself pathological, and can be viewed as a rational response to a realistic threat (Clayton, 2020; Pihkala, 2020). This distinguishes climate anxiety from classic anxiety disorders, meaning that it cannot be entirely explained by general trait anxiety (Pihkala, 2020). From theoretical proposals, it appears that uncertainty, uncontrollability, and unpredictability associated with future climatic changes play a major role in climate anxiety (Pihkala, 2020).

As a result of these factors, populations in countries like the UK can experience climate anxiety, even though their perhaps most common current concerns are anticipating significantly worse consequences in the future. Unsurprisingly, populations in high-risk countries (e.g., Nigeria, Chad, Somalia, and Syria) who already experience extreme consequences of climate change, tend to experience higher climate anxiety than populations in lower-risk countries, with serious mental health consequences (e.g., Cunsolo & Ellis, 2018; Ojala et al., 2021; Stanley et al., 2021). Furthermore, factors such as being female, younger, and having less education are linked to increased risk of climate anxiety in lower-risk countries (Poortinga et al., 2019). Finally, a variety of other factors, such as national politics (Poortinga et al., 2019), family contexts (Lawson et al., 2019), and local

temperature spikes (e.g., Sugerman et al., 2021), have been found to be associated with an individual's climate anxiety and concern.

In the work reported here, we developed and evaluated a climate anxiety instrument for the type of climate anxiety typically experienced in countries like the UK, where this study took place. Of particular interest was assessing trait levels of climate anxiety across situations where individuals report it. Also of interest was establishing situations where climate anxiety is highest, along with situational factors associated with climate anxiety. Although we assume that an individual's climate anxiety varies considerably across situations, we nevertheless assume that stable differences exist between individuals in their average trait-levels of climate anxiety across situations.

2.2.1. Climate anxiety as a constructed emotion

Some theoretical perspectives on climate anxiety suggest that it is highly malleable, varying widely between individuals and even within them (Pihkala, 2020). Because experiences of climate anxiety result from a wide variety of environmental and social factors, it can vary as diverse factors continually contribute to the specific forms it takes (e.g., local climate disasters, media communication about climate disasters, new social norms, changing weather patterns, silence around climate change; Pihkala, 2020).

The constructivist perspective of emotion offers a potentially powerful way of understanding how climate anxiety takes different forms both between and within individuals (Feldman Barrett, 2006, 2017; Feldman Barrett, 2006; Gendron & Barrett, 2009; Lebois et al., 2020; Wilson-Mendenhall et al., 2011). From this theoretical perspective, an emotion is a constructed category that depends heavily on an individual's culture, language, and learned conceptualisations of experience - similar to how categories for common objects, such as tools and furniture, are acquired. Rather than being implemented by an innate circuit in the brain, an emotion category is acquired throughout lifespan development, taking infinitely many forms as it is expressed in daily life. From this theoretical perspective, fear, for example, is viewed as an acquired category that takes diverse forms across situations, such as concern, alarm, fright, dread, and terror. Certainly, genetically based biological systems contribute to emotion categories (Lebois et al., 2020; LeDoux, 2012), as they do to all categories (e.g., the extraction and processing of perceptual features in plant and animal categories; Malt, 1995). Nevertheless, a wide variety of learning, social, linguistic, and cultural systems contribute to the experience and conceptualisation of emotion as well. As a result, each individual's emotion categories take

specific forms that reflect their unique biology and situational experience across the lifespan.

From the constructivist perspective, anxiety can be viewed as a constructed emotion category, with climate anxiety emerging as a sub-category in those individuals for whom it becomes relevant. For individuals who have so far avoided climate disasters or refused to acknowledge them, climate anxiety may not emerge as an emotion category that plays a central role in their experiences. For other individuals, however, climate anxiety may emerge as an emotion category that becomes highly salient on a daily basis. Because climate anxiety is a constructed category that reflects each individual's unique experience, it takes diverse forms across the individuals who do experience it. For individuals who have experienced climate disasters directly, climate anxiety takes forms that reflect these situational features of their experience. For individuals who only anticipate climate disasters and experience them indirectly in the media, climate anxiety likely takes different forms.

2.2.2. Psychometric assessment of climate anxiety

For the reasons just presented, we assume here that climate anxiety is a constructed emotion. From this perspective, a psychometric instrument is needed that captures the unique forms of climate anxiety in different individuals, reflecting each person's unique situational experience. As will be seen, we believe that current psychometric instruments cannot fully capture an individual's climate anxiety because they only assess the individual abstractly, not with respect to specific situations.

To date, climate anxiety (e.g., Clayton & Karazsia, 2020; Hogg et al., 2021), along with related concepts such as climate worry (e.g., Stewart, 2021) and climate emotions (e.g., Contreras et al., 2024), have typically been assessed psychometrically in a non-situated manner at the individual trait level, even when measuring climate anxiety in daily assessment studies (e.g., Contreras et al., 2024). To do so, existing measures assess climate anxiety or climate worry with general statements about the individual that ignore specific situational experience, such as "I worry that I might not be able to cope with climate change" (Stewart, 2021) or "I find myself crying because of climate change" (Clayton & Karazsia, 2020). Items like these do not reference specific situations but instead ask about individual experience abstracted across situations. Averaging across a set of unsituated items establishes a trait-level measure for an individual that is decontextualised, not

assessing the construct of interest for the situations where it is experienced (Dutriaux et al., 2023).

Unsituated approaches like these assume that individuals can abstract across diverse situations that are potentially relevant to the items being assessed. From a cognitive perspective, it is an open question whether people actually attempt to abstract across all relevant situations, and if so, whether they do so accurately (Dutriaux et al., 2023). Perhaps more realistic accounts of how people produce responses to unsituated assessment items is that they use the availability strategy to sample a small subset of situations that are currently available in memory (Tversky & Kahneman, 1973) and/or that they consult intuitive theories about climate anxiety and its relation to their self-concepts (Gelman & Legare, 2011; Nisbett & Wilson, 1977; Ross, 1977).

Finally, unsituated approaches make the implicit assumption that climate anxiety is relatively constant across relevant situations, which is unlikely (Pihkala, 2022). Indeed, much research finds that an individual's experiences and behaviours depend more on situational factors than on individual differences (e.g., Bandura, 1978; Cervone, 2005; Fleeson & Jayawickreme, 2021; Mischel & Shoda, 1995; Mischel, 1968). Not only do traits vary extensively across situations, but individuals vary widely in how they express traits in the same situations (i.e., individual by situation interactions; Dutriaux et al., 2023). It follows that climate anxiety cannot be captured entirely by a single trait-level measure (Pihkala, 2020). As Pihkala (2022) notes, individual variability and experiences across different situations influence emotions like climate anxiety substantially. Assessing climate anxiety at both the individual and situational levels may thus provide a much richer assessment than only measuring it at the individual level.

2.2.3. Developing a situated measure of climate anxiety

As described earlier, we assume that climate anxiety is a constructed emotion, with different individuals constructing different forms that reflect their unique situational experience. To capture and understand the unique form of climate anxiety that each individual constructs, it is therefore essential to assess the situations where they are likely to experience it. A situated assessment not only establishes each individual's trait-level of climate anxiety (their average climate anxiety across situations) but also establishes the situations where an individual is most and least likely to experience climate anxiety (the vector of climate anxiety as it varies across situations). Once a situational profile of climate anxiety has been established

for an individual, we know the situations most likely to induce it in their life and can therefore work with these specific situations to reduce it (if desired).

Originating in basic research on situated cognition (e.g., Barsalou, 2008; Newen et al., 2018; Robbins & Ayede, 2009), the Situated Assessment Method (SAM²) provides a novel framework for assessing individual differences in constructs on two dimensions of situatedness: situational experience and the Situated Action Cycle. Specifically, to measure a particular construct, a SAM2 instrument assesses it, first, in situations where it occurs, and second, across phases of the Situated Action Cycle (i.e., where: (1) events in the environment (2) trigger cognitive states of self-relevance, which in turn (3) induce affect, (4) initiate action, and (5) produce outcomes; Barsalou, 2020). Rather than measuring a construct in an abstract decontextualised manner, a SAM2 instrument assesses it embedded in these two dimensions of situatedness (referred to by the superscript 2 in SAM2). Besides establishing a trait-level measure of an individual across situations, a SAM2 instrument further establishes a unique profile of how each individual experiences the construct across situations (typically varying considerably), along with how the construct relates to other constructs in the Situated Action Cycle (establishing construct validity). For detailed discussion of these points, specifically, and of the SAM² approach in general, see Dutriaux et al. (2023). To date, the SAM² approach has been applied effectively to constructs associated with behaviour (e.g., healthy and unhealthy habits; Dutriaux et al., 2023), physical health (e.g., water drinking; Roger et al., 2024), and mental health (e.g., trichotillomania; Taylor Browne Lūka et al., 2024).

2.2.4. Overview

We first developed a situated psychometric instrument for assessing climate anxiety - the Situated Assessment Method for Climate Anxiety Measurement (SAM² CAM) - and then used it to evaluate UK adults' climate anxiety across 31 everyday situations. Specifically, the SAM² CAM assesses how much climate anxiety individuals recall experiencing previously in 31 situations where climate anxiety is likely to occur. Of interest was how climate anxiety is experienced in a country like the UK, where climate disasters are mostly heard about in the media and anticipated in the future, relative to countries where climate disasters are experienced directly and regularly.

Informed by previous literature, we sampled these situations from four domains likely to be relevant to climate anxiety in Western populations like the UK, reflecting indirect, overarching, and less severe direct climate change impacts: (1) media exposure (Usher et al., 2019; Luo & Zhao, 2021; Maran & Begotti, 2021; Ogunbode et al., 2020),

(2) experiencing climate change or environmental pollution (Dodd et al., 2018; Hrabok et al., 2020), (3) social interactions related to climate change (Galway et al., 2021; Hickman et al., 2021; Hoggett & Randall, 2018), and (4) performing (un)sustainable habitual behaviours (Galway et al., 2021; Godden et al., 2021; Lawson et al., 2019; Verplanken & Roy, 2013). Table 1 presents these 31 situations. Following the SAM^2 approach, we assessed these 31 situations on climate anxiety (dependent variable) and on 13 situational factors (predictors) from the Situated Action Cycle likely to influence climate anxiety in these situations (cf. Barsalou, 2020; Dutriaux et al., 2023). Table 2 presents the specific scales used to assess the dependent measure and its 13 predictors.

Table 1

The 31 situations assessed in the SAM² CAM.

Abbreviation	Situation
S01 – Catastrophes	Hearing about climate catastrophes on the news (e.g., flooding, wildfires)
S02 – Unsustainable ads	Seeing ads for animal products or single-use items.
S03 – Activism news	Hearing about climate activism on the news.
S04 – Government's plan	Hearing news about the government's climate action plan not being achieved.
S05 – Documentaries	Watching animal/ nature documentaries.
S06 – Influencers	Seeing influencers promote environmentally unsustainable lifestyles on social media (e.g., using private jets, 'fashion hauls').
S07 – Green energy	Seeing news on advances in green energy production.
S08 – Local product ads	Seeing ads for locally sourced products.
S09 – Litter	Seeing litter in the street.
S10 – Air pollution	Perceiving air pollution caused by fossil fuels (e.g., when a car drives by).
S11 – Left-overs	Seeing someone throw away food left-overs.
S12 – Water running	Seeing someone leave the water running.
S13 – Car running	Seeing someone leave their car running while parked.
S14 – Communal action	Seeing pro-environmental action in your community (e.g., a school planting trees).
S15 – Denier talk	Talking about climate change to someone who doesn't believe in it.
S16 – 'Green person' talk	Talking with someone who is giving up some kind of pleasure to be 'green' (e.g., giving up eating meat).
S17 – Take-away	Ordering take-away that is delivered in non-recyclable containers.
S18 – Taking car	Taking the car when I have a choice not to.
S19 – Disposable cups	Using disposable cups when I have a choice not to.
S20 – Plastic wrapping	Purchasing items wrapped in plastic.
S21 – Plant-based food	Choosing to eat plant-based products instead of animal products.
S22 – Reusable hygiene	Buying reusable hygiene and cleaning products (e.g., washable sponges).
S23 – Children's future	Thinking about the future that children in the current generation may experience.
S24 – Second-hand	Buying clothes second-hand.
S25 – Too much food	Purchasing more food than intended.
S26 – Aeroplane	Traveling by aeroplane.
S27 – Recycling	Recycling according to guidelines.
S28 – Reusable bags	Bringing reusable bags when shopping.
S29 – Climate activism	Engaging in climate activism (e.g., attending protests, sharing posts online).
S30 – Nature	Visiting a loved place in nature.
S31 – Own future	Thinking about my future.

Table 2

Judgement scales grouped by phase of the Situated Action Cycle (SAC), with their intraclass correlations.

SAC Phase	Judgement Name/ Query/ Values/ Labels	ICC2	ICC3	ICC3k
Affect	**Anxiety** When this situation occurs, how much anxiety do you experience about climate change? (0 to 10)/ (No anxiety at all, Moderate anxiety, Extreme anxiety)	.21	.44	.96
Environment	**Frequency** How frequently do you experience each of the following situations? (0 to 10)/ (Never, Once a month, Multiple times a day)	.38	.17	.87
Environment	**Concern** How concerned are other people in this situation about climate change and sustainability? (0 to 10)/ (Not concerned at all, Moderately concerned, Extremely concerned)	.11	.38	.95
Self-relevance	**Violation** How much does this situation violate your expectations? (0 to 10)/ (No violation at all, Moderate violation, Extreme violation)	.28	.28	.92
Self-relevance	**Threat** How threatened do you feel by what happens in this situation? (0 to 10)/ (Not threatened at all, Moderately threatened, Extremely threatened)	.26	.39	.95
Self-relevance	**Opportunity** How much of an opportunity do you see in this situation to do something constructive? (0 to 10)/ (No opportunity at all, Moderate opportunity, Extremely good opportunity)	.21	.29	.93
Affect	**Habits Motivation** How much does being in this situation motivate you to adopt sustainable habits? (0 to 10)/ (Not at all, Moderately, Extremely)	.11	.42	.96
Affect	**Action Motivation** How much does being in this situation motivate you to work on social action to promote sustainability? (0 to 10)/ (Not at all, Moderately, Extremely)	.05	.63	.98
Action	**Control** How much control do you believe you have over what happens in this situation? (0 to 10)/ (No control at all, Moderate control, Full control)	.45	.20	.88
Action	**Coping** How effectively are you able to cope with this situation (0 to 10)/ (Not effective at all, Moderately effective, Extremely effective)	.18	.34	.94
Action	**Rumination** How likely are you to ruminate about this situation? (0 to 10)/ (Not likely at all, Somewhat likely, Extremely likely)	.11	.44	.96
Action	**Compassion** How judgmental / compassionate are you about yourself and other people in this situation? (-5 to 5)/ (Extremely judgemental, Neither judgemental nor compassionate, Extremely compassionate)	.41	.08	.73
Outcome	**Consequences** How much do you think about the consequences of what happens in this situation for climate change and sustainability? (0 to 10)/ (Not at all, Somewhat, A lot)	.07	.41	.96
Outcome	**Disruption** How much does this situation disrupt your life? (0 to 10)/ (Not at all, Moderately, Extremely)	.10	.40	.95

Note. The left column shows the phase of the Situated Action Cycle from which each measure was sampled. The first row presents the climate anxiety measure used in the SAM² CAM, followed by the measures for 13 SAM2 predictors (each preceded by its name in bold). Below each measure are the end points of the continuous slider scaled used to assess it, together with the scale's labels. The right columns contain three measures of agreement and reliability (using the names for them from Shrout and Fleiss, 1979: ICC2, ICC3, and ICC3k). Specifically, ICC2 is the interrater agreement for each measure across the 31 situations, assessing how much participants agree in evaluating the 31 situations on a specific measure (with participants treated as random effects). The ICC3 is the coherence of the 31 situations as test items on the SAM² CAM, namely, how much they agree in ordering participants from highest to lowest on the respective measure (with

the situations treated as fixed effects). The ICC3k is Cronbach's alpha for the overall score of each measure (aggregated across the 31 situations serving as test items for each participant), capturing the measure's test reliability in ordering participants from highest to lowest.

Nine of the predictors assessed in the SAM^2 CAM have previously exhibited a positive relationship with climate anxiety: event *frequency* (Clayton & Karazsia, 2020; Maran & Begotti, 2021; Usher et al., 2019), *threat* (e.g., Soutar & Wand, 2022; Stollberg & Jonas, 2021), *rumination* (Clayton & Karazsia, 2020; Hogg et al., 2021), expectation *violation* (Dutriaux et al., 2023), anticipated *consequences* (Farrokhi et al., 2020; Myers, 2014), perceived *opportunity* to take constructive action (Maran & Begotti, 2021), *motivation* for sustainable *habits*/ behaviours (Clayton, 2020; Verplanken & Roy, 2013), *motivation* for social climate *action* (Bright & Eames, 2022; Stanley et al., 2021), and *disruption* to one's life (Ágoston et al., 2022; Brulle & Norgaard, 2019). We therefore expected these predictors to correlate positively with climate anxiety. Conversely, four additional factors have previously exhibited a negative relationship with climate anxiety: *control* (Cunsolo & Ellis, 2018; Grupe & Nitschke, 2013; Pihkala, 2020), other people's (perceived) *concern* (Norgaard, 2011; Pihkala, 2018), *coping* abilities (Ogunbode et al., 2019[1]; Ojala, 2013), and self-*compassion* (Gerber, 2023). We hence expected these predictors to correlate negatively with climate anxiety. Because all 13 predictors have been associated with climate anxiety in previous literature, we assumed that they would be similarly associated with it across the 31 situations here.

To evaluate the SAM² CAM, we developed the following hypotheses prior to data collection and then assessed them in a UK sample. Because the hypotheses in the original version of this article (pre-print Author et al., 2024) did not include specific statistical benchmarks, these were added following pre-print publication based on data in previous articles, thereby reflecting standard values obtained when applying the SAM² approach (see, e.g., Dutriaux et al., 2023; Roger et al., 2024; Taylor Browne Lūka et al., 2024). We also expanded H4 to include stress (in addition to depression and general anxiety) based on discovery of relevant literature that motivated including stress.

H1: Large reliable individual differences in participants' climate anxiety.
Individuals would reliably exhibit considerable variability in their trait-levels of climate anxiety, averaged across the 31 SAM² CAM situations. Specifically, we expected that mean individual scores for climate anxiety across the 31 situations would range across at least half

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[1] Change made after formal publication: "(C.A. Ogunbode et al., 2019)" changed to "(Ogunbode et al., 2019)".

the scale from 2.5 to 7.5 and exhibit test reliability of at least .80.

H2a: Substantial situational effects. Situations would exhibit considerable variability in their average level of climate anxiety across individuals. Specifically, we expected that a given participant would report having previously experienced high climate anxiety in some situations but low climate anxiety in others, such that their judgments for specific situations typically range across the entire scale from 0 to 10.

H2b: Substantial situation by individual interaction. A large situation by individual interaction would emerge for climate anxiety (i.e., the pattern of climate anxiety across the 31 situations would vary considerably across different individuals), with the intraclass correlation for individual agreement across situations being less than .40.

H3a: High construct validity for climate anxiety with large individual differences in prediction profiles. If the SAM^2 CAM measure for climate anxiety has construct validity, it should correlate moderately to highly with related constructs. We therefore predicted that climate anxiety should correlate with each of the 13 predictors from the Situated Action Cycle in its predicted positive or negative direction ($> |.30|$). Additionally, we predicted that the prediction profiles for different individuals would vary widely across the 13 predictors.

H3b: High content validity for climate anxiety. If the SAM^2 CAM measure for climate anxiety has content validity, the 13 predictors should explain its variance comprehensively. We therefore predicted that the 13 predictors would typically explain at least 60% of the variance in an individual's climate anxiety.

Exploratory questions (E1): We explored correlational relations of climate anxiety with general anxiety, stress, and depression. Because the measures for general anxiety, stress, and depression were all unsituated, only modest correlations between them and the SAM^2 CAM were likely to emerge, reflecting shared variance at the individual trait level. Because the SAM^2 CAM also captures variance related to a specific set of situations, it is likely to diverge significantly from measures that are not[2] situated, thereby resulting in weak correlations between them. Finally, as described earlier, climate anxiety may often not be closely related to general anxiety, further suggesting a weak relationship between them.

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[2] Change made after formal publication: "aren't" changed to "are not".

2.3. Methods

2.3.1. Design

This study was part of a larger project that collected data from a common set of participants for three related studies on climate change. For this study, all participants responded to the SAM² CAM's 31 situations (Table 1), first, for climate anxiety (dependent variable) and then for the 13 predictors from the Situated Action Cycle (frequency, concern, violation, threat, opportunity, habits motivation, action motivation, control, coping, rumination, compassion, consequences, and disruption; Table 2). Using the 21-item version of the Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995), three additional non-situated measures were collected for each participant: general anxiety, depression, and stress. To avoid issues with missing data, participants were required to answer all questions (forced response format).

2.3.2. Participants

A sample of 330 UK residents was sampled from the Prolific recruitment platform (prolific.co), requiring that they were fluent in English, aged 18 to 79, and had completed at least 10 previous Prolific studies with at least a 95% approval rate. The participants included in the study were individuals interested in participating and volunteered for pay, not participants we selected. Because we were interested in how climate anxiety is experienced by individuals in a relatively protected country, this sample was appropriate, given that UK residents have likely been exposed to more vicarious encounters (e.g., news) than to personal experiences with climate change.

Reflecting the availability of funding, participants were recruited over three data collection periods in April and July 2022. Participants were excluded if they exhibited repetitive responding (flatlining) and/or random responding across two or more of the measures across any of the three studies associated with the larger project. This resulted in the removal of 27 participants, leaving a final sample of $N = 303$. We determined this sample size to be sufficient, based on Schönbrodt and Perugini's (2013) recommendation that a sample size of 250 estimates population values of correlations accurately. Table 3 presents the demographic features of the final sample. As can be seen, the sample's demographic features correspond closely to those of the general UK population.

Table 3

Participant demographics.

Sample demographic characteristic	Sample	UK population
Gender		
Male	48.8%	49.0%
Female	50.8%	51.0%
Non-binary	0.3%	--
Country of Residence		
England	83.8%	84.3%
Scotland	9.2%	--
Wales	3.6%	--
Northern Ireland	3.0%	--
Other	0.3%	--
Ethnicity		
White	89.4%	81.7%
Asian	5.0%	9.2%
Black	3.0%	4.0%
Other/ Mixed	2.6%	2.9%
Median Age	41.0	40.7

Note. Data on UK population based on 2021 UK census data from the UK Government website (https://www.ethnicity-facts-figures.service.gov.uk/ accessed 25th February 2025).

2.3.3. Materials

As described earlier, the situations (Table 1) and predictors (Table 2) used in the SAM² CAM were established through existing literature on climate anxiety and the Situated Action Cycle (cf. Barsalou, 2008, 2020). Specifically, we sampled these situations from four domains likely to be relevant to climate anxiety in the UK, mainly reflecting indirect, overarching, and less severe direct climate change impacts related to: (1) media exposure (Usher et al., 2019; Luo & Zhao, 2021; Maran & Begotti, 2021; Ogunbode et al., 2020) ; (2) experiencing climate change or environmental pollution (Dodd et al., 2018; Hrabok et al., 2020); (3) social interactions related to climate change (Galway et al., 2021; Hickman et al., 2021; Hoggett & Randall, 2018); (4) performing (un)sustainable habitual behaviours (Galway et al., 2021; Godden et al., 2021; Lawson et al., 2019; Verplanken & Roy, 2013). For a detailed overview of the selection process that determined the final situations included, please see SM-7.

The 14 measures presented earlier in Table 2, including climate anxiety, were assessed for each of the 31 situations in Table 1 on a continuous 11-point slider scale from 0 to 10, with 0.1 decimal accuracy. Table 2 presents the verbal anchors used for each scale. If a participant had not previously experienced a situation, we asked them to imagine being

in it and then to evaluate their experience of the imagined situation (SM-1 presents the full instructions). Much research shows that imagined situations have the same expected emotional impact as experiencing them and can thus be used as valid stimuli (Lench et al., 2011).

To additionally assess the relationships of climate anxiety with general anxiety, stress, and depression, we included the DASS-21 (Lovibond & Lovibond, 1995), which has satisfactory psychometric properties and is applicable across countries (Bibi et al., 2020; Le et al., 2017). All materials are publicly available online at: https://osf.io/2zg5u/?view_only=054f603359e248ec8385432ac141e7c1.

2.3.4. Procedure

Participants were recruited online via Prolific (www.prolific.co, 24th February 2022) and then redirected to the Qualtrics survey (Qualtrics, Provo, UT, 2018). Participants were informed about the general purpose of the study, the study's procedure, payment details, their rights, data storage, and how to contact us. Consent was given electronically by selecting "I consent" from a drop-down menu. No personal information was obtained from participants, and all responses were stored securely. Participants were paid at a rate of £7.50 per hour. This study was approved by the University's Ethics Committee.

Participants first responded to the DASS-21 (Lovibond & Lovibond, 1995). They then received general instructions for responding to the SAM² CAM, along with specific instructions for each SAM² CAM measure just prior to evaluating it (provided in SM-1). Participants next evaluated climate anxiety for the 31 situations, which were presented in a different random order for each participant. Thereafter, participants responded to the SAM² CAM another 13 times for each predictor in Table 2. Participants received the predictor blocks in a fixed order that we thought would make intuitive sense to them (frequency, concern, violation, threat, opportunity, habits motivation, action motivation, control, coping, rumination, compassion, consequences, and disruption). This seemed most appropriate, also given that Dutriaux et al. (2023) found that a fixed order of predictor blocks produced the same results as randomising them. Within each predictor block, however, the 31 situations were randomised for each participant. Participants performed each judgment using a slider scale that recorded responses with one decimal point accuracy. After completing the SAM² CAM, participants were asked about their survey experiences, debriefed, and given resources for help with anxiety. The median time to complete the study was 51 minutes (min = 22, max = 321).

All statistical analyses were performed in R (version 4.2.0; R Core Team, 2021), using R Studio. Linear regression analyses regressed climate anxiety onto the 13 predictors. Pearson correlations were computed to investigate the relationships between climate anxiety and each of the DASS-21 subscales (Lovibond & Lovibond, 1995). The full set of R scripts with code and data sets are publicly available online: https://osf.io/2zg5u/?view_only=054f603359e248ec8385432ac141e7c1.

2.4. Results

2.4.1. Individual differences (H1)

We first computed an overall trait-level measure of climate anxiety for each participant by averaging their climate anxiety judgments across the 31 situations (with a grand mean across participants and situations of $M = 3.33$, $SD = 1.83$, 95% CI [3.12, 3.53]). We then computed the analogous trait-level averages for each of the 13 predictors. Figure 1 visualises the distributions of these individual measures, one measure per column, with each row representing the 14 mean judgments for a single participant. Overall measures of central tendency and variability appear at the bottom of the figure. As Figure 1 illustrates, clear individual differences emerged in climate anxiety scores, with a range of 7.30. Large individual differences similarly occurred for how frequently participants encountered the 31 situations and how much they experienced the 12 other predictors of climate anxiety. Interestingly, most measures tended to exhibit relatively moderate levels across participants (e.g., frequency, concern, action motivation, control, and rumination). Only coping exhibited a relatively high level, indicating that participants felt they could cope well in most situations. Surprisingly, and in contrast to our expectations, anxiety, violation, threat, and disruption all exhibited relatively low levels. For the table of raw situation means across measures, see SM-2.

Figure 1

Visualisation of the judgement means for each participant across measures, with the median, IQR, and range presented for each measure toward the bottom.
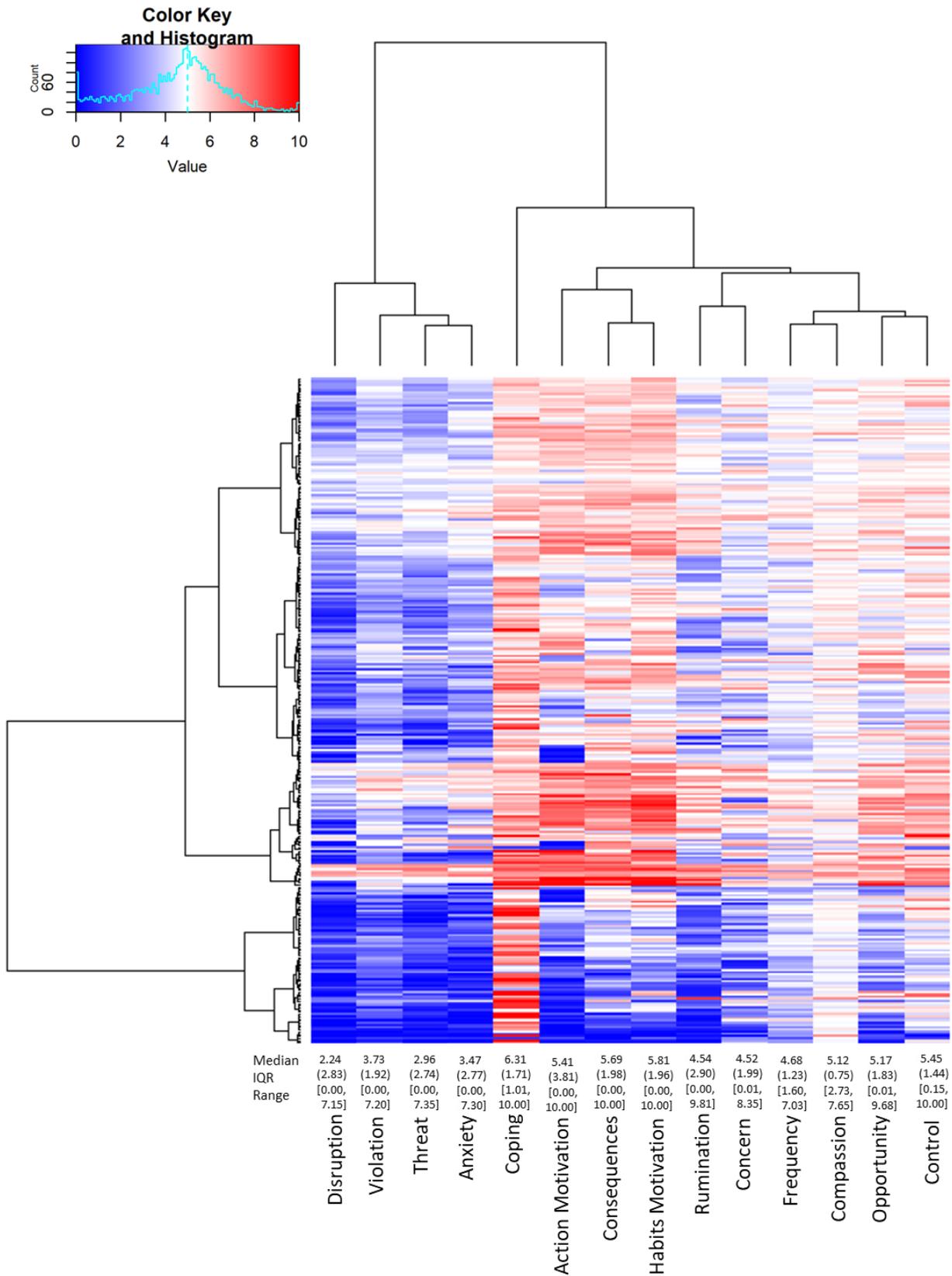
Note. Each row contains the 14 mean judgements for one of the 303 participants across situations. As cells become redder, they represent higher mean judgements. As cells become bluer, they represent lower mean judgements. Because Compassion was rated from -5 to 5, it was put onto a 0 to 10 scale here to allow for comparisons with the other measures. The dendrogram on the left resulted from hierarchical clustering using the Ward D measure. Median shown for each measure, with IQR in round brackets, and range in square brackets.

1.4.1.1. Exploratory observations

As the clustering solution on the left of Figure 1 illustrates, different groups of participants emerged from this analysis. The large cluster at the bottom exhibited the lowest levels of climate anxiety and related measures, along with the highest coping. In contrast, the next cluster up exhibited the highest anxiety and the lowest coping, with the clusters above exhibiting intermediate levels. As the clustering solution along the top illustrates, a relatively small cluster of measures exhibiting negative facets of climate anxiety emerged on the left with relatively low values. To the right, a larger cluster of measures emerged with relatively high values for coping, action, motivation, and consequences. These two clusters suggest that participants experienced relatively little negative emotion for the 31 situations while experiencing relatively high levels of motivation and efficacy.

2.4.2. Test reliability (H1)

To measure climate anxiety and individual differences reliably, the SAM² CAM should exhibit high test reliability (e.g., Huscroft-D'Angelo et al., 2020). We used Cronbach's alpha to measure how well the SAM² CAM situations can reliably establish participants' overall trait-level scores (averaged across the 31 situations that served as test items) on each of its 14 measures (Cronbach, 1951; ICC3k in Shrout & Fleiss, 1979). Intuitively, alpha estimates how reliably the same set of participants would exhibit the same average scores across the same situations as test items, if tested again under comparable conditions. Because we were only interested in the reliability of overall measures, coefficient alpha was sufficient for this purpose. Because it is not necessary that the *situations* in the SAM² CAM exhibit internal consistency (Dutriaux et al., 2023), it was not appropriate to assess coefficient omega (Flora, 2020).

As Table 2 illustrates, almost all measures exhibited excellent test reliability above .90, and all were above an acceptable level of .70 (Cronbach, 1951; Warrens, 2017). Most significantly, the SAM² CAM measure of climate anxiety exhibits a test reliability of .96.

2.4.3. Situation profiles (H2a)

2.4.3.1. Variability in situation profiles

The SAM² CAM not only established large differences between individuals but also between situations. Consider Figure 2, where each row shows the mean value of the 14 measures for a specific situation. On the left, situations are clustered by their similarity across the measures. At the top, measures are clustered by their similarity across the situations. Each measure varied considerably, depending on the situation.

Figure 2

Visualisation of the standardised mean judgement for each of the 31 situations.
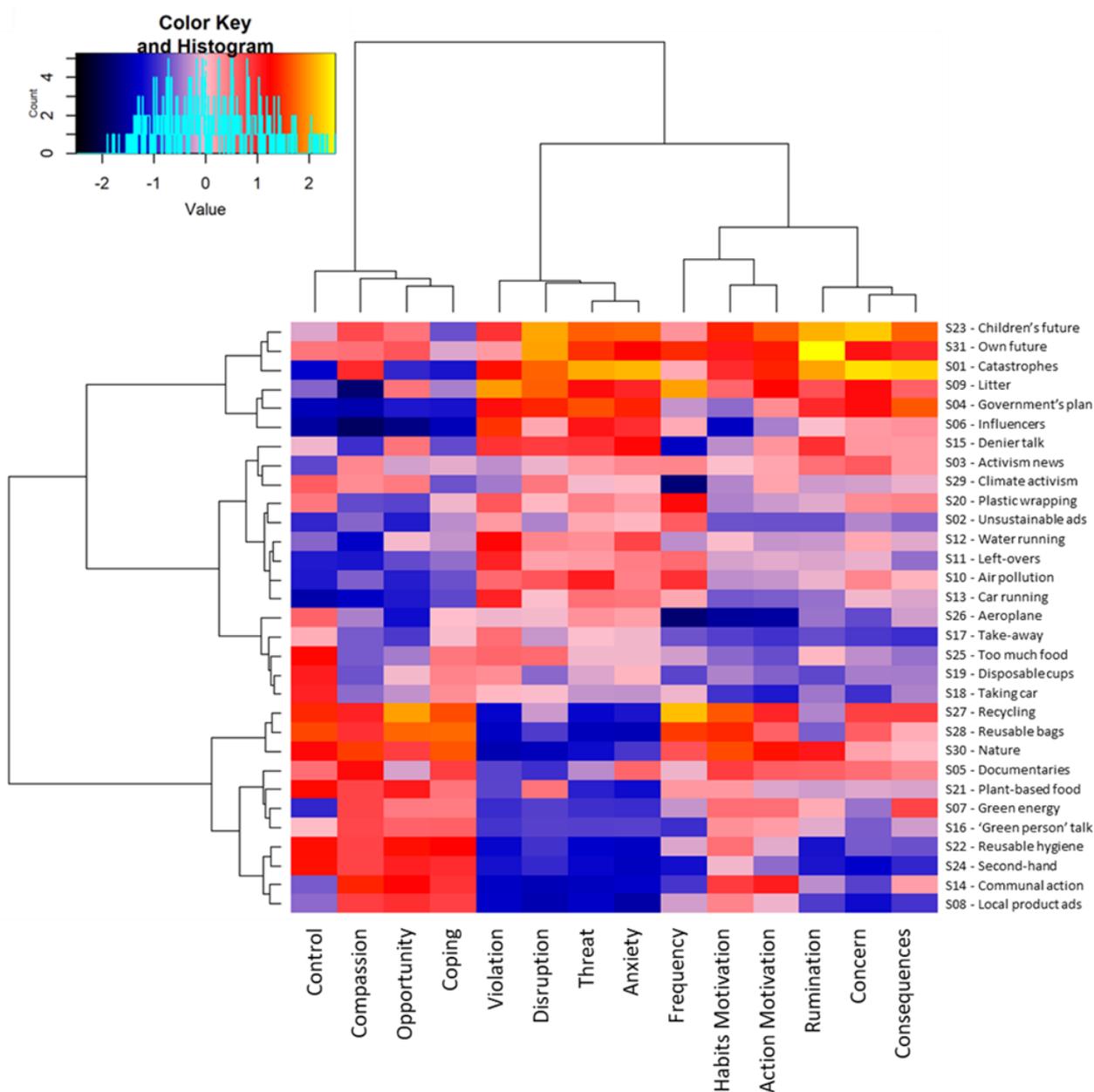
Note. Each cell represents the mean score for one situation and one measure across the 303 participants. As cells become darker, they increasingly represent scores up to 2 SD smaller than the standardised mean of 0. As cells become warmer, they increasingly represent scores up to 2 SD greater than the standardised mean.

2.4.3.2. Exploratory observations

As can be seen, diverse clusters of situations emerged. Whereas the cluster at the top reflects situations associated with the highest levels of climate anxiety, the clusters in the middle and at the bottom are associated with relatively moderate and low levels, respectively. Within each cluster, every situation exhibits a unique profile across the 14 measures.

Interestingly, Figure 2 also suggests that low anxiety situations are generally associated with lower concern, violation, threat, and disruption, but with higher levels of opportunity, habits motivation, action motivation, control, coping, and compassion. In contrast, high anxiety situations are associated with higher levels of concern, violation, threat, and disruption, but with lower levels of opportunity, habits motivation, action motivation, control, coping, and compassion. Rumination showed relatively mixed results. See SM-3 for further discussion of the situation profiles.

2.4.3.3. Situational variability across individuals for climate anxiety

As Figure 2 just illustrated, the 31 situations in the SAM^2 CAM differed considerably, exhibiting very different profiles across climate anxiety and the 13 predictors. These differences suggest that climate anxiety should not be static for an individual but should vary considerably across situations. Figure 3 shows that it clearly does, where each row presents an individual's judgments for the 31 situations across the columns.

Figure 3

Visualisation of climate anxiety scores for each individual across the 31 situations.
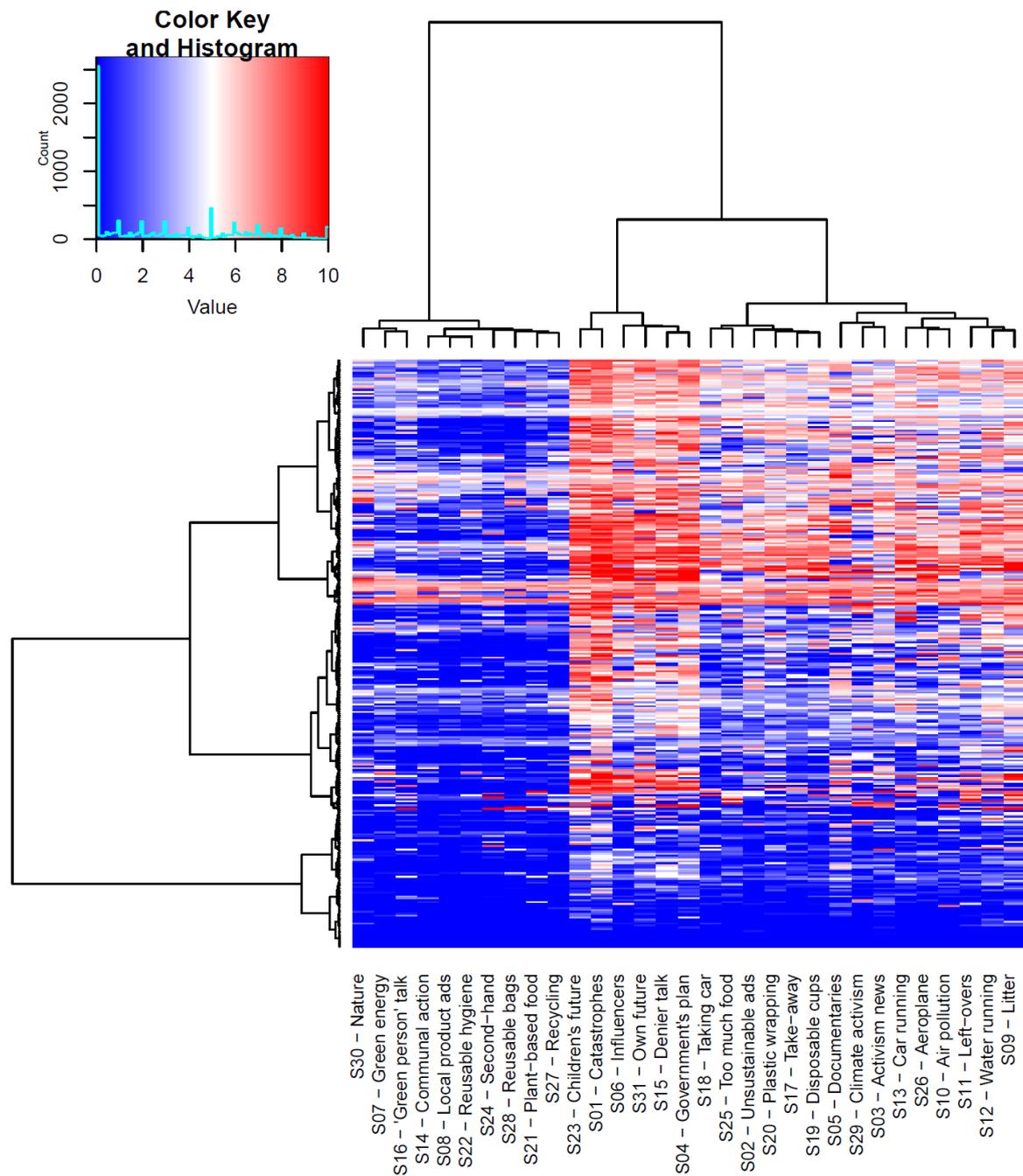
Note. Each row contains the 31 climate anxiety judgements across the 31 situations for one of the 303 participants. Table 1 presents the description for each situation (corresponding to the situation numbers shown here). As cells become redder, they represent higher climate anxiety judgements. As cells become bluer, they represent lower anxiety judgements. The hierarchical clustering dendrogram on the left groups participants according to how similarly they judged the 31 situations across situations. The hierarchical clustering dendrogram at the top groups the situations according to how similar their individual profiles are across participants.

As can be seen, the 31 situations exhibited large differences in their overall levels of climate anxiety across the 303 participants, with situations on the left exhibiting low levels, situations to the right exhibiting the highest levels, and situations further to the right falling in between. As predicted, most participants experienced the full range of climate

anxiety responses across situations, from very low (dark blue) to very high (dark red), documenting the considerable variability of climate anxiety within an individual. Rather than climate anxiety being a static trait within an individual, it expresses itself dynamically across situations. For further discussion of situational differences, see SM-4.

2.4.4. Situation by individual interaction for climate anxiety (H2b)

As we just saw, climate anxiety exhibited large differences across situations. These effects, however, were not constant across the 303 individuals but interacted with individuals considerably. Figure 3 visualises this interaction as the different patterning of rows (and clusters of rows) across the 31 situations. Whereas the topmost cluster of individuals reported high climate anxiety for some situations, moderate anxiety for others, and low anxiety for still others, the bottommost cluster reported low anxiety in most situations. In between these two clusters, other patterns of situational experience occurred, typically with high anxiety reported for a few situations and low to moderate levels reported for most others. Clearly, individuals experienced climate anxiety previously in quite different ways across the same 31 situations.

To quantify the magnitude of the situation by individual interaction for climate anxiety, we used intraclass correlations, specifically, the ICC2 random-effects form that generalises ICC2 values to the larger population (Shrout & Fleiss, 1979). Intuitively, the ICC2 captures the average correlation across all possible pairs of participants in their judgments for a measure, thereby quantifying the situation by individual interaction. As Table 2 illustrates, the ICC2 for climate anxiety was only .21, indicating relatively low agreement in how individuals reported climate anxiety across the same situations.

As Table 2 further illustrates, large interactions occurred for most other measures as well, with ICC2 values ranging from .05 to .45. For some of these measures, agreement was very low, including action motivation, disruption, rumination, habits motivation, concern, coping, opportunity, and consequences (ICC2s from .05 to .21). For other measures, agreement was somewhat higher but still relatively low, including threat, violation, frequency, compassion, and control (ICC2s from .28 to .45). These values further demonstrate considerable individual differences in climate anxiety across situations, as predicted, and similarly in related SAM[2] CAM measures.

2.4.5. Construct validity (H3a)

To assess the SAM² CAM's construct validity, we computed a prediction profile for each participant that established how climate anxiety was related to the 13 predictors. If the SAM² measure of climate anxiety exhibits construct validity, it should exhibit relations with predictors previously observed in the literature. Specifically, climate anxiety should correlate positively with violation, threat, consequences, disruption, rumination, frequency, habits motivation, action motivation, and opportunity, but should correlate negatively with control, coping, concern, and compassion. As long as a majority of predictors correlate in the direction hypothesised, construct validity is established. To compute each participant's prediction profile, we correlated their judgments for climate anxiety with one predictor at a time across the 31 situations, with the resulting vector of 13 correlations constituting an individual's prediction profile.

Figure 4 displays the results of this analysis. Each row presents the prediction profile for 1 of the 303 participants, and each column presents the correlations for 1 of the 13 predictors. Each cell represents the magnitude of a correlation (red for high positive correlations, blue for high negative correlations, white for no correlation). As the median values in Figure 4 illustrate, our predictions were largely supported. Threat ($r = .65$), expectation violation ($r = .53,$), disruption ($r = .37$), rumination ($r = .36,$), consequences ($r = .32$), and action motivation ($r = .17$) all exhibited positive relations with climate anxiety across participants (all values significantly greater than 0 on Wilcoxon signed-rank tests, one-tailed, all $p < .001$). Conversely, coping ($r = -.36$), compassion ($r = -.30,$), and control ($r = -.23$) all exhibited negative relations (all values significantly less than 0, on Wilcoxon signed-rank tests, one-tailed, all $p < .001$). Unexpectedly, opportunity ($r = -.19, p < .001$) and concern ($r = .32, p < .001$), related with climate anxiety inversely to our expectations, and both frequency ($r = -.01, p = .17$) and habits motivation ($r = .06, p = .99$) exhibited no clear relation to climate anxiety but instead showed large individual differences. Overall, however, these results establish construct validity for most of the SAM² CAM predictors as predicted.

Figure 4

Visualisation of the 13 predictive correlations for each participant, with the median, IQR, and range presented for each predictor toward the bottom.
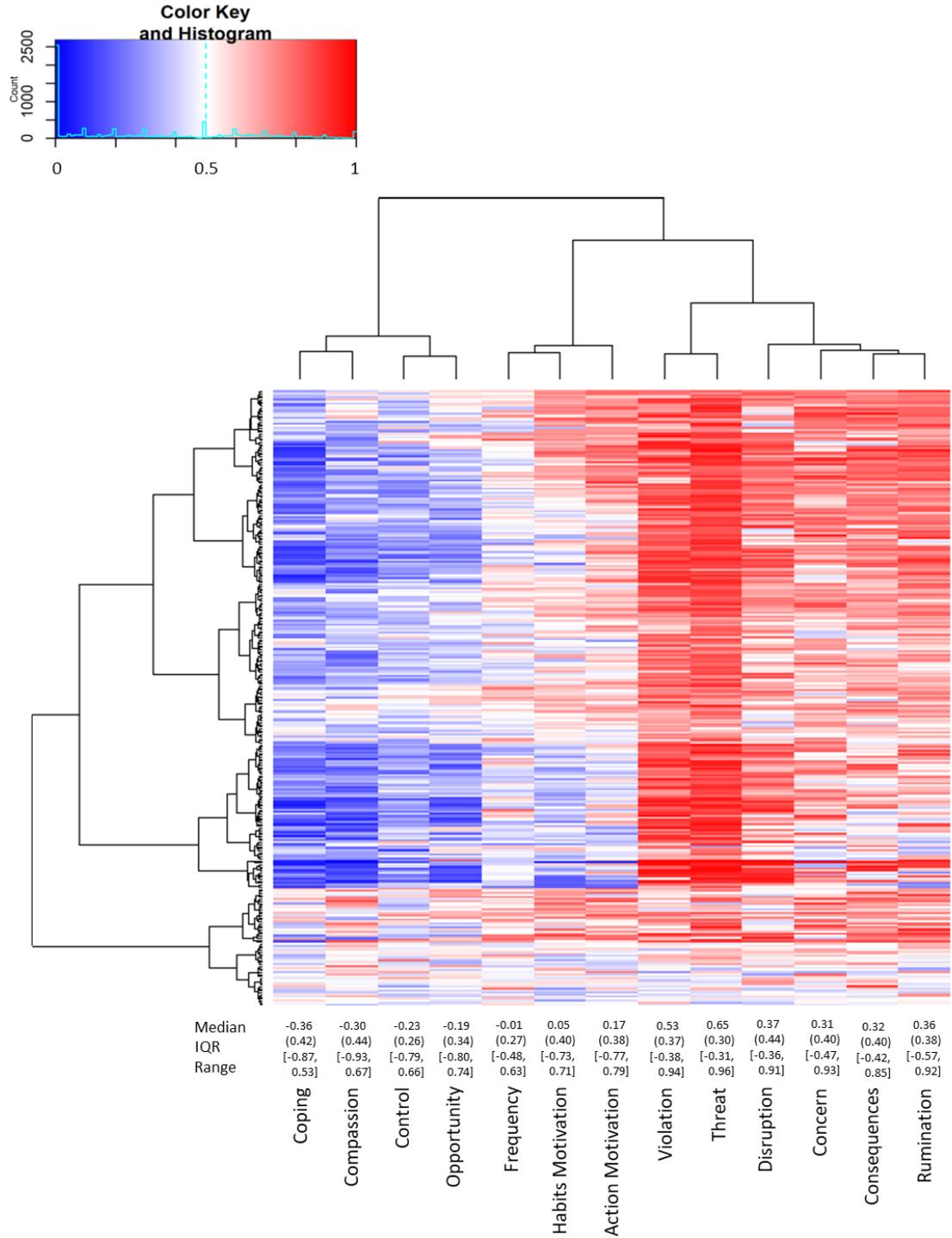
Note. As cells become redder, they represent correlations that are increasingly positive. As cells become bluer, they represent correlations that are increasingly negative. The hierarchical clustering dendrogram on the left groups participants according to the similarity of their predictive correlations. The hierarchical clustering dendrogram at the top groups the predictors according to how similar their individual profiles are across participants. Median for each measure shown, with IQR in round brackets, and range in square brackets.

Importantly, large individual differences were clearly present in the prediction profiles, as captured by the interquartile ranges and ranges at the bottom of Figure 4. For every predictor, some individuals exhibited the opposite pattern of the majority. Even for the strongest predictor, threat, not all individuals exhibited positive correlations. Thus, the SAM^2 CAM captured large individual differences in prediction profiles (illustrated by the clustering solution on the left), along with general trends (illustrated by the medians along the bottom). SM-5 provides the correlation matrix of all raw correlations between the 14 SAM^2 CAM measures at the group level.

2.4.6. Content Validity (H3b)

To assess how comprehensively the 13 predictors explained variation in climate anxiety (i.e., content validity; Cronbach, 1971), a regression analysis was performed for each participant that regressed their climate anxiety judgements for the 31 situations onto their 31 judgements for each of the 13 predictors. Variance explained (R^2) was computed for each individual regression and used as a measure of content validity. As outlined in Hypothesis 3b, any $R^2 > .60$ would be regarded as establishing content validity. Across the 303 individual regressions, the median R^2 was .75 (significantly greater than 0 on a Wilcoxon signed-rank test, one-tailed, $p < .001$, 95% CI [.73, .77]). This high level of explanation at the individual level indicates that the low ICC2 value in Table 2 for climate anxiety did not reflect random noise but instead reflected systematic individual differences (Dutriaux et al., 2023). Importantly, this high level of explained variance demonstrates that the SAM^2 CAM exhibits high content validity, with its predictors providing comprehensive coverage of the climate anxiety construct.

2.4.7. Climate anxiety and the DASS-21 (E1)

To explore whether climate anxiety is linked to general anxiety, stress, and depression, we computed correlations between the SAM^2 CAM climate anxiety measure and each DASS-21 subscale scores (Lovibond & Lovibond, 1995). Overall, participants reported low levels of general anxiety ($M = 1.40$, $SD = .44$), depression ($M = 1.74$, $SD = .67$), and stress ($M = 1.82$, $SD = .61$). A significant moderate correlation emerged between SAM^2 CAM climate anxiety and the DASS-21 general anxiety subscale ($r = .26$, $p < .001$, 95% CI [.15, .36]; see Funder & Ozer, 2019, for justification viewing .26 as a moderate effect). Similar results emerged for the DASS-21 stress subscale, where the correlation with climate anxiety was small to medium ($r = .20$, $p < .001$, 95% CI [.09, .30]; again, see

Funder & Ozer 2019). The correlation between the DASS-21 depression subscale and climate anxiety was small, with $r = .15$ ($p < .001$, 95% CI [.04, .26]).

2.5. Discussion

2.5.1. Summary

The SAM² CAM measure of climate anxiety exhibited large individual differences, with excellent test reliability of .96. Although the overall level of climate anxiety across situations was relatively low (median of 3.60 on 0-to-10-point scale), individuals exhibited considerable variability in how intensely they experienced it (a range of 7.30).

The SAM² CAM not only established large individual differences in climate anxiety, it also established large situational differences. Whereas some situations tended to exhibit high climate anxiety across participants, others tended to be low, with the mean climate anxiety reported for a situation ranging from 1.18 to 6.29 across situations (see SM-2). The SAM² CAM also established a rich profile of each situation's features across the 13 predictors that provides insight into its unique character. Within participants, climate anxiety tended to range from very low to very high, demonstrating the importance of situations in producing climate anxiety. Rather than being a fixed trait, climate anxiety is highly dynamic, reflecting the current situation. Finally, the SAM² CAM established a large individual by situation interaction for climate anxiety, as the relatively low agreement in climate anxiety for different individuals across situations indicated. Participants varied considerably in how a specific situation contributed to their climate anxiety.

The SAM² CAM exhibited good construct validity. Climate anxiety correlated positively with most predictors expected to correlate positively (e.g., threat, expectation violation, disruption). Climate anxiety similarly correlated negatively with most predictors expected to correlate negatively (e.g., coping, compassion, control). The SAM² CAM also exhibited high content validity, with individual regressions finding that the 13 predictors comprehensively explained a median 75% of the variance in an individual's climate anxiety.

As we anticipated, climate anxiety as measured with the SAM² CAM correlated positively but only modestly with general anxiety, as measured by the DASS-21. Although a positive correlation was also found between SAM² CAM anxiety and depression on the DASS-21, this correlation was even smaller, suggesting that climate anxiety differs from general anxiety disorders, which typically correlate highly and frequently with depression

(e.g., de Graaf et al., 2003). As suggested earlier, weak correlations between the DASS-21 measures and the SAM² CAM likely reflected shared variance at the individual trait level but divergence at the situational level. Because the SAM² CAM captures variance related to a specific set of situations, it is likely to diverge significantly from measures that are not[3] situated, resulting in weak correlations between them. Additionally, the modest correlation between climate anxiety and general anxiety also likely reflects important differences in these two types of anxiety, as discussed earlier.

2.5.2. Theoretical implications

2.5.2.1. Understanding climate anxiety as a situated construct

The SAM² CAM demonstrates that an individual's previous experiences of climate anxiety reflect both individual and situational factors, together with their interaction. It is therefore not the case that an individual experiences similar levels of climate anxiety across different situations, or that different individuals experience the same level of climate anxiety in the same situation. Instead, different situations induce different levels of anxiety across individuals, statistically speaking, while interacting with specific individuals in different ways.

For these reasons, much important information is lost when climate anxiety is only assessed at the individual level (e.g., Clayton & Karazsia, 2020; Hogg et al., 2021). Taking situational effects into account has significant implications for how climate anxiety is understood, assessed, and addressed. Future research could adapt the SAM² CAM to different contexts by sampling situations relevant to different cultures, more vulnerable countries, or specific demographic groups.

2.5.2.2. Understanding climate anxiety as a constructed emotion

Earlier we proposed that climate anxiety is a constructed emotion that emerges with increasing frequency as the result of climate change, reflecting an individual's culture, language, situational experience, and biological phenotype. As these factors vary, climate anxiety takes different forms in different individuals. Individuals, for example, who have experienced climate disasters develop different forms of climate anxiety than individuals who anticipate such disasters and experience them vicariously.

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[3] Change made after formal publication: "aren't" changed to "are not".

From this perspective, psychometrically assessing climate anxiety should benefit from taking a situated approach. By measuring an individual's climate anxiety for specific situations where it may typically occur, along with the situational factors that predict it, the SAM^2 CAM captures and represents the unique form that climate anxiety takes in each individual. In this manner, the SAM^2 CAM establishes the specific way an individual's climate anxiety varies across situations, along with a unique prediction profile of the situational factors associated with it. Together these two sources of information characterise the emotion construct that underlies different individuals' climate anxiety.

Theoretically, these findings are consistent with the view that climate anxiety is a constructed emotion that varies widely between individuals and across situations. Our findings also provide empirical evidence for Pihkala's (2020) notion that climate anxiety (like other emotions) depends on and varies between situations and cannot be explained fully by trait anxiety. Findings from the SAM² CAM predictors additionally provide empirical support for the involvement of uncontrollability and unpredictability (expectation violation) in climate anxiety, as has been previously proposed (Pihkala, 2020). By adopting a constructivist view, our approach takes into account a person's physical and social context in their experiences of climate anxiety (here, *vicarious experiences* of climate change in the UK), varying widely as a function of their specific situational experience.

2.5.3. Practical applications

In the UK (and similar countries), the SAM² CAM could be used as screening device for the following two purposes: (1) To identify individuals high in climate anxiety across a set of relevant situations, (2) To identify the specific situations most likely to trigger a particular individual's climate anxiety. The SAM² CAM could also be used to identify the specific factors most likely associated with an individual's climate anxiety, such as threat, expectation violation, or low coping ability. Once the most important situations and factors have been established for an individual, they could be used to select the coping strategies most effective for decreasing their unique form of climate anxiety. Adopting this kind of individualised approach is likely to be effective, given that it has been found useful for a wide variety of other mental health issues (e.g., Harvey et al., 2020; Hillebrand et al., 2023). This approach provides a unique opportunity for individualised support in difficult situations, without the need for pathologising a person's experiences. This could allow an individual to seek out their unique low-anxiety situations (e.g., spending time in nature or

joining climate action) or to prepare constructive coping strategies for high-anxiety situations (e.g., preparing debrief conversations with a friend/ partner when watching climate change news). This should allow individuals to cope effectively with their climate anxiety, thus preventing overwhelm and burnout-related inaction. Further, the SAM² CAM supports identifying types of situations that are typically associated with high climate anxiety across individuals, which in turn allows for community support and resilience training.

At a more general level, results from the SAM² CAM could be used to inform public policy on mitigating and preventing paralysing levels of climate anxiety. Because we found that threat is strongly related to climate anxiety, for example, disaster-focused news could be presented in alternative formats that report on those disasters but also highlight realistic action steps based on it. Similarly, because having good coping strategies is negatively related to climate anxiety, providing individuals with effective strategies is likely to reduce it. Again, these implications are more applicable to privileged populations than to vulnerable populations, given that our study assessed climate anxiety in UK adults.

2.5.4. Limitations

We cannot draw causal conclusions from our correlational results. Although we were able to establish associations between climate anxiety and its predictors, as well as between climate anxiety, general anxiety, stress, and depression, we cannot conclude anything about the direction of these relationships, nor make any assumptions about causation.

Similarly, our effect sizes may be somewhat inflated from recruiting participants through volunteer sampling, which could limit generalisability, as participants may have pre-existing interests in climate change. In contrast, our sample had slightly higher education levels compared to the general UK, which may have led to reporting lower levels of climate anxiety, as lower education seems typically associated with higher climate anxiety (e.g., Poortinga et al., 2019). Because the remaining demographic data of our sample are so similar to the UK demographics in general (see Table 3), however, we are confident that our results at least approximate the climate anxiety experiences of the adult UK population. Further, due to the size of our sample, our correlational results should be generalisable from a statistical perspective (Schönbrodt & Perugini, 2013).

Additionally, given the current sample, our findings may not generalise to populations more vulnerable to climate change. The SAM² CAM could, however, be easily adapted to these other populations where individuals experience personal effects of climate

change more often, such as within coastal regions of the UK, countries in the global south, and vulnerable island nations (see e.g., Pihkala, 2022).

Finally, although the SAM² CAM provides a detailed assessment of people's recollection of climate anxiety for specific situations experienced previously, it does not assess climate anxiety in the moment. One possibility would be to assess climate anxiety using ecological momentary assessment or daily prompts (see Contreras et al., 2024). A well-known problem with this approach, however, is that it fails to control for the types of situations where momentary assessments are captured (Dutriaux et al., 2023). An interesting possibility is to combine a SAM² instrument with ecological momentary assessment, such that situations are assessed at both the type (situation) and token (momentary) levels. Another interesting question is whether one of these levels predicts climate anxiety better than the other, or whether both contribute.

2.5.4.1. Implementing briefer versions of the SAM² CAM

A final limitation of the SAM² CAM is that it typically took participants about 50 minutes to complete. Although the depth and breadth of this instrument may be desirable for some applications, they may be unnecessary for others. Dutriaux et al. (2023) suggested that one way to construct a briefer version of a SAM² instrument is to only collect data for the dependent variable, in this case climate anxiety, and not for the predictors. Because we know that the SAM² CAM measure for climate anxiety exhibits both construct and content validity, it is not necessary to reassess the 13 predictors, unless the predictive profiles of specific individuals are of interest. Only evaluating the 31 situations for climate anxiety should take about 4 minutes, providing a brief but reliable and valid climate anxiety instrument.

Dutriaux et al. (2023) suggested that a second way to construct a briefer SAM² instrument is to reduce the number of situations and/or predictors through factor analysis. To explore this possibility, we performed two factor analyses on the SAM² CAM. A first factor analysis of the situations revealed an optimal five-factor solution, reducing the original instrument from 31 to 5 situations. A second factor analysis of the SAM² CAM predictors similarly resulted in an optimal five-factor solution, reducing the number of predictors from 13 to 5. When assessed on the current data set using only data for the most 5 representative situations and the 5 most representative predictors, the reduced instrument exhibited acceptable test reliability of .79. It also exhibited high construct and content validity, with the five predictors explaining a large amount of anxiety variance across

situations in individual regressions (median R^2 = .60, significantly greater than 0 on a Wilcoxon signed-rank test, one-tailed, p < .001, 95% CI [.56, .64]). Details of these analyses can be found in SM-6. With a total of 25 judgments to perform, only about 3 minutes are required to assess an individual's climate anxiety for the 5 measures across the 5 situations.

2.5.5. Conclusion

Although climate anxiety was generally low in our sample, its overall level varied considerably across individuals and situations. The SAM² CAM is the first instrument to evaluate situational factors in an individual's recollection of climate anxiety experienced previously in relevant situations. Findings established with the SAM² CAM demonstrate the usefulness of taking a situated approach to assessing it, having implications for how climate anxiety is measured and understood.

3. Chapter 3: Beyond symptomatic support: Students' emotional experiences with climate change and how universities can help

This chapter is an exact copy of the following manuscript in print at Global Environmental Psychology:

Hill-Harding, C. K. V., Barsalou, L. W., & Papies, E. K. (in press). Beyond symptomatic support: Students' emotional experiences with climate change and how universities can help [Author Accepted Manuscript]. *Global Environmental Psychology.* https://doi.org/10.23668/psycharchives.16201

3.1. Abstract

Research suggests that many young people in the UK experience worry and negative emotions about climate change. University students may be particularly likely to experience such emotions if, for example, exposed to distressing climate change content in their studies. In a pre-registered online mixed-methods study, we investigated climate anxiety, climate change-related emotions, thoughts, and views about their university's role in climate action among 869 students at a large UK university. Results showed that students experienced moderate climate anxiety intensity across different situations. Students reported high levels of negative emotions, including sadness, helplessness, and powerlessness, and low optimism and indifference. Students also experienced high levels of negative climate change-related thoughts, such as "The future is frightening". Regarding their university's role, many students favoured more climate change-related teaching and mental health support. On average, students moderately endorsed the thought that their university was "Dismissing people's distress" about climate change, which correlated significantly with students' climate anxiety intensity ($r = .32$, $p < .01$) and frequency of strong climate anxiety symptoms ($r = .30$, $p < .01$). These results demonstrate serious impacts of climate change on students' mental wellbeing. They also highlight the importance of universities recognising their responsibilities in climate action and protecting students' wellbeing.

3.2. Introduction

In the UK, 80% of young people feel at least moderately worried about climate change (Hickman et al., 2021). University students are particularly exposed to climate change content through their studies (e.g. Pedro et al., 2022) and many feel worried about climate change, without receiving support (Verlie et al., 2020). We investigated climate change-related emotions and anxiety among students at a large UK university (University of Glasgow), assessed which situations trigger climate anxiety, and students' perspectives on what support universities could offer.

Young people experience an increased intensity and prevalence of climate change-related emotions, which may stem from being confronted with and overwhelmed by climate change content (Kelly, 2017; Pedro et al., 2022), having no opportunities to discuss difficult climate change emotions (Verlie et al., 2020), and feeling disempowered and betrayed by those in power (Jones & Davison, 2020; Hickman et al., 2021). Additionally, young people have increased ethical concerns for global issues, making them more vulnerable to climate change-related mental health impacts (Pihkala, 2020).

Berry et al. (2018) proposed that the risk of climate change to mental health is increased when, for instance, mental health resources are limited, or unethical conduct is witnessed. This may apply to students, as they move away from home, pay increased attention to climate change through studying (Maran & Begotti, 2021; Pedro et al., 2022), and witness unethical conduct (Hickman et al., 2021). Indeed, 58% of students attribute a degradation of their mental health directly to their studies of environmental problems (Pedro et al., 2022). In qualitative interviews, some students mentioned dropping courses[4] because climate change content is too upsetting and overwhelming (Kelly, 2017). These emotions are typically not addressed in classrooms, meaning many students close up emotionally, and educators increasingly worry about students' wellbeing (Verlie et al., 2020).

We aimed to understand whether common feelings of disempowerment and betrayal (Hickman et al., 2021) relate to a university setting. It has been argued that, like governments, universities have institutional responsibility and power to respond to climate change, given they train and influence many students, are large employers, have significant purchasing power, policy influence, signalling and modelling functions, and

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[4] Change made after formal publication: "Some students drop courses…" changed to "In qualitative interviews, some students mentioned dropping courses…".

more (e.g., see Gardner et al., 2021; Henritze et al., 2023; Latter et al., 2024; Thierry et al., 2023). Regarding students, universities' actions could potentially help reduce climate anxiety and negative emotions by, for example, involving students in climate change solutions, and by using their power to address students' concerns (Pedro et al., 2022). However, little is known about how students themselves perceive this. We investigated whether students' anxiety was particularly elevated compared to non-student samples. Some studies suggest comparable results between students and adult populations (e.g., Schwartz et al., 2022; Wullenkord et al., 2021);[5] others raise unique issues among students (e.g., Pedro et al., 2022).

Importantly, no studies have yet assessed which situations in a student's life trigger such emotions. Recent developments in emotion theory suggest that emotional experiences are significantly affected by context-specific cues, meaning "no emotional process is common across all instances of the same emotion." (Lebois et al., 2020, p. 3). Assessing different situations where students may experience climate anxiety is thus important to understand specific triggers and to allow addressing those accordingly. We therefore included a *situated* measure of climate anxiety intensity.

Overall, this study contributes to climate anxiety and emotion research, education, and research on student mental wellbeing, as it investigates how university students experience climate anxiety, emotions, and thoughts. It adds to existing literature by considering situational influences on climate anxiety and how students' beliefs of their university's climate actions relate to their climate change-related emotions. Thus, we intended to answer the following questions:

1) What are current self-reported levels of University of Glasgow students' climate anxiety and climate emotions, and do they differ from those in other populations?
2) In which situations do students at the University of Glasgow report experiencing higher climate anxiety than in others?
3) What are the students' views on their university's and their department's climate change teaching, climate actions, and climate change mental health support for students?

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[5] Change made after formal publication: "," changed to ";".

We used quantitative questionnaires to assess climate change experience, climate anxiety, climate change-related thoughts and emotions, and students' beliefs about their university's climate actions. We used open-ended questions and content analysis to explore students' views on their university's role in climate change and what the university could do. Since this study was largely exploratory, we did not formulate any hypotheses.

3.3. Methods

This study was approved by the university's Ethics Committee. For preregistration, materials, and data files see:

https://osf.io/cwfh7/overview?view_only=4155ca3cc4524a85bc31f61efdb0b3d7.

3.3.1. Materials

The survey was created and delivered in Qualtrics (Qualtrics, Provo, UT, 2018; see SM-8). We used an embedded mixed methods design (e.g., see Caracelli & Greene, 1993; Greene & Caracelli, 1989), collecting and analysing quantitative and qualitative data simultaneously, embedding open-ended qualitative questions within a typically quantitative survey design (Creswell & Plano Clark, 2007). This was done to allow integrating insights into students' overall levels of climate anxiety, climate change-related emotions and thoughts, and individual beliefs and experiences, which we could not have predicted for a quantitative scale. Quantitative questions were answered using continuous slider bars with one decimal point accuracy.

3.3.1.1. Climate anxiety

To assess strong symptoms of climate anxiety and climate change experiences, we used Clayton and Karazsia's (2020) scale (first 16 items; 1 (Never) to 5 (Almost always)). There is some debate that this scale needs further development (Hogg et al., 2023), however, it still seems valid and reliable across contexts (Cronbach's alpha = .84; Mouguiama-Daouda et al., 2022) when ignoring the proposed factor structure, which we did (e.g., Cruz & High, 2022). We asked, "Please rate how often the following statements are true of you", including statements like "I find myself crying because of climate change". Items on climate change experiences included statements like "I have been directly affected by climate change".

To assess situations where students experience climate anxiety, we adapted the Situated Assessment Method for Climate Anxiety Measurement (SAM² CAM), which has been found to have excellent internal reliability (Cronbach's alpha = .96; (Hill-Harding et

al., 2026)[6], to university students' everyday life (0 (No anxiety at all) to 10 (Extreme anxiety)). We asked, "When this situation occurs, how much anxiety do you experience about climate change?". From the original questionnaire, we retained situations relevant to typical student life (e.g., "Hearing about climate change on the news"). Situations less relevant to students were omitted (e.g., "Taking the car when I have a choice not to."). Additional student-specific situations were created, based on research on young people's and students' experiences with climate change (e.g., "Talking about the emotional impacts of climate change in class."; e.g., Kelly, 2017).[7] See Table 4 for all 18 situations.

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[6] Change made after formal publication: "Hill-Harding et al., 2025" changed to "Hill-Harding et al., 2026".

[7] Change made after formal publication: "From the original questionnaire, we retained situations relevant to typical student life. We created additional situations based on research on young people's and students' experiences with climate change." changed to "From the original questionnaire, we retained situations relevant to typical student life (e.g., "Hearing about climate change on the news"). Situations less relevant to students were omitted (e.g., "Taking the car when I have a choice not to."). Additional student-specific situations were created, based on research on young people's and students' experiences with climate change (e.g., "Talking about the emotional impacts of climate change in class."; e.g., Kelly, 2017).".

Table 4

SAM² CAM-Students situations.

"When this situation occurs, how much anxiety do you experience about climate change?"	
Abbreviation	**Situation**
S01 – News	Hearing about climate change on the news (e.g., flooding, wildfires).
S02 – Social media	Seeing climate change content on social media.
S03 – Government's plan	Hearing news about the government's climate action plan not being achieved.
S04 – University action	Hearing about the university's action on climate change.
S05 – Influencers	Seeing influencers promote environmentally unsustainable lifestyles on social media (e.g., using private jets, 'fashion hauls').
S06 – Denier talk	Talking about climate change to someone who doesn't take it very seriously (e.g., using private jets, 'fashion hauls').
S07 – University food	Seeing the majority of food offered at university containing animal products.
S08 – Children's future	Thinking about the future that children may experience.
S09 – Activism	Engaging in climate activism (e.g., attending protests, sharing posts online).
S10 – Outdoors	Spending time outdoors (e.g., in a park).
S11 – Own future	Thinking about my future.
S12 – Field-specific issues	Learning about climate change issues specific to my field of study.
S13 – Lecturer story	Lecturers sharing their story of becoming interested in climate change issues.
S14 – Lecturer anxiety	Lecturers sharing that they feel anxious about climate change.
S15 – Emotions in class	Talking about the emotional impacts of climate change in class.
S16 – Assignment	Being given an assignment that makes me think about solutions to a climate change related issue.
S17 – Career	Thinking about pursuing a career that is related to climate change.
S18 – Age	Talking to someone about climate change who doesn't take me seriously because of my age.

Note. Situated measurement based on the original SAM² CAM by Hill-Harding et al. (2024). The following situations were reused or adapted from the original SAM² CAM: S01, S03, S05, S06, S08, S09, S10, and S11. The remaining situations were newly created for the SAM² CAM-Students.

3.3.1.2. Climate change emotions and thoughts

We used Hickman et al.'s (2021) questionnaire items and changed responses from "yes/no/prefer not to say" to 0 (Not at all) to 10 (Very much). We asked: "How much does climate change make you feel the following?". Students responded for different emotions (e.g., "sad"). We further asked: "How much does climate change make you think the following?". Response statements included, e.g., "The future is frightening".

3.3.1.3. Climate change beliefs about the university

Adapted likewise from Hickman et al. (2021), we asked about students' beliefs of their university's climate actions (from 0 (Not at all) to 10 (Very much)). We changed the original questions about governments to ask: "In relation to climate change, I believe that my [university] is…". Responses were scored for five beliefs relevant to universities: "Taking my concerns seriously enough", "Doing enough about climate change", "Dismissing people's distress", "Acting in line with climate science", and "Protecting me, the planet and/or future generations".

3.3.1.4. University actions and support

We used closed and open-ended questions to understand students' thoughts about their university's support for climate change-related mental health, climate change-related teaching, and additional climate actions (see Table 5). These were developed based on discussions of the research team.[8]

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[8] Addition made after formal publication: "These were developed based on discussions of the research team".

Table 5

Yes/no and qualitative questions on university and department actions.

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	Query	**Possible responses**
1.	Do you think the University [School/Institute/Department] should provide support for students' mental health related to climate change?	Yes/ No/ I don't know
1.1.	If you said yes, please explain, and describe in a few sentences what you think the University [School/Institute/ Department] should ideally do in this context. We are really interested in hearing your thoughts, so please give as much detail as possible.	Open-ended
1.2.	If you said no, please explain, and describe in a few sentences why you think the University [School/Institute/ Department] should not do anything in this context. We are really interested in hearing your thoughts, so please give as much detail as possible.	Open-ended
2.	Do you think the University [School/Institute/Department] should include more issues related to climate change in their teaching?	Yes/ No/ I don't know
2.1.	If you said yes, please explain, and describe in a few sentences what you think the University [School/Institute/ Department] should ideally do in this context. We are really interested in hearing your thoughts, so please give as much detail as possible.	Open-ended
2.2.	If you said no, please explain, and describe in a few sentences why you think the University [School/Institute/ Department] should not do anything in this context. We are really interested in hearing your thoughts, so please give as much detail as possible.	Open-ended
3.	Is there anything else that you think the University [School/ Institute/Department] should or should not do with regards to climate change? Please describe this to us in a few sentences, we are interested in finding out about your thoughts and opinions!	Open-ended

_____

Note. All questions were asked separately for University and School/Institute/Department.

3.3.2. Participants, recruitment, and procedure

We aimed to recruit 869 students (to represent 2.5% of the university's student population) from the University of Glasgow, a large research-intensive university, which was feasible with the available budget for incentives. The university has a large body of international students and is situated in Glasgow, one of the largest cities in the UK. This study is therefore contextual to a UK university, which is reflected in our choice of

materials (e.g., SAM² CAM-Students). It is further contextual to a research-intensive university, which may be reflected in the large proportion of postgraduate students, which is nevertheless representative for this university.

Data was collected through Qualtrics (Qualtrics, Provo, UT, 2018) between 22nd March 2023 and 28th April 2023. Participants were recruited through targeted adverts on social media, university TEAMS channels, university subject pools, emails, and in-person advertising. To ensure only students from the university participated, participants provided their student email to access the survey, which we collected separately from survey responses. As pre-registered, participants were excluded if they provided less than a third of quantitative data, and/or were missing all open-text responses. Participants could choose to participate in a prize draw for one of 10 £50 Tesco vouchers. When the target sample size of N = 869 was reached, data was reviewed for quality. Due to incomplete and missing data, 113 participants were excluded. Data collection was resumed until sufficient data from N = 869 was reached. See Table 6 for participant demographics. We did not collect data on participants' socioeconomic backgrounds.[9]

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[9] Addition made after formal publication: "We did not collect data on participants' socioeconomic backgrounds.

Table 6

Participant demographics.

Sample demographic characteristic	N	% sample	% university population
Gender			
Male	117	13.5	40.1
Female	605	69.9	59.6
Non-binary	32	3.7	0.3
Undergraduate/postgraduate			
Undergraduate	469	54.0	59.7
Postgraduate	346	39.8	40.3
College			
Arts	223	25.7	15.2
MVLS	207	23.8	23.3
CoSE	138	15.9	23.9
CoSS	252	29.0	40.2
Origin			
UK	447	51.4	56.3
Europe	102	11.7	6.0
International	276	31.8	32.1

Note. MVLS = College of Medical, Veterinary, and Life Sciences; CoSE = College of Science and Engineering; CoSS = College of Social Sciences. Data on university population based on 2022/2023 data from the University of Glasgow's official student headcount (https://www.gla.ac.uk/myglasgow/planning/ourdata/uofg/ accessed 29th January 2025).

Participants first completed scales on climate anxiety symptoms and climate change experiences, followed by questions on climate change emotions, thoughts, and the university's role in climate change. Next, participants responded to the SAM² CAM-Students, questions on university actions with open-ended follow-up questions, and demographic questions, including age, gender, college, level of study, degree course, and home country. No data was collected on socioeconomic status. After the study, participants were debriefed, given our contact details, and information of available anxiety support.

3.3.3. Data analysis

All statistical analyses were carried out and all figures created in R (version 4.2.1; R Core Team, 2022), using R Studio (version 2023.3.0.386).

3.3.3.1. Descriptive statistics

We calculated a mean across items 1 to 13 from Clayton and Karazsia's (2020) scale to establish average frequency of strong symptoms of climate anxiety. We did the

same across items 14 to 16 to assess average climate change experience. For climate change emotions, thoughts, and university beliefs, we calculated a mean across participants for each item to assess its average intensity.

We calculated distributional measures for university action questions to allow an overview of how many students responded "yes", "no", or "I don't know" to each question.

For SAM² CAM-Students, we took a mean across participants and situations to assess the overall mean climate anxiety intensity. We calculated a mean across participants for each situation to assess which situations were associated with the highest climate anxiety. Likewise, we used each participant's climate anxiety score for each situation to map individual differences in climate anxiety onto situations.

3.3.3.2. *Content analysis of open-text responses*

We conducted a quantitative content analysis to summarise common themes from open-ended questions on the university's mental health support, climate change teaching, and additional climate actions. This is a systematic, "objective, quantitative analysis of [qualitative] message characteristics" (Neuendorf, 2017, p. 2). We followed steps proposed by Neuendorf (2017; see SM-9 for codebooks). All data were coded by the first author. Data from students who said "yes" to mental health support and teaching were additionally coded independently by a second rater. Since comparisons of both raters' codes yielded little change in the primary rater's code, the remaining open-text responses (see Table 5) were coded only by the first author (data and coded responses available online: https://osf.io/cwfh7/overview?view_only=4155ca3cc4524a85bc31f61efdb0b3d7).

We deviated from our pre-registration by not including results on students' coping and support-seeking for climate change-related mental health. Because of the amount of rich data these questions generated, we report resultant findings in a separate manuscript. All other analyses followed our design and analysis plan from our time-stamped pre-registration.

3.4. Results

3.4.1. Climate change experience

Participants experienced climate change "sometimes" with $M(869) = 3.06$ ($SD = 1.05$; 1 to 5 scale). For a visual comparison to other samples, see Figure 5a: participants

experienced climate change more than non-student samples but with comparable frequency as student samples from the US.

3.4.2. Climate anxiety

On average, students experienced strong climate anxiety symptoms "rarely", with $M(869) = 2.03$ ($SD = 0.74$; 1 to 5 scale). For a visual comparison to other samples, see Figure 5b: participants experienced strong climate anxiety with similar frequency as other populations. On the situated measure of climate anxiety, students reported moderate anxiety intensity, with $M(869) = 5.00$ ($SD = 1.73$; see Figure 5c).

Figure 5

Median climate change experience and climate anxiety.
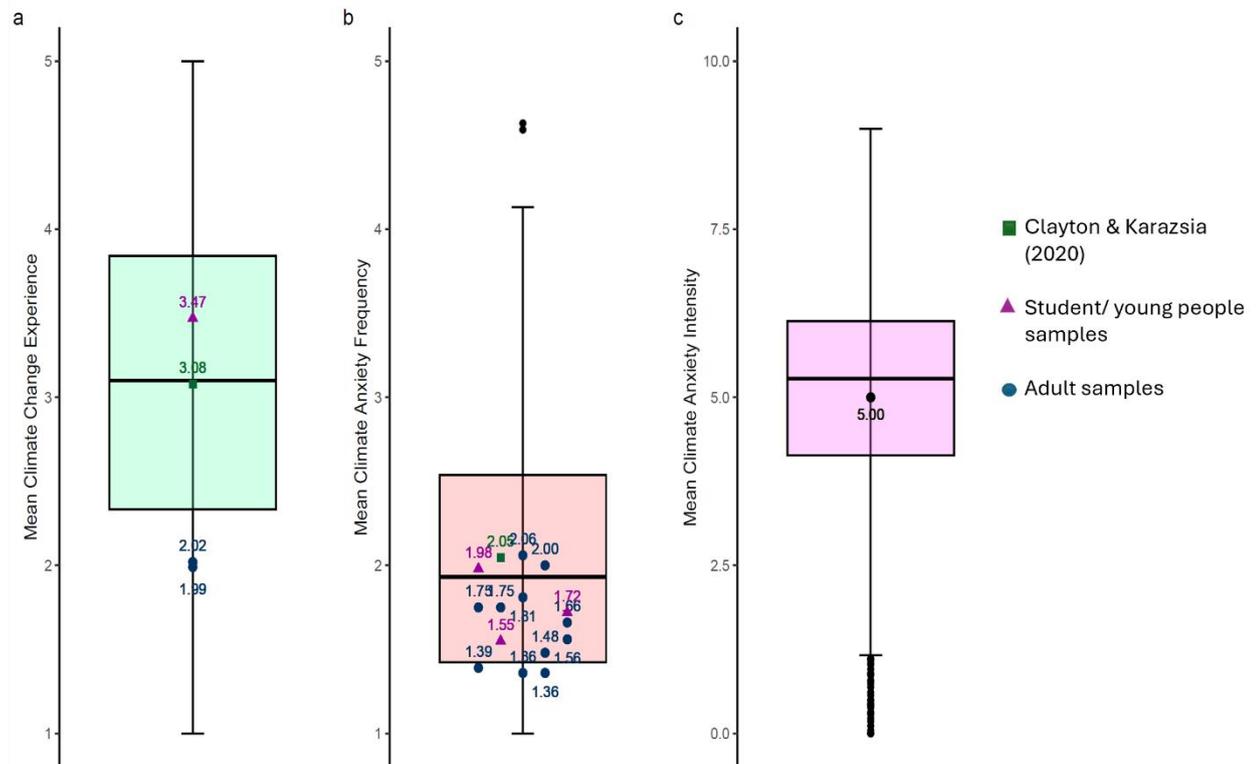
Note. Medians from our sample indicated by black bars in boxplots. Climate change experience scores in plot (a), climate anxiety frequency scores in plot (b), climate anxiety intensity in plot (c). Mean climate change experience and anxiety frequency from Clayton and Karazsia (2020) in green squares in plots (a) and (b). Mean experience from adult samples (Mouguiama-Daouda et al., 2022; Shinan-Altman & Hamama-Raz, 2022) in dark blue circles in (a). Mean experience from student samples (S. E. O. Schwartz et al., 2022) in purple triangles in plot (a). Mean anxiety frequency from adult samples in blue circles in plot (b) (Bratu et al., 2022; Cruz & High, 2022; Feather & Williams, 2022; Hajek & König, 2022; Heeren et al., 2022; Innocenti et al., 2021; Joshua et al., 2022; Larionow et al., 2022; Mouguiama-Daouda et al., 2022; Nasi et al., 2023; Wullenkord et al., 2021). Mean anxiety from other student (S. E. O. Schwartz et al., 2022)/ young people samples in purple triangles (Nadarajah et al., 2022; Thier & Lin, 2022) in plot (b). Black dot in (c) indicates mean situated climate anxiety intensity from our sample.

Figure 6 presents situated climate anxiety judgments for individual participants (rows) across situations (columns). From a visual analysis of the top of Figure 6, there

appear to be two major clusters of situations. Some situations tended to elicit lower climate anxiety across most students (left side of Figure 6; e.g., S10-Outdoors), while others elicited high anxiety across most students (right of Figure 6; e.g., S1-News). A few situations elicited higher anxiety for some and lower anxiety for other students (e.g., S16-Assignment). There also appear to be two major clusters of participants (see clustering on left of Figure 6). Some participants experienced lower anxiety across most situations (bottom of Figure 6). A larger portion of students experienced high anxiety in some situations, and lower anxiety in others. Hence, the intensity of climate anxiety experienced seems to depend on situational *and* individual characteristics, and perhaps various psychosocial factors (see e.g., Crandon et al., 2022, 2024).

Figure 6

Situations-by-individual interactions for mean climate anxiety intensity.
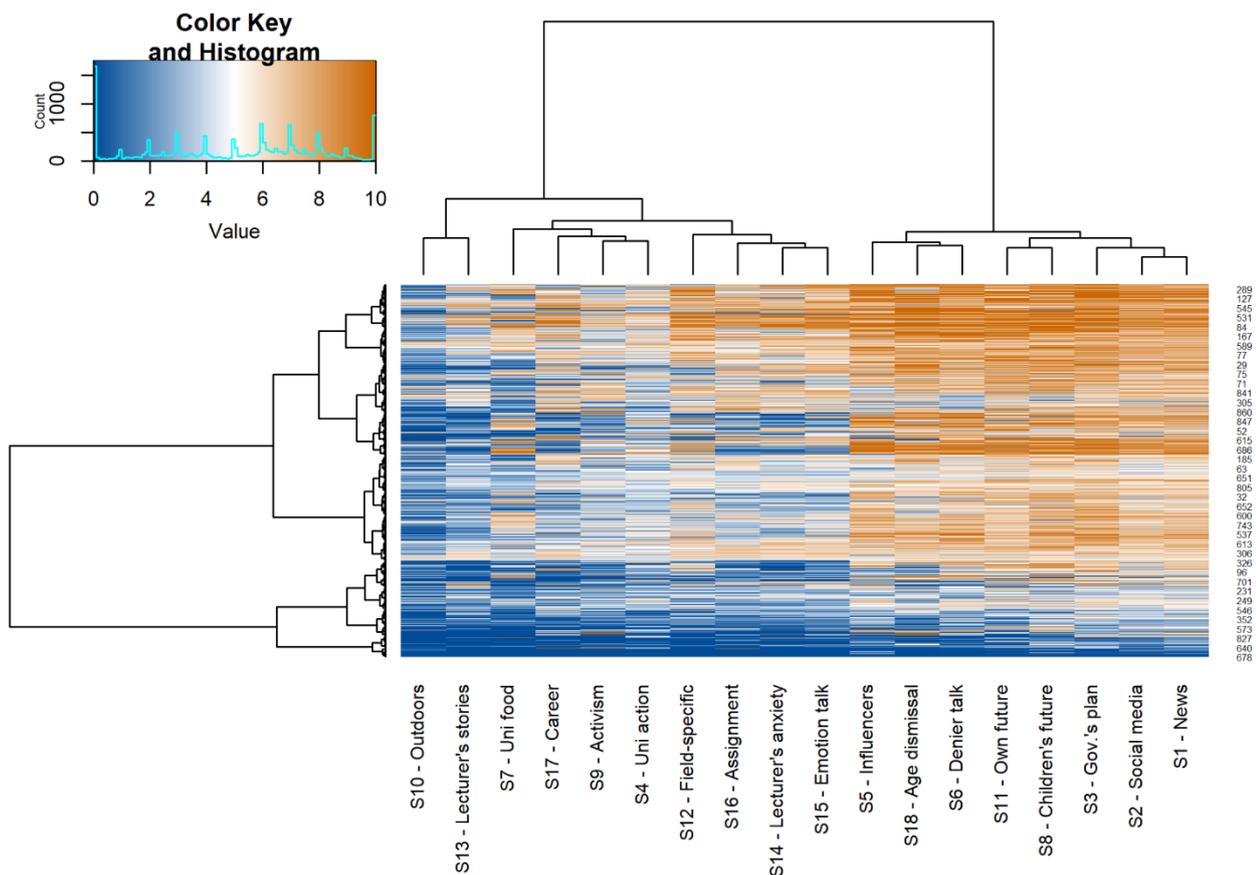
Note. Each row contains one participant's climate anxiety judgements for the 18 situations. Each column contains one situation's climate anxiety judgement across all 869 participants. As cells become more orange (particularly top right cluster), they represent higher climate anxiety intensity. As cells become bluer (particularly bottom left cluster), they represent lower climate anxiety intensity. The hierarchical clustering dendrogram on the left groups participants based on how similarly they experienced the 18 situations overall. The hierarchical clustering dendrogram at the top groups situations based on how similarly each situation was experienced across participants.

3.4.3. Climate change emotions and thoughts

3.4.3.1. Emotions

Figure 7a shows the means of participants' climate change emotions, along with percentages of young people from Hickman et al. (2021) who reported feeling these emotions about climate change (in response to yes/no questions), for visual comparisons. Participants reported high levels of negative emotions with a grand mean of $M(869) = 6.00$ ($SD = 2.03$; 0 to 10 scale), particularly feeling powerless: $M(869) = 7.22$ ($SD = 2.69$) and helpless: $M(869) = 7.15$ ($SD = 2.78$). On the contrary, participants experienced low optimism: $M(869) = 2.08$ ($SD = 2.09$) and indifference: $M(869) = 2.47$ ($SD = 2.57$).

3.4.3.2. Thoughts

Figure 7b shows how much students endorsed different climate change-related thoughts. Students experienced high intensity for thoughts like "People have failed to take care of the planet" ($M(869) = 8.49$; $SD = 2.14$; 0 to 10 scale), "The future is frightening" ($M(869) = 7.25$; $SD = 2.60$), "Humanity is doomed" ($M(869) = 6.45$; $SD = 2.88$), and "I won't have access to the same opportunities that my parents had" ($M(869) = 6.41$; $SD = 3.13$). Participants experienced *all* thoughts at least moderately with a grand mean of $M(869) = 6.52$ ($SD = 2.22$), and no thought had a mean below the scale average.

Figure 7

Mean intensity of the different climate change-related emotions and thoughts.
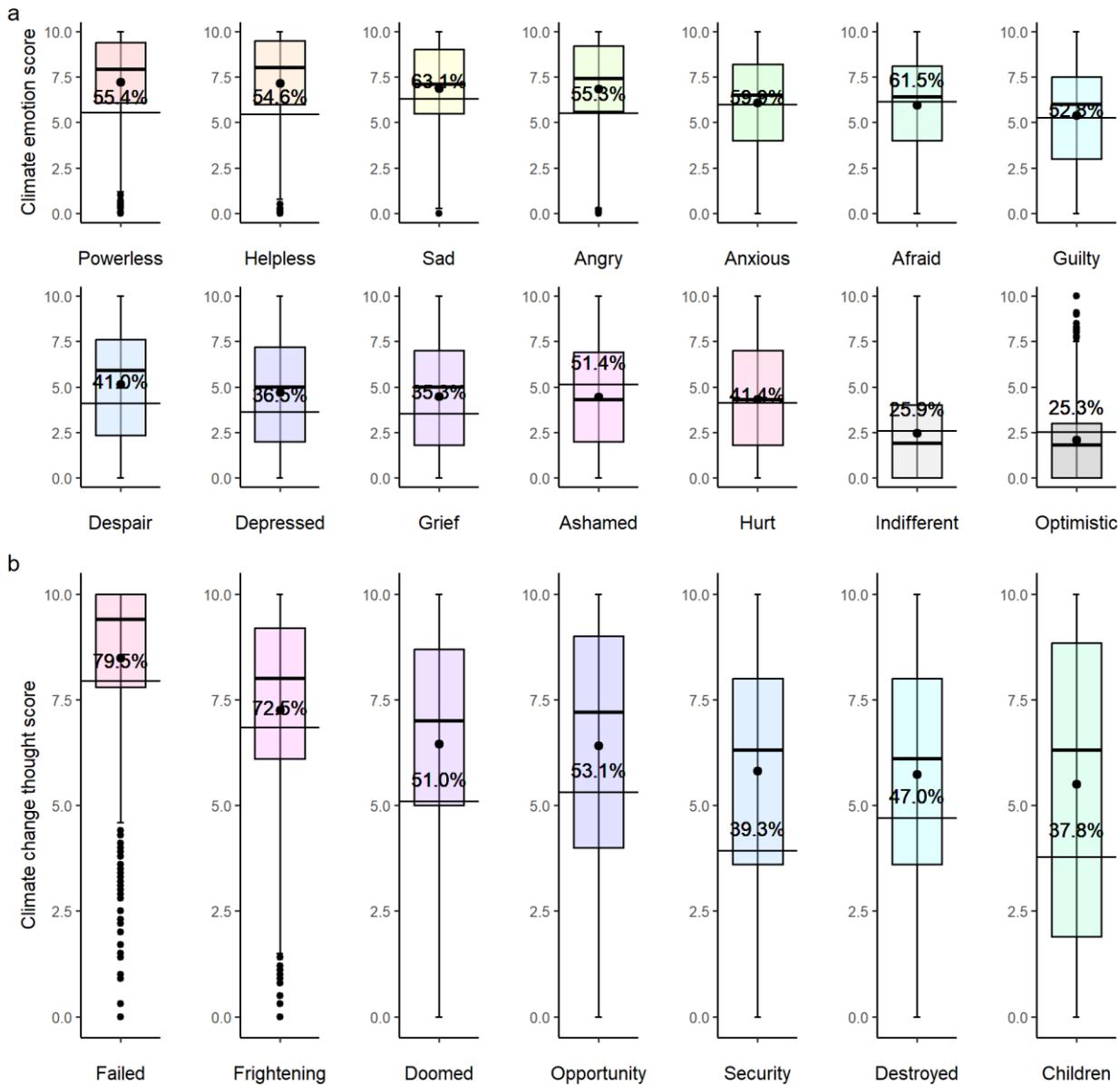
Note. Plot (a) shows mean intensity of experienced climate change emotions. Plot (b) shows mean intensity of experienced climate change-related thoughts. Percentages with thin black line show proportion of young people from the UK in Hickman et al. (2021) who reported experiencing the above emotions and thoughts. Thick black bars inside box plots indicate each emotion's and thought's median from our sample. Dots indicate each means.

3.4.4. Beliefs about university's actions

Figure 8 shows participants' beliefs about their university's climate actions with a grand mean of $M(855) = 4.38$ ($SD = 1.61$). Participants felt somewhat to moderately that the university was "dismissing people's distress" ($M(855) = 4.16$; $SD = 2.58$; 0 to 10 scale) and only somewhat "doing enough about climate change" ($M(855) = 3.93$; $SD = 2.46$).

Nonetheless, participants moderately believed that the university was "acting in line with climate science" ($M(855) = 5.13$; $SD = 2.36$). They believed that the university was "taking [their] concerns seriously enough" ($M(855) = 4.42$; $SD = 2.44$) and "protecting [them], the planet and/or future generations" ($M(855) = 4.23$; $SD = 2.36$) somewhat to moderately.

Figure 8

Mean university belief scores.
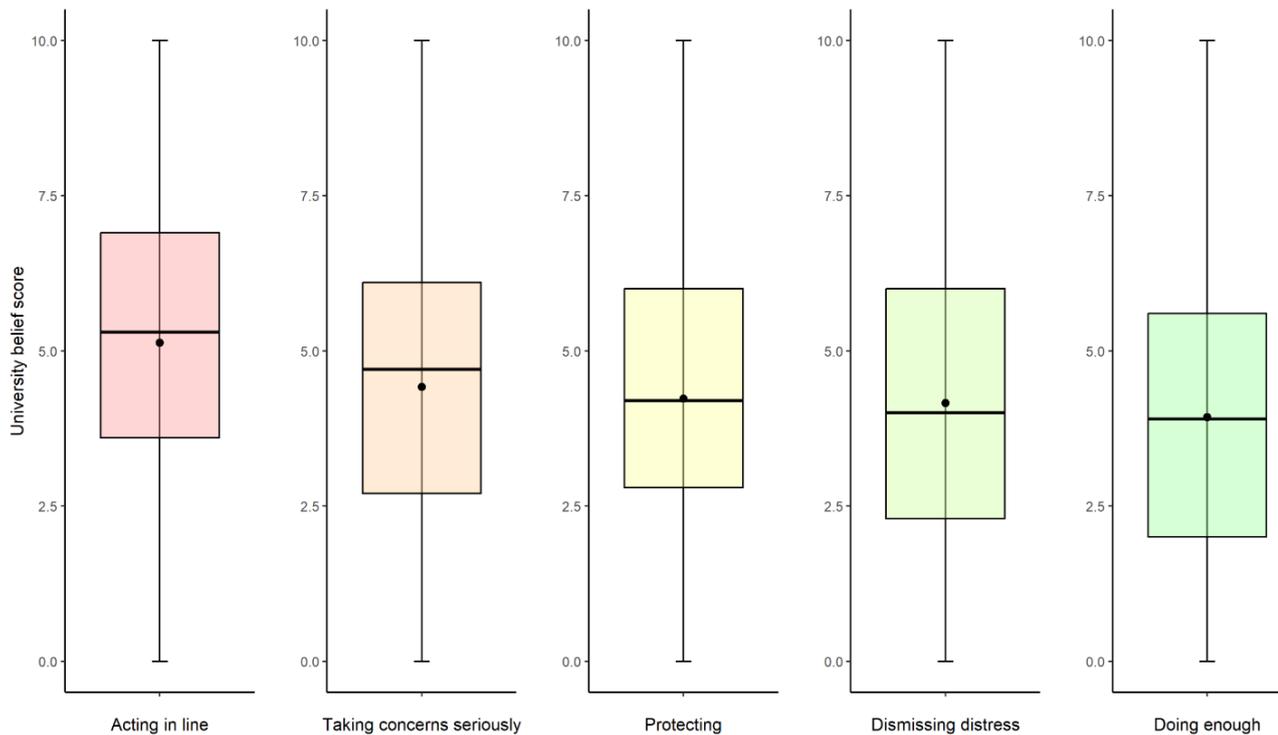
Note. Box plots represent mean scores for each belief. Black bars indicate the medians, dots indicate means. Acting in line = Acting in line with climate science; Taking concerns seriously = Taking my concerns seriously enough; Protecting = Protecting me, the planet and/ or future generations; Dismissing distress = Dismissing people's distress; Doing enough = Doing enough about climate change.

3.4.5. Actions the university and department should engage in

3.4.5.1. Climate change teaching

Overall, 67.7% ($N = 588$) of participants thought the university should provide more climate change-related teaching, 9.9% ($N = 86$) were opposed, and 22.3% ($N = 194$) unsure. At a departmental level, 60.9% ($N = 529$) of participants agreed with departments including more climate change issues in teaching, 15.4% ($N = 134$) were opposed, and 18.9% ($N = 164$) unsure.

Content analysis of open-text responses showed that those who favoured more climate change teaching mostly mentioned (1) more climate change teaching overall ($N =$

171), (2) subject-specific climate change teaching ($N = 148$), and (3) teaching about mitigation actions ($N = 124$). Other requests included teaching about (4) everyday life consequences of climate change ($N = 40$), (5) sustainable career options ($N = 26$), (6) how to live with climate change ($N = 15$), (7) science of climate change ($N = 14$), and (8) the university's climate actions ($N = 13$).

Of those who said "no" to climate change teaching, participants mostly mentioned (1) lectures should only focus on the degree subject ($N = 36$) and that (2) the university already provided enough climate change information ($N = 20$). Few participants mentioned (3) students were already well educated about climate change ($N = 8$) and (4) such teaching might increase negative emotions and anxiety ($N = 6$).

3.4.5.2. Mental health support for climate change

Regarding mental health support, 43.2% ($N = 375$) of participants agreed with this. A comparable 42.2% ($N = 367$) were unsure and 14.6% ($N = 127$) opposed. On a departmental level, 33.0% ($N = 287$) thought their department should provide support, 18.1% ($N = 157$) were opposed, and 44.8% ($N = 389$) unsure.

Participants who agreed with such support mostly thought this should consist of (1) counselling/therapy ($N = 146$), (2) climate cafés/peer support ($N = 59$), (3) more (transparent) university climate actions ($N = 52$), (4) education about climate change-related mental health ($N = 42$), and (5) listening to students' concerns ($N = 37$).

Of those students who said "no" to support, reasons included (1) climate change-related mental health not being a serious concern ($N = 26$), (2) risk of support taking focus away from mitigation actions ($N = 23$), (3) being too nuanced of a problem for university services ($N = 20$), (4) other mental health issues being a priority ($N = 19$), (5) such support should be provided through existing services ($N = 18$), and (6) services were already struggling ($N = 16$).

3.4.5.3. Additional actions

We also asked participants if there were any additional climate change-related actions they would like the university to perform. Of those who responded ($N = 339$), most common themes included (1) university's fossil fuel divestment ($N = 63$), (2) spreading awareness about climate change ($N = 39$), (3) sustainable catering (e.g., plant-based; $N = 38$), and (4) more sustainable buildings (e.g., retrofitting; $N = 35$). Additional actions

included: opportunities for students to get involved ($N = 29$), reducing single-use plastics in catering ($N = 21$), sustainable transport options to university ($N = 21$), better recycling ($N = 20$), transparency about the university's climate actions ($N = 19$), and general reduction of university's carbon footprint ($N = 14$). Twenty-nine students thought no further climate action was required.

Taken together, quantitative and qualitative findings provide interesting insights. For instance, quantitative results showed participants believed somewhat to moderately that the university was taking their concerns seriously enough, which qualitative findings supported, as participants voiced that the university should listen to their climate change-related concerns. Similarly, the relatively low mean for the belief that the university was "doing enough about climate change" seems reflected in participants requesting more transparent climate actions, fossil fuel divestment, and more sustainable buildings, among others.

3.4.6. Exploratory Analyses

We computed means of key variables, standard deviations, and Pearson's correlations (see Table 7). For correlations between the experience and anxiety scores, and each individual emotion, thought, and university belief, see SM-10. We found insightful correlations between participants' university beliefs and climate change emotions and thoughts. The belief that the university is "dismissing people's distress" correlated positively with both situated climate anxiety intensity ($r(855) = .32$, $p < .01$, 95% CI [.26, .38]) and anxiety symptom frequency ($r(855) = .30$, $p < .01$, 95% CI [.24, .36]). This belief correlated further significantly at the .01 level with feeling depressed ($r(855) = .28$, 95% CI [.22, .34]), afraid ($r(855) = .26$, 95% CI [.19, .32]), grief ($r(855) = .26$, 95% CI [.20, .32]), despair ($r(855) = .25$, 95% CI [.19, .31]), and other emotions. We also visually explored whether participants' climate change experiences, anxiety, thoughts, or emotions were related to their home country's climate change risk score (Thow et al., 2022; see SM-11).

Table 7

Means, standard deviations, and correlations with confidence intervals for students' means on each measure.

Variable	M	SD	1	2	3	4	5
1. Climate anxiety frequency	2.03	0.74					
2. Climate change experience	3.06	1.05	.42 [.37, .47]				
3. Climate anxiety intensity	5.00	1.73	.63 [.59, .67]	.40 [.34, .45]			
4. Climate change emotions	5.22	1.89	.67 [.63, .71]	.42 [.36, .47]	.72 [.69, .75]		
5. Climate change related thoughts	6.52	2.22	.50 [.45, .55]	.41 [.35, .46]	.63 [.59, .67]	.72 [.69, .75]	

Note. Values in square brackets indicate the 95% confidence interval for each correlation.

3.5. Discussion

This study explored climate change-related emotions, thoughts, and anxiety in students at the University of Glasgow. Participants experienced high levels of negative climate change emotions, feeling especially powerless, helpless, sad, and angry, while feeling little indifferent and optimistic. Participants strongly endorsed statements like "People have failed to take care of the planet" and "The future is frightening" (see also Hickman et al., 2021).

Two thirds of participants wanted their university to include more climate change issues in teaching, especially course-specific content, and teaching about mitigation. This is in line with students' views at other universities, where students called for more humanistic climate change-aware education (Khalaim & Budziszewska, 2024). Regarding climate change-related mental health support, a comparable number of students were in favour or unsure whether the university should provide this. Those in favour mentioned counselling, peer support, and more (transparent) university climate actions. Participants felt moderately that the university was "dismissing people's distress", which correlated with climate anxiety. Participants were somewhat to moderately convinced that the

university was "doing enough about climate change". They thought the university should divest from fossil fuels, spread awareness about climate change, and make catering and buildings more sustainable. These views support scholars' increasing calls for universities to engage in conversations and actions to mitigate climate change as institutions and academics (Thierry et al., 2023).

Regarding climate anxiety intensity, visual interpretations suggest that participants reported higher scores than members of the general population (Hill-Harding et al., 2026~~5~~). These further suggest that participants experienced higher climate anxiety in situations associated with a lack of agency and self-efficacy (e.g., watching the news) and lower anxiety in situations with higher self-efficacy and agency (e.g., engaging in climate activism).

3.5.1. Implications for climate anxiety research

Our results suggest that situational factors, individual differences, and climate anxiety frequency are associated with climate anxiety intensity. Berry et al. (2018) proposed a model with six factors that elevate one's risk for impacted mental health from climate change: (1) institutional unethical conduct, (2) aggravated root causes of mental ill-health, (3) destruction and upheavals, (4) strain of public (healthcare) resources, (5) pressure on community and societal functioning, and (6) lack of personal mental health resources. Our data suggest that this model can be partly applied to climate anxiety, as (1) perceived unethical conduct, (3) concern for threatened security, and (4) perceived lack of power and resources were all significantly linked to climate anxiety (see SM-10 for specific correlations). Our data also support the model by Crandon et al., (2024), who suggest that systemic and contextual factors play crucial roles in climate anxiety, which we found here for situational contexts and the university's actions. The results from this study therefore partly confirm theoretical models of climate anxiety and show the importance of individual and situational factors for climate anxiety. Our findings also support suggestions that climate anxiety is affected by varying experiences with climate change (e.g., Pihkala, 2021), as indicated by the strong correlations between climate change experience scores and climate anxiety. Future research may investigate whether additional factors, like cultural contexts or individual characteristics like optimism also affect climate anxiety.

Our observations suggest that participants experienced high climate anxiety in situations associated with low self-efficacy. These observations support research that suggests that self-efficacy plays an important role in the behavioural manifestations of

climate anxiety and that demonstrate a negative link between global self-efficacy and both functional and cognitive impairment of climate anxiety (Innocenti et al., 2023). It also confirms the proposal by van Valkengoed et al. (2023), that climate anxiety is likely higher when climate change is appraised as catastrophic, uncontrollable, and unpredictable, with low efficacy to deal with it. Recent findings suggest that a sense of self-agency is disrupted in generalised anxiety and major depressive disorders (Mehta et al., 2023). Future research should investigate the dynamics of such disruptions in relation to climate anxiety.

3.5.1.1. Measuring climate anxiety

In our study, students experienced strong symptoms of climate anxiety rarely, but climate anxiety was moderately intense for situations overall. Thus, students may experience severe climate anxiety on few occasions, but persistent moderate climate anxiety could still impact their functioning. It therefore seems insufficient to assess climate anxiety purely on a frequency level (e.g., Clayton & Karazsia, 2020; Hogg et al., 2021; Stewart, 2021), but to do so also for symptom severity (e.g., Ágoston et al., 2022; Beckord et al., 2024; Hepp et al., 2023). Measurements of climate anxiety should thus incorporate situational and individual factors and assess intensity as well as frequency. Measurements should also work towards a clear operationalisation of climate anxiety and the symptoms to be assessed, as there is currently little consensus on this (van Dijk et al., 2025). There is also an opportunity to assess climate anxiety as a continuum, as this may allow to capture different variations of climate anxiety (Hannachi et al., 2024; Lutz et al., 2023).

3.5.2. Applied implications for communication and social support

Our findings around climate emotions and agency raise the importance of constructive communication to share concerns about climate change and activate social support. Students' parents, teaching staff, and university management may respond to students' experiences by increasing their mitigation efforts in their roles as policymakers, investors, managers, stakeholders, consumers, and role models (e.g., Latter et al., 2024; Nielsen et al., 2021; Thierry et al., 2023). They may provide social support by engaging in staff-student dialogue and providing training and spaces for climate cafés on campus (see Forrest, 2025). In addition, university staff, particularly psychologists, have the opportunity to include climate change communication in research and practice, and to provide climate-related scientific training to students (Gardner et al., 2021; Moser, 2016; Nielsen et al., 2021; Papies et al., 2024).

3.5.3. Applied implications for universities

Universities may have particular responsibilities and opportunities in addressing students' climate change-related mental wellbeing. Our results show that many students wanted more climate change teaching. This is easily implementable if universities provide resources such as time and training for lecturers to teach climate change content and discuss its emotional impacts (Pellitier et al., 2023). Our findings from situations associated with climate anxiety also show that teaching staff can have a positive impact on students' climate anxiety. For example, students generally reported lower climate anxiety when thinking about pursuing a career related to climate change or lecturers shared stories of their interest in sustainability. Providing students with positive prospects beyond university and including positive climate change teaching may thus help address students' concerns and validate their potentially traumatic reality (Atkinson & Jaquette Ray, 2024).

As universities are the source of much of the knowledge about climate change and its consequences, it seems paradoxical that many continue to operate as business-as-usual (Thierry et al., 2023). Universities should be in an ideal position to act as role-model institutions for climate mitigation, given their body of research, resources, and educational responsibility. In fact, many participants seemed to suggest that the university's duty of care extends beyond symptomatic support. They implied that universities need to address the root causes of students' negative climate change emotions, which includes acting on what is important to students and their futures by reducing high-emission practices (e.g., fossil fuel divestment) and increasing sustainable practices (e.g., decarbonising campuses; see also Papies et al., 2024). A first step should be recognising and acknowledging the difficult emotions students face and to allow personal-level conversations (Khalaim & Budziszewska, 2024; Wallace et al., 2020). For a practical guide to implementing emotionally sustainable climate change teaching, see Atkinson and Jaquette Ray (2024).

3.5.4. Strengths and Limitations

3.5.4.1. Strengths

Our large sample represented about 2.5% of the university's student population. Students from all colleges of the university participated, with a good representation of undergraduate and postgraduate students, and almost all subject areas. Therefore, our findings are likely to reflect students' experiences and views across the university. We also replicated results by Clayton and Karazsia (2020) on both climate change experiences and

strong climate anxiety frequency, and found comparable results to Hickman et al. (2021) regarding climate change emotions and thoughts. Thus, these findings align with existing research and are likely to be externally reliable. We additionally assessed climate anxiety not only in terms of frequency of strong symptoms, but also in terms of intensity for different situations. Thus, we established that climate anxiety can be experienced with high intensity, even if experienced infrequently.

3.5.4.2. Limitations

Our sample was predominantly female (69.6%), raising the question whether our data reflect a largely female perspective. Research shows that females worry more about climate change and feel less indifferent than their male counterparts (e.g., Pihkala, 2020; Wullenkord et al., 2021). In this study, the only gender-difference was that females more strongly endorsed the statement "I am hesitant to have children" than non-female students. However, we cannot rule out that we would have found other differences in a more gender-balanced sample. We further failed to collect information on participants' socioeconomic backgrounds, which may have provided some interesting insights and could have allowed further discussions of the sample's representativeness to other university student populations.

Our sampling also depended on volunteer enrolment and was locally bound to one UK university. This raises potential concerns with self-selection bias and results' generalisability to other student populations. For instance, it is likely that students were more interested in participating if they had pre-existing interests in climate change and/or mental health. Indeed, we noted a slight underrepresentation of European students in our sample and that only the college of Medical, Veterinary, and Life Sciences was representative of the proportion it holds within the university's student body.

Finally, the scale used to assess climate anxiety frequency (Clayton & Karazsia, 2020) only captures strong climate anxiety symptoms. While we also assessed varying levels of climate anxiety with the SAM² CAM-Students, interpretations of climate anxiety frequency and how that relates to other variables and populations need to be considered with this in mind. Similarly, the SAM² CAM-Students has limitations, as some situations may be primed for higher climate anxiety (e.g., S12 to S15). It may also not cover all situations associated with climate anxiety in students' lives, and some included situations may be rather complex (e.g., S07-University food assumes knowledge of the link between

animal products and greenhouse gas emissions). Future research could investigate potential other situations.

3.5.5. Conclusion

Overall, students in our study experienced moderate climate anxiety and high levels of negative emotions and thoughts about climate change. Many students favoured more climate change teaching, mental health support, and (transparent) mitigating practices from their university. Universities have a responsibility to ensure they do not increase climate change-related harm to students' wellbeing through carbon-intense practices. Instead, implementing more climate mitigation practices and psychosocial support may benefit students' mental wellbeing.

4. Chapter 4: From hope and action to giving up: Students' stories of coping with climate change

This chapter is an exact copy of the following pre-print, which is currently under review at Applied Psychology: Health & Wellbeing:

Hill-Harding, C. K. V., Papies, E. K., Barsalou, L., & Reid, K. (2025). *From hope and action to giving up: Students' stories of coping with climate change.* PsyArXiv. https://doi.org/10.31234/osf.io/e28hj_v1

4.1. Abstract

Young people and university students are particularly vulnerable to the mental health effects of climate change due to their prolonged lifetime exposure to, and increased contact with, climate change and related information through learning. Despite this, little research exists on how university students cope with climate change from a psychological perspective. In this large qualitative study, we analysed data from an online survey to investigate how students ($N = 823$) of a large UK university cope with climate change. This survey covered which climate change situations were triggering for them, preferences for support-seeking, and specific coping strategies. Conceptual content analysis revealed that challenging situations included navigating climate change information, climate justice issues, climatic changes and environmental losses, and climate change dismissal. Findings from qualitative framework analysis further showed four ways students coped with these: by reducing the mental load of climate change, doing something constructive, seeking social support and meaning, and doomist thinking and behaviour. While many students highlighted the importance of social connections, a small minority considered seeking professional support. These findings partly support and expand on climate change-related coping literature and have implications for how higher education settings communicate about and act on climate change.

4.2. Introduction

Climate change can affect individuals' mental health directly, such as through traumatic stress responses or anxiety after a climate disaster, and long-term and indirectly due to factors like forced displacement and disruptions to social cohesion (World Health Organization [WHO], 2023). When considering these impacts on mental wellbeing, young people are especially at risk, given their prolonged life-time exposure to climate change and awareness of the climate crisis (Lawrance et al., 2022; Maran & Begotti, 2021; Ogunbode et al., 2020). Young people are thus growing up with the largest burden to shoulder, adapt, and respond to the effects of climate change throughout their lives (Lawrance et al., 2022), with 80% of young people in the UK being at least "somewhat" worried about climate change (Hickman et al., 2021).

University students may be a sub-group of young people especially at risk of negative mental health effects of climate change, since they experience a particularly high exposure to distressing climate change information in their learning, critical thinking, and engagement with current events (e.g., Eriksson et al., 2022; Maran & Begotti, 2021). However, support, such as providing space to discuss difficult emotions alongside teaching, is often not provided (Verlie et al., 2020). This is despite growing evidence that students experience distressing and intense levels of climate change emotions and negative thoughts (Eriksson et al., 2022; Hill-Harding et al., in press; Kelly, 2017). To be able to provide pro-active and adequate support, it is important to understand how students seek support and enact coping within their social systems. To address this, we investigated university students' support-seeking tendencies and intentions for climate change-related mental health impacts at the University of Glasgow.

4.2.1. Coping in the context of climate change

Over the past decades, much coping literature has split the ways individuals generally cope into high-level categories of function, where the focus is on the outcome (function) a strategy serves, rather than the coping behaviour performed (see e.g., Ágoston et al., 2022; Folkman & Lazarus, 1980; Lazarus, 1993; Ojala, 2013). This approach has also been used by researchers looking at how individuals cope with climate change (e.g., Ojala, 2013; Ojala & Bengtsson, 2019). Wullenkord and Ojala (2023), for instance, categorised Swedish adolescents' coping strategies into three high-level categories: 1) problem-focused coping entails attempts to solve the problem, for example through climate activism; 2) meaning-focused coping entails fostering positive emotions rather than

downregulating negative ones (p. 3); and 3) emotion-focused coping means regulating uncomfortable emotions. For climate change, this may include avoiding information about climate change or distancing oneself from climate worry (Ojala, 2013).

Across studies in Sweden, adolescents tended to mainly use meaning-focused coping and low to medium levels of problem- and emotion-focused coping (i.e., distancing themselves). The different categories also seemed to serve different purposes. For instance, problem-focused coping seemed to relate most strongly to pro-environmental behaviour (Ojala, 2013; Ojala & Bengtsson, 2019), while meaning-focused coping uniquely related to climate optimism (Ojala, 2013), and emotion-focused deemphasising related negatively to pro-environmental behaviour and subjective climate change knowledge (Ojala, 2013).

In a qualitative study, Zaremba et al. (2023) found that climate-concerned adults in Poland used a range of coping strategies that could be classified as emotion-focused, problem-focused, and meaning-focused. Emotion-focused strategies included, for example, avoiding climate change-related information or relationship withdrawal. Problem-focused strategies included engagement in climate activism or individual mitigation efforts. Coping strategies like reappraising responsibility for climate change or accepting the inevitability of its losses were classified as meaning-focused. Participants seemed to use individual problem-focused strategies (e.g., traveling sustainably) to help with feelings of guilt and unpreparedness, while collective problem-focused strategies (e.g., organised activism) were associated with positive emotions, a sense of empowerment, meaning, belonging, and improved wellbeing. Meaning-focused strategies seemed to help participants gain perspective and change their perception about climate change. This suggests that different coping strategies serve different purposes when coping with climate change.

In a critical perspective on this literature, however, Skinner et al. (2003) described this categorisation of coping strategies as problematic, since coping categories are not themselves functions, but rather it is coping actions that have and serve functions to wellbeing. Skinner therefore recognised such theoretical higher-order categories as useful for evaluating different coping strategies' effects. However, grouping coping strategies into action categories, meaning behavioural, cognitive, and emotional processes aimed at achieving a goal may be more beneficial (e.g., categories like support-seeking and information seeking instead of problem-focused coping; rumination and emotion-regulation instead of emotion-focused; and categories like spiritual support-seeking and positive cognitive restructuring instead of meaning-focused coping). These action

categories should allow a more accurate reflection of individuals' coping behaviours that is less abstracted for the sake of theory-building.

Perhaps a useful compromise between these approaches is a proposal by Stallman (2020). As suggested by Skinner et al. (2003), Stallman classified coping strategies in terms of their action categories but also provided higher-order categories by distinguishing between their anticipated consequences for an individual's health and wellbeing. The approach theorises that individuals turn to unhealthy strategies when healthy strategies are unavailable or insufficiently effective, and as distress increases (e.g., when an individual has limited mental resources or external role-models available to them). Similarly, it assumes that individuals will generally move from lower-intensity strategies (e.g., self-soothing) to higher-intensity strategies (e.g., professional support) with increasing distress. Both of these theorisations have indeed been empirically observed in how university students cope with emotional challenges (Stallman et al., 2021).

Coping also seems to depend on the context an individual is experiencing. Early coping research already stated that people are more variable in their coping than they are consistent (Folkman & Lazarus, 1980) and that they exhibit context-specific use of coping strategies (Lazarus, 1993). More recent constructivist views of emotion assume that emotions are constructed of multiple components, including affect, cognitive processes, meaning-making, social artifacts, and others (Gendron & Barrett, 2009). These are assumed to be culturally relative, meaning that learned social, cultural, and societal norms influence and explain individuals' variety in emotion experiences and expressions (Gendron & Barrett, 2009). Over time and across various emotional experiences, such learned constructions accumulate in memory and form the basis for future emotional experiences in similar situations (Lebois et al., 2020). Thus, different forms of the same emotion may be experienced depending on the emotion's situational adaptation (e.g., fear of social rejection vs. fear of physical harm; Lebois et al., 2020). It seems, therefore, that different theoretical views of emotions and coping assume emotions and coping strategies to be context dependent.

In line with this are recent findings that showed climate anxiety to vary largely between different types of situations (Hill-Harding et al., 2026). Thus, individuals tended to generally recall low levels of climate anxiety for some situations (e.g., "Engaging in climate activism") and high climate anxiety for others (e.g., "Hearing about climate catastrophes on the news"; (Hill-Harding et al., 2026). Climate anxiety intensity further

varied largely between individuals, meaning some people tended to experience higher climate anxiety than others, even for the same situations (Hill-Harding et al., 20265). This provides empirical evidence for the importance of situational contexts for how emotions like climate anxiety are experienced. No research has yet investigated, however, which types of situational contexts require individuals to use different strategies to cope with these climate change emotions.

In this paper, we looked at both, types of situations in which students had to actively cope with climate change and what types of strategies they used. To see whether students' general coping experiences with climate change differ from those in specific triggering situations, we additionally explored their coping strategies more generally, over different contexts.

4.2.2. Overview

Using a largely qualitative approach, we investigated climate change-related support-seeking tendencies and coping strategies of University of Glasgow students by analysing pre-existing survey data (see Hill-Harding et al., in press). We analysed quantitative data on support-seeking and explored qualitative findings on students' coping strategies using exploratory framework analysis, embedding some quantitative analysis in a largely qualitative approach. By doing so, we aimed to achieve both in-depth insights and broad first understandings of students' coping and support-seeking tendencies. We addressed the following research questions:

Q1) What are students' support-seeking tendencies for climate change-related mental health impacts? (I.e., what proportion of students has previously sought support and/or would seek support for climate change-related mental health in future?)

Q2a) How do university students cope with climate anxiety/ climate change emotions in specific situations?

Q2b) How do university students cope with climate anxiety/ climate change emotions more generally over time?

Q3) In what types of situations do students use coping strategies to regulate climate anxiety/ climate change emotions?

4.3. Methods

See https:\\doi.org\10.17605/OSF.IO/HSDRB for this study's registration. For all data, analyses, and materials, see https://osf.io/pd4j3/overview?view_only=b707e21357b646a2aab3399ddc667e41. We used minimal quantitative analyses from multiple-choice survey questions to support largely qualitative analyses from open-ended survey questions. This approach was selected to enable the uncovering of unexpected and novel (inductive) insights from qualitative responses regarding coping, which could not have been derived from a quantitative scale. We used some quantifications to provide a brief background of students' support-seeking tendencies. Qualitative data provided a richer insight into students' experiences of climate change and coping, allowing to find evidence of unexpected descriptions and meanings of students' lived experiences. The participants' own accounts of their experiences may have been different from those that simplified survey questions would have been able to capture. Both quantitative and qualitative data were analysed within the same timeframe.

Throughout this thesis, I, the first author, take an interpretivist epistemological stance and therefore acknowledge that all findings and interpretations are subjective to the research context and my own background, assumptions, and that I need to negotiate the potential for implicit biases. My lived experience of climate anxiety and personal views on climate justice are two examples of how my truths and values have shaped the development of research questions, analysis, and data interpretations. For a full positionality statement, see SM-12.

4.3.1. Materials

We analysed pre-existing data, first collected during March/April 2023, taken from Hill-Harding et al. (in press); see https://osf.io/cwfh7/overview?view_only=4155ca3cc4524a85bc31f61efdb0b3d7, accessed 1st May 2024). The primary data collection and planned forms of analyses were approved by the university's Ethics Committee. Participants provided informed consent by clicking a box in the initial data collection process.

Regarding Q1, support-seeking tendencies, students were asked: "Have you previously sought professional mental health support for climate change?" and "Would you like to seek professional mental health support for climate change in the future?", with response options "yes"/"no"/"prefer not to say".

To discover participants' general coping strategies (Q2a), we asked: "Please think generally about your emotional experiences with climate change. How do you generally cope with these in your daily life? How do you handle the emotions that climate change can trigger?". Regarding coping in specific moments (Q2b) and the types of triggering situations, (Q3), students were asked: "Now, please think back to a particular situation or moment where you experienced strong emotions about climate change. Please briefly describe a situation or moment that comes to mind. In this situation or moment, what do you usually do to cope with those emotions? How do you handle this in the moment?".

4.3.2. Participants

This secondary data was sampled from students at the University of Glasgow, a large research-intensive university, located in one of the largest cities in the UK (see Hill-Harding et al., in press). The results are thus contextual to university students at a large UK university that is research-intensive (i.e., larger proportion of postgraduate students) with many international students. The original dataset contained data from 869 participants. Since climate anxiety is not considered a mental illness (Clayton, 2020; Pihkala, 2021) and we were interested in wider emotional experiences and coping with climate change, we did not apply any exclusion criteria relating to clinical levels of anxiety or other mental health issues. Participants were excluded from analysis when all quantitative and qualitative data on support-seeking and coping was missing. This resulted in removal of 46 participants, leaving a final sample of $N = 823$ (mean age = 24.6). We analysed demographic information on age, gender, level of study, college, degree course, and home country (Table 8).

Table 8

Participant demographics.

Sample demographic characteristic	N	% sample	% university population
Gender			
Male	176	21.4	40.1
Female	604	73.4	59.6
Non-binary	31	3.8	0.3
Undergraduate/postgraduate			
Undergraduate	467	56.7	60.8
Postgraduate	345	41.9	39.2
College			
Arts	222	27.0	15.2
MVLS	206	25.0	23.3
CoSE	138	16.8	23.9
CoSS	251	30.5	40.2
Origin			
UK	445	54.1	56.3
Europe	102	12.4	6.0
International	275	33.4	37.7

Note. MVLS = College of Medical, Veterinary, and Life Sciences; CoSE = College of Science and Engineering; CoSS = College of Social Sciences. Data for university population taken from the University of Glasgow's official student headcount for 2022/2023 (https://www.gla.ac.uk/myglasgow/planning/ourdata/uofg/ accessed 1st April 2025). Due to use of pre-existing data, sample largely overlaps with Hill-Harding et al. (in press).

4.3.3. Data analysis

4.3.3.1. Quantitative analyses

Regarding Q1, we computed basic amounts to create an overview of the number of students who answered "yes", "no", and "prefer not to say" to the support-seeking questions in R (version 4.2.1; R Core Team, 2022), using R Studio (version 2023.3.0.386).

4.3.3.2. Qualitative analyses

All qualitative analyses were carried out in NVivo (version 14; Lumivero, 2023). We decided to inductively code the data, using the Framework Method (FM; Gale et al., 2013), based on Thematic Framework Analysis (Ritchie & Spencer, 1994). We followed the steps outlined by Gale et al. (2013), apart from Step 1 (Transcription), which was not required for our data. This method of analysis is suitable for qualitative survey data (Goldsmith, 2021). In addition, using FM aligns with our research aims to systematically identify, describe, and interpret patterns within and across individuals, which is especially useful for larger data sets like ours (Goldsmith, 2021).

For Q2a and Q2b on coping strategies, we used FM throughout. To answer these research questions, we identified numerous coding categories from the wider literature and used these to inform the development of a coding frame. We decided for this deductive approach, as a lot of relevant literature existed that could inform our analysis process. We thus developed deductive categories based on theoretical and more general coping literature (see Skinner et al., 2003; Stallman, 2020; Stallman et al., 2022) and literature on coping with climate change specifically (see Ágoston et al., 2022; Ojala, 2013; Ojala et al., 2019; Ojala & Bengtsson, 2019; Wullenkord & Ojala, 2023; Zaremba et al., 2023). For a detailed overview of all deductive categories identified from the literature, see SM-13.

After identifying an initial set of deductive categories, a subset of the data (10%; 82 responses) was coded independently by two of the authors. The independent sample coding was compared to evaluate the inter-rater consistency of the coding framework and its deductive categories on our data (kappa = .50). Any discrepancies and issues were discussed, resulting in a revision of the coding framework, as suggested by Gale et al. (2013). Revisions included, for instance, combining codes "Mindfulness", "Controlled breathing", and "Meditation" into "Mindfulness/Meditation" or removing overarching categories "healthy" and "unhealthy", as they were found to hinder the coding progress where coping strategies may be adaptive in the short-term for that individual but harmful in the long term to either individual or planet. For full details on all revisions, see SM-13.

This revised coding framework was used for a second coding trial, where the same two authors independently coded a further 5% (41 responses) of the dataset. This resulted in greater agreement between coders (kappa = .86). Finally, few minor revisions were made to the coding framework such as specifying the definition for code "Active

avoidance/denial" to include "active element of choice". This resulted in the final version (see SM-14), which the first author used to code the entire data set. See SM-13 for detailed coding procedures and timeline.

Regarding Q3, the situation types that required students to cope, we initially used the FM to code inductively to reduce the risk of bias when coding, as we felt that our previous research on situations where climate anxiety may be particularly elevated could influence this. Since these situations may not be the same situations students needed to cope in, or not the only ones, we opted for an inductive-only approach. Thus, the first author carefully created codes one by one, while going through the data, following guidelines by Goldsmith (2021).

After the initial round of coding, the first author reviewed the codes for their representation in the data, the quality of quotes coded, each code's relevance to answering the research questions, and the individual codes' distinctiveness (i.e., reduce overlap between codes). As recommended by Saldana (2021), any codes that did not directly answer the research questions were removed with their associated coded data (e.g., code "Ambivalence" captured participants ambivalent about climate change who had no need for coping (applied to N = 161). Some of the remaining codes were merged based on conceptual similarity. For instance, codes "Climate conversation/role-model" and "Climate action/sustainable behaviour" were merged into "Climate action and conversation", as they conceptually described the same coping strategy of acting as a climate advocate and role-model. See SM-13 for a detailed overview of this process.

During theme development, we realised that themes were very descriptive and close to the verbatim with little room for further interpretation. This made the data less suitable to framework analysis, which we had initially planned. To provide an overview of the different situation types, we therefore decided to conduct conceptual content analysis. This form of analysis establishes count frequencies of pre-defined concepts that occur from qualitative data (Neuendorf, 2017). This allowed an overview of the frequency of previously identified conceptual codes, thus quantifying the occurrence of each situation type in participants' descriptions (Neuendorf, 2017).

To better understand how the themes related to one another, it was useful to schematically represent the interactions and intersections through mind mapping to visualise these relationships, using the function ProjectMap in NVivo (Lumivero, 2023).

We also created framework matrices for both coping strategies and situation types, using the Framework Matrices function in NVivo (Lumivero, 2023). This provided an overview of the different coping strategies and situation types across participants, where cells showed participants' quotes relating to the different strategies and situations, as suggested by Gale et al. (2013). These visualisations helped to develop conceptual themes from the codes. For a detailed overview of how themes were developed from codes, see SM-13.

4.4. Results

4.4.1. Support-seeking tendencies

Of our participants, 2.6% (N = 21) had previously sought professional support for climate change-related mental health, while 97.1% (N = 779) had not. Twenty-three students (2.8%) provided no answer. In comparison, 12.5% (N = 103) of students would like to seek professional support for climate change-related mental health in the future, while 75.6% (N = 662) would not. Ninety-eight participants (11.9%) provided no response.

4.4.2. Triggering situation types

Conceptual content analysis revealed the most frequently mentioned situation types where participants needed to cope with climate change. Most common situations included (1) being confronted with climate change information (N = 167) – news and documentaries were especially mentioned by those students, (N = 152); (2) climate justice issues (N = 143) – these participants particularly highlighted inaction by those in power (N = 100) and feeling robbed of a future and opportunities (N = 28); (3) climatic changes and losses (N = 108) – of which students mostly mentioned climatic changes and extreme weather (N = 57), exposure to climate catastrophes (N = 41), and environmental pollution and destruction (N = 21); and (4) climate change dismissal and ignorant behaviour (N = 69). For an in-depth thematic discussion of these situation types, see SM-15.

4.4.3. Coping with climate change

Using the Framework Method, based on Thematic Framework Analysis (Gale et al., 2013), four overarching themes were developed that enabled a descriptive and conceptual exploration into how participants coped with climate change generally and in specific contextual situations (Table 9). The analysis presented next is organised around thematic headings that are supported by verbatim evidence from participants' survey

responses. We also created a narrative from the evidence and themes that answer the research questions and contributes to further understanding of the topic area.

Table 9

Summary of themes for coping strategies.

Theme Title	Theme Definition
1. Reducing the mental load of climate change	Discusses the need to reduce the heavy mental burden that climate change elicits by avoiding thinking or talking about climate change or avoiding feeling difficult emotions related to climate change.
2. Doing something constructive	Discusses how doing something constructive that helps mitigate climate change in some way or communicate about climate change seems to reduce negative emotions.
3. Finding meaning and support	Discusses the longing to find meaning through strategies such as mindfulness or meditation, and the need for social connectedness and support to cope with climate change.
4. Doomist thinking and behaviour	Discusses how some participants felt the burden of climate change was too big and how hopelessness, self-harm, and acceptance were a way to cope by providing perspective.

Note. Additional quotes for each theme that are not presented in-text can be found in SM-16.

4.4.3.1. Theme 1 - Reducing the mental load of climate change

When participants were asked how they coped with climate change, common strategies were centred around the need to reduce the mental load of climate change. This theme discusses the ways participants achieved this when faced with climate change. This theme links caring deeply about climate change and the need to disengage, which participants achieved in different ways. We sub-divided this theme around conceptual strategies to allow a more nuanced and conceptually discrete insight into the specific ways participants coped to achieve a reduction of the mental load of climate change.

Subtheme 1.1. – Distraction. Some participants actively distracted themselves from encounters with climate change so that they would no longer actively think about it, such as participant 88 (female, aged 19): *"Take myself away from the situation either physically by walking away or mentally by listening to music"*. This participant describes "taking themselves away" from a climate change-related situation by physically withdrawing or distracting themselves. The way they say "take myself away" to refer to

both physical removal and mental distraction suggests that they serve a similar function: to no longer be faced directly with climate change.

Participant 114 (female, aged 28) describes a similar strategy: *"I repress the sense of impending doom I feel when I think about climate change by distracting myself in a book or with assignments until its not at the forefront of my mind anymore."*. The participant's use of the words "repress" and "not at the forefront of my mind anymore" suggests that they use distraction to overlayer climate change-related thoughts until the distraction replaces them. They do not use distraction to merely engage in something more fun or pleasant, the importance seems to be in shifting their focus away from climate change.

Participant 739 (male, aged 39) bluntly puts it: *"Do something else to shift my concentration and reduce anxiety."*. Again, the focus seems to be on shifting attention with the aim of reducing difficult emotions. By using the words "Do something else", "shift my concentration", and "reduce anxiety", their statement implies that the main goal of the distraction is to reduce the emotional load of climate change by focusing on something else.

From these quotes, it seems like distraction offers these students a way to continue living their lives and focus on daily tasks, such as university assignments. Without distraction, participants describe negative experiences they wish to escape. It is thus a way of replacing distressing thoughts and feelings about climate change with ones that permit them to continue with daily tasks.

Subtheme 1.2. – Avoidance. Other participants reduced the mental load of climate change by actively avoiding engaging with climate change or avoiding acknowledging its severity to prevent distressing emotions. Participant 258 (female, aged 27) outlines: *"I keep my life without thinking about it. I have many friends that suffer and are very anxious about it, take meds, etc. I prefer sometimes to don't consume information about it"*. The way they refer to their friends' anxiety implies that if the participant did engage with climate change-related information, they fear they may themselves "suffer and be very anxious". This quote suggests that removing themselves from climate change-related information and avoiding thinking about climate change prevents this participant from experiencing distressing emotions, like their friends experience climate anxiety.

Participant 378 (female, aged 35) describes a similar experience: *"I struggle with my feelings about climate change. I am an avid reader of the news, but I have to limit my engagement with climate change stories otherwise I start to feel very overwhelmed."*. Participant 378 also experiences that, to not get overwhelmed, they need to occasionally

remove themselves from climate change news. This participant seems quite informed about climate change. However, despite being well-informed, they need to "limit their engagement" with climate change information to avoid overwhelm, which is something experienced by other participants as well:

> "Unfortunately, I just push away any and all thoughts related to climate change away most of the time. When I think about it too hard, I just feel like I inevitably end up at the conclusion that the best thing I could do for the planet would be to just die here and now, and that's not a pleasant thought." [Participant 16, female, aged 22]

This participant's use of the words "pushing thoughts away" suggests that they do think about climate change and do not deny its existence. Instead, they feel that those thoughts become very negative and even self-harming, as they talk about feeling they should "die here and now", so they feel the need to dissociate from them. Their word choice of "unfortunately" further suggests that dissociating from these thoughts is not something they *want* to do, but something they *need* to do to protect their mental health.

From these quotes, it appears that participants avoid climate change not as denial, but to prevent becoming overwhelmed and mentally unwell. This may thus present a different form of avoidance compared to individuals who have no interest in climate change. It seems like avoidance is used to prevent overwhelm and protect mental health pro-actively, rather than applying coping strategies as or after negative emotions set in.

Subtheme 1.3. – Trying not to feel emotions. Finally, some students reduced the mental load of climate change by not allowing themselves to feel negative emotions. As participant 145 (female, aged 25) describes: *"The only way to cope for me is compartmentalising, to think about it in it's fullness always would be disabling."*. The participant states that pushing their emotions aside is the "only way to cope" and that not doing so would be "disabling". This language is quite strong and insightful, as it suggests that the mental load of climate change is so heavy that ignoring their emotions and thoughts about it is the only way they can prevent debilitating mental health consequences. Participant 615 (female, aged 20) shared similar experiences:

> "I do find it almost quite a debilitating feeling, of being unable to do anything worthwhile because of the scale of the problem. I don't really know how to deal with these emotions productively because I do end up just either pushing it away immediately or feeling it deeply before something else more mundane and to hand comes along and I forget all about what I was feeling."

This participant describes climate change-related emotions as "debilitating feeling" and that they are "unable to do anything worthwhile" because of how big and scary climate change is. This language suggests that the need to reduce the mental load of climate change is high for this student. They also mention that they "don't really know how to deal with these emotions", which suggests that supressing their emotions may not be a first choice, but that it can reduce climate change's mental load when they have no other way to cope. The participant further describes that they try "pushing it away immediately or feeling it deeply", which suggests that suppression is the only alternative to intense emotions about climate change.

Participant 111 (female, aged 20) further illustrates this: *"Because of the feeling of helplessness that climate change produces, often the only thing I can do is detach myself from the instigating discussion, despite having strong feelings about it"*. In this response, participant 111 describes how, even though they care a lot about climate change, they feel the need to avoid climate change-related discussions and to emotionally distance themselves from climate change to be able to cope. Their use of language like "detach" and "despite having strong feelings about it" suggests that their need for reducing the mental load of climate change is closely linked to an awareness and emotional investment in climate change, rather than avoidance that stems from climate change denial. As they talk about the "feeling of helplessness" caused by climate change, it seems that avoiding certain conversations or emotionally detaching themselves is the only way they can cope.

This form of coping thus seems to be used when participants have no other effective strategy available to them or when the intensity of negative emotions would be overwhelming. It is conceptually distinct from the other subthemes in that this subtheme does not involve an avoidance or removal from climate change itself but seems to come at a slightly later stage when participants have already been faced with climate change and their emotions and need to escape the emotions rather than escaping climate change itself. This suggests that participants use different coping strategies to serve different purposes, with a temporal quality to coping at different stages of climate change exposure.

4.4.3.2. Theme 2 - Doing something constructive

Other participants described doing something constructive to be an effective coping strategy. This theme discusses the ways in which taking action and adopting sustainable habits helps participants reduce negative emotions and thoughts about climate change. This theme draws a connection between participants feeling like they are 'part of the solution'

and reduced climate change-related emotional burden. We sub-divided this theme into conceptually different forms of constructive action participants engaged in.

Subtheme 2.1. – Climate action and conversation. Many participants recollected sustainable climate actions and role-model conversations that they engaged in to cope with climate change. This allowed participants to feel like they were making a difference and doing something constructive, which made them feel empowered and hopeful. Participant 127 (female, aged 18) explains: *"I do community based volunteering work. I feel as though there is little I can do for climate change. However, I find comfort in the knowledge that I do help when possible."* In this quote, the participant states that "there is little I can do", which suggests that they generally feel quite powerless and helpless about climate change. However, by engaging in their volunteering work, they "find comfort" by knowing that they "do help when possible". This use of words suggests that taking constructive action provides a sense of relief and comfort, as they know that they do what is within their power to act on climate change. Participant 33 (male, aged 21) goes even further:

> *"Taking action on the environment in ways that are meaningful and feasible for me. I feel more empowered and hopeful when I do something positive for the planet, such as reducing my carbon footprint, joining a campaign or volunteering for a green organization."*

This participant uses language like "empowered" and "hopeful" to describe how they feel when doing something constructive for the planet, suggesting that these positive actions provide a sense of empowerment, agency, and hope that they may not otherwise experience about climate change. They also state that the actions are "meaningful" to them, suggesting that the participant finds meaning and a sense of purpose in taking action. However, they also mention that they take action in ways that are "feasible" to them, which implies that they need to have the resources and availability to perform these actions. Participant 420 (female, aged 24) explains how educating others on their behaviour by engaging in climate change conversations seems like the only thing they can do:

> *"I always speak up when i think something is very bad for the environment. people around me know that i will say something and get worried about it but i feel as long as its said then thats all i can do to encourage others to think about it"*

They describe how they "always speak up" when they witness unsustainable behaviour, suggesting that climate change and sustainability are important to them. They

even risk uncomfortable interactions, as they speak up although some people "get worried about it", which suggests that this may cause disagreements at times. Finally, this participant says that "as long as its said then that's all I can do", which implies that engaging in these conversations is the only thing they feel is within their power to get others to act sustainably. Participant 621 (female, aged 38) describes similar experiences:

> *"I try to not get too emotional in these situations. i understand everyone has their own agendas however trying to promote / advise people on how they can make a better impact makes me feel like i have achieve a little"*

This participant chooses words like "I try not to get too emotional" and "trying to promote/ advise", which suggests that their aim in such conversations is to prevent emotionally laden arguments and to convey facts to educate others. They mention that doing so makes them feel that they "achieve a little", which suggests a sense of pride and purpose from these conversations.

Overall, engaging in climate actions and conversations seems to give participants a sense of meaning and purpose that empowers them, while simultaneously reducing negative emotions. It also seems important to use conversations to educate others, even if that risks uncomfortable social situations. Finally, participants seem to try to protect social relationships by avoiding being too emotional in climate change conversations, while still feeling that they are doing something constructive about climate change.

Subtheme 2.2. – Information seeking. Some participants engaged in something constructive by seeking out climate change-related information and news to stay educated and engaged. It seemed especially important to stay informed on positive climate change news and to find a balance, so not to get overwhelmed by disaster-focused reports:

> *"I'm fairly good now as compared to first when I started reading and watching documentaries about climate change. Everytime I read about an act that is miserable for the environment i immediately read about the ways to manage the act or better just avoid it altogether. So that gives me hope and positivity and i try to implement it in my life"* [Participant 59, female, aged 24]

This participant states that they initially were not well when they "started reading and watching documentaries about climate change" but that they are "fairly good now", as they changed the way they engaged with such news. They mention they "immediately read about how to manage the act or better just avoid it altogether", suggesting they balance out

negative news with more constructive information on mitigating a climate change-related problem. They further mention that finding this balance and engaging with constructive information gives them "hope and positivity" and motivates them to "implement it in [their] life". Balancing upsetting news with constructive information thus protects their mental health, elicits positive emotions and inspires their own actions.

This is something participant 142 (female, aged 27) mentions as well: *"There are times when I'm hopeless, but I have been trying my best in learning more about the same so that i can contribute in climate change mitigation activities"*. This participant mentions how they sometimes feel "hopeless" about climate change. However, seeking out climate change information helps them "learn[] more about the same", which in turn allows them to "contribute in climate change mitigation activities". This language suggests that their feeling of hopelessness stems from feeling helpless and not knowing what to do. Seeking out information reduces their negative emotions, as it provides knowledge that empowers them to change their own actions and constructively contribute to climate change mitigation. Participant 642 (female, aged 35) further illustrates:

> *"Reading about zero waste living, responsible consumerism and plant-based low carbon impact food ideas also gives me hope. I follow creators on social media whose content gives sustainable alternatives to fast fashion, waste and ethically compromised products (food included)."*

In this quote, the participant describes that they seek out information particularly on "zero waste living", "responsible consumerism", and "low carbon impact food ideas", which suggests that they use information seeking to educate themselves. Engaging with information on climate-conscious behaviours gives them "hope", suggesting that the confirmation of something positive happening and how to implement that in their own life is important for staying hopeful. Their language like "responsible consumerism" or "ethically compromised products" suggests that they are already quite educated about these matters. This is interesting, as it suggests that mere knowledge or education about climate change is not protecting their mental wellbeing. Instead, news on *positive* actions being taken and *actionable* steps that allow agency in personal life seem to be particularly important.

Overall, it appears that information seeking acts to stay informed about climate change. More so, it is the seeking out of *positive* information that seems to provide hope and motivation for action, while simultaneously reducing negative feelings. Balancing

exposure to climate change news that are often upsetting with more positive and actionable information seems important to maintain hopeful and protect mental health. It thus seems to not only be about seeking any climate change-related information but seeking out constructive and solution-orientated information with implementable action steps, which highlights again the importance of agency in coping with climate change.

4.4.3.3. Theme 3 – Seeking support and meaning

Participants also described coping through seeking support and meaning by connecting with others, practising mindfulness, and staying hopeful. This theme discusses the importance of social relationships for support and the role of mindfulness and self-soothing for regulating negative emotions. We sub-divided this theme to allow more in-depth insights into the conceptually different ways participants sought meaning and support.

Subtheme 3.1. – Seeking social support. Many participants described how talking to and connecting with like-minded others helped them cope with difficult climate change emotions. Participant 233 (female, aged 19) describes this: *"I will rant to someone about my feelings and share information so it doesnt overwhelm me"*. This participant seeks out social support to "rant to someone" and thus express their negative feelings, which provides relief. They also do this "so it doesn't overwhelm" them, which suggests that talking about climate change in social connections prevents them from experiencing more distress.

Participant 553 (female, aged 19) raises the importance of like-mindedness in social connections: *"My friends have similar mindsets regarding climate change therefore we often discuss our thoughts and emotions regarding it which is a good way of managing emotions"*. They say their "friends have similar mindsets", which allows them to connect on a similar level regarding views and emotions. They share how discussing "thoughts and emotions" is a "good way of managing emotions". This language suggests that the sharing of difficult emotions and relating to others who feel similarly is important to regulate these emotions.

Participant 759 (female, aged 23) agrees and shares the importance of social connectedness in climate protesting: *"Going to climate marches has been an emotional experience for me as being physically with a large group of people who care reminded me that I'm not alone and there is a string movement."*. They describe how "being physically with a large group" of like-minded individuals who also share their feelings about climate

change provided some comfort and reassurance, as they remember they are "not alone". This participant's choice of words suggests that it is not sufficient to receive any form of social support but that it is important that social connections share similar values and contribute to positive change together. This reduced their feelings of isolation and gave them hope that positive change is happening.

From these quotes, it appears that social support is important for regulating emotions through a sense of connectedness with others and sharing common emotional experiences about climate change. This implies that talking about climate change is in itself not the same as support where like-mindedness and common experiences are shared. These types of social connections seem to provide a sense of belonging and hope, while allowing to express emotions and preventing overwhelm.

Subtheme 3.2. – Self-soothing and mindfulness. Other participants sought meaning in practising mindfulness and self-soothing, such as through meditation or physical emotional release. Participant 52 (male, aged 23) says: *"I meditate daily and read Chinese philosophy to put everything in perspective"*. This suggests that these mindful activities ground their emotions and provide a bigger picture, which eases difficult emotions about climate change.

Participant 586 (female, aged 20) elaborates on this: *"I try to breathe evenly and keep calm because I feel very anxious about the state of the planet and feel helpless to stop it from getting worse"*. This participant mentions that they feel "very anxious" and "helpless" about climate change. They state that they "try to breathe evenly and keep calm" to manage their anxiety, which suggests that they rely on mindful breathing exercises to regulate difficult emotions provoked by climate change. They use these techniques to mindfully regulate their emotions instead of repressing them or avoiding climate change altogether. Participant 668 (female, aged 23) expands on this:

> *"I literally meditate. I don't know what else to do! In day to day life, I try to have a low carbon footprint. When I become overwhelmingly anxious, and there is nothing to do in that exact moment, I meditate."*

This participant mentions that they live a low-carbon lifestyle but that this is insufficient to prevent negative emotions about climate change. They use words like "I don't know what else to do" and that climate change makes them feel "overwhelmingly anxious". This suggests that they care deeply about climate change and try to mitigate it in their daily actions. However, they experience strong climate change emotions that need to

be regulated. They use meditation as an outlet for these emotions in moments where "[they] don't know what else to do".

These quotes suggest that mindfulness and self-soothing exercises are effective for regulating distressing climate change emotions, which participants use when experiencing high levels of negative emotions that they cannot otherwise manage. Mindfulness and self-soothing also seem to be strategies used by participants who care deeply about climate change. Unlike some others, these participants acknowledge their feelings and choose to consciously manage rather than supress them. Finally, it seems like mindfulness provides a form of perspective that grounds participants and thus reduces overwhelming emotions.

Subtheme 3.3. – Staying hopeful. Some participants found meaning in staying hopeful and optimistic by focusing on positive advancements or through their faith. Participant 759 (female, aged 23) explains: *"Engaging with activists such as mikaela loach does inspire me that it's not too late and better futures are attainable"*. This participant looks at positive changes that are happening, mentioning specifically activist role-models. Having positive climate role-models provides hope that not all is lost yet and that "better futures are attainable". This participant seems very aware of climate change and chooses to engage with activists that "inspire" them, suggesting that they draw hope and optimism from seeing their role-models' positive work. Participant 440 (female, aged 21) describes a different way of staying hopeful:

> *"While sometimes thinking about climate change makes thinking and the future of humanity and the impact it will have on wildlife makes me feel upset and powerless I try to remain hopeful. Thinking that we are helpless or doomed does not help. I still think we can make a difference if we educate people about climate issues and speak up and protest against big corporations."*

This participant seems emotionally involved in climate change, as suggested by their use of words like "the impact it will have on wildlife" or "makes me feel upset and powerless". They describe that they "try to remain hopeful", suggesting that staying hopeful is an active choice they make, as they believe "[t]hinking that we are helpless or doomed" is unhelpful. They have hope that collective actions ("speak up and protest") and better climate change education will result in effective changes. This participant thus actively chooses to stay hopeful and trust in collective actions and advances despite their knowledge of climate change's impacts.

Participant 4 (female, aged 22) has more general hope in the good of humanity: *"I try to think that I try my best and am hopeful the humanity will try there best. Even if governments or institutions don't"*. They are seemingly aware of political issues around climate change, as they state that "governments or institutions don't" do enough about climate change. They remain hopeful, however, by reassuring themselves that they "try [their] best" to live sustainably. They also seem to believe in the good of humanity as they are "hopeful the humanity will try there best". This suggests that, despite knowing that more needs to be done about climate change on a political and corporate level, they are hopeful that fellow humans will try their best to mitigate climate change on an individual and collective level, like they seem to do.

Overall, participants seem to draw hope from positive advancements and climate change role-models. This hope is actively sought out and is linked to an awareness of larger climate change issues. The quotes suggest that participants' hope is closely linked to climate action, both their own and collective actions on a larger scale. This hope is thus different from wishful thinking and shows the importance of larger-scale climate actions for individuals' mental health.

4.4.3.4. Theme 4 – Doomist thinking and behaviour

Some participants described engaging in doomist thinking and behaviour, including harmful behaviours and thoughts, resigning to helplessness, and giving up. This theme discusses how the mental burden of climate change can become overbearing and result in harmful thinking and behaviour or an ambivalence where participants give up all hope for improvements. We sub-divided this theme into conceptually different ways participants engaged in doomist thinking and behaviour.

Subtheme 4.1. – Harmful thinking and behaviour. Some participants' doomist outlook on climate change led them to engage in self-harming behaviour and thinking. Participant 371 (female, aged 32) expresses: *"Just have to hope you die before the world becomes unliveable. e.g. hopefully getting hit by a car and dying instantly"*. This participant expresses an overwhelming fear of climate change making the world "unliveable", which makes them wish for a quick and instant death. This language suggests that climate change makes them so scared of what the future might be like that they would rather not experience it. Participant 16 (female, aged 22) describes a similar experience:

"Thinking about how unable we seem to be as a collective to figure out even these small things just makes be feel so defeated and hopeless, and like everything I try to do is meaningless, and well, like I might as well go die."

This participant describes how climate change makes them feel "defeated" and "hopeless", which makes their efforts of mitigating it seem "meaningless". This language suggests that they feel very powerless and hopeless, as nothing they do would ever be enough to mitigate climate change without societal changes, as they describe the "collective" to be "unable" to "figure out even" small changes. This produces feelings of meaninglessness, which seems to put their whole life's purpose into question and allow suicidal ideations, as they express that they "might as well go die".

Other participants did not only engage in harmful thinking but described harmful behaviour, like participant 160 (male, aged 25): *"I resort to habits that reduce my anxiety like binge eating or smoking"*. This quote suggests that this participant cannot regulate negative emotions in a healthy way. Instead, they resort to "habits that reduce" these negative feelings, relying on familiar behaviours that are maladaptive but temporarily reduce anxiety like "binge eating or smoking".

Overall, it seems that climate change is overwhelmingly anxiety-inducing for these participants, which leads to them feeling meaningless and hopeless. These distressing emotions make some participants ruminate and think self-harming thoughts. Others resort to maladaptive behaviours that can reduce their anxiety temporarily. This shows what a serious impact climate change can have on participants' wellbeing.

Subtheme 4.2. – Resigning and giving up. Other participants' doomist thinking was centred around resigning to climate change doom and giving up both hope and efforts for mitigating it. Participant 490 (female, aged 23) describes:

"I am resigned to the idea that the climate is changing and there is little I can do about it personally. I belobe policy change and social change are essential, but have little hope of those being enacted in time. I am now indifferent."

This participant uses words like "I am resigned", "there is little I can do", "have little hope", and "I am now indifferent". This choice of language suggests that they used to care about climate change, however, realising how little difference their individual actions made resulted in resigning to feeling powerless to the point where they now feel indifferent about climate change. They also express that they see large-scale change as "essential",

which shows awareness of climate change issues, but that they have "little hope of those being enacted in time". Overall, this participant seems helpless and hopeless, which led them to give up and become indifferent.

Participant 561 (female, aged 29) describes a similar experience: *"I have become quite doomy about the situation, I recently started eating meat again for example because I feel like nothing will change our reliance on big agriculture, so I suppose my coping mechanisms aren't always healthy"*. This participant describes feeling "quite doomy" about climate change, suggesting that they have little hope. They also mention that they "recently started eating meat again" as they have little faith in structural changes of the food system. This implies that they have given up on their sustainable behaviours, as they seem to have resigned to the idea that there will be no improvement.

Participant 759 (female, aged 23) has similar thoughts: *"I'm very concerned by the crisis but the main emotion I feel is fatigue/helplessness/apathy towards it as I often feel that those in power don't care and not enough is ever being done to deal with it"*. This participant describes that they feel "very concerned" about climate change, which suggests an awareness and emotional involvement. However, they realise that "those in power don't care" and that "not enough" progress is happening to mitigate climate change. This inaction from governments and other powerful institutions makes them feel "fatigue/helplessness/apathy". This suggests that being invested and involved leaves them fatigued and burned out, as they feel powerless and helpless since they cannot see enough positive change. Eventually, this results in feeling apathetic towards climate change, as they see no point in being emotionally invested anymore.

Overall, this theme suggests that participants try to protect themselves by distancing themselves from climate change in the form of apathy or ambivalence. The need to protect themselves seems to stem from overwhelming feelings of anxiety, fear, helplessness, and hopelessness as they find themselves powerless and see insufficient actions from those in power. This shows the importance of large-scale mitigation efforts for individuals' mental health and the need for a balance with individual-level actions, which on its own may lead to burnout and fatigue.

4.4.4. Exploring relationships

To better understand how participants' use of coping strategies relates to the different triggering situation types, we explored associations between each situation type and the four coping themes by creating visualisations. From Figure 9, it appears that

participants used some strategies more than others, and that many participants used a combination of strategies at a time. Specifically, Figures 9a) and 9b) suggest that when confronted with *climate change information* and *climatic changes and losses*, participants used *reducing the mental load of climate change*, *doing something constructive*, and *seeking support and meaning* more than *doomist thinking and behaviour*. Numerous participants also used a combination of strategies. When confronted with *climatic changes and losses*, combinations consisted mostly of *reducing the mental load of climate change* and *doing something constructive*, as well as *doing something constructive* and *seeking support and meaning* (Figure 9b). In contrast, participants seemed to use a combination of all four coping themes for *climate change information* (Figure 9a).

Figures 9c) and 9d) further suggest that participants used all four strategies almost equally to cope with *climate justice issues* and *dismissal and ignorance*. Figure 9c) suggests that many also used a combination of all four strategies when confronted with *climate justice issues*. In contrast, Figure 9d) suggests that fewer participants combined coping themes for *dismissal and ignorance*. Those who did mainly used *reducing the mental load of climate change* and *doing something constructive*.

Figure 9

Visualisation of relationships between triggering situation types and coping themes.
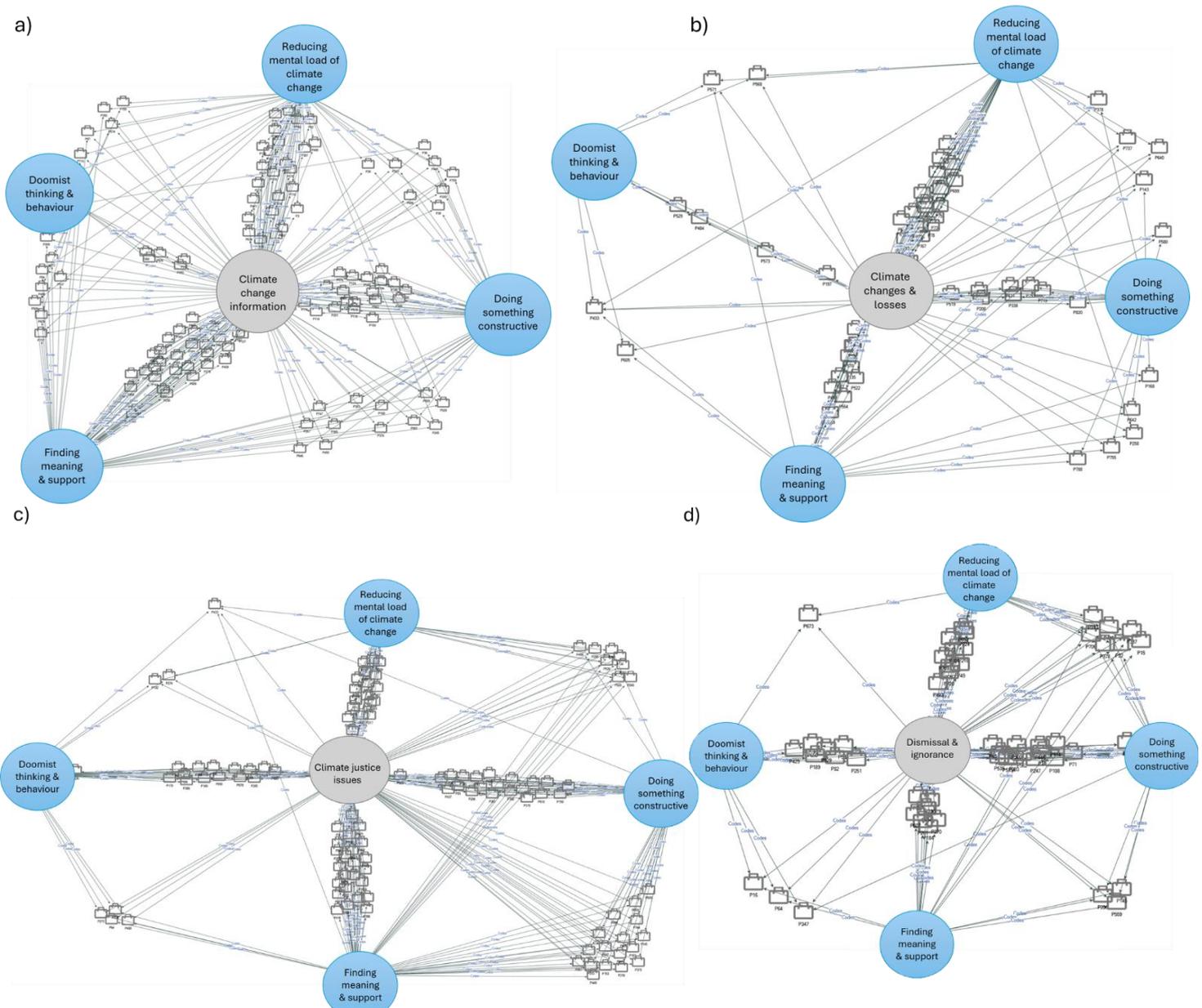
Note. Links between *climate change information* and coping themes at top left (a), links between *climate changes and losses* with coping themes at top right (b), links between *climate justice issues* and coping strategies at bottom left (c), and links between *dismissal and ignorance* with coping themes at bottom right (d). Situation types in grey circles, coping themes in blue circles. Participants are mapped between each situation type and the coping strategies they reported, which may be more than one.

4.5.　Discussion

In this large qualitative study, we explored participants' support-seeking and coping tendencies with climate change. For Q1 ("What are students' support-seeking tendencies for climate change-related mental health impacts?"), participants reported low

rates of seeking professional support for climate change-related mental health. Regarding Q2a ("How do university students cope with climate anxiety/ climate change emotions in specific situations?" *and* Q2b "generally"), many participants mentioned social support and sharing of lived experiences to be important. For Q3 ("In what types of situations do students use coping strategies to regulate climate anxiety/ climate change emotions?"), participants highlighted climate change information, climate justice issues, climatic changes, and climate change dismissal. These responses provided meaningful insights into the types of climate change-related situations that were triggering to students and the types of coping strategies they employed.

Using conceptual content analysis (Neuendorf, 2017), we identified four types of triggering situations: *climate change information*; *climate justice issues*; *climatic changes and losses*; and *climate change dismissal/ignorance*. Similarly, we identified four themes for students' coping strategies, using the framework method (Gale et al., 2013): *reducing the mental load of climate change*; *doing something constructive*; *seeking support and meaning*; and *doomist thinking and behaviour*. From these thematic findings, we found that participants generally described the same four strategies for general and situational coping. This was an interesting and somewhat unexpected finding, as previous literature suggested climate change-related emotions to be highly situation-specific (Hill-Harding et al., in press; Hill-Harding et al., 2026). Despite the intensity of these emotions varying between situations (Hill-Harding et al., 2026), these present findings suggest that participants employ the same strategies to generally cope with climate change and for different situations.

4.5.1. Theoretical implications

Our thematic findings for Q2a and Q2b suggest that participants typically employed a combination of four types of coping strategies to cope with climate change. Wullenkord and Ojala (2023) proposed three coping categories typically employed by adolescents when coping with climate change: meaning-focused, problem-focused, and emotion-focused coping. Meaning-focused coping focuses on fostering pleasant emotions; emotion-focused coping regulates unpleasant emotions; and problem-focused coping entails attempting to solve the problem at hand. Our findings partly confirm these categories, as participants have described problem-focused coping in theme 2, "doing something constructive", meaning-focused coping as part of theme 3, "seeking support and meaning", and emotion-focused coping as part of theme 1, "reducing the mental load of climate change".

However, our thematic findings expand on these categories. For example, in theme 1, "reducing the mental load of climate change", the experience of coping is conveyed to involve not only downregulating unpleasant emotions but also emotion avoidance and avoidance of climate change as the stressor. The latter may present behaviourally in a similar way as notions of de-emphasising (Ojala, 2013). This suggests that "reducing the mental load of climate change" involves components of emotion-regulation to foster positive emotions over negative emotions, as well as emotion avoidance such as distraction or suppression (e.g., McRae & Gross, 2020).

Participants further described theme 3, "seeking support and meaning", to go beyond the fostering of pleasant emotions and to include seeking meaning through mindfulness and social connections. This supports findings by Ágoston et al. (2022) who identified seeking social support and social coping to be important coping strategies that may have both problem- and emotion-focused elements. When drawing links to classical emotion-regulation, "seeking support and meaning" seems to involve some elements of cognitive reappraisal, which involves altering the ways participants think about climate change to alter their emotional response to it (e.g., McRae & Gross, 2020).

Finally, theme 4 "doomist thinking and behaviour" describes how some participants engaged in maladaptive thoughts and behaviours. This may present a coping category that partly ties in with Ojala's (2013) notion of de-emphasising but that behaviourally presents as rather dysfunctional. In a way, this may also involve some reappraisal, as participants changed their attitudes towards climate change to reduce their negative emotions (McRae & Gross, 2020). However, this form of coping includes less adaptive forms of reappraisal, as its consequences for individuals' behaviours and wellbeing cannot be sustained long-term.

Our thematic findings from participants' open-text responses to Q2a and Q2b further suggest that which coping strategies are used may potentially depend on the level of experienced distress and the time at which a strategy is employed. For instance, some participants used resigning and giving up (part of theme 4, "doomist thinking and behaviour") once they had found other strategies to be insufficiently effective or not sustainable over time. This is in line with research by Stallman et al. (2021) who found that with increasing stress, college students moved from strategies like social support and relaxation to strategies like distraction and negative self-talk. The different strategies described by students in our sample may therefore reflect their experienced stress level, with more unhealthy strategies likely to be used with increasing distress and at later

timepoints. This may explain why some students reported using multiple coping strategies for the same situation or using different strategies for varying types of situations. It may provide some evidence for the Health Theory of Coping (Stallman, 2020), which theorises that individuals use healthy coping strategies first, if available and effective. Only if unavailable or insufficiently effective, do individuals move to more unhealthy strategies.

When trying to understand coping with climate change holistically, it seems important to draw connections between research findings, considering how people cope on an individual and collective level. For instance, van Valkengoed and Steg (2024) proposed a theoretical framework on how to cope with climate anxiety that incorporates both, focussing on emotion-focused and problem-focused coping. This framework offers suggestions on how different coping strategies could be integrated to allow coping for different scenarios. It suggests that effective coping could entail adaptation and mitigation on both the individual and collective level.

For problem-solving, students in our study described mainly individual mitigation (e.g., sustainable diet) and some collective mitigation (e.g., protesting) in theme 2, "doing something constructive". Participants did not mention adaptation to the same extent, which could include staying cool in extreme heat (individual) or creating community gardens (collective). For emotion-focused coping, participants mentioned mitigation on an individual level (e.g., mindfulness) and collective level (e.g., seeking social support) in theme 3, "seeking meaning and support". To a lesser extent, they described emotion-focused adaptation (e.g., individual: counselling, collective: climate cafés). Our findings therefore partly align with existing research and theoretical proposals but also provide some new perspectives and expand on previously proposed coping categories. Taken together, our thematic findings suggest that there is still room for building adaptation into students' coping skills, on both collective and individual levels. This may provide a more holistic coping approach and equip them with effective strategies for various life situations.

4.5.2. Practical implications for education

Based on conceptual content analysis of Q3, findings of situation 1 ("climate change information") suggest that a large source of participants' need to cope stemmed from climate change-related information and news. In coping theme 2, "doing something constructive", participants mentioned that seeking out news that reported on *positive* advances related to climate change and realistic action steps to result in feeling hopeful and empowered. This could have some implications for the way educational institutions teach

about climate change. For example, climate change-related teaching and information should be problem-focused, solution-orientated, and actionable to equip students with skills and knowledge for mitigating climate change within their own means (Kundariati et al., 2025; Rom, 2023). Such teaching should be included in all subject areas (Hill-Harding et al., in press), balance difficult climate change facts with positive and empowering action steps, and include students in climate actions (e.g., Kundariati et al., 2025; Rom, 2023). Educators should also acknowledge the uncertainty surrounding climate change and connect with learners on an emotional level (Mah et al., 2020). By being sensitive to the emotional impacts of climate change, they can create an experience of shared resilience (Mah et al., 2020).

Finally, students in this study reported that an important situation that required coping was "climate justice issues" (situation 2), such as inaction by those in power, which supports findings from Hill-Harding et al., (in press). Arguably, this includes universities, as they have a responsibility and obligation to reduce their own carbon emissions and reduce institutional climate injustice due to their educational and social standing (e.g., Shue, 2022). This should go beyond growth-centred sustainability (e.g., carbon offsetting) to also address universities' own contribution to climate change (e.g., fossil fuel investment) and deep-rooted climate injustices like intra-institutional power imbalances (e.g., funds for cheap, not sustainable, travel for staff; e.g., Shue, 2022; Stein, 2024). These findings and implications support previous research by Hill-Harding et al. (in press), who found significant correlations between the university's climate actions and climate change communications with students' mental wellbeing. Hill-Harding et al. further reported that students thought it would benefit their mental wellbeing, if the university communicated more clearly on their climate actions and, overall, to engage in more impactful actions, such as fossil fuel divestment and retrofitting buildings.

4.5.3. Strengths

Our study had a large sample of students from different colleges, origins, degree courses, and levels of study. This means our findings are likely to represent views and experiences from different sub-populations within the university's student body. Our findings also partly reflected previous findings by Hill-Harding et al. (in press), Wullenkord and Ojala (2023) and a systematic review on both coping strategies and triggering situation types (Soutar & Wand, 2022). Our findings are thus likely to be externally reliable. Using a largely qualitative embedded design further allowed to get detailed insights into participants' coping experiences combined with basic count data.

This use of 'big qualitative data' provides rich in-depth accounts that are likely to be consistent with other students' experiences of climate change-related coping. This provides a unique combination of in-depth accounts of personal experiences and good external consistency of findings.

4.5.4. Limitations

Our sample was largely female (73.4%), which raises the question whether our findings may reflect predominantly female experiences, as female youth have been shown to experience climate worries differently to males (e.g., Ndetei et al., 2024). Our sample was also not representative of the university's student population, as three of the four colleges were under- or overrepresented, and European students were overrepresented in our sample. Our sample was also recruited via voluntary enrolment, which poses potential problems with self-selection bias. It is, for instance, likely that students were more likely to sign up if they had a pre-existing interest in climate change and/or mental health. Finally, our sample was restricted to students of one UK university. All of these raise potential issues with the findings' applicability to other universities or young adults outside of higher education.

We used the framework method to analyse open-ended survey data. While this method is suitable for analysing qualitative survey data (Goldsmith, 2021), there are some limitations compared to analysing other forms of qualitative data. For instance, in our survey we were unable to probe or follow-up with less expressive participants, as is possible in interviews. This raises potential concerns with less expressive or less interested participants providing comparably little information and thus being underrepresented in the data. Nonetheless, this "big qualitative" approach using survey data allowed us to gather insights into the coping experiences of a large number of participants. This makes it valuable for our aim of providing a first understanding of how students coped with climate change, despite not being able to probe for more detailed responses.

We assessed participants' support-seeking tendencies only with basic quantifications. This restricts these results, as it remains unclear *why* participants had previously sought professional support for climate change-related mental health or why they would (not) like to seek such support in the future. Open-ended questions could have revealed more detailed insights. Future research may want to investigate what encourages or hinders students to seek out such support.

We assessed triggering situation types and coping strategies separately and qualitatively and therefore cannot draw any correlations between specific moments and coping strategies. Although we created exploratory connections between the situations and coping strategies, the magnitude or statistical significance of these connections remains unclear. Future research could use the here found situation types and strategies in a quantitative survey to explore correlational relationships.

Overall, future mixed-methods research may be valuable that combines quantitative survey data and qualitative explorations on climate change emotions, climate anxiety, and coping with these, to better understand how these variables and experiences are related. A future study could be derived directly from the findings reported here by combining them with quantitative results from the other study published from this dataset. This may provide some interesting insight into participants' coping strategies related to varying levels of climate anxiety in specific situations.

4.5.5. Conclusion

Most participants had not previously sought any professional support for climate change-related mental health, nor did they intend to do so in the future. Moments where students needed to cope with climate change included engaging with *climate change information*, *climate justice issues*, *climatic changes and losses*, and *climate change dismissal/ ignorance*. To cope, participants tried to *reduce the mental load of climate change*, and they took action by *doing something constructive*, sought *[social] support and meaning*, and engaged in *doomist thinking and behaviour*. These findings have implications for the ways climate change-related information is presented, and institutional climate justice issues are addressed, which may be particularly relevant for higher education settings.

5. Chapter 5: General Discussion

5.1. Aims and overview

Across three empirical projects, this thesis aimed to produce a more holistic understanding of climate anxiety and related emotions in the UK by contextualising individuals' experiences, and how they cope with these, in everyday life situations. To achieve this, this thesis produced three research studies that explored climate anxiety and emotions in the general UK population and a more focused target population of university students. Specifically, projects presented in Chapters 2 and 3 aimed to provide a better understanding of climate anxiety and climate change emotions by taking into account situational contexts and predictors. Chapter 4 further aimed to explore the types of coping strategies individuals may use when coping specifically with climate change-related emotions.

This chapter will provide a summary of the main research findings from across all three empirical chapters, evaluate the thesis' contribution to the climate anxiety and wider climate psychology literature, reflect on the thesis' overall limitations, and discuss its implications for theoretical understandings of climate anxiety, climate change emotions, as well as practical implications for climate change education and practices at higher education institutions.

5.2. Summary of key findings

The first empirical project in Chapter 2 reported a quantitative online survey study where we developed and evaluated the SAM² CAM, a situated measure of climate anxiety, contextualised for the UK. This involved participants from the general UK public to indicate how much climate anxiety they experienced when thinking about a series of different situations (e.g., hearing about climate catastrophes on the news; traveling by aeroplane). Results from statistical analyses revealed low average climate anxiety intensity but large situational and individual differences of climate anxiety, as well as individual-by-situation interactions. An individual may, therefore, experience low climate anxiety in one situation, moderate climate anxiety in another, and high climate anxiety in yet another. An individual is also unlikely to experience the same levels of climate anxiety as another individual. Similarly, two different individuals may experience different levels of climate anxiety intensity, even for the same situation, due to the interaction between individual and situational characteristics. These findings showed that including situational predictors in climate anxiety assessments can play an important role in predicting an individual's climate

anxiety for different types of everyday life situations. An individual's climate anxiety may, therefore, vary substantially depending on the situational context they encounter.

To further contextualise and understand how climate anxiety and related emotions are experienced in a more vulnerable sub-population in the UK, Chapters 3 and 4 focused specifically on university students. Building on findings from the first study, Chapter 3 reported a mixed methods online survey study on a sample of University of Glasgow students. This study looked at students' climate anxiety, climate change-related emotions, climate change-related thoughts, and their perceptions of the university's role in climate actions. To assess climate anxiety intensity, we adapted the SAM² CAM to student-specific situations (e.g., thinking about my future; learning about climate change issues specific to my field of study), which we used alongside unsituated measures. Findings revealed moderate climate anxiety intensity in this population, along with infrequent experiences of disruptive climate anxiety symptoms. Participants reported high levels of negative climate change-related thoughts (e.g., people have failed to take care of the planet) and emotions (e.g., anger, depression). Qualitative and additional exploratory findings further revealed significant links between the university's climate actions and climate change communication with participants' climate anxiety and mental wellbeing. How the university engages with climate change is thus directly linked to students' emotional wellbeing.

Finally, Chapter 4 reported a largely qualitative mixed methods study that analysed existing data from the subject pool of the study reported in Chapter 3. This study thus used pre-existing survey data to explore how University of Glasgow students experienced triggering situations related to climate change and how they tended to cope with these. Qualitative findings from participants' open-text responses showed four types of triggering situations: climate change-related information; climate justice issues; climatic changes and losses; and climate change dismissal. We further found four types of coping strategies that participants typically employed: reducing the mental load of climate change; doing something constructive; finding meaning and support; and doomist thinking and behaviour. Overall, participants used the same four coping strategies for coping with climate change generally and in specific triggering situations, which was slightly unexpected, given the large situational variability of climate anxiety observed in Chapters 2 and 3.

Nonetheless, the findings from across all three studies suggest that climate anxiety varies largely between different situations and between individuals, although there seems to be a common set of trigger situations that are linked to climate anxiety across most

individuals. Those triggering situations were often related to climate justice issues (e.g., governmental climate inaction), a lack of agency and control (e.g., engaging in climate activism linked to lower climate anxiety), and being confronted with upsetting consequences of climate change (e.g., news about climate disasters; ecological degradation of loved natural spaces). This thesis further suggests that climate anxiety is not a pathological form of anxiety, as it showed some differences to generalised anxiety, thus supporting previous notions of climate anxiety as rational and non-pathological (e.g., Clayton, 2020; Pihkala, 2021). Despite this, however, the intensity of climate anxiety and distressing climate change emotions/ thoughts reported by students in Chapter 3 was alarmingly high. Albeit not being pathological, this suggests that climate anxiety should be taken seriously and that support systems for those who experience it would be highly valuable.

5.3. Contributions of this thesis

5.3.1. Theoretical contribution: constructed understanding of climate anxiety

Throughout this thesis, I have viewed climate anxiety as a constructed emotion, adapting a constructivist perspective of emotions. This constructivist view of emotions theorises that emotions result from a combination of learned constructions of relevant processes involved in specific situations an individual experiences (e.g., Feldman Barrett, 2017a, 2017b; Lebois et al., 2020). As such, how an individual conceptualises a situation, including its physical entities, sensations, agents, or actions involved, determines how emotions are experienced (Feldman Barrett, 2017a; Lebois et al., 2020; Wilson-Mendenhall et al., 2011; Wilson-Mendenhall & Barsalou, 2016).

Based on this assumption, no two individuals are likely to experience emotions the same way even if in the same situation. This is due to their different personal conceptualisations and the interactions that exist between a person's individual characteristics and situational ones, as we observed in the study presented in Chapter 2. Likewise, an individual is unlikely to experience an emotion the exact same way across different situations, as the entities involved are likely to be different. Thus, a central theme throughout this thesis is to view (climate) emotions as constructed, taking into account an individual's situational contexts to emotional experiences and thus acknowledging that individuals' experiences of climate anxiety should likely vary across situations and individuals.

By viewing climate anxiety as a constructed emotion, this thesis provides a more holistic understanding of climate anxiety than research without such a theoretical frame of emotion. First, I was able to demonstrate the variability and fluctuations of climate anxiety intensity individuals recalled for different types of situations linked to human-made climate change and pollution. This provided new empirical insights into the types of situations generally associated with higher climate anxiety intensity, compared to situations generally associated with lower climate anxiety intensity. The situated approach further showed that individuals with high average climate anxiety do not necessarily experience high climate anxiety across all situations. Instead, they seem to recall high climate anxiety intensity for certain types of situations and low climate anxiety for other situations.

This is an important finding for theoretical views of climate anxiety, as it suggests fundamentally different properties of climate anxiety compared to clinically relevant generalised anxiety or "trait" anxiety. Trait anxiety is an individual's general tendency to view the world as threatening and thus predicts a general likelihood to experience anxiety (e.g., Quigley et al., 2012). In contrast, "state" anxiety describes a transient, momentary, feeling of anxious arousal that is directly related to a specific threat or situation (e.g., Quigley et al., 2012). Since the research presented in this thesis clearly showed that climate anxiety is highly situation-dependent, it can be concluded that it cannot only be viewed as a constructed emotion, but that climate anxiety is indeed not entirely attributable to trait anxiety. This is in line with previous theoretical proposals by Pihkala (2021).

Similarly, climate anxiety seems to be different from generalised anxiety, despite the possibility that very high levels of climate anxiety can impact functioning (e.g., Clayton & Karazsia, 2020). Generalised anxiety is a clinically relevant and pathological form of anxiety that is closely linked, and often predicted by, an individual's trait anxiety (e.g., Jouvent et al., 1999). Individuals with generalised anxiety often report feeling anxious despite a lack of a realistic threat (e.g., while driving in clear weather; Jouvent et al., 1999). Climate anxiety, on the other hand, seems to be a rather rational fear of a realistic threat (i.e., climate change and its consequences) that becomes more intense in situations of more salient climate change-related danger (e.g., news about climate catastrophes) and awareness of climate change-related justice issues (e.g., news about governmental inaction). This supports previous theoretical views of climate anxiety, as well as empirically supported views that describe climate anxiety as rational, non-pathological but still with potentials to impair daily functioning (e.g., reduced concentration or poor sleep quality; Clayton, 2020; Clayton & Karazsia, 2020).

These findings provide opportunities for supporting individuals who experience overwhelming climate anxiety by specifically targeting high-anxiety situations. For example, disaster-focused news about climate change were linked to high climate anxiety across the three empirical chapters. In a situation where an individual is consuming or learning such news, for instance in a lecture on biodiversity loss, there is an opportunity to provide spaces for supportive and meaningful discussions. Such situation-tailored support could reduce climate anxiety in particularly triggering situations. This may have real-life impacts, as climate anxiety is often linked to pro-environmental action and activism (e.g., (Ogunbode et al., 2022), however, high climate anxiety can also lead to paralysis and avoidance (see e.g., Innocenti et al., 2023). Addressing triggering situations specifically could support effective coping and self-efficacy, which has been linked to a reduction in climate anxiety paralysis and an increase in pro-environmental behaviour (Innocenti et al., 2023). Situation-specific support thus could have real-life benefits for supporting individuals' wellbeing as well as more climate-conscious actions.

5.3.2. Practical research contribution: situated assessment of climate anxiety

Across all three empirical chapters, different methods have shown that situational variations, contexts, and encounters are important for how climate anxiety is experienced. This thesis additionally portrayed large individual differences in climate anxiety intensity and its associated triggering situations. Typical measures assess climate anxiety only on the individual level, however, ignoring situational variations or interactions between individual and situational factors (e.g., Clayton & Karazsia, 2020; Hogg et al., 2021).

Thus, typical measures of climate anxiety assess the *individual level*, meaning they can establish general differences in climate anxiety experiences between individuals. However, they usually require respondents to abstract their experiences across various situations. Scale items like "I find myself crying because of climate change" (Clayton & Karazsia, 2020) thus ask the respondent to make an average assessment about whether they cry because of climate change, which makes their response less contextualised and prone to recall error (Dutriaux et al., 2023). It would, for example, be likely that an individual may indeed find themselves crying because of climate change when seeing disturbing footage of livestock dying in a wildfire. However, it seems less likely for an individual to cry when reading about pioneering works in renewable energy. By ignoring the *situational level*, these traditional measures thus do not capture how climate anxiety experiences may vary between situations. Finally, by not assessing the situational level, typical measures of climate anxiety also fail to capture any individual-by-situational interactions. This means

they cannot showcase how climate anxiety experiences differ between individuals, even for the same situations.

In this thesis, I assessed all three, individual-level, situational level, and situation-individual interactions. By doing so, this thesis expands on traditional measures of climate anxiety and thus provides a broader range of useful insights from a single assessment: 1) how an individual generally experiences climate anxiety averaged across situations (similar to traditional questionnaires, e.g., Clayton & Karazsia, 2020; Hogg et al., 2021; Stewart, 2021); 2) how a particular situation is associated with climate anxiety averaged across participants; and 3) how an individual experiences climate anxiety for each type of situation. This means that a participant's responses do not only shed light on their *average* climate anxiety across situations, but also how different individuals experience climate anxiety for various situations.

This information can also be used to create predictive profiles that are unique to each individual. Hence, predictions can be made of when and how a specific participant may experience high climate anxiety by looking at that individuals' climate anxiety situations. It can establish types of situations typically linked to high climate anxiety for that individual, as well as the kinds of situations typically associated with low climate anxiety for that individual. This could be valuable for tailoring support for a person with high climate anxiety to particularly high-anxiety situations. The situational data can further be used to predict which situations are generally linked to high climate anxiety across participants. These predictions could be used to create community support in situations where participants generally experience high climate anxiety (e.g., thinking about children's future) and likewise provide opportunities for participants to engage in more low-anxiety situations (e.g., engaging in climate activism).

Using a situated approach to assessing climate anxiety thus provides richer and more contextualised data, which can be used and applied in a myriad of ways. Data generated from situated assessments of climate anxiety can, for instance, provide a nuanced basis for effective coping with climate anxiety by allowing individuals to prepare trigger-specific coping strategies. Such data further allows to establish support systems for climate anxiety by taking into account situational variables like social interactions that may be associated with climate anxiety. Finally, it can inform theoretical understandings of climate anxiety in more detail than non-situated measures can, as it provides less abstracted data on climate anxiety, which is more likely to resemble actual past experiences (see Dutriaux et al., 2023).

5.3.3. Applied implication: understanding climate anxiety in higher education

A mix of quantitative and qualitative findings from Chapters 3 and 4 revealed that University of Glasgow students experienced high levels of negative emotions and thoughts about climate change. According to visual explorations, students' experiences of these thoughts and emotions were comparable to those of young people across the globe (Hickman et al., 2021). Participants also reported moderate climate anxiety intensity when averaged across participants and situations, which was higher than that experienced by the general UK public in Chapter 2. However, the frequency of climate anxiety symptoms students reported was comparable to other student and non-student samples (e.g., Clayton & Karazsia, 2020; Innocenti et al., 2021; Mouguiama-Daouda et al., 2022; Shinan-Altman & Hamama-Raz, 2022). This suggests that the climate anxiety, thoughts, and emotions university students experience may differ in some ways from experiences that the general population have, but that students seem to have similar experiences to other young adults. Thus, in contrast to some of our initial expectations, students seem to experience climate change emotionally in a similar way to other young people, despite factors in students' lives that make them more exposed to climate change information and other triggers.

Indeed, students' qualitative descriptions of triggering situations were often not directly linked to their university life but rather described encounters with climate change that non-student populations could also encounter (e.g., climate change news, climate justice issues, conversations with climate deniers). Nonetheless, our student sample reported higher climate anxiety than the general UK population sample from Chapter 2. This difference could be partly due to the different versions of measurements used or participants' motivations to enrol in these studies – for instance, participants sampled via Prolific from the general UK population may have been motivated by financial incentives, whereas university students may have been more motivated by voicing their concerns. However, there is another potential variable that could explain this difference: the significant positive link between the university's climate actions and communication about climate change with students' climate anxiety and some negative emotions and thoughts, as revealed in exploratory results in Chapter 3. These findings could suggest that one major factor differentiating students' experiences from non-students' experiences may be linked to how universities address climate change.

For instance, findings from both Chapters 3 and 4 suggest that climate justice issues are an important contributing factor for climate anxiety, negative climate change emotions, and the need to cope with these. The perception that the university was dismissing people's

distress about climate change, for example, correlated significantly with climate anxiety intensity and some other negative emotions and thoughts. Furthermore, participants described in open-text responses that one of the things the university could do to support students' mental wellbeing included engaging in more climate actions and being more transparent about climate change-related practices. These findings suggest that how universities act on and teach about climate change can directly impact students' wellbeing, both positively and negatively, a conclusion that other researchers have also drawn (e.g., Eriksson et al., 2022; Thierry et al., 2023). To make a positive impact, findings from Chapter 3 show that universities could move towards more climate conscious and ethical investments (e.g., fossil fuel divestment not mere offsetting), involve students in their climate action decision-making (e.g., student representatives for sustainability working groups), and include climate change teaching in all subjects (e.g., teach sustainable career options, research opportunities related to climate change issues specific to a degree).

5.3.4. Theoretical contribution: expanding understanding of coping with climate change

In Chapters 2 and 3, it became apparent that there are certain types of situations that are generally linked to lower or higher climate anxiety intensity. As discussed earlier, these specific situations provide opportunities for targeted support. However, when support is unavailable, individuals still have various coping strategies to deal with difficult climate change emotions. Chapter 4 describes such coping strategies in University of Glasgow students. Evidently, there are patterns of adaptive and less adaptive strategies, which may be reason for concern, as less adaptive strategies could involve harmful thinking and behaviours, or social withdrawal. Nonetheless, this also provides an opportunity for teaching and fostering adaptive coping strategies. For instance, educational self-help materials could be distributed across university campuses that include practical prompts and exercises for adaptive strategies. This could include short mindfulness exercises, contact details for climate action groups, or tips on talking about climate change with likeminded peers.

While previous research has already established some categories of coping with climate change (Ojala, 2013; Ojala & Bengtsson, 2019; Wullenkord & Ojala, 2023), this thesis expands on this by combining in-depth qualitative accounts of coping with a constructed understanding of climate emotions. This means that trigger situations that require coping with climate change could be identified, as well as the strategies individuals use to cope with these. This goes beyond higher-order descriptions of coping categories, as

provided by previous research (e.g., Wullenkord & Ojala, 2023), as it draws connections between the individual's lived experiences of climate anxiety in a specific triggering situation, the properties of such trigger situations, and the ways they cope with these emotions in said situation. It thus allows to build individual profiles of trigger situations together with an individual's usual coping strategies, which provides a much richer picture of when and how an individual experiences climate anxiety and emotions, and what they tend to do to deal with these.

This provides opportunities for targeting less adaptive coping strategies and fostering more adaptive ones to allow individuals to cope effectively and in a way that can be sustained for their own wellbeing. For example, an individual may receive counselling for their overwhelming climate anxiety and the maladaptive ways they tend to cope with this, say, for example, by binge eating and withdrawing socially. If that individual's trigger situations can be identified (say, in this case, news about climate disasters), counselling exercises could include watching climate change-related *positive* news or watching disaster-focused news with a loved one with immediate follow-up conversations. This would target the trigger situation *and* provide ways of more adaptive coping by replacing binge eating with constructive conversations.

5.4. Limitations

Despite its contributions, this thesis is not without limitations. Firstly, all empirical studies presented in Chapters 2 to 4 relied on participants' voluntary enrolment. As with any non-probabilistic sampling technique, this means our measurements cannot be fully independent from the sample obtained, which limits interpretations made based on obtained data (Heeringa et al., 2010). This means it is unclear to what extent the samples truly reflect the wider populations of interest, as voluntary participants may differ from individuals who choose not to participate in a number of ways (Elston, 2021). As such, their experiences of climate anxiety, their interest or understanding of climate change, and their ability to navigate online surveys may differ from non-participants. The extent to which self-selection occurred may even differ between the sample obtained through Prolific and that sampled across the university, as participants' main motivations for study enrolment may have been different. This may have influenced participants' responses, attrition rates, and ultimately our findings, which would all limit the generalisability and external validity and reliability of the results presented (Elston, 2021).

Another limitation of this thesis is that the majority of participants in Chapters 3 and 4 were female. This poses a potential issue with gender-biased data towards a more

female perspective and experience of climate anxiety, climate change emotions, and coping with these. Indeed, research has shown that females experience worries and care for climate change differently to other genders. For instance, females experience climate anxiety significantly more frequently than males (Closson et al., 2025). Females are also generally more likely to cry because of climate change than males and experience significantly more impacts on cognitive functioning, such as difficulties concentrating, because of climate change (Closson et al., 2025). This means that findings from Chapters 3 and 4 may represent a largely female experience of climate anxiety and emotional climate change impacts, which would limit the results' applicability to males and other genders. It remains unclear, however, why this overrepresentation of females has occurred. It may be that female students had a higher interest in climate change and/or mental health than their male counterparts, or it could be that males are generally more difficult to recruit for psychological research like this, as is the case for health-related research (Borg et al., 2024) and behaviour change research (e.g., Ryan et al., 2019).

Moreover, all data present in this thesis relied on self-reported answers, which causes potential issues with recall bias or social desirability. As a result, there is a risk of our findings being inaccurate or inflated, which would again limit their generalisability and reliability (Elston, 2021). We did, however, take precautions with the selection of our sample characteristics to reduce some of these risks. Quantitative results from Chapters 2 and 3 are further comparable to those from other studies, suggesting that some generalisations may still be possible. Moreover, a recent report suggests that self-report measures may be better at capturing mental states, such as emotions, than implicit measures, as implicit measures often rely on unrelated performance indicators (Corneille & Gawronski, 2024). Thus, a person's self-reported climate anxiety can be assumed to be more accurate than climate anxiety assessed using implicit measures that capture things like response frequencies or response times (Corneille & Gawronski, 2024).

Moreover, none of the empirical studies allow for the inference of causal relationships, as all statistical data was cross-sectional and correlational. While the results can show associations between variables of interest, no causal links can be drawn (Altman & Krzywinski, 2015), which limits the impact of the data and the conclusions that are possible. The findings presented are, however, still valuable, as they provide initial insights into how climate anxiety and climate emotions are experienced and managed. They thus provide a valuable basis for further development of research materials and additional analyses that may allow such conclusions (e.g., longitudinal designs, randomised controlled trials).

A further drawback of the SAM² scales used in Chapters 2 and 3 is that climate anxiety was not assessed directly as participants *experienced* each of the situations of the scale items, but rather as participants *thought about* experiencing each situation. In Chapters 2 and 3, specifically, we were able to find patterns of situations that are associated with climate anxiety, yet climate anxiety was not measured in those situations directly. The same applies to Chapter 4, where participants described triggering situations and how they coped in these based on memory. Thus, in all three studies, participants were required to recollect their experiences when thinking about each situation, which may present difficulties with inaccurate or inflated recollections. However, the situational data found is still valuable, as it presents more informative accounts than unsituated self-report scales (see Dutriaux et al., 2023). Even compared to ecological momentary assessments, where participants would be assessed *while* experiencing climate anxiety, the SAM² approach has an advantage, as there are pre-determined situations that can compare different individuals' recalled experiences across various situation types (see Dutriaux et al., 2023). In ecological momentary assessments, one has little control over the types of situations participants experience, which makes them difficult to compare and model, despite such data's external validity.

The student samples in Chapters 3 and 4 were also only sampled from the University of Glasgow. With such a restriction to one university, there may be limitations as to the generalisability of the results to students at other universities in the UK. For instance, location, degrees offered, and number of research and international students vary largely between universities. Such variables may, however, be influential to how students think about climate change and experience climate change-related emotions: students at a large urban university like Glasgow may be more aware of greenhouse gas emissions and pollutions than those at remotely located universities and universities with fewer research and postgraduate students may not produce as much critical thinking about climate justice issues. Thus, findings from Chapters 3 and 4 are likely to be highly contextualised to students at a large research-intensive and urban university in the UK.

Finally, this thesis focused on climate anxiety in the UK, a highly developed and, at present, comparably sheltered country from climate disasters. While this is in line with this thesis' aims, focusing on the UK means that the data presented is likely not generalisable to countries with different climate change realities, such as countries in the global south (e.g., Nigeria, Syria) or vulnerable island nations (e.g., Philippines). Although being able to generalise to other countries was not part of this thesis' aims, it still means that conclusions can only be made about the type of climate anxiety I examined here – a form of climate

anxiety where climate change is largely experienced through indirect or vicarious encounters (e.g., news, documentaries) and disasters mostly anticipated to occur in the future.

5. 5. Directions for future research

To build and expand on this thesis, future research could use the new SAM² CAM and SAM² CAM-Students scales introduced in this thesis and validate them for different contexts. For instance, the situations from the SAM² CAM scales could be replaced with situations more relevant or appropriate for different cultural, age, or ethnic contexts. This may include interchanging situations like "Hearing about climate catastrophes on the news" with something like "Talking about recent climate catastrophes with a neighbour or friend". The SAM² CAM could also be used when researching different subgroups of the UK population to see if there are specific differences, for example depending on demographic or locational variables. This would allow more context-specific and relevant insights regarding the situations likely to be associated with climate anxiety in each specific population of interest. This would, in turn, provide a more nuanced basis for individualised support, self-help resources, or research, as relevance and likelihood of experiences are accounted for. An individual from a low-income background would, for example, be less likely to find "travelling by aeroplane" climate anxiety inducing, as they would be less likely to travel abroad. Instead, situations like "having to arrange child care when children are off school due to extreme heat" would likely be more relevant.

Similarly, the findings from qualitative analyses could inform further quantitative research that includes hypothesis testing to see whether the qualitative impressions can be statistically verified. For example, the findings from open-text responses in Chapter 4 could be used to test whether the type of triggering situation can perhaps be used to predict an individual's choice of coping strategies. The findings from open-ended questions in Chapter 3 could likewise be used to test whether there are any significant correlations between students' climate anxiety and their thoughts on climate actions the university should engage in.

In a similar way, the results of this thesis could inform further in-depth qualitative research. For instance, the empirical chapters indicate that certain situations involving social interactions about climate change are linked to high climate anxiety and negative emotions across many participants. This includes situations like talking to someone who does not believe in climate change or being dismissed in a conversation about climate change due to one's age. Future research could use these findings to further explore the

role of social relationships and interactions in individuals' experiences of climate anxiety and related emotions. This could involve focus groups with family members or other social networks. The same approach could be used to further understand how higher education institutions could support students and communicate with students about climate change and thus expand on findings from Chapters 3 and 4.

Finally, future research may want to replicate or conduct similar research to that presented in Chapters 3 and 4 with a more gender-balanced sample to assess whether the results presented here are indeed skewed towards a female experience. Such replications could also be conducted at different universities across the UK and similar countries to see whether students experience climate change emotions and thoughts similarly across different universities, as some research suggests that they might (Kelly, 2017; Khalaim & Budziszewska, 2024). At last, universities may find it of interest to use the materials developed and applied in this thesis to focus on specific groups of students that may be at higher risk of experiencing climate anxiety directly from their studies (e.g., geography, biology, conservation studies). This may allow to provide degree-specific support after emotionally difficult lectures, which should increase the effectiveness and simultaneously reduce the resources needed to provide such support.

5. 6. Conclusions

This thesis aimed to provide a better understanding of the types of situations and experiences associated with climate anxiety and climate change-related emotions in the UK and how individuals cope with these. To achieve this, I conducted three empirical studies that built on theoretical perspectives of the constructivist view of emotions and the SAM² approach. In doing so, we were able to draw connections between individual and situational variabilities of climate anxiety and how these variables interact. Findings from across all three studies showed that situational variables are important for understanding how climate anxiety is experienced – from predicting climate anxiety profiles to understanding triggering situations that require coping. Taken together, this thesis provides insight into the everyday life situations associated with climate anxiety and thus a better theoretical understanding of how climate anxiety is experienced in daily life. It further provides insights into how university students experience climate change emotionally and the role universities can play in this. Finally, this thesis provides some understanding of how people cope with climate change and what kind of support might be effective for regulating difficult climate change emotions. Further research is needed, however, to allow

causal and directional conclusions about the relationships discussed, or to confidently generalise findings from Chapters 3 and 4 to other UK populations.

6. Supplementary Materials

6.1. SM-1: Introductory text presented to participants before rating the 31 situations for each measure (for Chapter 2, 2.3.3. Materials)

Measure	Introductory Text
Anxiety	"In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **When this situation occurs, how much anxiety do you experience about climate change?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **anxiety** follows next. **Anxiety** is a negative response to anticipated future situations that are likely difficult in some way. Often, this negative response includes unpleasant bodily states, such as a fast heart rate, difficulty breathing, muscle tension, and intense arousal. Anxiety is often associated with worry, rumination, and feeling upset about a difficult future event. Situations that produce anxiety are typically not perceived as desirable but are instead perceived as anticipated difficulties one would prefer to avoid. Although some people don't currently experience anxiety about the climate change, other people increasingly do."
Frequency	"In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How frequently do you experience this situation?** A little more detail about what we mean by **situation frequency** follows next. **Situation frequency** refers to how often you experience a situation. Some situations you may have never experienced. Others you may experience about once a year, once a month, or once a week. Some you may experience everyday or multiple times each day."
Concern	"In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How concerned are other people in this situation about climate change and sustainability?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **other people's concern** follows next. People you may know may vary widely in **how concerned they are about climate change and sustainability**. Some people may not be concerned at all, whereas others may be intensely concerned. Furthermore, the amount of concern you encounter may vary widely across the situation you're in at the moment, depending on the people present."

Violation   "In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How much does this situation violate your expectations?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **expectation violation** follows next.

An **expectation violation** can potentially take numerous forms, including: (1) an unexpected or "surprise" situation (e.g., an unexpected bill in the mail for something you didn't purchase), (2) an unexpected outcome for an expected situation (e.g., an unexpectedly high charge on a monthly bill), (3) an expected violation of a desirable outcome that one would prefer to not see violated (e.g., receiving a high bill as expected that violates the desire to minimise expenditures), and (4) the violation of a social norm (e.g., a friend asks you to pay their utility bill). Please feel free to draw on any of these possibilities to assess how your assessments of expectation violation next."

Threat   "In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How threatened do you feel by what happens in this situation?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **threat** follows next.

A **threat** can take numerous forms, including something that could potentially cause: (1) physical pain or injury (e.g., falling on an icy pavement), (2) damage to your property (e.g., damage to your car due to icy roads), (3) danger to your loved ones (e.g., being out in the cold for long without protection), or (4) an unpleasant mental state (e.g., fear about getting lost while hiking in a snow storm). Please feel free to draw on these kinds of threat and others in your assessments of threat next."

Opportunity "In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How much of an opportunity do you see in this situation to do something constructive?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **opportunity** follows next.

An opportunity to do something constructive refers to a situation where you can achieve something positive. Such opportunities can include connecting with others, contributing to your community, supporting family and friends, and protecting the environment. Such opportunities may also be more personal, such as experiencing personal growth, establishing a purpose, discovering meaning, and achieving personal goals. Many other potentially positive outcomes may come to mind for you as well."

Motivation	"In a moment, you will receive a series of 31 situations. For each situation, you will
Habits	be asked to rate: **How much does being in this situation motivate you to adopt sustainable habits?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **motivation to adopt sustainable habits** follows next.
	Motivation is a reason or feeling that makes you want to perform a behaviour. **Sustainable habits** are behaviours performed regularly to ensure that we don't permanently deplete natural resources or damage the environment supporting our existence. Sustainable habits maintain a balance between human activity and the environment, allowing both to coexist and thrive. Thus, **motivation to adopt sustainable habits** refers to motivation that makes you want to perform eco-friendly behaviours, perhaps replacing behaviours that are less environmentally friendly."
Motivation	"In a moment, you will receive a series of 31 situations. For each situation, you will
Action	be asked to rate: **How much does being in this situation motivate you to perform social action that promotes sustainability?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **motivation to perform social action that promotes sustainability** follows next.
	Motivation is a reason or feeling that makes you want to perform a behaviour. **Social action that promotes sustainability** refers to coming together with others and acting as a group to prevent depletion of natural resources and damage to the environment. This kind of social action may also aim to develop social awareness and influence government policy related to climate change and sustainability. Additionally, social action may take the form of volunteering, joining community organisations, joining peer networks, fundraising, protesting, and so forth. Feel free to draw on any of these possibilities to assess how much each situation that follows motivates you to engage in social action that promotes sustainability."
Control	"In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How much control do you believe you have over what happens in this situation?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **personal control** follows next.
	Personal control refers to how much you believe that you have the ability and the means to influence a situation you're currently experiencing. You may be able to influence either what happens as the situation unfolds or what its final outcome is. You could attempt to control a situation through your personal actions, through your ability to influence the actions of others, through your ability to alter physical aspects of the environment, and so forth. Alternatively, you may believe that you have little or no ability to influence a situation in any of these ways, with other factors having control over it instead (e.g., other individuals, social institutions, environmental causes, etc.)."

Coping "In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How effectively are you able to cope with this situation?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **coping effectiveness** follows next.

Coping effectiveness refers to how effectively and confidently you handle a situation to achieve an outcome that is satisfactory. In some situations, you may know exactly what to do, have high confidence that you can resolve the situation effectively, and succeed in achieving a satisfactory outcome (high coping effectiveness). In other situations, you may have no idea what to do, have low confidence that you can resolve the situation effectively, and fail to achieve a satisfactory outcome (low coping effectiveness)."

Rumination "In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How likely are you to ruminate about this situation?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **rumination** follows next.
Rumination refers to continually thinking about a situation when it's not actually occurring. For some situations, you may ruminate about them immediately after they occur. For others, you may ruminate about them just before they occur. Sometimes rumination arises spontaneously even when a situation hasn't just occurred or isn't just about to occur."

Compassion "In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How judgmental / compassionate are you about yourself and other people in this situation?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **compassion and judgmentalness** follows next.

Compassion refers to how warm and understanding you are toward yourself and others when various situations arise, especially difficult ones. The opposite of being compassionate in these situations is being **judgmental**, negatively criticising your actions, thoughts, emotions, and who you are, along with similarly being judgmental about others. People vary widely in how compassionate versus judgmental they are toward themselves and others in particular situations."

Consequences "In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How much do you think about the consequences of what happens in this situation for climate change and sustainability?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **consequences** follows next.

As many situations occur, your actions in them potentially have **consequences for climate change and sustainability** across the Earth's diverse ecologies. These **consequences** can take many forms. Sea levels are rising due to the polar caps melting. Extreme weather is causing droughts, heat waves, flooding, uncontrollable fires, and other serious outcomes. The seasons as we know them are shifting around the world. Places that were once inhabitable are becoming uninhabitable due to flooding, lack of water, unbearable heat, and so forth. Of interest next is how much you think about potential consequences for climate change and sustainability as you're acting in various situations."

Disruption "In a moment, you will receive a series of 31 situations. For each situation, you will be asked to rate: **How much does this situation disrupt your life?** If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine. A little more detail about what we mean by **disruption** follows next.
Disruption refers to how much a situation interferes with what you are currently doing or what you had planned. It also refers to how upset you become by not being able to do these other things and instead having to deal with the disruption. Some events may be extremely disruptive to your day-to-day life, whereas others may not interfere with anything at all."

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6.2. SM-2: The raw situation means for the 14 SAM² CAM measures (for Chapter 2, 2.3.3. Materials and 2.3.4. Procedure)

	Anxiety	Freq.	Concern	Violation	Threat	Opp.	Motiv_ Habits	Motiv_ Action	Control	Coping	Rumin.	Comp.	Conseq.	Disruption
S01 Catastrophes	6.29	4.80	6.62	5.64	6.20	3.29	6.71	5.99	2.25	4.77	6.39	1.95	7.66	3.76
S02 Unsustain. ads	3.36	5.68	3.85	3.89	3.15	3.17	4.66	3.94	2.88	5.88	3.23	-.83	4.71	1.95
S03 Activism news	3.79	5.22	4.90	2.97	3.28	4.54	5.52	4.80	3.40	6.17	4.64	.85	5.56	2.20
S04 Gov.'s plan	5.26	4.06	5.43	5.37	5.48	3.13	4.86	4.96	1.98	4.76	5.18	-2.34	7.03	3.50
S05 Documentaries	4.09	4.42	4.77	2.18	2.37	4.55	6.57	5.25	6.63	7.54	4.76	2.31	5.69	1.47
S06 Influencers	4.60	4.80	4.48	5.93	4.66	2.22	3.94	4.23	1.58	4.42	4.04	-3.15	5.61	2.42
S07 Green energy	1.92	4.07	3.71	1.93	1.42	5.57	6.18	5.14	2.88	6.97	4.20	1.63	6.13	1.57
S08 Local prod. ads	1.18	4.18	3.02	1.41	0.88	6.35	6.00	4.56	3.96	7.51	3.07	1.70	4.35	1.06
S09 Litter	4.67	8.09	5.43	6.73	4.75	5.66	6.25	5.85	3.86	5.75	4.87	-2.97	5.93	3.75
S10 Air pollution	3.85	6.16	4.61	4.41	4.58	3.20	5.14	4.37	2.64	5.33	3.95	-.90	5.38	2.87
S11 Left-overs	3.88	5.51	4.12	5.17	3.29	3.68	5.28	4.50	2.68	5.60	3.85	-1.77	4.75	2.45
S12 Water running	4.39	3.99	4.38	5.46	3.41	4.80	5.50	4.37	3.90	5.94	3.76	-2.05	5.14	2.61
S13 Car running	3.94	4.83	4.16	5.17	3.72	3.15	4.70	4.02	1.78	5.25	3.47	-2.07	5.11	2.27
S14 Communal act.	1.48	2.99	3.39	1.40	0.79	6.79	6.58	5.66	3.71	7.64	3.68	2.47	5.53	1.10
S15 Denier talk	4.97	2.28	4.49	4.98	4.34	5.66	5.12	4.91	5.16	5.27	5.12	-1.46	5.56	3.01
S16 'Green person'	2.11	2.91	3.56	2.01	1.59	5.81	5.91	4.86	5.41	7.21	3.89	1.62	5.06	1.58
S18 Taking car	2.85	4.43	3.26	3.57	2.45	4.40	4.41	3.59	7.87	6.81	3.51	-.76	4.88	2.26
S19 Dispos. cups	3.37	3.16	3.79	4.03	2.64	4.79	5.04	4.05	7.95	6.90	3.16	-1.04	4.84	1.79
S20 Plastic wrap.	3.61	6.61	4.57	4.60	3.55	3.60	5.04	4.40	6.49	6.25	3.88	-1.14	5.71	2.32
S21 Plant-based	1.62	5.00	4.06	2.19	1.25	6.57	5.84	4.47	8.50	7.05	3.79	1.63	5.10	2.70
S22 Reusable hyg.	1.43	4.26	3.55	1.53	.92	6.94	6.16	4.50	8.55	8.11	2.76	1.65	4.55	1.49
S23 Children's fut.	5.72	5.05	6.51	4.98	5.60	5.65	7.25	6.26	4.91	5.33	6.46	1.58	7.08	4.05
S24 Second-hand	1.40	2.56	2.93	1.64	0.98	6.51	5.45	4.11	8.58	7.70	2.78	1.64	4.26	1.43
S25 Too much food	3.19	4.17	3.90	4.44	2.81	4.17	4.83	3.92	8.47	7.01	4.11	-.96	4.77	2.75
S26 Aeroplane	3.56	1.44	3.45	3.38	3.38	3.02	3.65	3.18	6.81	6.37	3.49	-.51	5.07	2.24
S27 Recycling	1.71	8.34	5.08	1.52	.99	8.06	7.57	5.61	8.87	8.64	3.62	2.04	6.17	2.07
S28 Reusable bags	1.32	7.20	4.87	1.38	.76	7.60	7.29	5.22	9.24	8.83	3.32	1.86	5.42	1.54
S29 Climate act.	3.32	1.49	4.01	2.76	2.84	5.57	5.08	4.81	6.90	5.34	3.78	.82	5.19	2.68
S30 Nature	2.02	5.78	4.42	1.21	1.04	6.19	7.50	5.92	8.29	8.69	5.29	2.95	5.34	1.12
S31 Own future	5.03	7.07	5.38	3.88	5.25	5.95	6.86	5.96	6.51	6.11	7.13	1.13	6.30	4.03

Note. Abbreviations Measures: Freq. = Frequency; Opp. = Opportunity; Motiv_Habits = Motivation Habits;

Motiv_Action = Motivation Action; Rumin. = Rumination; Comp. = Compassion; Conseq. = Consequences.

Abbreviations Situations: S02 Unsustain. ads = S02 Unsustainable ads; S04 Gov.'s plan = S04 Government's plan; S08

Local prod. Ads = S08 Local product ads; S14 Communal act. = S14 Communal action; S16 'Green person' = S16

'Green person' talk; S19 Dispos. Cups = S19 Disposable cups; S20 Plastic wrap. = S20 Plastic wrapping; S21 Plant-

based = S21 Plant-based food; S22 Reusable hyg. = S22 Reusable hygiene; S23 Children's fut. = S23 Children's future;

S29 Climate act = S29 Climate activism.

6.3. SM-3: A guide to the profiles for specific situations (for Chapter 2, 2.4.1. Individual differences (H1))

The profiles in Figure 2 offer insight into the experience of specific situations. Each situation can be interpreted for climate anxiety and each of the 13 predictors.

Consider *S01 - Hearing about climate catastrophes on the news*. As can be seen in Figure 2, not only do people experience a high level of anxiety in this situation, they also feel highly threatened, are highly concerned about its consequences, and ruminate about what is happening. Simultaneously, people are unable to cope, experience little control, and perceive little opportunity to do something constructive. For an interesting, and perhaps somewhat paradoxical contrast, consider *S31 - Thinking about my future*. Here, people again experience high levels of anxiety, concern and rumination, but now experience higher levels of coping, control, and opportunity.

One can similarly explore each remaining situation, examine its profile across measures, and gain insight into how people experience it. These profiles could also be used for developing interventions to reduce climate anxiety, tailored to the specific features present in a situation.

6.4. SM-4: Detailed discussion of situation effects on climate anxiety (for Chapter 4, 2.4.3.2. Exploratory observations)

In the left-most cluster of columns in Figure 3, the respective situations elicited relatively low climate anxiety judgments, including *S07 - green energy*, *S08 - local product ads*, *S14 - communal action*, *S16 - 'green person' talk*, *S21 - plant-based food*, *S22 - reusable hygiene*, *S24 - second-hand*, *S27 - recycling*, *S28 - reusable bags*, and *S30 - nature*. In contrast, the next cluster of situations to the right elicited relatively high climate anxiety judgments, including *S01 - catastrophes*, *S04 - government's plan*, *S09 - litter*, *S12 - water running*, *S15 - denier talk*, *S23 - children's future*, and *S31 - own future*. Notably, however, most of the other situations in the right half of Figure 3 exhibited mixed responses of high and low climate anxiety judgments, including *S02 - unsustainable ads*, *S03 - activism news*, *S05 - documentaries*, *S06 - influencers*, *S10 - air pollution*, *S11 - left-overs*, *S13 - car running*, *S17 - take-away*, *S18 - taking car*, *S19 - disposable cups*, *S20 - plastic wrapping*, *S25 - too much food*, *S26 - aeroplane*, and *S29 - climate activism*. These general patterns indicate that an individual's climate anxiety is not constant across situations but varies widely.

Interestingly, it appears that higher climate anxiety was often associated with situations that are threatening but may not affect an individual's life circumstances directly: *S01 - catastrophes*, *S04 - government's plan*, *S12 - water running*, *S15 - denier talk*. Situations that posed direct threats to one's circumstances were in the minority: *S23 - children's future*, *S31 - own future*. Interestingly, all the situations eliciting higher climate anxiety are generally experienced as not very controllable.

In comparison, situations associated with lower climate anxiety were mostly those with immediate effects to one's personal circumstances and over which an individual has control: *S14 - communal action*, *S16 - 'green person' talk*, *S21 - plant-based food*, *S22 - reusable hygiene*, *S24 - second-hand*, *S27 - recycling*, *S28 - reusable bags*, *S30 - nature*. Situations associated with lower climate anxiety that did not have an immediate effect on personal circumstances and that lay outside of one's control were in the minority, including *S07 - green energy*, *S08 - local product ads*.

For the situations with mixed climate anxiety scores, six have no direct effect on someone's life (*S02 - unsustainable ads*, *S03 - activism news*, *S05 - documentaries*, *S06 - influencers*, *S11 - left-overs*, *S13 - car running*), while eight situations may have a direct effect (*S10 - air pollution*, *S17 - take-away*, *S18 - taking car*, *S19 - disposable cups*, *S20 -*

plastic wrapping, S25 - too much food, S26 - aeroplane, S29 - climate activism). Interestingly, exactly half of the mixed scored situations can be controlled by an individual (*S17 - take-away*, *S18 - taking car*, *S19 - disposable cups*, *S20 - plastic wrapping*, *S25 - too much food*, *S26 - aeroplane*, *S29 - climate activism*), while the other half can generally not (*S02 - unsustainable ads*, *S03 - activism news*, *S05 - documentaries*, *S06 - influencers*, *S10 - air pollution*, *S11 - left-overs*, S*13 - car running*). Thus, is appears that participants generally experienced higher climate anxiety in situations that were not under their control and that posed a general threat. In contrast, they seemed to experience lower climate anxiety in situations they could control to some extent and that had a direct effect on their personal lives. Later correlational analyses will partially support this observation.

6.5. SM-5: Correlation matrix for all SAM² CAM raw data, taken across participants (for Chapter 2, 2.4.3.3. Situational variability across individuals for climate anxiety)

	Anx.	Freq.	Conc.	Viol.	Threat	Opp.	Motiv. Habits	Motiv. Action	Contr.	Coping	Rum.	Comp.	Conseq.	Disr.
Anxiety	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Frequency	0.12	1.00	-	-	-	-	-	-	-	-	-	-	-	-
Concern	0.37	0.22	1.00	-	-	-	-	-	-	-	-	-	-	-
Violation	0.57	0.07	0.30	1.00	-	-	-	-	-	-	-	-	-	-
Threat	0.67	0.13	0.34	0.64	1.00	-	-	-	-	-	-	-	-	-
Opportunity	-0.01	0.17	0.13	-0.07	-0.05	1.00	-	-	-	-	-	-	-	-
Motivation Habits	0.23	0.26	0.27	0.12	0.17	0.53	1.00	-	-	-	-	-	-	-
Motivation Action	0.32	0.24	0.30	0.21	0.27	0.38	0.61	1.00	-	-	-	-	-	-
Control	-0.12	0.04	0.04	-0.16	-0.14	0.38	0.25	0.15	1.00	-	-	-	-	-
Coping	-0.34	0.08	-0.05	-0.33	-0.37	0.23	0.14	0.03	0.36	1.00	-	-	-	-
Rumination	0.44	0.21	0.33	0.33	0.46	0.22	0.41	0.47	0.06	-0.11	1.00	-	-	-
Compassion	-0.24	0.06	0.01	-0.44	-0.31	0.31	0.25	0.16	0.24	0.31	0.02	1.00	-	-
Conseq.	0.42	0.21	0.36	0.31	0.38	0.26	0.49	0.48	0.05	-0.08	0.53	0.02	1.00	-
Disruption	0.51	0.13	0.28	0.44	0.57	0.06	0.18	0.30	-0.01	-0.28	0.40	-0.17	0.35	1.00

Note. Abbreviations Measures: Anx. = Anxiety; Freq. = Frequency; Conc. = Concern; Viol. = Violation; Opp. = Opportunity; Motiv. Habits = Motivation Habits; Motiv. Action = Motivation Action; Rum. = Rumination; Comp. = Compassion; Conseq. = Consequences; Disr. = Disruption.

6.6. SM-6: Analyses and recommendations for a shorter SAM² CAM instrument (for Chapter 2, 2.4.5. Construct validity (H3a))

6.6.1. Reducing number of Situated Action Cycle predictors

Based on our exploratory factor analysis (orthogonal – varimax rotation), the 5-factor solution offers the best conceptual fit (see image below).

For a conservative 5-predictor measure directly informed by the 5-factor solution, we propose the following predictors (informed by factor loadings):

- Motivation Habits (MR4);
- Threat (MR1);
- Violation (MR2);
- Control (MR3);
- Concern (MR5).

To test whether the reduced set of predictors still manage to explain a preferrable amount of climate anxiety variance, we conducted a simple linear regression. Here, Anxiety was the dependent variable, with the five predictors retained from the exploratory factor analysis as predictors, with no random intercepts or interactions. The five Situated Action Cycle predictors retained after the exploratory factor analysis together explain about a median 60% of anxiety variance, which is less than the original 13 factors (which explained 75%). For a detailed analysis, see R script "@@6-SAM2_climate_anxiety-factor_analysis.R" and "@@5-SAM2_climate_anxiety-individual_regressions_v3.R" (line 171).

For a more comprehensive measure, including some more conceptually important predictors, we recommend the following seven predictors (informed by both, factor loadings and theoretical importance for climate anxiety):

- Threat;
- Disruption;
- Violation;
- Control;
- Motivation Habits;

- Opportunity;
- Frequency.

Again, we conducted a simple linear regression to assess the variance explained by the seven suggested predictors. Here, Anxiety was the dependent variable, with the seven suggested predictors from the exploratory factor analysis as predictors, with no random intercepts or interactions. The seven suggested Situated Action Cycle predictors together explain about 69% of anxiety variance, which is less than the original 13 factors (which explained 75%) but more than the conservative five predictor solution above. For a detailed analysis, see R script "@@6-SAM2_climate_anxiety-factor_analysis.R".

6.6.2. Reducing number of SAM² CAM situations

Based on our exploratory factor analysis (orthogonal – varimax rotation), the 5-factor solution offers the best conceptual fit (see image below).

```
> print(df_fa_sit_5$loadings, cutoff = .3)

Loadings:
     MR2    MR1    MR4    MR5    MR3
s01         0.652         0.407
s02         0.704
s03  0.494  0.492
s04         0.756
s05  0.623
s06         0.776
s07  0.708  0.404
s08  0.776
s09         0.725
s10         0.743
s11         0.765
s12         0.678  0.376
s13         0.806
s14  0.800
s15         0.481  0.304         0.376
s16  0.714                       0.334
s17         0.529  0.577
s18  0.349  0.362  0.655
s19  0.358  0.361  0.678
s20         0.588  0.512
s21  0.666         0.359
s22  0.784         0.425
s23         0.481         0.574
s24  0.707         0.436
s25  0.332  0.383  0.652
s26         0.342  0.566
s27  0.784
s28  0.797         0.360
s29  0.480                       0.484
s30  0.778
s31  0.346  0.386         0.581


                  MR2   MR1   MR4   MR5   MR3
SS loadings     7.563 7.325 3.765 1.302 1.049
Proportion Var  0.244 0.236 0.121 0.042 0.034
Cumulative Var  0.244 0.480 0.602 0.644 0.678
```

For a conservative 5-situation measure directly informed by the 5-factor solution, we propose the following situations (informed by factor loadings):

- S14 – Communal action (MR2);
- S13 – Car running (MR1);
- S19 – Disposable cups (MR4);
- S31 – Own future (MR5);
- S29 – Climate activism (MR3).

For a more comprehensive measure, including some more conceptually important situations, we recommend the following seven situations (informed by both, factor loadings and theoretical importance for climate anxiety):

- S14 – Communal action;
- S13 – Car running;
- S19 – Disposable cups;
- S31 – Own future;
- S29 – Climate activism;
- S01 – Catastrophes;
- S23 – Children's future.

Finally, the existing SAM² CAM situations could be revised and combined to create a shorter, but all-round informative measure, as informed by the literature on climate anxiety. Thus, we suggest the retention of some, revision/ combining of other situations, as follows:

- S01 – Catastrophes;
- S31 – Own future;
- S23 – Children's future;
- S04 – Government's plan;
- NEW combination of situations: "Witnessing unsustainable behaviour (e.g., seeing someone leave their car running while parked).";
- S14 – Communal action;
- S30 – Nature;
- NEW combination of situations: "Engaging in less common sustainable behaviours (e.g., buying clothes second hand).";

- S19 – Climate activism (MR3);
- NEW combination of situations: "Engaging in common sustainable behaviours (e.g., taking the car when I have a choice not to).";

To use a shorter version of the SAM² CAM, we propose that, depending on the purpose and goal of its use, the following options:

1) Use **all** original SAM² CAM situations, but **no** Situated Action Cycle predictors (predicted assessment length: ± **4 minutes**).
    - This will be of use when only the intensity of climate anxiety is of interest, with
    - no interest in the predictors of climate anxiety, but
    - a comprehensive assessment of climate anxiety is desired.

2) Use one of the **reduced** sets of situations (choose depending on desired complexity of climate anxiety to be assessed), together with **reduced** set of Situated Action Cycle predictors (predicted assessment length: ± **8 minutes**).
    - This will be of use when intensity of climate anxiety is of interest,
    - as well as a sense of the most important predictors of climate anxiety, but
    - a less comprehensive assessment of climate anxiety is sufficient.

3) Use one of the **reduced** sets of situations (choose depending on desired complexity of climate anxiety to be assessed), but **no** Situated Action Cycle predictors (predicted assessment length: ± **1.5 minutes**).
    - This will be of use when only intensity of climate anxiety is of interest, with
    - no interest in the predictors of climate anxiety, and
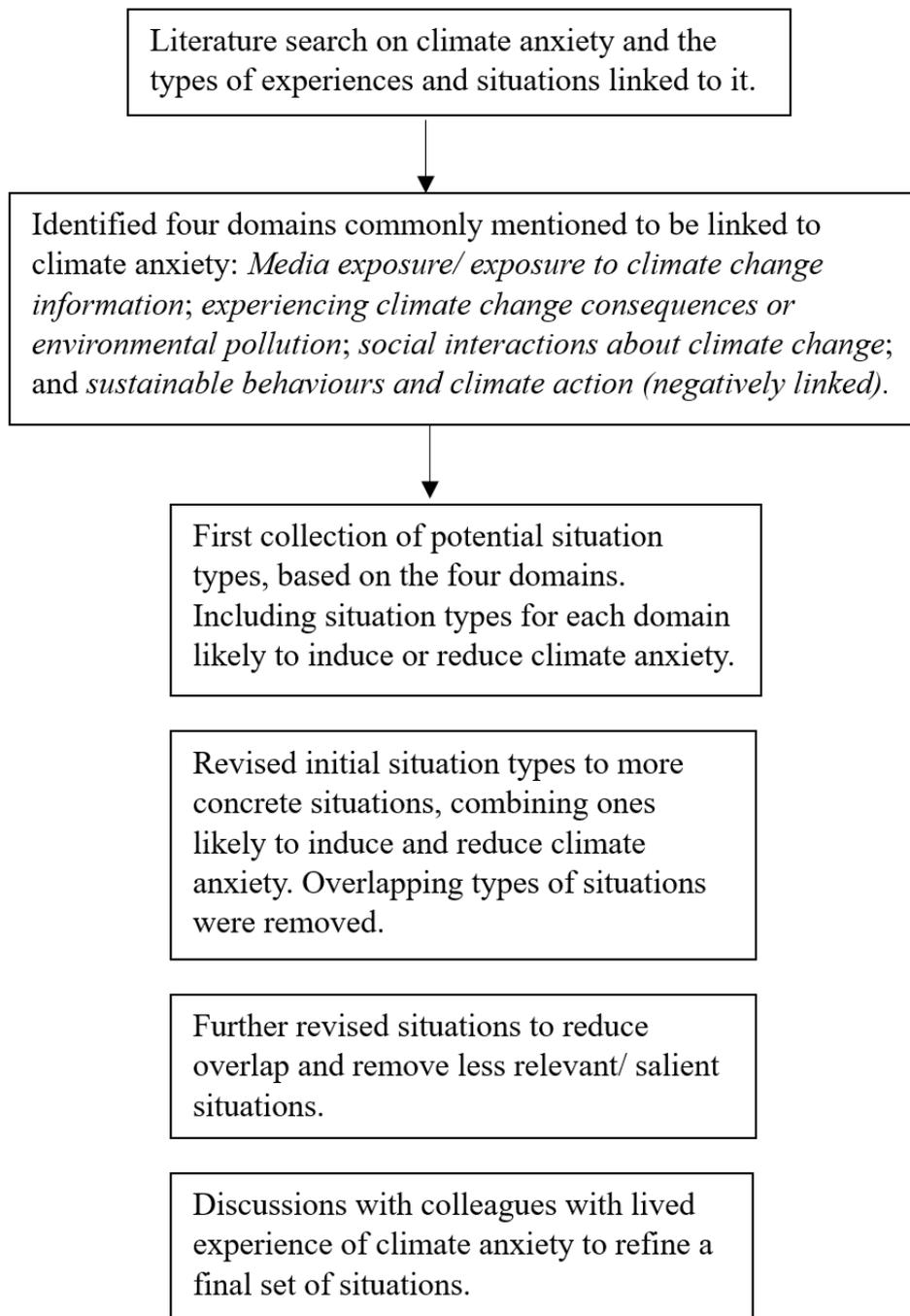   - a less comprehensive assessment of climate anxiety is sufficient.

Table 10

Suggested judgements from exploratory factor analysis grouped by Situated Action Cycle (SAC) phases, with corresponding intraclass correlations

SAC Phase	Judgement Name/ Query/ Values/ Labels	ICC2	ICC3	ICC3k
Affect	**Anxiety** When this situation occurs, how much anxiety do you experience about climate change? (0 to 10)/ (No anxiety at all, Moderate anxiety, Extreme anxiety)	.24	.47	.86
Environment	**Frequency** How frequently do you experience each of the following situations? (0 to 10)/ (Never, Once a month, Multiple times a day)	.31	.36	.79
Self-relevance	**Opportunity** How much of an opportunity do you see in this situation to do something constructive? (0 to 10)/ (No opportunity at all, Moderate opportunity, Extremely good opportunity)	.40	.21	.65
Environment	**Concern** How concerned are other people in this situation about climate change and sustainability? (0 to 10)/ (Not concerned at all, Moderately concerned, Extremely concerned)	.17	.29	.74
Self-relevance	**Violation** How much does this situation violate your expectations?" (0 to 10)/ (No violation at all, Moderate violation, Extreme violation)	.21	.36	.80
Self-relevance	**Threat** How threatened do you feel by what happens in this situation?" (0 to 10)/ (Not threatened at all, Moderately threatened, Extremely threatened)	.11	.44	.85
Affect	**Motivation Habits** How much does being in this situation motivate you to adopt sustainable habits? (0 to 10)/ (Not at all, Moderately, Extremely)	.15	.40	.83
Action	**Control** How much control do you believe you have over what happens in this situation? (0 to 10)/ (No control at all, Moderate control, Full control)	.41	.19	.62
Outcome	**Disruption** How much does this situation disrupt your life? (0 to 10)/ (Not at all, Moderately, Extremely)	.22	.26	.71

Note. The left column shows the phase of the Situated Action Cycle from which each measure was sampled. The second column presents the climate anxiety item used in the SAM² CAM, followed by the suggested items for the SAM² predictors identified through exploratory factor analysis (each preceded by its name in bold). Below each assessment item are the end points of the continuous slider scales used to assess it, together with the scale's label. The ICC2 is the interrater agreement for each measure across the seven suggested situations retained from exploratory factor analysis, treating participants as random effects. The ICC3 is the coherence of the seven suggested situations as test items on the SAM² CAM (i.e., how consistently they order participants), with the situations treated as fixed effects. The ICC3k is Cronbach's alpha for the overall score of each measure (aggregated across the seven suggested situations for each participant), capturing the measure's test reliability in ordering participants. Note, that Disruption may not be a relevant predictor in areas and individuals less affected by climate change but may be important for areas/ individuals who have been exposed (e.g., those living in the Global South). Also note that the ICC3k for Anxiety is good, however, other measures with ICC3k below .80 may not be acceptable. We suggest that Spearman-Brown formula (e.g., see Warrens, 2017) be used to identify the number of situations required for an ICC3k of .80 or above, if the affected predictors are to be used.

6.7. SM-7: Situation Selection Process for the SAM² CAM (for Chapter 2, 2.5.4.1. Implementing briefer versions of the SAM² CAM)

6.7.1. Schematic of the Situation Selection Process for the SAM² CAM

Literature search on climate anxiety and the types of experiences and situations linked to it.

Identified four domains commonly mentioned to be linked to climate anxiety: *Media exposure/ exposure to climate change information*; *experiencing climate change consequences or environmental pollution*; *social interactions about climate change*; and *sustainable behaviours and climate action (negatively linked).*

First collection of potential situation types, based on the four domains. Including situation types for each domain likely to induce or reduce climate anxiety.

Revised initial situation types to more concrete situations, combining ones likely to induce and reduce climate anxiety. Overlapping types of situations were removed.

Further revised situations to reduce overlap and remove less relevant/ salient situations.

Discussions with colleagues with lived experience of climate anxiety to refine a final set of situations.

6.7.2. Detailed Situation Selection Process for the SAM² CAM

6.7.2.1. Literature search: identified four domains linked to climate anxiety (Sep – Nov 2021)

Domain 1: Media exposure/ exposure to climate change information

Luo, Y., & Zhao, J. (2021). Attentional and perceptual biases of climate change. *Current Opinion in Behavioral Sciences, 42*, 22-26. https://doi.org/10.1016/j.cobeha.2021.02.010

Maran, D. A., & Begotti, T. (2021). Media exposure to climate change, anxiety, and efficacy beliefs in a sample of Italian university students. *International Journal of Environmental Research and Public Health, 18*(17), 1-11. https://doi.org/10.3390/ijerph18179358

Ogunbode, C. A., Doran, R., & Böhm, G. (2020). Exposure to the IPCC special report on 1.5 °C global warming is linked to perceived threat and increased concern about climate change. *Climatic Change, 158*(3-4), 361-375. https://doi.org/10.1007/s10584-019-02609-0

Usher, K., Durkin, J., & Bhullar, N. (2019). Eco-anxiety: How thinking about climate change-related environmental decline is affecting our mental health. *International Journal of Mental Health Nursing, 28*(6), 1233-1234. https://doi.org/10.1111/inm.12673

Domain 2: Experiencing climate change consequences or environmental pollution

Dodd, W., Scott, P., Howard, C., Scott, C., Rose, C., Cunsolo, A., & Orbinski, J. (2018). Lived experience of a record wildfire season in the northwest territories, Canada. *Canadian Journal of Public Health, 109*(3), 327-337. https://doi.org/10.17269/s41997-018-0070-5

Hrabok, M., Delorme, A., & Agyapong, V. I. O. (2020). Threats to mental health and well-being associated with climate change. *Journal of Anxiety Disorders, 76*, 1-5. https://doi.org/10.1016/j.janxdis.2020.102295

Domain 3: Social interactions about climate change

Galway, L. P., Beery, T., Buse, C., & Gislason, M. K. (2021). What Drives Climate Action in Canada's Provincial North? Exploring the Role of Connectedness to Nature, Climate Worry, and Talking with Friends and Family. *Climate, 9*(10), 1-19. https://doi.org/10.3390/cli9100146

Hickman, C. (2020). We need to (find a way to) talk about eco-anxiety. *Journal of Social Work Practice, 34*(4), 411-424. https://doi.org/10.1080/02650533.2020.1844166

Hoggett, P., & Randall, R. (2018). Engaging with climate change: Comparing the cultures of science and activism. *Environmental Values, 27*(3), 223-243. https://doi.org/10.3197/096327118X15217309300813

Domain 4: Sustainable behaviours and climate action (negatively linked)

Galway, L. P., Beery, T., Buse, C., & Gislason, M. K. (2021). What Drives Climate Action in Canada's Provincial North? Exploring the Role of Connectedness to Nature, Climate Worry, and Talking with Friends and Family. *Climate, 9*(10), 1-19. https://doi.org/10.3390/cli9100146

Godden, N. J., Farrant, B. M., Yallup Farrant, J., Heyink, E., Carot Collins, E., Burgemeister, B., Tabeshfar, M., Barrow, J., West, M., Kieft, J., Rothwell, M., Leviston, Z., Bailey, S., Blaise, M., & Cooper, T. (2021). Climate change, activism, and supporting the mental health of children and young people: Perspectives from western Australia. *Journal of Paediatrics and Child Health, 57*(11), 1759-1764. https://doi.org/10.1111/jpc.15649

Lawson, D. F., Stevenson, K. T., Peterson, M. N., Carrier, S. J., Seekamp, E., & Strnad, R. (2019). Evaluating climate change behaviors and concern in the family context. *Environmental Education Research, 25*(5), 678-690. https://doi.org/10.1080/13504622.2018.1564248

Verplanken, B., & Roy, D. (2013). "My worries are rational, climate change is not": Habitual ecological worrying is an adaptive response. *PloS One, 8*(9), 1-6. https://doi.org/10.1371/journal.pone.0074708

6.7.2.2. First collection of possible situations based on these four domains (03/11/2021)

Situations likely to induce climate anxiety

Media (9)

- News about a climate catastrophe
- News about problematic changes in temperature and weather

- News about environmental pollution

- News about government's climate action plan not being achieved

- News about climate activism

- News about climate change deniers

- Ads for disposable products

- Ads for animal products

- Influencers living and promoting highly pollutive lifestyles

Witnessing pollution in "real life" (8)

- Seeing litter in the street/park/forest

- Witnessing someone litter

- Seeing or smelling CO_2 emissions from cars

- Seeing or smelling emissions from industrial plants

- Seeing someone leaving the lights on when leaving a room

- Seeing someone leaving the water running

- Seeing someone waste food

- Seeing someone leaving their car running when parked

Social interactions (2)

- Getting into an argument with a "climate change denier"

- Talking with someone about climate change consequences

Own behaviour that is not conform with pro-environmental values (13)

- Purchasing more food than needed/intended

- Buying exotic fruit/veg from distant sources

- Shopping online instead of shopping locally

- Throwing away still edible food

- Eating animal products

- Ordering take-away

- Purchasing plastic wrapped items

- Using disposable cutlery, cups, or straws

- Using disposable hygiene products instead of reusable ones

- Using disposable face masks instead of reusable ones
- Buying fast fashion
- Taking the car instead of the train/bike/walking
- Travelling by jet

Situations likely to reduce climate anxiety

Media (5)

- Tips on sustainable behaviour
- News/documentaries on advances in green energy production
- Promotion of second-hand fashion (by influencers, peers, ads)
- Promotion of free-from products (by influencers, peers, ads)
- Ads for free-from products
- Promotion of home-grown fruit/veg
- Ads for locally sourced products

Witnessing pro-environmental behaviour (4)

- Seeing someone using reusable shopping bags
- Seeing someone using reusable cutlery, cups, or straws
- Seeing pro-environmental action in your community (e.g., a school establishing a school garden)
- Overhearing constructive discussion about climate change

Own behaviour conform with pro-environmental values (7)

- Recycling
- Using reusable drinking bottles
- Eating plant-based products
- Buying unwrapped fruit/veg
- Using paper bags or reusable bags instead of plastic bags
- Walking/cycling/taking train instead of car
- Pro-environmental investments (e.g., electric car, solar panels, environmental companies)

- Donations to pro-environmental organisations (e.g., Greenpeace, WWF)
- Engaging in climate activism
- Carpooling
- Being out in unpolluted nature

6.7.2.3. Revision of initial situations to reduce overlap of similar situations (12/11/2021)

Media

- Hearing about a climate catastrophe on the news (e.g., flooding, earth quakes)
- Seeing ads for disposable products (e.g., disposable razors)
- Hearing about climate activists on the news*
- Hearing about the government's climate action plan not being achieved
- Watching animal/ nature documentaries
- Seeing ads for animal products
- Seeing influencers promote environmentally unsustainable lifestyles on social media (e.g., using private jets, 'fashion hauls')
- Seeing news on advances in green energy production*
- Seeing ads for locally sourced products*
- Hearing about climate protests that I did not attend

Witnessing pollution in "real life"

- Seeing litter in the street
- Smelling CO_2 emissions (e.g., when a car drives by)
- Seeing someone turn off the lights when leaving a room*
- Seeing someone throw away food left-overs
- Seeing someone leave the water running
- Seeing someone leave their car running while parked
- Seeing pro-environmental action in your community (e.g., a school establishing a school garden)*

Interactions

- Talking about the consequences of climate change to someone who doesn't believe in it

- Talking to someone who is giving up enjoyment (e.g., not eating meat) to be 'green'*

Own behaviours

- Ordering take-away
- Taking the car when I have a choice not to
- Using disposable cups when I have a choice not to
- Purchasing items wrapped in plastic
- Choosing to eat plant-based products instead of animal products*
- Buying reusable hygiene products and cleaning products (e.g., reusable sponges)*
- Shopping online
- Buying exotic fruit and vegetables
- Buying clothes second-hand*
- Purchasing more food than intended
- Traveling by aeroplane
- Recycling according to guidelines*
- Bringing reusable bags when shopping*
- Engaging in climate activism (e.g., attending protests, sharing posts)*
- Being in unpolluted nature*

6.7.2.4. Revision of situations to reduce overlap and remove less relevant situations (02/02/2022)

Media

- Hearing about a climate catastrophe on the news (e.g., flooding, earth quakes).
- Seeing ads for animal products or single-use items.
- Hearing about climate activism on the news.*
- Hearing news about the government's climate action plan not being achieved.
- Watching animal/ nature documentaries.
- Seeing influencers promote environmentally unsustainable lifestyles on social media (e.g., using private jets, 'fashion hauls').
- Seeing news on advances in green energy production.*
- Seeing ads for locally sourced products.*

Witnessing pollution in 'real life'

- Seeing litter in the street.
- Smelling CO2 emissions (e.g., when a car drives by).
- Seeing someone turn off the lights when leaving a room.*
- Seeing someone throw away food left-overs.
- Seeing someone leave the water running/
- Seeing someone leave their car running while parked.
- Seeing pro-environmental action in your community (e.g., a school planting trees).

Interactions

- Talking about climate change to someone who doesn't believe in it.
- Talking with someone who is giving up some kind of pleasure to be 'green' (e.g., giving up eating meat).*

Own behaviours

- Ordering take-away that is delivered in non-recyclable containers.
- Taking the car when I have a choice not to.
- Using disposable cups when I have a choice not to.
- Purchasing items wrapped in plastic.
- Choosing to eat plant-based products instead of animal products.*
- Buying reusable hygiene and cleaning products (e.g., washable sponges).*
- Buying exotic fruit and vegetable.
- Buying clothes second-hand.*
- Purchasing more food than intended.
- Traveling by aeroplane.
- Recycling according to guidelines.*
- Bringing reusable bags when shopping.*
- Engaging in climate activism (e.g., attending protests, sharing posts).*
- Being out in nature.*

6.7.2.5. *Final revision of situations based on colleague discussions (08/02/2022)*

Media

- Hearing about a climate catastrophe on the news (e.g., flooding, wildfires).
- Seeing ads for animal products or single-use items.
- Hearing about climate activism on the news.*
- Hearing news about the government's climate action plan not being achieved.
- Watching animal/ nature documentaries.
- Seeing influencers promote environmentally unsustainable lifestyles on social media (e.g., using private jets, 'fashion hauls').
- Seeing news on advances in green energy production.*
- Seeing ads for locally sourced products.*

Witnessing pollution in 'real life'

- Seeing litter in the street.
- Perceiving air pollution caused by fossil fuels (e.g., when a car drives by).
- Seeing someone throw away food left-overs.
- Seeing someone leave the water running.
- Seeing someone leave their car running while parked.
- Seeing pro-environmental action in your community (e.g., a school planning trees).*

Interactions

- Talking about climate change to someone who doesn't believe in it.
- Talking with someone who is giving up some kind of pleasure to be 'green' (e.g., giving up eating meat).*

Own behaviours

- Ordering take-away that is delivered in non-recyclable containers.
- Taking the car when I have a choice not to.
- Using disposable cups when I have a choice not to.
- Purchasing items wrapped in plastic.
- Choosing to eat plant-based products instead of animal products.*
- Buying reusable hygiene and cleaning products (e.g., washable sponges).*
- Buying clothes second-hand.*

- Purchasing more food than intended.

- Travelling by aeroplane.

- Recycling according to guidelines.*

- Bringing reusable bags when shopping.*

- Engaging in climate activism (e.g., attending protests, sharing posts online).*

- Visiting a loved place in nature.*

Future

- Thinking about my children's future.

- Thinking about my future.

6.8. SM-8: Participant instructions and measurement scales (for Chapter 3, 3.3.1. Materials)

6.8.1. Climate Anxiety (Clayton & Karazsia, 2020)

All questions scored on a 1 to 5 scale (never, rarely, sometimes, often, almost always)

Now, we would like to ask you a few questions about your experiences with climate change. There are no right or wrong answers. Just respond in a way that best reflects your own experiences and how you are feeling.

Please rate how often the following statements are true of you.

1. Thinking about climate change makes it difficult for me to concentrate.

2. Thinking about climate change makes it difficult for me to sleep.

3. I have nightmares about climate change.

4. I find myself crying because of climate change.

5. I think, "why can't I handle climate change better?"

6. I go away by myself and think about why I feel this way about climate change.

7. I write down my thoughts about climate change and analyse them.

8. I think, "why do I react to climate change this way?"

9. My concerns about climate change make it hard for me to have fun with my family or friends.

10. I have problems balancing my concerns about sustainability with the needs of my family.

11. My concerns about climate change interfere with my ability to get work or [university] assignments done.

12. My concerns about climate change undermine my ability to work to my potential.

13. My friends say I think about climate change too much.

6.8.2. Climate change experiences (Clayton & Karazsia, 2020)

All questions scored on a 1 to 5 scale (same as above; never, rarely, sometimes, often, almost always)

Please rate how often the following statements are true of you.

14. I have been directly affected by climate change.

15. I know someone who has been directly affected by climate change.

16. I have noticed a change in a place that is important to me due to climate change.

6.8.3. Climate change emotions (Hickman et al., 2021)

All questions scored on a 0 to 10 scale (not at all, moderately, very much)

Now, we would like to ask you some more questions about your emotional experiences with climate change. There are no right or wrong answers. Just respond in a way that best reflects how you are feeling.

How much does climate change make you feel the following?

Sad

Helpless

Anxious

Afraid

Optimistic

Angry

Guilty

Ashamed

Hurt

Depressed

Despair

Grief

Powerless

Indifferent

6.8.4. Climate Change Thoughts (Hickman et al., 2021)

All questions scored on a 0 to 10 scale (not at all, moderately, very much)

Now, we would like to ask you some more questions about your thoughts about climate change. There are no right or wrong answers. Just respond in a way that best reflects your thoughts.

How much does climate change make you think the following?

1. I'm hesitant to have children.

2. Humanity is doomed.

3. The future is frightening.

4. I won't have access to the same opportunities that my parents had.

5. My family's security will be threatened (e.g. economic, social, physical security).

6.The things I most value will be destroyed.

7. People have failed to take care of the planet.

6.8.5. University questions (adapted from Hickman et al., 2021)

All questions scored on a 0 to 10 scale (not at all, moderately, very much)

Now, we would like to ask you some more questions about your thoughts about climate change and the university. There are no right or wrong answers. Just respond in a way that best reflects your thoughts.

In relation to climate change I believe that my university is...

1. Taking my concerns seriously enough.

2. Doing enough about climate change.

3. Dismissing people's distress.

4. Acting in line with climate science.

5. Protecting me, the planet and/or future generations.

6.8.6. SAM2 CAM Students

All questions scored on a 0 to 10 scale (No anxiety at all, Moderate anxiety, Extreme anxiety)

Evaluating your recent experience of specific situations (please read carefully)...

In the next section of the survey, you will be asked to evaluate specific everyday situations that you may or may not be experiencing currently in your life. When you rate a situation in some manner, you will use a slider scale from 0 to 10.

IMPORTANT: Even if your rating of a situation corresponds to where the slider initially starts in the middle of the scale, you will need to move the slider at least slightly for the question to count as answered. If you don't move the slider for each rating at least a little, you will not be able to proceed to the next screen of ratings.

Please note you do not necessarily have to use the entire rating scale. It is perfectly fine, for example, to rate most situations on the left hand side of the scale if you tend to experience them that way. Alternatively, it is fine to rate most situations on the right if you tend to experience them that way. Please make whatever responses best reflect your experience of the situations.

Please be sure to rate all situations without leaving any blank. If you leave a rating blank, you will not be able to proceed to the next section. If you are not sure how to rate a situation, just click on the point that best represents your intuition. If you haven't previously experienced the situation, just imagine that it occurs sometime in the future, and then evaluate what you imagine.

Again, please remember that there are no right or wrong answers. We are solely interested in your individual responses to each question from your own point of view. Please respond with whatever responses come to mind naturally and intuitively, without putting a lot of thought and effort into them. By providing honest and natural responses, you will best contribute to the goals of our research.

Once you have completed rating all the situations, click the arrow at the bottom right of the screen. Doing so will indicate that you are ready to continue.

When this situation occurs, how much anxiety do you experience about climate change?

1. Hearing about climate change on the news (e.g., flooding, wildfires)
2. Seeing climate change content on social media.
3. Hearing news about the government's climate action plan not being achieved.
4. Hearing about the university's action on climate change.
5. Seeing influencers promote environmentally unsustainable lifestyles on social media (e.g., using private jets, 'fashion hauls').
6. Talking about climate change to someone who doesn't take it very seriously.
7. Seeing the majority of food offered at university containing animal products.
8. Thinking about the future that children may experience.
9. Engaging in climate activism (e.g., attending protests, sharing posts online).
10. Spending time outdoors (e.g., in a park).
11. Thinking about my future.
12. Learning about climate change issues specific to my field of study.
13. Lecturers sharing their story of becoming interested in climate change issues.
14. Lecturers sharing that they feel anxiety about climate change.
15. Talking about the emotional impacts of climate change in class.
16. Being given an assignment that makes me think about solutions to a climate change related issue.
17. Thinking about pursuing a career that is related to climate change.

18. Talking to someone about climate change who doesn't take me seriously because of my age.

6.8.7. University actions

The following questions will ask you about your own opinions about what the University should/ shouldn't do with regards to climate change and mental health. We are really interested in hearing your views and ideas as a student and value your responses very much. So, please feel free to share any thoughts and ideas honestly and freely. Be reassured that there is no way for us to identify you from your responses. You can therefore answer openly and honestly. All your responses remain anonymous, and we will not know who you are.

However, please do make sure not to include any identifiable information about yourself, your friends, lecturers, your classmates, your living situation, etc. in your response. If you include any information that allows to identify you or someone else, your response will have to be deleted and cannot be included in our study.

Do you think the University should support students' mental health related to climate change?

(yes, no, prefer not to say)

If you said yes, please explain, and describe in a few sentences what you think the University should ideally do in this context. We are really interested in hearing your thoughts, so please give as much detail as possible.

(text entry)

If you said no, please explain, and describe in a few sentences why you think the University should not do anything in this context. We are really interested in hearing your thoughts, so please give as much detail as possible.

(text entry)

Do you think the University should include more issues related to climate change in their teaching?

(yes, no, prefer not to say)

If you said yes, please explain, and describe in a few sentences what you think the University should ideally do in this context. We are really interested in hearing your thoughts, so please give as much detail as possible.

(text entry)

If you said no, please explain, and describe in a few sentences why you think the University should not do anything in this context. We are really interested in hearing your thoughts, so please give as much detail as possible.

(text entry)

Is there anything else that you think the University should or should not do with regards to climate change? Please describe this to us in a few sentences, we are interested in finding out about your thoughts and opinions!

(text entry)

6.8.8. Department actions

The following questions will ask you about your own opinions about what your School/Institute/Department should or shouldn't do with regards to climate change and mental health. We are really interested in hearing your views and ideas as a student and value your responses very much. So, please feel free to share any thoughts and ideas honestly and freely. Be reassured that there is no way for us to identify you from your responses. You can therefore answer openly and honestly. All your responses remain anonymous, and we will not know who you are.

However, please do make sure not to include any identifiable information about yourself, your friends, lecturers, your classmates, your living situation, etc. in your response. If you include any information that allows to identify you or someone else, your response will have to be deleted and cannot be included in our study.

Do you think your School/Institute/Department should support students' mental health related to climate change?

(yes, no, prefer not to say)

If you said yes, please explain, and describe in a few sentences what you think your School/Institute/Department should ideally do in this context. We are really

interested in hearing your thoughts, so please give as much detail as possible, without making yourself or anyone else identifiable.
(text entry)

If you said no, please explain, and describe in a few sentences why you think your School/Institute/Department should not do anything in this context. We are really interested in hearing your thoughts, so please give as much detail as possible.
(text entry)

Do you think your School/Institute/Department should include more issues related to climate change in their teaching?
(yes, no, prefer not to say)

If you said yes, please explain, and describe in a few sentences what you think your School/Institute/Department should ideally do in this context. We are really interested in hearing your thoughts, so please give as much detail as possible, without making yourself or anyone else identifiable.
(text entry)

If you said no, please explain, and describe in a few sentences why you think your School/Institute/Department should not do anything in this context. We are really interested in hearing your thoughts, so please give as much detail as possible.
(text entry)

Is there anything your School/Institute/Department should or should not do with regards to climate change? Please describe this to us in a few sentences, we are interested in finding out about your thoughts and opinions!
(text entry)

6.8.9. Support seeking

The following questions will ask you about your own experiences with seeking support for climate change related mental health, and about other coping strategies. We understand that these questions are very personal.
Be reassured that there is no way for us to identify you from your responses. You can therefore answer openly and honestly. All your responses remain anonymous, and we will

not know who you are. Again, please feel free to write a few sentences if you are comfortable doing so.

Now, please think generally about your emotional experiences with climate change. How do you generally cope with these in your daily life? How do you handle the emotions that climate change can trigger?

(text entry)

Please think back to a particular situation or moment where you experienced strong emotions about climate change. Please briefly describe a situation or moment that comes to mind. In this situation or moment, what do you usually do to cope with those emotions? How do you handle this in the moment?

(text entry)

Have you previously sought professional support for mental health related to climate change?

(yes, no prefer not to say)

Would you like to seek professional support for mental health related to climate change in the future?

(yes, no, prefer not to say)

6.8.10. Demographics

In this final section, we have some questions about yourself and your studies. Again, rest assured that you are completely anonymous.

What is your age?

(text entry)

What is your gender?

(male, female, non-binary, prefer not to say)

Are you an undergraduate or postgraduate student?

(undergraduate, postgraduate)

Please select your College.

(dropdown menu)

What subject is your degree course?

(dropdown menu)

Are you a UK/home student or international student?

(UK/home, international, prefer not to say)

If you are an international student, what is your home country? (optional)

(text entry)

6.8.11. Wrap up & Debrief

Thank you!
Thank you for participating in our study on climate change emotions in University of [] students! We are most grateful for your participation.

Previous research suggests that climate change anxiety and distressing emotions related to climate change are especially high in young people. Learning about climate change and its many consequences for the environment, ecosystems, weather, and people's lives can be particularly distressing. Therefore, we want to find out how much students at the University of [] are affected by climate change anxiety. We also want to find out whether students studying subjects closely related to climate change issues experience higher levels of anxiety than students in subjects not related to climate change.

We hope to use this information to support students as needed in the future.
If you have any questions about the study or would like to learn more about the research, please contact the researcher below. Also, please contact us with any other problems that may have arisen from participating in this research.
[Primary researcher]: author@email.co.uk

If you are experiencing distress during this time and are looking for support, you may find it useful to visit the following sites:
Climate Psychology Alliance
Samaritans

Big White Wall

MIND

Red Cross Anxiety Support

Thank you for your participation!

IMPORTANT: Please click the arrow on the bottom right in order for your answers to be saved and to complete this survey.

6.9. SM-9: Student Climate Emotions - Content Analysis Code Book (for Chapter 3, 3.3.3.2. Content analysis of open-text responses)

6.9.1. "Yes" Responses Teaching and Support

1. Content for analysis (for quantitative paper):

    a. Comments in response to questions on student mental health support (students who answered "yes" to wanting such support);

    b. Comments in response to questions on university's climate change teaching (students who answered "yes" to wanting such teaching);

2. Units of analysis: themes in responses to above questions; frequency of different themes mentioned in responses

    Categories used for coding: responses according to each question

        a. Mental health support

            a. Counselling/therapy

            b. Climate cafes/ peer support

            c. Educating about climate mental health

            d. Listen to students

            e. Additional forms of support (make each "theme" one category)

        b. University's climate change teaching

            a. More climate change teaching

            b. Subject-specific teaching

            c. Teaching about science of climate change

            d. Teaching about everyday life consequences

            e. Teaching about actions

            f. Teaching about how to live with climate change

            g. Teaching about career options

            h. Additional requests for teaching (make each "theme" one category)

3. Rules for coding

        a. Mental health support

            a. **Counselling/ therapy:** Counselling/ counsellor/ therapy/ therapist/ psychologist/ psychological support/ mental health services/ mental health support/ drop-in sessions/ accessible support/ AND responses

directly describing the above without explicit mention of these words

b. **Climate cafes/ peer support:** Climate café/ peer support/ support group/ climate change groups/ supporting each other/ AND responses directly describing the above without explicit mention of these words

c. **Educating about climate mental health:** Climate mental health education/ self-help resources/ teach how to cope/ learn coping strategies/ AND responses directly describing the above without explicit mention of these words

d. **Listen to students:** listen to students/ listen to us/ try to understand/ see students' perspective/ take students' views into account/ AND responses directly describing the above without explicit mention of these words

e. **Additional forms of support:** any responses directly relating to how the university could/ should support climate change related mental health in students that is not covered by any of the above themes

b. University's climate change teaching

a. **More climate change teaching:** include more climate change teaching/ teach more about climate change/ educate more about climate change/ more lessons on climate change/ more workshops/ more seminars on climate change/ AND responses directly describing the above without explicit mention of these words

b. **Subject-specific teaching:** climate change content specific to subject/ subject-specific issues/ field-specific issues/ climate change for different disciplines/ AND responses directly describing the above without explicit mention of these words

c. **Teaching about science of climate change:** climate change science/ physics of climate change/ science of global warming/ explaining greenhouse gas effect/ carbon sinks explained/ science of climate catastrophes/ how climate change works/ AND responses directly describing the above without explicit mention of these words

d. **Teaching about everyday life consequences:** how climate change will affect us/ how climate change is relevant to UK/ what will

happen/ consequences of climate change/ effects of climate change/ economic effects of climate change/ social effects of climate change/ effects of climate change on family/ climate change injustice/ AND responses directly describing the above without explicit mention of these words

e. **Teaching about actions:** how to slow down climate change/ climate change actions/ preventative actions/ what we can do/ sustainable behaviours/ changes to behaviours/ how to prevent worsening of climate change/ how students can help/ how students can get involved/ mitigating climate change/ AND responses directly describing the above without explicit mention of these words

f. **Teaching about how to live with climate change:** how to live with climate change/ how to cope with climate change/ what the future could look like/ adapting to climate change/ growing old with climate change/ AND responses directly describing the above without explicit mention of these words

g. **Teaching about career options:** careers in climate change/ careers in green energy/ sustainable careers/ careers away from fossil fuels/ careers away from oil and gas corporations/ careers that help the planet/ career options related to climate change/ AND responses directly describing the above without explicit mention of these words

h. **Additional requests for teaching:** any responses directly relating to what the university could/ should (not) do regarding climate change related teaching that is not covered by any of the above themes

6.9.2. "No" Responses Teaching and Support

1. Content for analysis (for quantitative paper):

    a. Comments in response to questions on student mental health support (students who answered "no" to wanting such support);

    b. Comments in response to questions on university's climate change teaching (students who answered "no" to wanting such teaching);

2. Units of analysis: themes in responses to above questions; frequency of different themes mentioned in responses

    Categories used for coding: responses according to each question

a. Mental health support

    a. No matter for real concern

    b. There are more important mental health issues

    c. Too nuanced of a problem

    d. Existing mental health services can't take on climate change issues

    e. Additional reasons for no support (make each "theme" one category)

b. University's climate change teaching

    a. Focus on subject matter

    b. University is providing enough information on climate change

    c. Students are generally educated enough about climate change

    d. Might increase negative emotions

    e. Additional reasons for no teaching (make each "theme" one category)

3. Rules for coding

a. Mental health support

    a. **No matter for real concern:** Not serious issue/ not serious problem/ not mental health problem/ not mental health concern/ not that bad/ too sensitive/ get a grip/ need better resilience/ not a real issue/ AND responses directly describing the above without explicit mention of these words

    b. **There are more important mental health issues:** Other mental health problems more important/ not mental health priority/ more serious disorders are priority/ it's not as serious as other conditions/ doesn't need same level of support as other conditions/ AND responses directly describing the above without explicit mention of these words

    c. **Too nuanced of a problem:** Too nuanced of a problem/ shouldn't be university's responsibility/ too much of a niche problem/ should be other services' responsibility/ should be other institutions' responsibility/ university can't provide everything/ AND responses directly describing the above without explicit mention of these words

    d. **Existing mental health services can't take on climate change issues:** Existing services already struggling/ existing services have

no capacity for it/ existing services can't take on climate change issues/ existing services are too broad for climate change mental health/ existing services need resources for other conditions/ existing services should be improved for more common conditions/ existing services should be improved before taking this on/ AND responses directly describing the above without explicit mention of these words

e. **Additional reasons for no support:** Any responses directly relating to why the university should not support climate change related mental health in students that is not covered by any of the above themes

b. University's climate change teaching

a. **Focus on subject matter:** Focus on subject matter/ focus on main subject/ don't include it if not relevant to subject/ don't use teaching time for climate change/ use teaching time for course-relevant material only/ AND responses directly describing the above without explicit mention of these words

b. **University is providing enough information on climate change:** Already enough information provided/ university is already doing this/ university is providing this already/ sufficient climate change teaching provided/ already included in teaching enough/ AND responses directly describing the above without explicit mention of these words

c. **Students are generally educated enough about climate change**: Students already know enough about climate change/ students already learned about climate change previously/ students have good general knowledge already about climate change/ students already know what's going on/ students are educated enough about climate change/ don't need any more education on climate change/ don't need to learn more about climate change/ AND responses directly describing the above without explicit mention of these words

d. **Might increase negative emotions:** Might increase negative emotions/ could increase climate anxiety/ might be anxiety provoking/ may make students sad/ may make students fearful/

might elevate bad feelings/ AND responses directly describing the above without explicit mention of these words

    e. **Additional reasons for no teaching:** Any responses directly relating to why the university should not provide more climate change teaching that is not covered by any of the above themes

6.9.3. Additional Actions

1. Content for analysis (for quantitative paper):

    c. Comments in response to questions on additional actions from the university with regards to climate change (what should they additionally do/ not do)

2. Units of analysis: themes in responses to above question; frequency of different themes mentioned in responses

    Categories used for coding: responses according to each question

    a. Additional actions by the university

        a. No additional actions

        b. Generally reduce carbon footprint

        c. More sustainable catering

        d. Less single-use wrapping in catering services

        e. Better recycling

        f. Divest from fossil fuels and other unsustainable corporations

        g. Promote sustainable careers/ don't promote unsustainable careers

        h. More transparency on current actions

        i. Opportunities for students to get involved

        j. More sustainable buildings

        k. Provide sustainable transport options

        l. More greenspaces on campus

    a. Additional actions (make each "theme" one category)

3. Rules for coding

    a. Additional actions by the university

        a. **No additional actions:** No additional actions/ university needs to do nothing/ no extra action needed/ university is doing fine/ it's good as it is/ don't need to do anything else/ AND responses directly describing the above without explicit mention of these words

b. **Generally reduce carbon footprint:** Reduce carbon footprint overall/ generally reduce emissions/ overall more sustainable actions/ reduce emissions in every area/ AND responses directly describing the above without explicit mention of these words

c. **More sustainable catering:** Vegan catering/ plant-based food options/ less meat/ fewer animal products/ sustainable food choices/ organic food choices/ locally sourced food/ meat tax/ AND responses directly describing the above without explicit mention of these words

d. **Less single-use wrapping in catering services:** Less single-use wrapping in catering services/ less plastic wrapping/ reusable food containers/ reusable cutlery/ less single-use cutlery/ less plastic cutlery/ reusable crockery/ less single-use crockery/ less non-recyclable crockery/ reusable takeaway containers/ AND responses directly describing the above without explicit mention of these words

e. **Better recycling:** Better recycling facilities/ better recycling on campus/ more recycling bins/ better recycling instructions/ compost bins/ better recycling in labs/ AND responses directly describing the above without explicit mention of these words

f. **Divest from fossil fuels and other unsustainable corporations:** Divest from fossil fuels/ divest from oil and gas companies/ divest from unsustainable corporations/ don't support fossil fuel industry/ move away from fossil fuel investments/ AND responses directly describing the above without explicit mention of these words

g. **Promote sustainable careers/ don't promote unsustainable careers:** Promote sustainable careers/ promote green careers/ teach sustainable career options/ invite green companies/ green career fayres/ don't promote unsustainable careers/ don't invite unsustainable companies/ AND responses directly describing the above without explicit mention of these words

h. **More transparency on current actions:** Transparency on current actions/ make climate actions transparent/ what is university actually doing/ show what university is doing about climate change/ be transparent about mitigation actions/ AND responses

directly describing the above without explicit mention of these words

i. **Opportunities for students to get involved:** Opportunities for students to get involved/ allow students to get involved/ students involved in climate change decisions/ students on committees/ let students have a say/ include students in climate change decisions/ AND responses directly describing the above without explicit mention of these words

j. **More sustainable buildings:** Sustainable buildings/ better insulated buildings/ smart lighting/ better heat control in buildings/ upgrade windows/ solar panels on university buildings/ make buildings energy efficient/ AND responses directly describing the above without explicit mention of these words

k. **Provide sustainable transport options:** Provide sustainable transport options/ improve cycle lanes on campus/ improve cycle routes to campus/ sustainable university-owned vehicles/ sustainable sports coaches/ AND responses directly describing the above without explicit mention of these words

l. **More greenspaces on campus:** More greenspaces on campus/ more trees on campus/ more grass areas on campus/ nature spots on campus/ gardens on campus/ AND responses directly describing the above without explicit mention of these words

m. **Additional actions:** Any responses directly relating to what the university could/ should additionally (not) do about climate change that is not covered by any of the above themes

6.10. SM-10: Correlation matrix with Pearson's correlations between all variables (for Chapter 3, 3.4.6. Exploratory Analyses)

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.
1. Anxiety frequency																												
2. Experience	.42																											
3. Anxiety intensity	.63	.40																										
4. E1 - Sad	.55	.39	.59																									
5. E2 - Helpless	.43	.28	.50	.69																								
6. E3 - Anxious	.60	.37	.64	.72	.65																							
7. E4 - Afraid	.57	.40	.64	.70	.64	.80																						
8. E5 - Optimistic	.10	.05	-.02	-.11	-.25	-.05	-.07																					
9. E6 - Angry	.42	.34	.54	.66	.63	.61	.60	-.11																				
10. E7 - Guilty	.42	.23	.51	.49	.48	.48	.53	-.08	.48																			
11. E8 - Ashamed	.45	.26	.49	.47	.43	.47	.52	-.09	.46	.72																		
12. E9 - Hurt	.54	.35	.56	.57	.46	.56	.61	-.02	.54	.41	.52																	
13. E10 - Depressed	.61	.32	.59	.62	.54	.65	.67	-.06	.52	.43	.48	.60																
14. E11 - Despair	.57	.32	.58	.64	.63	.67	.67	-.13	.59	.46	.51	.66	.77															
15. E12 - Grief	.57	.35	.56	.62	.51	.62	.64	-.08	.53	.42	.44	.68	.70	.70														
16. E13 - Powerless	.36	.25	.48	.60	.73	.55	.56	-.27	.57	.46	.41	.47	.59	.52	.52													
17. E14 - Indifferent	-.13	-.15	-.22	-.31	-.21	-.29	-.25	.06	-.30	-.15	-.11	-.19	-.22	-.22	-.23	-.16												
18. T1 - Children	.44	.29	.47	.46	.46	.51	.45	-.15	.45	.35	.43	.46	.42	.47	.40	.41	-.19											
19. T2 - Doomed	.33	.29	.45	.45	.49	.41	.47	-.31	.45	.34	.38	.46	.46	.57	.36	.44	-.19	.54										
20. T3 - Frightening	.43	.34	.55	.59	.61	.59	.62	-.19	.57	.39	.45	.57	.49	.57	.45	.46	-.21	.52	.70									
21. T4 - Opportunities	.35	.32	.47	.46	.52	.49	.51	-.15	.45	.37	.34	.40	.46	.48	.38	.36	-.14	.50	.48	.58								
22. T5 - Security threat	.43	.36	.51	.43	.45	.51	.53	-.05	.43	.36	.35	.41	.42	.46	.43	.43	-.14	.45	.45	.59	.61							
23. T6 - Destroyed	.47	.37	.54	.54	.50	.54	.54	-.10	.47	.41	.37	.36	.46	.51	.45	.45	-.23	.50	.60	.58	.56	.62						
24. T7 - People failed	.21	.22	.39	.47	.49	.39	.54	-.26	.52	.47	.41	.37	.49	.51	.47	.47	-.18	.38	.55	.59	.46	.40	.45					
25. U1 - Concerns	-.03	.06	.03	-.10	-.15	-.09	-.08	.14	-.11	.11	-.00	.27	.25	.49	.30	.41	-.16	.38	-.00	.56	.46	.40	-.00	-.05				
26. U2 - Doing enough	-.02	-.01	-.01	-.13	-.20	-.14	-.09	.23	-.15	-.03	.01	-.05	-.13	-.17	-.09	-.11	-.07	-.13	-.06	-.00	-.04	-.10	.01	-.04	.73			
27. U3 - Dismissing	.30	.14	.32	.23	.22	.24	.26	-.03	.22	.18	.19	.23	.28	.25	.26	.21	-.14	.23	.19	.12	-.15	.18	.18	-.16	-.28	-.25		
28. U4 - Acting	-.04	-.01	-.04	-.13	-.18	-.12	-.11	.22	-.11	.22	.13	.19	.13	.08	.21	.11	.08	.25	.13	.11	.15	.13	.18	-.05	.61	.64	-.28	
29. U5 - Protecting	-.02	.04	-.01	-.14	-.21	-.13	-.12	.21	-.13	-.11	-.13	-.07	-.16	-.20	-.11	-.14	.11	-.14	-.10	-.14	-.17	-.08	-.08	-.15	.67	.72	-.25	.75

*Note.* Anxiety frequency refers to the grand mean of non-situated climate anxiety frequency, Experience to the grand mean of climate change experiences, and Anxiety intensity to the grand mean of situated climate anxiety intensity, each taken across items and participants. All other variables show the mean for each item (i.e., each emotion, thought, and university belief). Correlations in bold are significant at the .05 level.

6.11.   SM-11: Additional explorations for countries' climate change risk scores and variables of interest (for Chapter 3, 3.4.6. Exploratory Analyses)

6.11.1. All students' countries' climate change risk scores and variables of interest

Figure 10

Visualisation of students' countries' climate change risk scores and frequency of climate change exposure
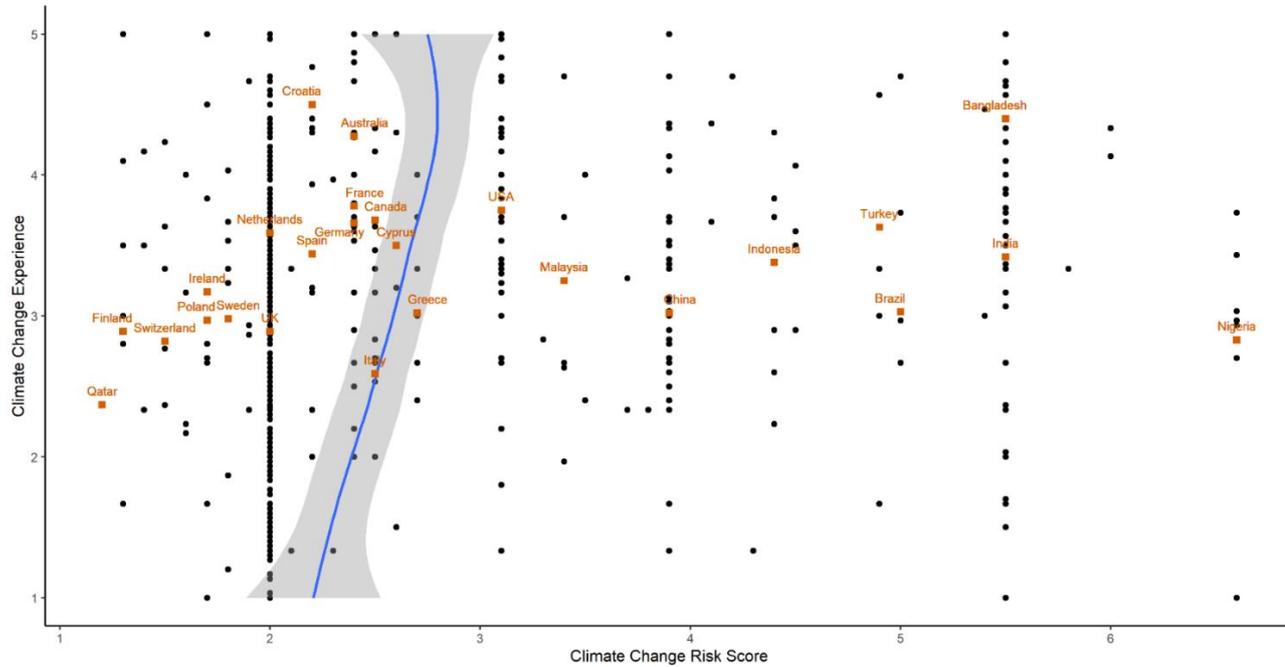
Note. Black dots represent individual participants' data scores. Orange squares represent country means. Regression lines show link between individuals' climate change risk scores and their individual variable means. Countries with less than three participants in our study were not included in the plots.

Figure 11

Visualisation of students' countries' climate change risk scores and frequency of strong climate anxiety symptoms

Note. Black dots represent individual participants' data scores. Orange squares represent country means. Regression lines show link between individuals' climate change risk scores and their individual variable means. Countries with less than three participants in our study were not included in the plots.
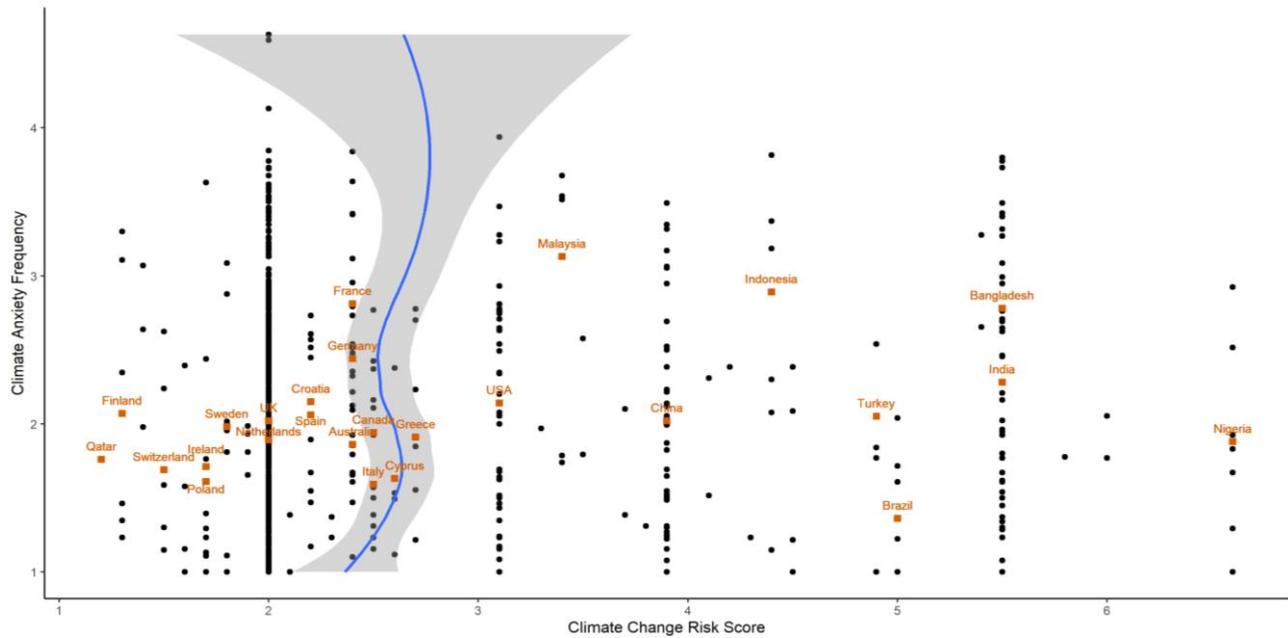
Figure 12

Visualisation of students' countries' climate change risk scores and intensity of climate change emotions

Note. Black dots represent individual participants' data scores. Orange squares represent country means. Regression lines show link between individuals' climate change risk scores and their individual variable means. Countries with less than three participants in our study were not included in the plots.
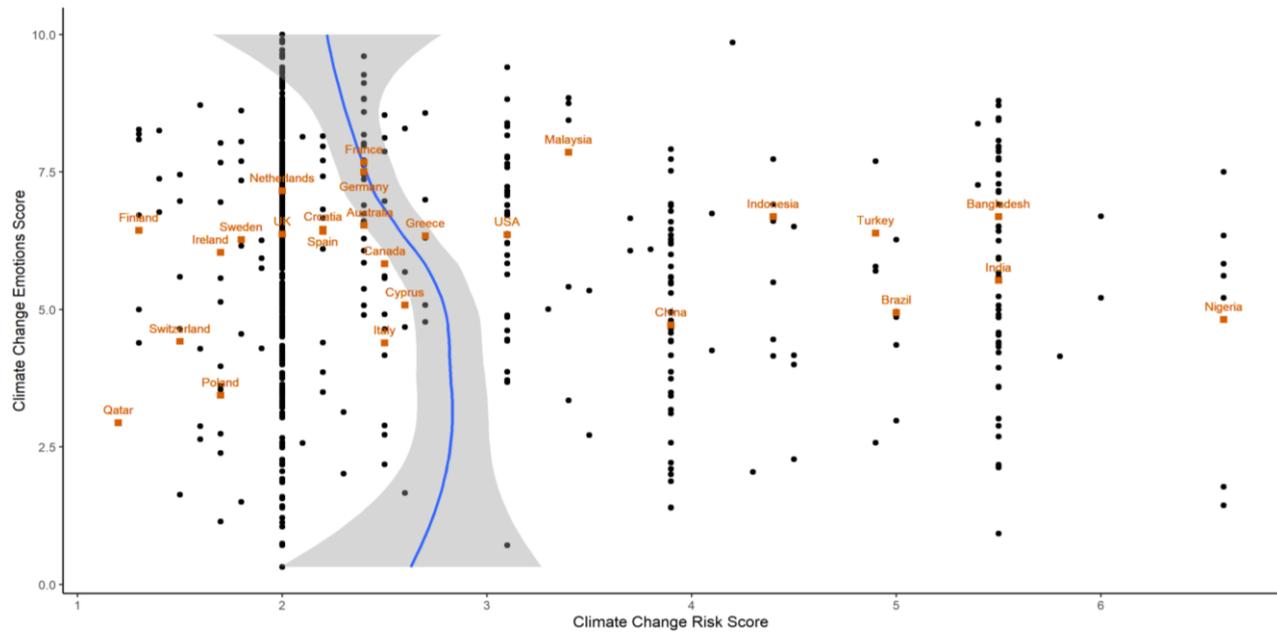
Figure 13

Visualisation of students' countries' climate change risk scores and intensity of negative climate change thoughts

Note. Black dots represent individual participants' data scores. Orange squares represent country means. Regression lines show link between individuals' climate change risk scores and their individual variable means. Countries with less than three participants in our sample were not included in the plots.

6.11.2. Students' countries' climate change risk scores and variables of interest without UK data

Figure 14

Visualisation of non-UK students' countries' climate change risk scores and frequency of climate change experience

Note. Black dots represent individual participants' data scores. Orange squares represent country means. Regression lines show link between individuals' climate change risk scores and their individual variable means. Countries with less than three participants in our study were not included in the plots.
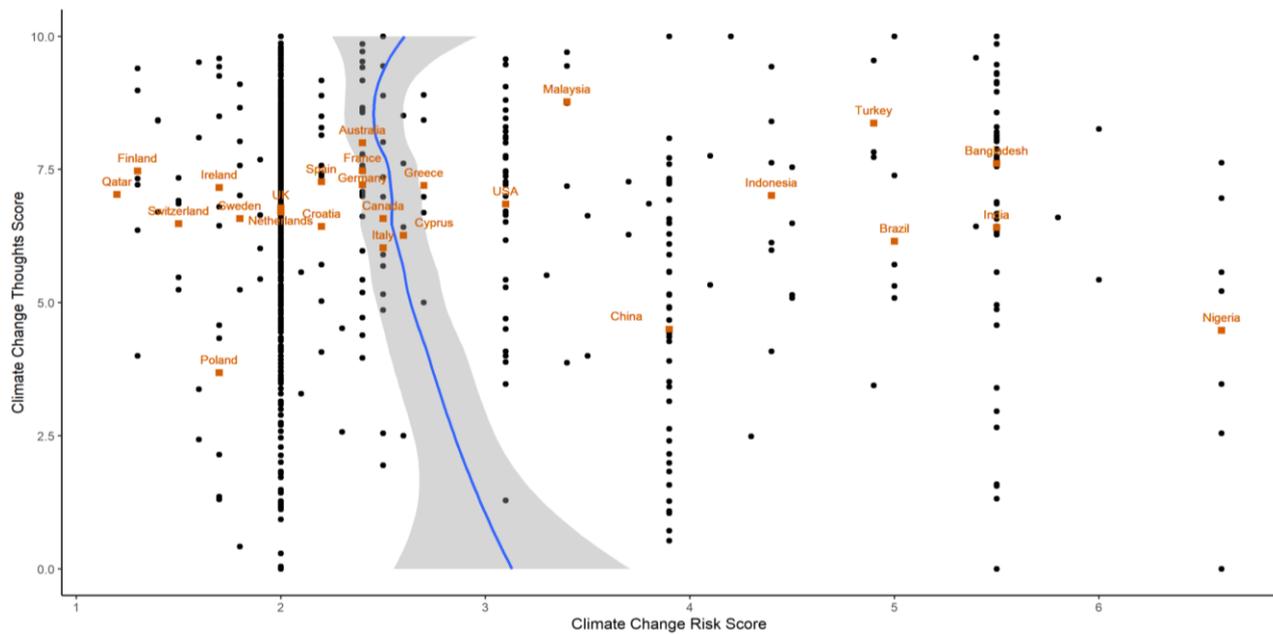
Figure 15

Visualisation of non-UK students' countries' climate change risk scores and frequency of strong climate anxiety symptoms
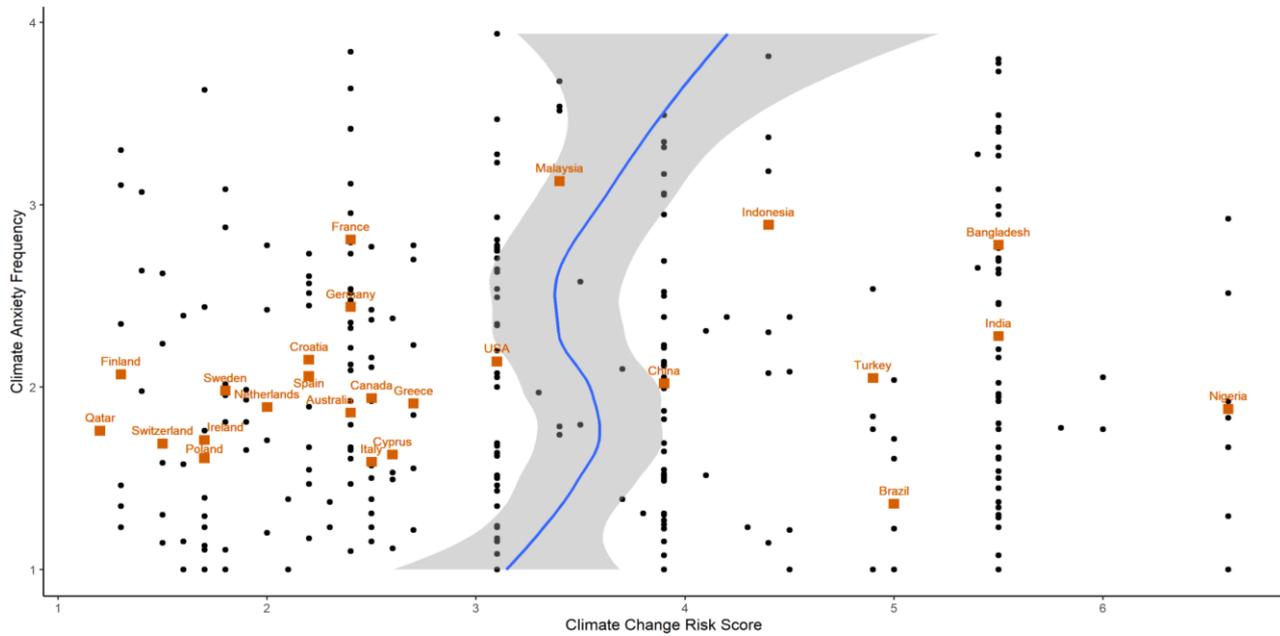
Note. Black dots represent individual participants' data scores. Orange squares represent country means. Regression lines show link between individuals' climate change risk scores and their individual variable means. Countries with less than three participants in our study were not included in the plots.

Figure 16

Visualisation of non-UK students' countries' climate change risk scores and intensity of climate change emotions
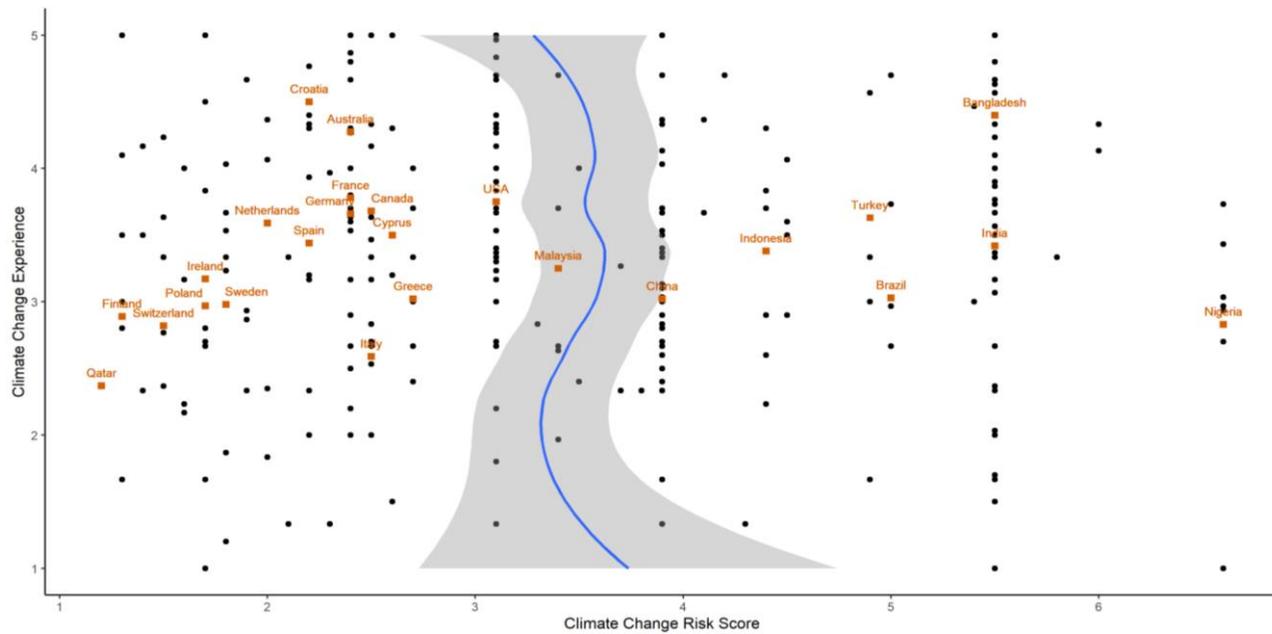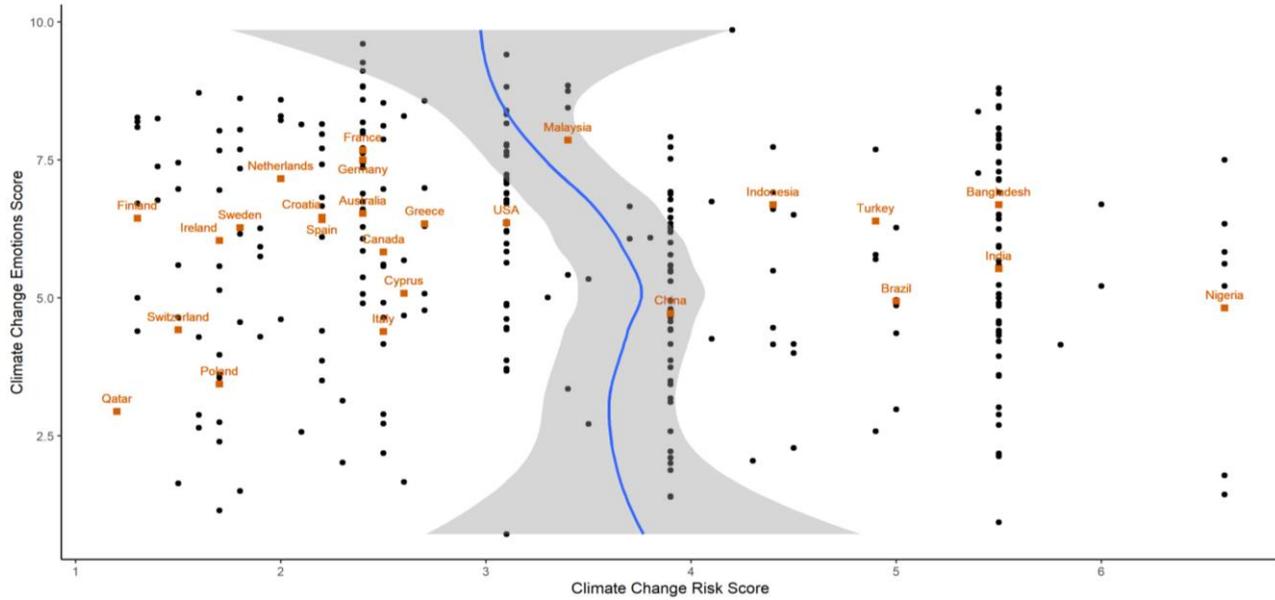

Note. Black dots represent individual participants' data scores. Orange squares represent country means. Regression lines show link between individuals' climate change risk scores and their individual variable means. Countries with less than three participants in our study were not included in the plots.

Figure 17

Visualisation of non-UK students' countries' climate change risk scores and intensity of negative climate change thoughts

Note. Black dots represent individual participants' data scores. Orange squares represent country means. Regression lines show link between individuals' climate change risk scores and their individual variable means. Countries with less than three participants in our study were not included in the plots.
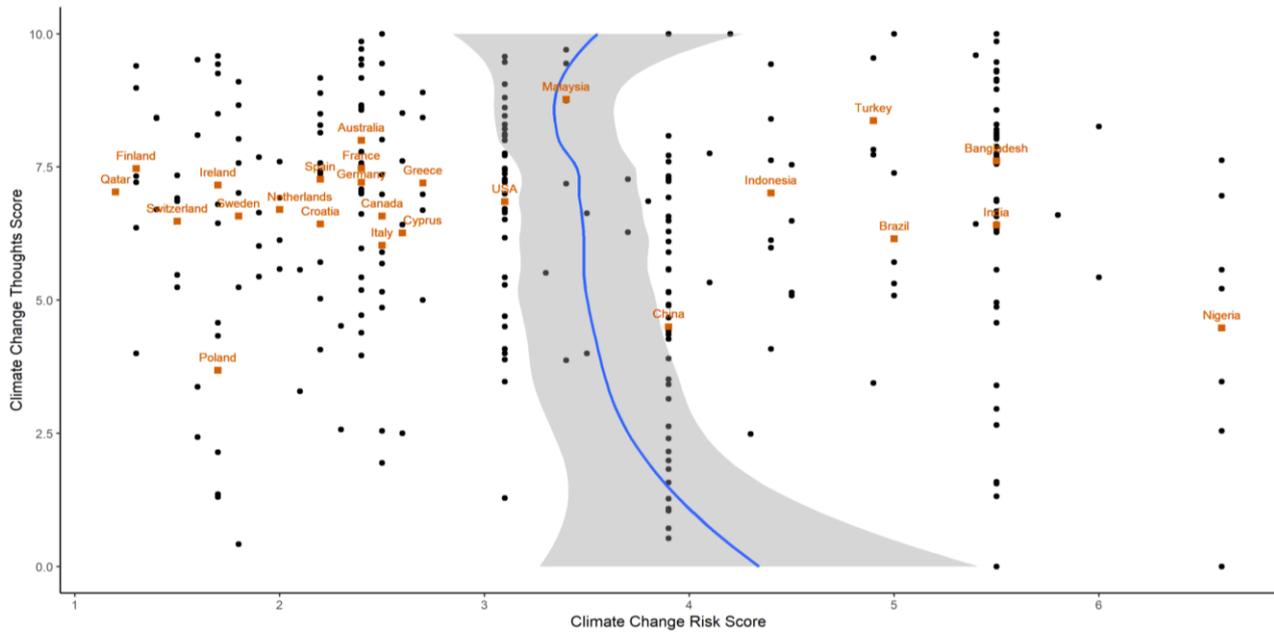
6.12. SM-12: Primary Author's Positionality Statement (for Chapter 4, 4.3. Methods)

Alongside presenting my findings of this research study, I acknowledge my own position as a white female postgraduate research student. I have a strong personal interest in climate change, mental health, and I am an advocate of climate justice. Due to my own experiences with climate anxiety, I acknowledge that I have a special interest in climate change-related mental wellbeing, which shaped my interest in the present research. This personal lived experience shaped the research questions by focusing on university students' momentary experiences of climate change and how they cope with associated difficult emotions. Due to my largely quantitative research education in Psychology, I acknowledge that I am a novice at qualitative data analysis. This educational background shaped my pre-existing largely positivist view and made the interpretative leap from verbatim data to theme development more difficult at first. My personal views on climate justice also influenced my interpretations at times: e.g., to me, government inaction and corporate silence are part of climate (in)justice. However, to a different researcher, these may represent political actions and business decisions. Overall, my interpretations of the data are influenced by my lived experience and my views on climate justice. My chosen methodology (framework method) and analysis process have been influenced by my prior education and research experiences.

6.13. SM-13: Detailed overview and timeline of the coding process (for Chapter 4, 4.3.3.2. Qualitative analyses)

June 2024

- CHH conducted a literature search on Google Scholar, Web of Science, University of Glasgow Library, using key words "coping with climate change", "emotional responses to climate change", "theoretical views on climate anxiety", "impact of climate change on mental health and emotional wellbeing", "coping strategies theories", "theory of coping", "how students cope with climate change", "how students cope with climate change in different situations", "student mental health", "framework analysis".

July 2024

- CHH worked on pulling coping strategies, clusters of coping strategies, and coping categories from the literature, creating a first overview.

August 2024

- CHH sorted identified strategies and categories into action categories, as described by Skinner at al. (2003) and into "healthy" and "unhealthy", as proposed by Stallman (2020) and Stallman et al. (2022).

- This formed the basis for developing a detailed coding framework.

October 2024

- Using the identified and grouped strategies, CHH created a first version of a detailed coding framework, with overall categories of "healthy" and "unhealthy", and subcategories and sub-subcategories, as identified in the previous steps.

- After consulting with KR, CHH added definitions to each category to allow more transparent coding.

- CHH loaded coding framework and data for general coping strategies into NVivo 14 (version 14.23.4 (49)).

- Independent analysis of 10% (82 responses) of data by CHH and KR: participants 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96, 112, 120, 136, 144, 152, 160, 168, 176, 184, 192, 200, 208, , 216, 224, 232, 240, 248, 256, 264, 272, 280, 288, 296, 304, 312, 320, 328, 336, 344, 352, 360, 368, 376, 384, 392, 400, 408, 416, 424, 432, 440, 448, 456, 464, 472, 480, 488, 504, 512, 520, 528, 536, 544, 560, 568, 576, 584, 592, 600, 608, 616, 624, 632, 640, 648, 656, 664, 672, 758, 788, 815.

- CHH was familiar with the dataset, KR was not familiar with the data prior to coding.

November 2024

- CHH conducted a coding comparison analysis in NVivo to get a first insight into inter-coder consistency (see "Coding Comparison initial 10%.xlsx") (mean Cohen's Kappa = .50).

- CHH and KR were both impressed and happy about the depth of some of the responses and how some participants went into contextual detail (e.g., raising their cultural or personal context as an influence).

- CHH and KR met to compare codes and discuss any thoughts, discrepancies, and issues.

- CHH noted her own assumptions and bias in analysis, in that she is very climate change conscious, which may at times affect her coding (e.g., CHH coded more responses as "denial" than KR, as CHH understood more things to be "denial" than mere denial of climate change existence).

- KR and CHH noted some differences in their coding. CHH was generally more conservative and coded responses that did not very obviously fit a sub-category of code as ", other", whereas KR was less conservative and was more likely to code responses into sub-categories that responses could easily be interpreted as fitting. CHH also interpreted and coded responses more to their verbatim meaning, whereas KR interpreted data more in the context of social understanding of language.

- Regarding inter-rater consistency, CHH and KR noticed that the coding consistency analysis by NVivo often showed only partial overlap, when both coders agreed in their coding, but one may have coded a part of a paragraph, whereas the other may have coded an entire paragraph to a particular category. CHH and KR therefore believed their actual consistency to be higher than the Kappa coefficient presented by NVivo.

- Some issues with the initial coding framework were discussed. CHH and KR agreed to make the following changes to the coding framework, based on the Kappa coefficient *and* team discussions:

  o "L1.1.2 - Mindfulness", "L1.1.3 – Controlled breathing", and "L1.1.4 – Meditation" would be combined into "Mindfulness/ Meditation". It was brought up whether "L1.1.5 – Prayer" should be included in this new category, however, it was agreed that Prayer directs a focus/ locus of control outside whereas Mindfulness and Meditation focused inwards, and therefore Prayer was retained as its own category.

  o "L1.2.2 – Seeking professional support" and "L1.2.3 – Seeking spiritual support" would be combined into "Seeking specialised professional support".

  o "L1.3.1 – Exercising", "L1.3.2 – Nature", and "L1.3.3 – Distraction, other" would be removed from the framework and a broad category "Distraction" would be retained with a more specific description.

  o "L1.5.1 – Making plans" and "L1.5.2 – Taking individual action" would be combined into "Individual action".

  o "L1.5.4 – Social conversation" would be renamed "Climate change conversation/ role-model" to include not only talking about climate change but also modelling climate-friendly behaviour.

  o "L1.5.5 – Social negotiation" would be removed, as it was felt that this was included in "Social conversation".

- o "L1.6 – Relaxation" would be removed, as this seemed to be a part of "Distraction".

- o "L2.1.1 – Self-harm", "L2.1.2 – Substance use", "L2.1.3 – Emotional eating", and "L2.1.5 – Suicidality" would be combined into "Self-harming behaviours".

- o "L2.2.1 – Negative self-talk" and "L2.2.2 – Rumination" would be combined into "Negative self-talk".

- o "L2.2.3 – Suppressing" would be changed to include dissociation into "Suppression/ Dissociation".

- o "L2.3.3 – Denial" would be revised and made more specific to also include active avoidance of climate change.

- o "L 2.3.4 – Helplessness/ acceptance" would be changed to include hopelessness into "Helplessness/ hopelessness/ acceptance".

- o "L 2.4 – Wishful thinking/ optimism" would be changed to include faith and hope into "Hope/ optimism/ faith/ wishful thinking".

- o "L2.4.1 – Belief in positive advances" would be changed to include governance into "Belief in positive advances/ governance".

- o "L 2.4.3 – Belief in God/ religion" would be renamed to "Belief in God/ higher power".

- o A new category would be added for participants with no negative emotions/ ambivalence about climate change: "Ambivalence" with subcategory "general emotional ambivalence" and subcategory "needed prioritisation/ limited emotional resources".

- o A new category "NA" would be added to capture participants who did not respond to this question.

- o The overarching categories "healthy" and "unhealthy" would be removed, as they were found to not help the coding progress but rather hinder it, in case where coping strategies may be adaptive in the short-term for that individual but harmful in the long term to either individual or planet.

- When developing the first revision of the coding framework, CHH noted her own positionality that likely affected her coding:

  - o A strong climate conscious and pro-environmental stance and interest in climate change and how it affects emotional wellbeing. This likely influenced her initial choice of what classed as "healthy" and "unhealthy" in the first version of the coding framework (e.g., strategies adaptive for emotion-regulation in that moment, but unhealthy for planetary health were classed as "unhealthy"). This was one of the reasons these categories of "healthy" and "unhealthy" were removed.

  - o This positionality and directionality of personal values likely also influenced the way CHH coded participants' responses (e.g., CHH coded "denial" more broadly to also include active avoidance than KR did).

- CHH and KR each coded a random set of 5% of the data again with the revised coding framework (participants 14, 30, 44, 50, 62, 84, 106, 120, 143, 145, 170, 180, 200, 209, 229, 241, 274, 290, 313, 329, 341, 346, 364, 380, 384, 394, 413, 419, 429, 448, 484, 490, 512, 522, 530, 536, 553, 567, 578, 585, 609).

December 2024

- CHH and KR met to discuss ways to best analyse research questions 2a and 3. They decided that it was most feasible and logical to use the same coding framework as for research question 2b for research question 2a, but bearing in mind options for additional inductive coding. Research question 3 would be coded inductively only, given the lack of research in this area (and therefore lacking theoretical bases) and also to not constrain participants' experiences in any pre-existing conceptualisations. CHH and KR agreed that it would be best to visually and conceptually link the thematic codes that would come from analysing research

questions 2a and 3. They each took time to reflect on how to best do this and met a week later to decide.

- Code comparison of CHH's and KR's coding of the 5% yielded a quantitative overlap of Kappa = .86. Both researchers discussed any codes where there were discrepancies and decided to make two final small adjustments to the coding framework:

  - L8.3 – Active avoidance/ denial: "active element of choice" was added to clarify any potential confusion with L10.1 – General emotional ambivalence.

  - L10.1 – General emotional ambivalence – added "(no real emotional reaction)" to specify this is not only a "no care attitude".

- Due to the very good Kappa value and general researcher agreement, it was decided that CHH could continue to code the remaining data set using version 3 of the coding framework.

- While coding the remaining data, CHH noticed that some participants did not really have any strategy to cope with their emotions. CHH therefore added a new inductive code "Don't cope" to capture this.

- While coding, CHH noticed that a lot of the quotes relating to information seeking related particularly to seeking climate-positive information. Likewise, a lot of quotes describing individual or collective action described channelling of negative emotions into action. Many quotes of helplessness/ hopelessness/ acceptance described feeling anger and frustration against governments, big corporations, or the super-rich (this did not include descriptions of expressing this anger/ frustration as a coping strategy though, which is why it wasn't coded under Opposition).

- CHH also noticed that a lot of quotes coded under Distraction due to the coding framework actually had a deeper meaningful engagement with nature and the natural world (e.g., "sitting by a tree"). This is something to note. Based on this, CHH created a new inductive code "Nature".

- CHH coded coping strategies for specific situations. She noted that a lot of the comments around being hopeful involved hope for the young generation specifically to act and make changes.

- Where participants had responded things like "see above" or similar, CHH went back to their previous response and coded their response as if they had written the same thing again. She felt this was a better representation of their responses than to not code those participants' responses accordingly.

- CHH, again, created a new code for "Nature" and for "Don't cope" (where participants did not have any particular way of coping, or no way at all).

- Generally, a lot of anger was expressed by participants towards government(s) and big corporations. Although we didn't create a new code for this (as it was not used as a coping strategy to express this anger), it is noteworthy.

- A lot of comments featuring collective action overlapped with social support in that participants described how being part of an activist group or joining a protest has provided them with social support by connecting with like-minded others.

- CHH added a new inductive sub-code to L8 – Avoidance, called "Shifting responsibility", as she realised while coding that a lot of responses portrayed not just a feeling of helplessness as an individual, but a clear dismissal of any personal responsibility for climate change or acting sustainably.

- CHH also noticed that a few participants that expressed hope as a coping strategy, specifically referred to being hopeful for the new generation/ their generation to come into power. Hence, CHH created a new sub-code for L9 – Hope, optimism, faith, wishful thinking called "Hope for new generation".

- When coding situation types, CHH noticed that a few participants mentioned climate activism events or rallies as triggering situations. This was somewhat surprising, given that CHH had previously come across research suggesting climate activism to be linked to lower climate anxiety. CHH noticed, however, that when

such events were mentioned as triggers, it was often the obvious indifference of governments, police force, or upsetting and moving lived experience stories of climate change that led to upset.

February 2025

- Codes were reviewed and merged/ collapsed/ removed as appropriate. CHH consulted KR after the first round of code revision for theme development, as CHH was unsure to what extent codes could be merged to develop themes.

- CHH recognised that her previous knowledge of climate change-related coping literature and research on negative climate change emotions and climate anxiety may have influenced the way she grouped coping strategies into themes. For instance, although the code "Nature" was not very prevalent in the data, CHH decided to keep it as a salient subtheme of the theme "Finding meaning and support" because she felt that a meaningful connection to nature was important in climate change emotions. This view was informed by her own experiences and existing literature.

- Likewise, CHH's personal views on climate justice have likely influenced her interpretations of the different codes and data and the decisions of what to group into a theme. E.g., she grouped government (in)action into the theme "Climate justice issues" because she herself views government inaction and immoral corporate behaviour as climate justice issues, whereas others may have themed them something like "political aspects" or similar.

- CHH consulted KR and they formulated the first theme together, which provided an interpretive example for CHH for remaining theme development.

- During theme development, CHH also reflected on how the context of where and where the data was originally collected may influence the themes discovered. E.g., data was from a large UK university, so that the cultural and geographic context may have yielded different responses than if data had been collected at a small rural university in the global south, for example.

March 2025

- CHH wrote a first draft of all themes, for coping strategies and situations. KR gave feedback.

- CHH wrote a positionality statement, reflecting on her own biases and personal experiences and views of climate change and climate anxiety.

April 2025

- Discussions and reflections of the themes for situation types showed that those themes were much more descriptive and close to the verbatim, as participants' descriptions of situations did not allow much room for further interpretation. This resulted in the decision to perform a content analysis on the situation types to allow more succinct and broad reporting.

- CHH performed content analysis on situation type codes previously identified.

- It became clear that the entire manuscript would be much too long for a journal article. It was decided to continue with the write-up until a first full draft exists and to only then find feasible ways to shorten the manuscript without withholding important information.

6.14. SM-14: Final coding framework (for Chapter 4, 4.3.3.2, Qualitative analyses)

Categories	Definitions	Sub-subcategories	Definitions
L1 - Self-soothing (meaning-focused)/ emotion regulation (emotion-focused)	"internal cognitive and behavioural calming strategies" (Stallman, 2020, p.297)	**L1.1 - Positive self-talk (emotion-, meaning-focused)**	Self-talk that is kind to the self (e.g., self-encouragement, self-compliments)
		L1.2 - Mindfulness/ meditation (meaning-focused)	Focussing attention on present moment, accepting emotions and thoughts (incl. controlled breathing and meditation)
		L1.3 - Prayer (meaning-focused)	Requesting help, thanking, or speaking to God or another deity.
		L1.4 - Emotion expression (emotion-focused)	Emotion expression with the goal of regulating negative emotions (incl. venting etc.)
		L1.5 - Self-soothing, other	Another form of internal cognitive and behavioural calming strategy, not previously listed.
L2 - Seeking support (problem-focused, emotion-focused)	Intentional communicating and connecting with others in order to receive support of some sort.	**L2.1 - Seeking social support**	Seeking support from social relationships (e.g., family, friends, peers, colleagues etc.)
		L2.2 - Seeking specialised professional support	Seeking professional support (e.g., from a health professional, counsellor, a pastor or other religious/ spiritual leader, etc).
		L2.3 - Seeking support, other	Seeking support in a way not previously listed

L3 - Distraction (emotion-focused)	Temporary attention shift to something else (e.g., exercising, reading, going for a walk). Includes deliberate relaxation and activity distractions.		
L4 - Information seeking (problem-focused)	Seeking out more information on climate change (e.g., watching news, reading articles)		
L5 - Problem-solving (problem-focused)	Deliberate decisions to work on solving a problem	**L5.1 - Individual action**	Taking individual action (or planning to do so) with the intent of solving a problem related to climate change (e.g., travelling sustainably)
		L5.2 - Collective action	Taking collective action with the intent of solving a problem related to climate change (e.g., joining an activist group)
		L5.3 - Climate change conversation/ role-model	Engaging in a conversation about climate change/ modelling climate conscious behaviour with the intent of influencing others.
		L5.4 - Problem solving, other	Working on solving a problem related to climate change in a way not listed above
L6- Harmful activities	Engaging in activities that could have negative or dangerous consequences to oneself or others	**L6.1 - Self-harming behaviours (emotion-focused)**	Deliberate act of inflicting harm or pain to one's own body (incl. harmful behaviours like substance use, emotional eating, suicidal behaviours, or other unsafe/ harmful behaviours).

		L6.2 - Opposition (emotion-focused, meaning-focused)	Expressing or acting on aggression as a means of dealing with negative emotions
		L6.3 - Harmful activities, other	Engaging in types of harmful activities to deal with negative emotions not listed above
L7 - Harmful self-talking (emotion-focused, meaning-focused)	internal cognitive and behavioural strategies that cause upset or harm to self	L7.1 - Negative self-talk (meaning-focused)	Deliberate self-talk that is unkind to the self (includes rumination)
		L7.2 - Suppression/ dissociation (emotion-focused)	Suppressing or dissociating from unwanted thoughts or emotions
		L7.3 - Harmful self-taking, other	Another form of harmful self-talking not listed above
L8 - Avoidance (emotion-focused)	Keeping away or withdrawing from situations or people	L8.1 - Social withdrawal	Withdrawing from social situations/ relationships (e.g., friends or family) as a means of dealing with negative emotions
		L8.2 - Information avoidance	Avoiding climate change information (e.g., news, articles)
		L8.3 - Active avoidance/ denial	Avoiding thinking/ talking about climate change, denial of its existence or severity; active element of choice
		L8.4 - Helplessness/ hopelessness/ acceptance	Helplessness/ feeling powerless as individual, accepting destiny of doom, giving up
		L8.5 - Avoidance, other	Another form of avoidance not listed above

L9 - Hope/ optimism/ faith/ wishful thinking (emotion-focused)	Wishfully and optimistically focusing on the positive	**L9.1- Belief in positive advances/ governance**	Optimistic that positive changes, such as technological or policy advances will solve the climate crisis
		L9.2 - Belief in good of humanity	Optimistic that humans are generally good and that humanity will "come around" to solve the climate crisis
		L9.3 - Belief in God/ higher power	Optimistic that God/ a higher power will solve the climate crisis for us
		L9.4 - Hope/ optimism/ faith/ wishful thinking, other	Another form of optimism/ hope/ faith/ wishful thinking not listed above
L10 - Ambivalence	Emotional ambivalence to climate change	**L10.1 - General emotional ambivalence**	A general "no care" attitude or emotional ambivalence to climate change as a choice (no real emotional reaction)
		L10.2 - Needed prioritisation/ limited emotional resources	Emotional ambivalence to climate change because of limited emotional capacity/ resources available; needing to prioritise other life challenges
L11 - NA	NA responses (i.e., participant did not provide a response)		
L12 - Unsure	Response that we aren't sure respond to survey question or that we are unsure how to code		

L13 - Interesting quotes Copy quotes here that are particularly interesting or illustrate a particular way of coping very well

6.15. SM-15: Thematic analysis findings for Q3), triggering situation types (for Chapter 4, 4.4.2. Triggering situation types)

6.15.1. Theme 1 – Climate changes and losses

When participants were asked which types of momentary experiences required them to cope with climate change, common experiences were described as some form of exposure to climate changes and losses of natural environments. This theme discusses different types of situations where participants described such exposures to have been triggering.

Many participants described situations where they or their loved were personally affected by climate change to be triggering. Participant 107 (female, aged 23) describes such a scenario:

> *"The are[a] where I am from has recently been experiencing a drought and it has been very scary/worrying, I am not sure how to handle my feelings about it. All my family lives there, and that place might soon become unlivable"*

They describe how their family's home environment has experienced drought, which is "very scary/worrying" to them. They say, "I am not sure how to handle my feelings about it", which suggests that the emotions about the drought and how it will affect their family are quite complex and difficult to regulate. They further express fear that "that place might soon become unlivable", which suggests that they are scared for their family's home and might grieve the loss of their former homeland.

For other participants, climatic changes, such as extreme weather or noticeable changes to the natural environment were triggering. Participant 117 (male, aged 24) describes this:

> *"There was the heatwave in Scotland last year and I was melting at 30 degrees, and I had friends down south in London saying it hit like 42 degrees and I was just terrified that this is the future, and my plan was to just move further north to like Inverness where it was 20 degree tops and live in ignorance."*

This participant describes extreme heat in Scotland and the UK, which made them "terrified that this is the future", since such heat is not normal for the UK. They further say that they would "move further north" where temperatures are cooler to "live in ignorance". This language suggests that they felt very scared and anxious for the future because of climate change. This fear seems overwhelming to deal with, so that they consider escaping some climate change consequences by moving to a safer location. Participant 322 (male, aged 24) experienced similar emotions:

> *"There is a lake I went camping to every year since I was born and this summer it completely dried out and still has no water. Seeing the pictures of hundreds of dead fish and the bottom of the lake looking like a drought zone in Sub sahara africa made me very sad and anxious. I did not really handle the moment at all but tried to move on to other things as I felt a bit helpless"*

This participant recalls the drying out of a lake that seems to mean a lot to them, as suggested by the statement "I want camping to every year since I was born". The shocking images of "hundreds of dead fish" made them "very sad and anxious", which they "did not really handle" well in the moment. This suggests that what they witnessed at this place they hold dearly was quite overwhelming so that they could not regulate these emotions in the moment.

These quotes suggest that extreme weather, climate catastrophes, and other changes to the natural environment are distressing to participants, which they cannot always handle well in the moment. The unpredictability of future changes elicited anxiety and fear in students, as they felt escape was the only feasible option. These observations highlight the importance of natural spaces for mental health and how changes thereof can be distressing. They also show that participants are scared of how climate change will progress, which makes them fear their futures.

6.15.2. Theme 2 – Climate change information

Another type of situation that required many participants to cope was exposure to climate change information, for example in the form of news reports, topical conversations, or climate change education. This theme discusses how being faced with distressing information and content about climate change is upsetting and requires coping. Participant 574 (female, aged 29) gives an example: *"Watching documentaries on animals and how we are destroying them and pushing them to extinction. We have such a beautiful planet and helpless animals are being killed because of humans being so careless and selfish"*. This participant describes how "[w]atching documentaries" about animal extinction due to "humans being so careless and selfish" was upsetting to them. Their language suggests that seeing the suffering of animals due to climate change was deeply upsetting to them and the human involvement in this made them particularly angry.

Participant 668 (female, aged 23) found news reports distressing in a different way: *"I was watching the news, and I saw a report on how much warmer my home city is than it was 10 years ago. I started spiraling, thinking about how many generations of my family have lived there"*. This participant describes how a news report on "how much warmer [their] home city is than it was 10 years ago" led to them "spiraling". These word choices suggest that the report made them acutely aware of how climate change impacts their own hometown, which was a shocking and upsetting realisation. They further mention "thinking about how many generations of [their] family" had lived there, suggesting that they may have experienced a sense of loss and grief when faced with this news, as they have a familiar attachment to that place.

Participant 36 (female, aged 20) also found the news triggering: *"Reading the news about passing 1.5 degrees in 2024. It's a feeling of pure terror for collective humanity, and I feel grief for the plants, animals and humans that will be destroyed in an unnatural process due to injustice".* This participant experienced "grief" and a "feeling of pure terror" when reading about "passing 1.5 degrees in 2024". This suggests that this news was deeply upsetting to them, as they contemplated its consequences for "collective humanity", animals, and biodiversity. They further make the link between this 1.5 degree increase and "injustice", suggesting their anger to stem from climate justice issues and the related implications for the future liveability of the planet.

These quotes suggest that climate change information is distressing for participants, particularly when highlighting how climate change has already impacted loved places and how humans have played a large part in it. Climate change information described by participants was mostly disaster-focused without balance for constructive action. It seems that participants felt particularly distressed by seeing the physical consequences of climate change that they may have thought to occur in the future to already have occurred or to do so much sooner than expected. This may have implications for how climate change communication and education and highlights the importance of fast and effective mitigation for mental wellbeing.

6.15.3. Theme 3 – Climate justice issues

Many participants described the need to cope in situations where they were faced with climate injustice or learned about climate justice issues. This theme discusses how governmental inaction, dismissal, and robbed opportunities are climate justice issues that impact participants' mental health and require active coping. We sub-divided this theme to provide better insights into two conceptually different situation types where climate justice issues were experienced.

6.15.3.1.   Subtheme 3.1 – (In)actions of those in power

Many participants described governmental inaction about climate change and carbon-intense practices by large corporations to be emotionally difficult. Participant 179 (female, aged 19) gives an example:

> *"Finding out about the acceptance of the Willow project and how it was going to set us humans way back in terms of lowering carbon emissions, and feeling*

helpless that no matter how many petitions that could be signed it's virtually unstoppable"

This participant describes a situation where they heard about "the acceptance of the Willow project" and the negative consequences this would have. They describe feeling "helpless that no matter how many petitions" they sign, "it's virtually unstoppable". This language suggests that they are invested in climate change mitigation and that counterproductive actions by governments, like the Willow project, make them feel helpless and like their own actions are meaningless. Arguably, this makes them feel powerless and helpless. Participant 285 (female, aged 19) describes a similar experience:

"Most of my strong emotions regarding climate change can be drawn back to the helplessness that I think a lot of young people feel, no matter how much we do to take public transportation or walk nothing we can do will ever offset the emissions of large companies who see no financial incentive in taking action against climate change which causes feelings of frustration more so than anxiety."

This participant describes feeling helpless, as they try to live sustainably by "taking public transportation or walking". They say, "nothing we can do will ever offset the emissions of large companies", suggesting that they feel like their own actions are meaningless when large companies continue with carbon-intense practices. This realisation makes them feel "helplessness", "frustration", and "anxiety" as they feel powerless as an individual to mitigate climate change and angry that high-polluting corporations seem to "see no financial incentive" to change their practices.

Participant 442 (female, aged 31) also feels angry: *"Seeing the UK host COP then try to open a new coal mine the next year - it's all rhetoric and no action"*. This participant describes the paradox of "the UK host[ing] COP" and then "try[ing] to open a new coal mine" shortly after. They mention "it's all rhetoric and no action", which suggests that they feel angry at political promises not aligning with actions.

These quotes suggest that situations where governments and large corporations acted against climate mitigation policies or efforts, caused participants to experience difficult emotions, such as anger, anxiety, and helplessness. Participants felt especially helpless and powerless as individuals, as they felt like their own mitigation efforts were meaningless if those in power continued with carbon-intensive practices. This shows an important link between government and corporation actions and participants' mental wellbeing.

6.15.3.2.   *Subtheme 3.2 – Robbed opportunities*

Other participants experienced climate justice issues in situations where they felt that climate change robbed them of their future and of opportunities other generations had before them. Participant 215 (female, aged 21) gives an example:

"When I was told that it would be selfish to have more than one child or any child at that by my teacher. I feel like I am being robbed of having the life that I want. It is a feeling of hopelessness. and anger too, because the generation before got everything and more and they left nothing for us."

This participant describes a situation where they were told "it would be selfish to have more than one child or any child" by an educator, implicitly because of the link between population growth and climate change. They continue to say that they "feel like [they are] being robbed" of their desired life in this situation. This causes feelings of "hopelessness and anger", as "the generation before got everything and more and left nothing for us". This language implies that they are angry at older generations who got to live the life they desired, while the participant may not be able to.

Participant 150 (female, aged 24) describes another experience: *"Watching the 2020 documentary from David Attenborough when I was pregnant. Seeing the projections of how some places in the world may look in 2050, knowing my child will only be 30 at that time"*. This participant describes how seeing "how some places in the world may look" in the near future made them think about their unborn child who will "only be 30 at that time". This suggests that these images made them anxious about the future their child will experience and the liveability of the world when their child is an adult. It is implied that they worry about what opportunities will be left for their child's life, seeing the way the planet could degrade in only two decades.

Participant 487 (female, aged 20) experienced similar emotions when thinking about the future: *"Reading that we only have a few years before we are past the point of no return and then thinking about how I won't even be half way through my life by that point was incredibly depressing"*. This participant expressed that news that "we only have a few years" before climate change becomes irreversible made them contemplate their future and realise, they "won't even be half way through [their] life" by then. This thought "was incredibly depressing" to them. These words suggest that the thought of an unpredictable future that would be different from the life they know was very saddening to them. The

fact they would have to live half their life in a world they knew would not be the same caused them to feel despair and depression.

From the above quotes, it appears that situations where participants are faced with ways climate change will impact their lives and future opportunities caused depression, anxiety, and hopelessness. It seems that anger towards previous generations was closely linked to feelings of being robbed of a future. These worries and emotions were not only related to self-centred opportunities but extended to future generations. These are interesting findings that raise the importance of inter-generational communication about climate change.

6.15.4. Theme 4 – Dismissal and ignorance

Finally, situations required coping where climate change was being dismissed or ignored in some way, such as in conversations with climate deniers, collective silence around climate change, or through unsustainable actions. This theme discusses how being confronted with climate change dismissal or ignorance in social situations and more generally required participants to cope. Participant 206 (male, aged 31) describes such a scenario:

> *"When I talk to friends or family members who are skeptical of climate change. Even if they believe that my cause is right, they don't believe that an individual action will change things. That makes me frustrated and angry at moments but with time I just had let it go and just continue doing what I believe."*

This participant describes conversations with "friends or family" who are "skeptical of climate change" to be difficult for them. They mention how loved ones "don't believe that an individual action will change things", even if they support such actions in principle. This made them feel "frustrated and angry", implicitly because they feel that their efforts are dismissed, which seemingly made their actions seem meaningless. Participant 251 (female, aged 22) had a similar experience:

> *"Going back home for Christmas and hearing family friends saying that climate change isn't real and trying to get them to hear your point of view but just having them laugh at you and not take you seriously. Sit there feeling hopeless and wondering how this is still an argument we're having."*

This participant also recalls conversations with loved ones who think "climate change isn't real". They describe "trying to get them to hear your point", which was met

with "them laugh[ing] at you". These words suggest that this participant cares deeply about climate change, so they try to educate their family and friends. When this results in dismissal and being laughed at, they feel "hopeless", "wondering how this is still an argument we're having". This langue implies that this dismissal is hurtful and takes away hope of betterment, as they wonder how others can still deny climate change today.

Participant 293 (male, aged 35) describes a different type of situation: *"When I see people don't recycle things and use lot of electricity for fun make me angry"*. This participant mentions how seeing other people behaving unsustainably "for fun" made them "angry". These words suggest that they find it especially triggering when people waste resources without a real need to do so. This kind of behaviour makes them feel angry, as they are arguably aware of the negative impacts of such behaviour and therefore ethically disagree with it.

Overall, it seems that ignorance and dismissal of climate change both verbally and through actions elicited negative emotions in participants. Conversations with climate change deniers and witnessing unsustainable actions seemed to evoke anger, frustration, and hopelessness. It can be implied that these situations were triggering, as they made participants feel unheard and their sense of urgency dismissed. This shows how dismissing students' concerns about climate change more generally can lead to them feeling such emotions and may have implications.

6.16. SM-16: Additional quotes for coping strategy themes (for Chapter 4, 4.4.3. Coping with climate change)

6.16.1. Theme 1 - Reducing the mental load of climate change

6.16.1.1.   Subtheme 1.1 – Distraction

"I feel worried for the future if I think deeply about climate change. In this case, I'll do something to distract me." (P3)

"Anxiety, slightly distracting but distractions from it can help" (P7)

"i keep myself busy with research, work, and hobbies" (P67)

"get my mind off it by listening to music or going for a walk." (P88)

"Although itâ€™s not ideal, when I begin to feel anxious about climate change and how very few countries are putting all their effort into actually helping the situation, I try to distract myself with other activities so that I do not become too overwhelmed" (P128)

"I just have to distract myself so I stop thinking about it" (P178)

"Other anxieties tend to overshadow climate change related ones, but when something does come up I generally just cope by distracting myself with other things." (P184)

"But then sometimes not wanting to think about it and using some form of media to drown it out." (P251)

"I'll do diversionary activities, even though I know it's a palliative, not a cure." (P323)

"When I'm worried about climate change, I force myself to divert my attention." (P348)

"I usually distract myslef by interacting with something directly unrelated to climate change. This might be watching a movie or playing a game" (P370)

"I tend to try and redirect myself to something else, like read a book, or even work on those emotions to push myself harder and attend marches and protest" (P376)

"I barely understand how myself handle emotions, but one thing I know is that I normally entertain myself rather than make some productive works. It is indeed unproductive but I found myself healing whenever I did this. For example, abnormal hot weather outside would hinder me from going outside, thus I chose lying on bed and watched Netflix and chill" (P463)

"I have to distract myself because if I think too much about it, I panic" (P475)

"I often find that I find myself helpless and anxious about the future. there is a sense of doom that is heavy in the media and that can be depressing when you really sit and think about. I feel that I my anxiety is generally spiked when I read about it/ see it in the media. aside form that it is not really on my mind day to day, I handle this by distracting myself or reminding myself to live in the now" (P478)

"Climate change seldom causes me to have any serious mood swings, but sometimes I do get worried when I see a disaster caused by climate change, and I usually do something else to distract myself." (P593)

"Sometimes I'd like to do other things distract myself." (P604)

"I have not found a way to cope with it yet apart from distracting myself with other things" (P659)

"Distract myself with things I enjoy which often furthers the anxiety as I feel like I am ignoring the issue rather than finding solutions" (P704)

"Summer months tend to be harder as my country has wildfires quite often which is saddening and infuriating. I don't have a coping mechanism other than to distract myself." (P710)

"There's always just a creeping anxiety that the people that are causing the most damage (big corporations) and it leads further to feeling helpless and powerless. Most common way I prevent these thoughts are just using other things to distract such as studying, games, sports, etc." (P720)

"I distract myself and tell myself there's nothing I can do to make a major impact to climate change, so no point worrying about it." (P727)

"Do something else to shift my concentration and reduce anxiety." (P739)

"I can get worried or angry when thinking about climate change, but to handle the emotions i usually just think about something else" (P763)

6.16.1.2.   Subtheme 1.2. – Avoidance

"I try to avoid thinking too deeply about it at the moment as it can lead me to spiral and it can deepen other issues I'm having which leads to less productive healing." (P10)

"I don't handle them too well. I try not too seem to pretentious or all-knowing and try to ignore these triggers (especially if the triggers are words from someone I have been talking to)" (P22)

"I feel helpless about it so tend to put it to the back of my mind" (P34)

"Generally I repress the idea of climate change because easier to ignore but know I shouldn't" (P82)

"Try not to think about it. Avoid overconsuming news articles related to this and approach life with a glass half full mentality." (P84)

"I shut out all the news. Its too triggering to see them everyday." (P118)

"Try not to think it. It affects a lot of my daily actions." (P123)

"It feels extremely hopeless and like it is a never ending intake of so much misery in our futures. The only way to cope is to mainly push it out of my head, and try and only focus on the here and now." (P126)

"I just try not to think about it." (P166)

"I tend to step away from the conversation and stop looking into climate change to avoid these emotions" (P176)

"And i avoid most social media regarding climate change as i feel the "raise awareness" campaigns do nothing but cause anxiety for clicks and shares." (P194)

"Try to shut it out and not think too much about things that make me anxious." (P210)

"I try not to think too much about climate change because I feel so utterly powerless and scared." (P230)

"A lot of the time I have to ignore it in order to be able to continue and get thorugh my day to day." (P231)

"Just don't think about it. Greatest alternative to therapy lol" (P295)

"I try to ignore it as much as i can if it makes me too anxious." (P310)

"Although this isn't very responsible, I don't watch the activities of influencers and big corporations regularly as seeing their impact on the plant makes me really angry, and I don't want to feel angry all the time" (P329)

"Sometimes I have to completely remove myself from politics. I'm usually very engaged in politics but Liz Truss's government gave me a type of stress and anxiety that has had me removed from politics ever since, just in order to maintain some level of sanity." (P344)

"I avoid watching videos on internet related to that because it makes me feel sad." (P353)

"Honestly, i have to not think about it day to day as much as possible as i get so anxious about it. A lot of my learning is about climate change and it is heavy, so aside from learning i try to disengage otherwise i would be in an anxious state constantly." (P405)

"i ignore it as much as i can because the emotions feel so unmanageable and never ending. if i let myself dwell on them then i would simply never manage to get anything done." (P406)

"I don't think about it!! It's too huge and problematic - I do what I can, but I cannot take personal responsibility for the disaster that humanity has created." (P442)

"I tend to stray dangerously into apathy and stop caring about it. I ignore it in everyday life until it comes up. (P471)

"I try my best to not be consumed by the bad news about climate change or it leads to high levels of anxiety" (P494)

"This and also taking a break off of my phone, I know it doesn't change what's happening but i can deal with my emotions and then return once I'm better." (P505)

"I deleted news apps off my phone that would send me notifications in the day that would trigger a lot of anxiety and fear. I still read the news, but only do it on my own terms, reading it when I feel calm and stable, choosing what to read when and where." (P525)

"I prefer not to think about the future as that is what causes me anxiety. I still do what I can for the environment but I think it is important to make sure it doesn't negatively affect your life." (P531)

"It is a topic I really care about, but sometimes it is just necessary to detach yourself from it a bit, usually by avoiding it on social media or the news. I don't know how much there is to do beyond that, I do kind of feel like the best solution would be for the issue of climate change itself to be dealt with more seriously rather than the repercussions of us feeling sad about it." (P533)

"I guess I don't think about it too much to not feel desperate and powerless." (P547)

"I try not think about it, sadly. My triggers are often from watching TV programmes on climate change so avoiding the topic often helps." (P574)

"I come from a place where crazy wild fires happen in the summers and really bad ice storms in the winter, and sometimes you can't let yourself get bogged down by it. You have to live your life at the end of the day, so I tend to ignore it until forced to confront major feelings about it. Maybe not exactly healthy, but I can't be paralyzed by it all the time." (P640)

"Limiting my social media usage and engagement with news media." (P652)

"makes me anxious and frustrated to think about, and especially hopeless. overall pretty depressing so i generally avoid thinking about it to be honest." (P707)

"i try not to think about it as much. it is really hard though because there is waste, pollution and carbon emissions everywhere which are all constant reminders of how we are destroying the planet everyday." (P724)

"I tend not to think about climate change unless it is brought to my attention because it would be too overwhelming to constantly think about it." (P744)

"I think the only way to deal with it is to just not think about it because it feels like we are heading in that direction no matter what." (P775)

"Although these issues are important constant messaging on social media and the news can be quite overwhelming. Sometimes removing yourself and trying to take actions you can, small as they may seem, can help to reduce feelings of anxiousness" (P809)

"I tend to avoid most news about it because it stresses me out too much." (P815)

6.16.1.3. Subtheme 1.3. – Trying not to feel emotions

"I tend to compartmentalise my emotions since climate change deniers seem like emotional thinkers who who cannot be convinced that their actions affect the environment and tend to say hurtful things when i try to explain" (P15)

"Thinking about my future, especially for if i get a job back home (i am an international student from a southern developing country) gives me anxiety. I fear for my country's future, and what it means for my family. I cope with this by mostly ignoring these feelings and going for a run to let of steam sometimes" (P47)

"By shoving them deep deep down" (P58)

"I repress the sense of impending doom I feel when I think about climate change by distracting myself in a book or with assignments until its not at the forefront of my mind anymore." (P114)

"I don't cope with my emotions I suppress them for a while until I have a panic attack and then the cycle starts again" (P147)

"Usually anxiety when I see that the world is climate is changing. Also when I see how my hometown (where my family lives) is being impacted by rain and

landslides (which is ununsual). Also, I am more afraid about how the world society will respond to increased number of hazards and when the essential resources, such as water will start to be more scarce. I generally block those feelings and think in something else." (P225)

"bottle them up" (P234)

"I feel them briefly and then suppress them." (P381)

"I struggle to cope with the fact that there may not be a future for the potential children I may have and this makes me question whether I would even want to bring more humans into this dying world. I tend to try and push my worries under the carpet but also reassure myself that I live a life that alines with my values and that I can only do as much as I can to help." (P436)

"I usually get very angry if I think about it too hard, so I often have to dissociate which is messed up considering—" (P483)

"I don't. It is what it is. Sometimes I listen to the album "Wasteland, Baby!" and try to give the anxiety a nice vibe." (P511)

"I have to try to supress a lot of my emotions because teachers / colleagues / friends do not understand or want to engage with these dark thoughts and feelings." (P564)

"Having been to therapy for most of my teenage years I have also practiced compartmentalising emotions a lot so quite often I just schedule them. Which includes scheduling intake so I will schedule when I read news for example. I also disassociate a lot which isn't exactly ideal." (P605)

"repressing any anxieties" (P613)

"If I experience anxiety due to the climate crisis, I tend to dissociate from these feelings, as I feel that there is no way to rationalise the terrible reality that is climate change." (P632)

"I don't think I deal with it very well, when I feel stressed and anxious, I usually try to push the thought away because I feel like there is nothing I can do." (P678)

"I try to ignore them, when I do think about them I tend to go into a spiral of research and hopelessness" (P687)

"Just try to ignore them as there is no kuch support about these, and most people won't understand or believe your anxieties about climate change." (P774)

6.16.2. Theme 2 – Doing something constructive

6.16.2.1.   Subtheme 2.1 – Climate action and conversation

"Focus on the things I can control and being environmentally responsible in my day to day life." (P12)

"My emotional experiences with climate change tend to be when learning about the disasters across the planet in relation to climate change. I handle the emotions by trying to get involved in raising awareness" (P19)

"I don't really experience distress when thinking about climate change but I try to do my part like recycling etc to know I'm doing what I can to help an issue that's much larger than myself" (P21)

"I do climate activism" (P36)

"I also try to make sustainable decisions in terms of what I buy and eat." (P46)

"The helplessness I feel actually helps with the anxiety. I just kind of accept that I am personally trying to not make unsustainable decisions, and ultimately, my role as a consumer is so small, because because even the "sustainable" choices are not actually that good, and there's a lot of green washing. So all I can do is vote for a government that takes it seriously" (P75)

"I am an ethical vegan consumer, I only buy clothes from sustainable brands or secondhand and I am satisfied that I am doing the best I can within my means. That is all I can do at the end of the day." (P84)

"The frustration makes me seek more ways to be proactive about tackling climate change" (P99)

"Channel my emotions into researching how to be better for climate change as an individual, and then share on the knowledge" (P103)

"I do small actions. Volunteering. Cycling instead of driving. Go to university for env geosci to maybe become part of a solution. I can only control myself." (P109)

"However, when I do think about it, I get feelings of being helpless and fearful about the future. In those cases I try to research what I could do, and try to limit my meat intake for example and that makes me feel a little more useful. Or when I feel nervous about it I take a walk in nature to destress and at the same time assess if I could do something in my local community to help." (P143)

"I attend protests and try to do my best to act consciously when it comes to protecting the my environment to make myself feel less guilty." (P163)

"When I vote climate change is the most important issue for me and that is how i express my views." (P180)

"When it is something I can change, such as picking up garbage to recover some of the natural state of a place, then cleaning up and helping out gives me much relief." (P208)

"trying to get more involved in activism, as that seems to be the only thing that is producing any sort of change whatsoever" (P213)

"I try to make conscious choices that will affect the environment as minimally as possible. I no longer have any interest in having children because I don't think it would be fair to bring them into a world that is becoming what it is." (P239)

"I try to live environmentally responsibly. I follow a vegan diet, do not buy produce from outside of Europe, don't own a car and use my bicycle or public transport for most activities. Sometimes I rent a car or go by plane but I don't feel great about it, so I try to limit these activities." (P266)

"As much as I want to stop and help climate change I can't say it effects me much as I feel like I do my part (recycling, reducing power usage etc.) so there is not much more I can do so I've kind of just come to terms with that." (P274)

"I recycle, buy reusable things and only second hand clothes." (P316)

"I think the best way to cope for me is to engange in political action and thereby feel like I am at least trying to change something" (P322)

"I came from a country that is affected by climate change. The weather has becoming unpredictable, days getting hotter and flood has become more frequent. Climate caused poverty is also becoming more common. I realised that I need to do something rather than just being anxious about it. I decided to enroll to study about environment and sustainable development in hoping that I can help my country in facing climate change and problems that come with it." (P338)

"I have certain commitments in my life which help me feel like I am doing my part on an individual level (recycling, buying second hand, limiting consumption as best as possible). I also have plans to live more sustainably (going off-grid once my career allows it) which give me some hope as I know that this is part of a larger movement. I also plan both volunteer by undertaking conservation work and I will use my knowledge in psychology to engage with climate action as best I can." (P378)

"Doing the best I can to raise awareness. Play my part my adopting a climate friendly lifestyle." (P393)

"I generally try to do small things to live a more sustainable life, like reducing single use plastics, to balance the guilt I feel when I hear about humanity destroying the planet. It doesn't feel like there's much I can do on an individual level, that it's an issue bigger than myself, which often makes my mood very low. So I try to do what I can to cope with that. Knowing I'm doing something helps me cope." (P409)

"Vegan diet, buy from sustainable brands, sometimes easier to ignore" (P445)

"Through finding community and struggling together against capitalism which values profit over humanity to try and make a difference. But if i get too emotional, I cannot actively resist and do something to change. While there is the constant underlying fear,

dismay, and despair that lingers beneath the surface, by channeling those feelings into anger at the those who choose to destroy our planet for their convience, and channeling that anger into organising, I try to make tangilble change. But mostly, it is through solidarity and connections with those who also care." (P449)

"I don't eat meat, and rarely dairy so find peace in knowing I'm already doing more than most" (P462)

"I do also do my best to live an eco friendly lifestyle, for example, I am vegan, and I also sometimes try to engage in activism, but it can be disheartening because the majority of the time that I have, I haven't seen many results" (P483)

"Recognise what I am personally able to do within my mental and physical state, how much energy i have, i act accordingly. i am vegetarian, do not drive, do not buy fast fashion, do not endorse corrupt companies as much as i can, do a lot of reading and learning. i try not to judge others and see only with compassion, which helps my mental health." (P528)

"buying food on reduced when possible to avoid food waste/ other small things which i know dont make a big difference in the grand scheme of things." (P532)

"I try to focus on what i can do to help improve the situation and the only thing is to go to protests and vote for politicians who I think will prioritise climate issues" (P548)

"I also focus on campaigning and activism work I'm a part of, this helps me to channel some of the anger I feel into worthwhile action." (P561)

"I try to vote and support political actions against climate change and make sustainable choices when and where i can. I decided to not want children, which reduces anxiety." (P576)

"I cope by taking action where I can on climate change. Other than that, there's not really anywhere else that my anger can go." (P599)

"I try to discuss climate change with others." (P625)

"The way that I cope with climate change is by realising that I am hopeless and I am helpless and the only option I have left is to accept it and plod forward and nevertheless try my best to make some meagre difference." (P634)

"When I feel anxious, I do less of the things that might damage the environment, and I advise my family to join in." (P669)

"Generally I feel hopeless and completely despairing. I'm yet to find a way to rectify how I feel about climate change and the state of world politics in general aside from making small differences where I can." (P672)

"They are an underlying fear that I try and address by changing my lifestyle and spreading to others the most sustainable way to live." (P677)

"I try do my best in doing things that would reduce my own impact of climate change, while also making small changes in my household so my family can also participate." (P706)

"Sometimes, doing something which is beneficial to the environment can help me out." (P723)

"however when it does happen I tend to do research and sign petitions to feel as though I am doing something om to help" (P732)

"I try to make very conscious choices related to everyday life, including the food I eat and products I generally purchase, the way I travel, etc., which is my way of coping with the climate change stress and our impact on the environment." (P737)

"It usually affects me in terms of my occupation. I am a geologist doing my PhD, and my subject is almost pure science. Almost every day I think about other jobs that I could do with my knowledge instead of being in academia and working on rocks. My subject has very little to do with climate change and I feel like I am wasting my life for something that is not useful for the world to become better. Hopefully after I finish my PhD I can work on other subjects related to climate change." (P752)

"I live as sustainably as possible, and I encourage my family to do the same (eating little meat, choosing not to drive, avoiding dairy, etc.)." (P756)

"Going to climate marches has been an emotional experience for me as being physically with a large group of people who care reminded me that I'm not alone and there is a string movement." (P759)

"I've concluded that the only way to get over the anxiety is to look to pursuing a career path in combatting climate change and putting lessons on climate anxiety into good use." (P790)

"I try to think about solutions rather than consequences, but sometimes the solutions feel like too little too late." (P807)

"For me, climate change is something that it is happening and I can't control, so I try to help inthe ways I can, for example recycling or trying to don't waste water" (P813)

"Generally, I feel quite anxious about this, but it ebbs and flows. It is typically triggered by me noticing significant changes to my home nature, such as the false autumn last year. I have learned to cope with these emotions by setting up a community project which educates local people about climate change, advocates for climate mitigation and adaptation and pursues local biodiversity projects" (P814)

6.16.2.2.   *Subtheme 2.2 – Information seeking*

"It's hard to cope with something completely out of your control. I try to find things people are doing that are actually making huge strides in the battle against climate change." (P30)

"I'm only wary of the world around me and I stay updated on countries and nations failures to meet targets." (P50)

"I try to stay in touch with the climate positive news. Learning about extensive community action and small businesses trying to fight this crisis and promote collective sustainable action helps me refocus on why I am pursuing a career in the field." (P76)

"Keep engaged with the latest news in advancements being made in the correct direction to tackle climate change." (P93)

"Channel my emotions into researching how to be better for climate change as an individual, and then share on the knowledge" (P103)

"There are times when I'm hopeless, but I have been trying my best in learning more about the same so that i can contribute in climate change mitigation activities" (P142)

"I often try to help in ways I can towards climate change, such as keeping up to date and educating myself, signing petitions and working everyday to conciously lead a more sustainable life" (P179)

"I think of climate change and the dangers it poses to me personally and the whole of humanity quite often. I like watching David Attenborough's programmes because they suggest that there is still hope for a better future." (P253)

"Meditation, and seeing positive news about climate change" (P335)

"I watch videos on what can be done and talk to my family and friends" (P339)

"I usually watch videos on positive legislation/actions being taken to tackle climate change to decrease anxiety" (P373)

"I feel a lot of anger and sadness about how climate change is damaging the earth and itâ€™s animals. i handle these emotions by making small sustainable changes and reading good climate change news too" (P437)

"I do what I can to educate myself about climate change issues." (P452)

"I think mostly about climate change when I see information about it on social media. It causes anxiety and a panic I feel I cannot control as I feel helpless to change anything about climate change. To handle it I usually explore into the issue further and see the work done to counter it." (P505)

"There are some positive videos on YouTube about how scientists are creating projects to help combat climate change so I watch these to feel better." (P539)

"I look at the activism that is being done and the positive work towards climate change" (P540)

"I cope by making sure to balance the bad news i read with positive headlines, such as those about animals that are no longer at risk of extinction etc." (P556)

"Staying informed about the issue is also vital, and I like to read articles and watch documentaries to learn more about what's going on. Knowledge is power, after all." (P600)

"looking at positive news and focusing on what good is being done" (P655)

"I also try to widely read about these issues, which is both triggering that anxiety as well as soothing it, depending on what you read." (P675)

"I try not to doom scroll and instead read stories about positives in the environmental world." (P712)

"I try to stay up to date on new information regarding sustainable practices and adjust my choices accordingly." (P737)

"However, when I am thinking about Climate Change I cope by researching it as much as possible because I think more anxiety comes from the unknown." (P744)

"I look at optimistic sides of things, specifically good news stories" (P748)

"I'm studying something related to climate change so that is my way to cope with those feelings" (P771)

"I try to keep up to date with any positive climate change news - related to solutions or conservations successes and the work of charities and iniatives to tackle climate change impacts" (P786)

"Counteract all the negative news lines with all the good work being done by local and international wildlife charities which I follow on social media" (P821)

6.16.3. Theme 3 – Seeking support and meaning

6.16.3.1.   Subtheme 3.1 – Seeking social support

"That's a very personal and interesting question. I think climate change can trigger a range of emotions, such as fear, anger, sadness, guilt, hopelessness or anxiety. These emotions can be overwhelming and stressful at times. I try to cope with these emotions in different ways. Some of the strategies that I use are: Seeking support from others who share my concerns and values about climate change. I find it helpful to talk to friends, family or

online communities who can empathize with me and offer me encouragement or advice." (P33)

"But thankfully my parents and loved ones often help me with my emotional triggers." (P64)

"Chatting with friends or crying" (P86)

"I discuss it with my family or friends who agree with my perspective and concerns." (P90)

"Anxious - but talking to my parter, who is level headed and better keeps up with both the good and bad news helps a lot. Talking to my parents, and their experience of the Cold War helps as well." (P96)

"Talking about it with friends/ family" (P108)

"Cuddle my children closely and remind myself to just live every day to the fullest so if the world ends due to climate change then I can leave this world with no regrets. That I was able to spend what time I have with my loved ones, and I hope they will survive if I don't make it." (P177)

"I vent to friends and family, and engage in activism, but also focus on other things. Constant rumination with no resolution does no good." (P216)

"i will rant to someone about my feelings and share information so it doesnt overwhelm me" (P233)

"I usually talk to a friend and most of the time they also feel like the climate is affecting their mood, so we sit and complain together" (P311)

"However, I think being able to talk openly about it with others does wonders, being able to talk WHY its so worrying and know other people feel the same way can help immensely." (P345)

"Through finding community and struggling together against capitalism which values profit over humanity to try and make a difference." (P449)

"I also sometimes speak to family and friends about my concerns." (P452)

"I also talk to friends and family when I feel scared or worried" (P525)

"I would discuss these issues with my close friends who are consistent with the concept of environmental protection with me." (P549)

"My friends have similar mindsets regarding climate change therefore we often discuss our thoughts and emotions regarding it which is a good way of managing emotions" (P553)

"But perhaps the most important thing I've found is to connect with others who share similar feelings. It can be a tremendous relief to know that I'm not alone in this struggle. Together, we can commiserate, share ideas, and channel our emotions into meaningful action. In the end, it's all about acknowledging the emotional impact of climate change and finding ways to cope with it in a healthy and constructive way." (P600)

"Climate change makes me feel demotivated completely. I deal with it the best I can by receiving counselling and appreciating what I have in the moment but the nihilism which I feel due to climate change is a fair and rational response to the gravity of the problem we face." (P641)

"I talk about it regularly with my friends and family." (P675)

"Going to climate marches has been an emotional experience for me as being physically with a large group of people who care reminded me that Iâ€™m not alone and there is a string movement." (P759)

"I do not handle them in a particular manner. I use it to talk to my friends and learn more on my freetime, and try to choose classes relavant to climate change." (P768)

6.16.3.2.   *Subtheme 3.2 – Self-soothing and mindfulness*

"I use grounding techniques. I listen to ambient music" (P9)

"I meditate daily and read Chinese philosophy to put everything in perspective. Working hard and keeping healthy by eating well and doing exercise helps a lot" (P52)

"Through a bit of quite time and self reflection" (P127)

"I usually do yoga, pranayama and meditation to keep myself in a good mental state." (P130)

"i cry" (P153)

"Breathing exercises and reflection" (P195)

"I feel anxious that I am not doing enough. Especially after telling other people of the impact of their actions. Practicing what you preach weighs heavy on my mind and to ensure that I always live up to the mark gets stressful at times. But I give myself a break in those hard moments. An occasional slip is not much to be concerned about as long as one is consistent and mindful at other times." (P218)

"I cry quite a lot and feel a lot of anger" (P238)

"I cope thanks to taking direct action and making art." (P244)

"Meditation, and seeing positive news about climate change" (P335)

"I let myself feel them – they're justified" (P341)

"I reassure myself that there are activism groups and political parties who are fighting for this cause" (P357)

"I generally console myself be reminding myself that progress is being made (even though it is on a pitiful scale) and hope that the very human trend of only greatly acting during a dire crisis will pull is through eventually" (P364)

"I meditate and practice yoga to conectvwith myself snd the larger energy of life. I get outdoors and appreciate nature." (P405)

"Remember to breath and relax." (P441)

"Honestly I lay on the floor for a bit and do general anxiety exercises." (P508)

"Deep breathes and talking to someone about it" (P513)

"Sometimes I'll draw to get the emotions out and often I'll go for a walk and sit by a tree or something." (P559)

"Remind myself that the problem is bigger than me, and I can only make better choices as they are presented to me to the best of my ability." (P562)

"I try to care for myself in basic ways and remind myself of the good things that are happening in the world and on a local level." (P564)

"I try to breathe evenly and keep calm because I feel very anxious about the state of the planet and feel helpless to stop it from getting worse." (P586)

"I try to thing about living and focusing my mental efforts on the present instead of anxiety about the future." (P637)

"By doing what little I can, taking care of my mental health by stepping back when i get overhwlemed" (P655)

"In the same way I handle other forms of anxiety, with mindfulness, meditation and exercise" (P658)

"I journal all my feelings" (P713)

"Being a nature photographer I try to channel my energy towards photography and content witting as well as story writing where I can express my thoughts better." (P755)

"personally i would like to shift my mind in to being present. thinking too much about climate change sometimes scared me and feeling scared did not bring any good for my life." (P776)

6.16.3.3.   Subtheme 3.3 – Staying hopeful

"I try to think that I try my best and am hopeful the humanity will try there best. Even if governments or institutions don't." (P4)

"I try to look at the brighter side of things as to initiatives that have worked positively in mitigating climate change." P46)

"In these moments I try to focus on the good things and motivate myself to bring more change." (P116)

"I'm not generally anxious about climate issues. My religious faith plays a role in coping with potential triggers." (P137)

"Prayer and some time alone." (P169)

"Our planet is so powerful, mother earth will get rid of humans long before she dies herself. Not sure why we have this hightened sense of self-worth and importance, we are ants and mother earth is a tsunami, she is powerful and we are not, we don't need to worry about it, whatever happens will happen. This at least gives me comfort." (P240)

"Trust that it will get better some day" (P252)

"I just hope that governments and the big corporations responsible will changes" (P274)

"I reassure myself that there are activism groups and political parties who are fighting for this cause" (P357)

"I generally console myself be reminding myself that progress is being made (even though it is on a pitiful scale) and hope that the very human trend of only greatly acting during a dire crisis will pull is through eventually" (P364)

"I find it best to look at it with an optimistic approach. Its hard as it can seem to be avoident or unrealistic, but sometimes its the only solution when anything you do is on a very small scale." (P404)

"I get anxious thinking about the future and try to remind myself of the good in the world" (P439)

"Humans [mostly capitalists, politicans, and profiteers] got us here; we can also get us out of this. Hope as a discpline helps. Knowing that hopelessness is the first step in passivity

helps. A healthy dose of nihilisim [we are doomed regardless, so we must fight like hell anyways] alongside coping mechanisms soothes the pain too." (P449)

"I try to remain hopfeful for the future and take it day by day. Sometimes this is the best I can do." (P500)

"I have a 'we'll figure it out', we referring to me and my close network. As long as I'm with the people I love, I believe we can make do." (P504)

"Be hopeful that things can change. Understanding that extreme weather events can be survived and recovered from" (P554)

"I'm still anxious but I just try to think that world leaders will one day wake up to the changes they need to make and in worst case scenario, the world will recover once all humans are dead." (P587)

"it is scary seeing natural disasters and climate change on the news, but learning about the efforts people are doing to change is reassuring" (P686)

"I know that in later life and when applying for jobs I know I've always wanted to make a difference to be helping the environment or the animals within and so I try to remain positive that at least I will be making a difference" (P794)

"I understand that it will not be an instant change to the climate so it helps me be calm to know theres time to do something about it" (P801)

6.16.4. Theme 4 – Doomist thinking and behaviour

6.16.4.1.   Subtheme 4.1 – Harmful thinking and behaviour

"When I think about it too hard, I just feel like I inevitably end up at the conclusion that the best thing I could do for the planet would be to just die here and now, and that's not a pleasant thought. Might be selfish of me, but I do still want to live for now." (P16)

"I resort to habits that reduce my anxiety like binge eating or smoking." (P160)

"I don't (not well). On top of other things, climate change worries increases my feelings of self-hate for being comparatively helpless in it all." (P196)

"I tell myself that the faster humanity disappears, the better. It's time for another species to try and do better since we're clearly a deadly virus to Earth." (P275)

"I don't cope. As an autistic individual I understand that the world is not build for me anyway and i would rather not exist but i am too scared of dying." (P523)

"I drink" (P527)

"so I suppose my coping mechanisms aren't always healthy, I can also engage in other negative/unhealthy behaviours when I think about the inevitable effects of climate change, so I suppose I can be part of the problem." (P561)

"Eating sweets" (P571)

"Have an anxiety spiral then get on with it." (P616)

6.16.4.2.   *Subtheme 4.2 – Resigning and giving up*

"I think I've become fairly passive about it, because I've realised that there is nothing that I can realistically do that would make any sort of significant impact. I get quite angry knowing that the people and companies who are actually able to make a difference to the future of the plant realistically won't do anything because capitalism means that it's in their best interest to carry on as they are doing." (P17)

"However due to the nature of the study i am doing currently which is largely focusef in climate change its extremely hard not to feel pessimistic aboht current world condition and the geopolitical implications in climate change mitigation. It doesnt feel like me doing small things like recycling or cutting down my meat intake and trying to live a sustainable life is ever going to put a dent due to big corporations and the harm that they sre doing. Along with that i come from a third world country many of them are near poverty line and are highly vulnerable to climate change. I normally just feel helpless. Despite studying environmental science and climate change for 4 plus years i dont have solution like i thought i would. And i feel pessimistic about it." (P53)

"Mostly resigned to that it's a sooner or later thing." (P63)

"I don't know how to cope, when governments and businesses continue to devastate the environment. No amount of personal therapy or personal accountability can change these facts- until legislation actually catches up to the science of climate change, I don't think there is any realistic way for average people to reduce our anxieties about the state of the planet." (P66)

"The helplessness I feel actually helps with the anxiety. I just kind of accept that I am personally trying to not make unsustainable decisions, and ultimately, my role as a consumer is so small, because because even the "sustainable" choices are not actually that good, and there's a lot of green washing. So all I can do is vote for a government that takes it seriously" (P75)

"I am very worried about the future and I feel helpless most times." (P107)

"I honestly don't know by the time I become an older man, if I'll still have a world to live in, and I honestly don't know how to deal with it." (P132)

"I trying to make a peace with the fact that we are doomed" (P151)

"I feel as though my attempts to help with climate change aren't doing anything. Even if I try to use single use plastics less and recycle often, the rich will still be using private jets and companies will be throwing plastic into the ocean. I feel as though there's nothing I can do." (P155)

"I just accept the fact that at this point there is very little I can do and thus I shouldnt worry." (P180)

"I don't (not well). On top of other things, climate change worries increases my feelings of self-hate for being comparatively helpless in it all." (P196)

"bury my head in the sand" (P211)

"I have accepted we are doomed" (P259)

"so there is not much more I can do so I'e kind of just come to terms with that. I just hope that governments and the big corporations responsible will changes" (P274)

"I tell myself that the faster humanity disappears, the better. It's time for another species to try and do better since we're clearly a deadly virus to Earth." (P275)

"Think life is/will be too short to waste my time worrying about inevitabilities" (P297)

"I don't often feel anxious, I feel angry, because the issue seems too big to even feel anxious about. The worst seems inevitable and I can't even envision it, and it's the fault of people that I can't reason with or persuade. There isn't really a way to handle that." (P328)

"Accepted that we will not stop climate change so no point worrying about it anymore." (P332)

"I sometimes worry about my kids and grandchildren and what they might experience but I don't feel like there is much more I can do other than what I already do." (P366)

"there is no point doing anything to solve climate change from an individual perspective because there is nothing i can change. most carbon emissions are the work of big companies that i have no influence over who value oil and money over human lives." (P397)

"Iâ€™ve moved onto a radical acceptance of the state of the world while retaining a belief in our collective ability to enact change." (P422)

"I don't. I have given up, honestly. Seeing how millioners and billioners fly on private jets to meetings just to tell us we need to wash our tincans before throwing them away to "save the environment"? I'm honestly not sure if there's anything WE (common people) could do to help in the long term. Compare recycling a cardboard box with approving and building a new oil mine." (P429)

"It doesn't really trigger emotions anymore. It's just another part of the world/ life that's a bit shit. I used to get very anxious about animals and extinction specifically and the thought that I might live to see a world without certain beings in it. That was upsetting. But what support can be offered for that? I don't see how it's plausible. Counselling (AFAIK) is to help people deal with either personal issues like bereavement, identity struggles, to treat disorders etc it's for realising that perception isn't reality in a way - like anxiety and depression lie to you and you need outside help to realise it. With climate change it's actually happening – it's not our brains overreacting and lying. It's something (mostly)

everyone is experiencing at the same time. If I go to a counsellor and say I'm really anxious about the climate what are they gonna say? Yeah you should be." (P433)

"ive grown up knowing the world is ending so its always been a given" (P450)

"I feel sad about the future without healthy air and food" (P458)

"or I simply get overwhelmed by the existential anxiety and spiral into a period of poor mental and emotional health" (P503)

"I've become somewhat apathetic because I don't trust that change can truly be done and I sort of have faith." (P522)

"I have become quite doomy about the situation, I recently started eating meat again for example because I feel like nothing will change our reliance on big agriculture, so I suppose my coping mechanisms aren't always healthy," (P561)

"When the topic is brought up in a way that is discussing how we can change for the better helps, but at the end of the day it's not down to us as individuals to make the change, it's the massive billion dollar corporations that have to make the change so this makes me feel helpless." (P574)

"I accept that i cannot change it." (P576)

"I cope because I have no power over it. The thought that my individual life is somehow part to blame for the crisis is nonsense. Climate change cannot be dealt with on an individual basis and it is up to institutions such as [] University to take a stand on their role in the crisis." (P582)

"I don't really have any coping mechanisms, I find the situation increasingly demoralising." (P597)

"In general I tend to try not to think about my emotions in regard to climate change because I feel very powerless and insignificant" (P623)

"After spending most of my life worrying about climate change I feel like I have become desensitized to it. I don't let myself feel hopeful about the future because I know that every

positive action I see will be offset by selfish, greedy capitalists willing to burn the future for the sake of money. I feel completely helpless, no matter how much I cut down on the few luxuries in my life that doesn't come close to the pollution and carbon emissions of any one conglomerate, or even just one wealthy politician. No matter how I or the rest of [country] vote in elections and referendums we always end up going england's way, which generally is less progressive. The way that I cope with climate change is by realising that I am hopeless and I am helpless and the only option I have left is to accept it and plod forward and nevertheless try my best to make some meagre difference." (P634)

"but the nihilism which I feel due to climate change is a fair and rational response to the gravity of the problem we face. It is near impossible for me to be invested in a future for myself which is not garunteed and at this rate seems impossible" (P641)

"It's depressing, but I just carry on. I am completely powerless to change it within the capitalist system that we live in so why should I feel bad about it" (P680)

"I find it all very overwhelming and struggle to not feel anxiety. When you have someone like the primeminister preaching environmentalism to us but then taking hundreds of thousands of pounds (taxpayer pounds at that) to fly across the globe, it's a terrible feeling. I think it's fair to say, most normal people feel very powerless about the climate crisis." (P681)

"I mostly feel hopeless and anxious about the direction our world is headed and angry that the actors who actually have the influence and resources to change this are doing nothing useful. At this rate, I honestly do not see things getting any better. I am too busy to let myself dwell on those feelings for long, but I do not look forward to the future of our world at all." (P709)

"I have accepted our fate so I do not feel stressed" (P784)

"As a geography student, I've kind of come to terms with issues already." (P790)

"I'm very much not in denial as I'm acutely aware of the situation, but feel powerless and not in a position to do very much to stop it" (P803)

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