

Climate emotions: A grounded theory of climate emotions in students and a meta-analysis of gender differences in climate emotions

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Portfolio Abstract

Introduction

Human activity is the primary cause of climate breakdown, presenting one of the most significant challenges to humanity. Awareness of the threat that climate breakdown poses to all life on Earth causes distress in people, often described as climate or eco-anxiety. Young people especially experience this distress. However, there is no clear consensus on its impact. Although growing literature suggests that women report higher climate and eco-anxiety scores than men, this has not been consistently documented.

Methods

The systematic review, a meta-analysis, focused on synthesising gender (men, women) differences in climate and eco-anxiety, measured by the Climate Change Anxiety Scale (CCAS) and Hoggs Eco-Anxiety Scale (HEAS). The empirical paper developed a grounded theory, adopting a critical realist approach, based on the experiences of 10 young people who were higher education students and identified as having climate anxiety or significant climate-related concerns.

Results

The meta-analysis found a small effect of gender, with women scoring higher on climate and eco-anxiety scales than men. Moderator and subgroup analyses of mean sample age and type of questionnaire revealed no impact on gender effects on climate and eco-anxiety scores. Visual inspection indicated that the country of residence did not obviously influence the gender effect. A cyclical explanatory model was developed regarding how awareness of climate breakdown grows, its emotional, cognitive, relational, and mental health impacts, and what coping strategies are beneficial, such as making sense of it all, acceptance, connecting with what is important, and taking action.

Conclusion

Overall, the meta-analysis found that women score higher than men on climate and eco-anxiety measures, and the empirical project developed a grounded theory of growing climate breakdown awareness, its impact and helpful coping strategies in higher education students who identified as having climate anxiety or significant concerns. Recommendations for future research and clinical implications were given.

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Chapter One: Introduction to Thesis Portfolio

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Climate change

Climate change is and will be one of humankind's most difficult challenges (Intergovernmental Panel on Climate Change, IPCC, 2023). The authors of the IPCC (2023) report used scientific data on climate change to emphasise the urgent need for climate action. The authors also unequivocally confirmed that human activities have led to global warming. They shared that the global surface temperatures reached 1.1°C in 2011-2020 above that of 1850-1900. Their climate models project that the surface temperature will increase by 3.2°C by 2100. The report further stressed that climate change is significantly impacting the weather and climate events around the world, resulting in significant loss and damage to both people and nature.

There is clear evidence that exposure to weather and climate events like hurricanes, floods, and droughts increases the risk of developing mental health conditions such as post-traumatic stress disorder (PTSD), depression, and anxiety (Liu, et al., 2021; Walinski, et al., 2023; Brandt et al., 2024). The severity and duration of these mental health conditions can be worsened by psychosocial stressors, including financial hardship, forced migration, vulnerabilities like pre-existing mental health issues, low social support, and limited access to mental health care (Walinski et al., 2023).

The United Nations (UN) released a statement in 2021 that climate breakdown is a humanitarian crisis (UN, 2021). Through modelling possible future scenarios, the IPCC (2023) report urged the necessity of reducing emissions by at least 43% by 2030, compared to emissions in 2019, to remain below a critical threshold of 1.5 °C. The report also highlighted that climate mitigation action needs to prioritise equity, social justice, and inclusion, as climate breakdown can further widen inequalities, which will affect all and could include violence and displacement (IPCC, 2023; UN, 2021).

The need for urgent action was further brought to our attention over the last year by the most recent catastrophic and severe weather events all over the world, such as extreme heat in the Sahel region of Africa, longer drought in southern Africa, flooding in Europe and draught and consequential fires in the United States (US), in Los Angeles.

However, the UK's Department for Environment, Food and Rural Affairs (DEFRA) National Adaptation Programme published in 2023, which covers a five-year period to address rising sea levels, developing more green spaces near built-up areas and a plan for infrastructure to withstand extreme temperatures and flooding, is falling short on what actually needs to be done (Climate Change Committee, CCC, 2024). The CCC stressed that the governmental plans need an urgent revision. Further, Friends of the Earth (2024) have taken legal actions against the UK as they point out that the National Adaption Programme has failed to meet the legal requirements of the Climate Change Act 2008. This shows the

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discrepancy between scientific evidence of what action is needed and the lack of action taken by those in power.

This discrepancy was recently further underscored by Donald Trump's action to sign the order to withdraw from the Paris Climate Agreement on the first day of his presidency, as well as putting plans in motion to reverse the US climate regulations that were previously put in place (McGrath, 2025).

Terminology

Although the IPCC uses the terminology of climate change to describe global warming, changes in climate patterns and extreme weather events, it has been criticised as not being an accurate term to describe this phenomenon (Carrington, 2019). As we are beginning to witness the consequences of climate change more and more and becoming more aware of the immediate and severe threat of drought and rainfall, a term reflecting this severity seems more fitting. Therefore, climate breakdown is seen as a more appropriate term (Carrington, 2019) and will be used in this thesis portfolio. Throughout the development of the thesis portfolio, the author has observed her tendency to use language that makes the phenomenon sound less threatening and wondered whether this was a way to keep emotions “at bay” and not fully take notice of the threat posed on all life on Earth. Therefore, using the term climate breakdown throughout her thesis was seen as a step towards her acceptance of this.

Throughout this thesis, different terms will be used to refer to the impact the awareness of climate breakdown and environmental degradation can have on people. This impact is often psychologically distressing, evokes a range of different emotions and can affect people's functioning (Calabria & Marks, 2024; Ojala et al., 2021; Pihkala, 2020). While this response is frequently called climate anxiety or eco-anxiety, it can encompass a range of “negative” emotions, not only anxiety (Ojala et al., 2021). There is no clear consensus on what climate anxiety or eco-anxiety is nor how to measure it (Dijk et al., 2024).

Although these terms could risk pathologising people's threat responses to the biggest challenge that humankind is currently facing, most of the participants in the empirical project shared that although they thought they were not perfect, they had found these terms helpful, as they gave them a language to express their distress and helped connect with others. However, the thesis title refers to climate emotions rather than climate anxiety, as the author, at the point of submitting the thesis title, thought that this more accurately reflected the emotional response to people's awareness of climate breakdown. Overall, the thesis will use different terms somewhat interchangeably, drawing from a perspective that the terms

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climate anxiety and climate emotions both reflect the effects of awareness of climate breakdown as a spectrum of emotional and functional responses.

Making sense of climate emotions

The researcher takes the stance that strong climate emotions (including climate anxiety) should not be viewed through a medical or pathologising perspective. The author views non-paralysing climate emotions as a healthy, proportionate and important way to feel, given the current state of the Earth, the impending climate crisis and the lack of action seen by those in power. The researcher also views strong climate emotions as functional, motivating actions to address the problems head-on. This is not a unique view and has been shared by many (e.g. Bhullar et al., 2022; Clayton, 2020; Cunsolo et al., 2020; Verplanken et al., 2020). However, if individuals are completely incapacitated by their thoughts and feelings on the topic, it may no longer be a helpful threat response, and further psychological support may be needed. Furthermore, while engaging in climate action can be beneficial for those who experience climate anxiety or climate emotions, it may also contribute to some individuals placing disproportionate expectations upon themselves to take action (Williams, 2023).

The author feels that a contextual approach to explaining people's climate emotions, such as using the Bronfenbrenner Ecological Systems model (Bronfenbrenner & Morris, 2006) can be helpful. Bronfenbrenner's nested systems would include climate breakdown as influences on the patterning of environmental events in the 'chronosystem', meaning 'over time', and in the 'macrosystem', which includes attitudes and ideologies of the culture. These broader environmental phenomena, in turn, influence more immediate systems which surround individuals, such as universities, friends and families. This conceptualisation encourages attention to broader societal influences, which could help facilitate meaningful and impactful social change.

Similarly helpful is the more recently developed Power Threat Meaning Framework (PTMF) by Johnstone and Boyle (2018). The PTMF is an approach, alternative to the approach of psychiatric diagnosis, which focuses on understanding emotional distress through power dynamics, their associated threats, and the meaning a person makes of these. Thus, the framework helps create a more hopeful narrative of people's distress, emphasising the importance of the influences of the different types of power (such as social/cultural, legal, economic, political and ecological power) on their mental health. This framework has been suggested for use in conceptualising the distress experienced due to climate breakdown (Morgan et al., 2022). With climate breakdown progressing and the

likelihood of human beings experiencing more threat to life, more people will start to experience significant distress (Wainwright, 2024). The PTMF can help people create a narrative of these experiences, which is non-pathologising, and help conceptualise their difficulties in order for people to understand the relationship between climate breakdown and their mental health. This approach of making sense of people's threat responses can be used in clinical psychology to formulate their difficult experiences and help inform psychological support.

Research has shown that experiencing climate emotions may increase people's climate action and pro-environmental behaviour (Ballew et al., 2024; Boluda-Verdú et al., 2022; Ogunbode et al., 2022). On a similar note, climate change-related worries have been shown to be often constructive and a pro-environmental response to the issue faced (Verplanken et al., 2020). Others have suggested that, although they acknowledge that it is not a mental health condition, there would be benefits to treating climate anxiety as such in order to increase research in this area and help those who experience it to find effective coping strategies (van Valkengoed, 2023). However, although this approach might be well-intentioned, it would come with the risk of these emotions feeling invalidated and thus may cause further distress. An alternative approach may be to explore the idea of thresholds of climate anxiety, similar to those in other questionnaires that help understand the intensity of people's experiences and, consequently, their need for support. An example of this is the thresholds of the Generalized Anxiety Disorder-7 questionnaire (Spitzer et al., 2006).

Grounded theory

At the start of this thesis, a grounded theory approach (Strauss & Corbin, 1998) was proposed because, at the time, research mainly explained climate anxiety using existing anxiety theories (Pihkala, 2020). As climate anxiety is a relatively new concept, using existing theories to understand the concept may not be sufficient. Therefore, a bottom-up approach, such as grounded theory, asking individuals who experience climate anxiety or significant concerns to share their experiences and understandings, gives an opportunity to develop an explanatory model grounded in people's experiences. Grounded theory's iterative process allows an in-depth exploration and constant refinements to develop a model from the data without being constrained to pre-existing themes. Therefore, the grounded theory approach was preferred over other qualitative approaches, such as thematic analysis (Braun & Clarke, 2006).

Relevance to clinical psychology

Wainwright (2009) wondered how clinical psychology might need to adapt to address the challenges that we will face because of climate change and to help support people in becoming more aware of their bidirectional relationship with nature. Numerous years later, many mental health professionals still feel under-informed to support people with climate change-related emotions (Croasdale et al., 2023; Hoppe et al., 2023) and young people across the world are asking for appropriate climate-aware mental health support (Diffey et al., 2022). Therefore, it is crucial to support mental health professionals to understand further the emotional burden many experience due to the current state of the Earth. Furthermore, a recent study by King (2024) suggested additional evolving roles central to clinical psychologists, which could support people and the planet they live on. The author suggested that clinical psychology must first acknowledge the root causes of climate breakdown and people's emotional responses. There is evidence that this is starting to happen as climate change is now mentioned in the Clinical Psychology Training Standards (BPS, 2024). King (2024) further proposed that psychology might cultivate a nature-based perspective on mental health while assisting others in overcoming cognitive defence responses in order to engage with the topic of climate breakdown. King's final suggestion was that clinical psychologists could act more pro-environmentally and become more political, engage in climate activism, and support others to do so in order to work towards social justice collaboratively.

Overall, it is clear that clinical psychologists are well-placed to conceptualise the challenges caused by climate breakdown, behavioural adaptation, and mitigation. Furthermore, they hold responsibilities to advocate for health, prevent ill health in communities and understand how broader societal issues can impact mental health in populations (HCPC, 2023). However, clinical psychologists still face professional barriers to voicing concerns and taking action for planetary health within their professional roles (Walker, 2021).

Demographics

The systematic review in this portfolio focused on the demographic factor of gender and how this may impact the scores on scales that aim to measure climate and eco-anxiety. Gender was looked at because the IPCC (2023) suggested that some genders, e.g., women, can be disproportionately impacted by the impacts of climate breakdown. This may relate to the idea that the perceived threat of climate breakdown can amplify threats individuals face through social injustices, such as existing mental health difficulties, gender, race and disabilities (Clayton et al., 2021; Gebhardt et al., 2023). Establishing whether there are

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gender effects on climate and eco-anxiety measures may encourage further research to understand the mechanisms behind any possible effects. Similarly, young people have been reported to experience climate and eco-anxiety more strongly than other adult populations (Ballew et al., 2024), and therefore, it was decided for the empirical project to explore the experience of young adults who were in higher education. Although the thesis portfolio focused on some demographic factors, it needs to be acknowledged that exploring intersectionality is important, and, unfortunately, the capacity for this was limited in this portfolio.

Summary of the thesis portfolio

This portfolio will explore gender differences in climate and eco-anxiety scores in a meta-analysis and systematic review. The empirical project will qualitatively explore the impact of awareness of climate breakdown in students who identify as having significant climate concerns or climate anxiety. Using grounded theory, the study will develop a model of growing climate breakdown awareness, its impacts, and helpful coping strategies for these students. Ideas of support for people through clinical practice and public health interventions will be provided.

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Chapter Two: Systematic Review and Meta-Analysis

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A meta-analysis of gender differences in climate anxiety and eco-anxiety scores

Prepared for Submission to the Journal of Environmental Psychology (see Appendix A for submission guidelines)

Climate emotions: A grounded theory of climate emotions in students and a meta-analysis of gender differences in climate emotions

A meta-analysis of gender differences in climate and eco-anxiety scores

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Abstract

Human activity is the leading cause of climate breakdown, posing one of humankind's most difficult challenges (Intergovernmental Panel on Climate Change, IPCC, 2023). Awareness of the threat that climate breakdown places on all life on earth causes distress in people and can be described as climate and eco-anxiety. Although there is a growing literature suggesting that women have higher climate and eco-anxiety scores than men, this has not been consistently reported. To our knowledge, this was the first meta-analysis aiming to synthesise the climate and eco-anxiety scores, measured by the Climate Change Anxiety Scale (CCAS) and the Hoggs Eco-Anxiety Scale (HEAS), across different genders. The meta-analysis also aimed to find out if gender effects are moderated by mean sample age and the type of questionnaire used, and visual inspection aimed to see whether the gender effect is impacted by country of residence.

This meta-analysis found a small effect of gender, in which women scored higher on climate and eco-anxiety questionnaires (CCAS, HEAS) than men. This finding was consistent across mean sample ages, questionnaire type and on inspection, country of residence. Results should be interpreted with some caution due to high levels of heterogeneity across studies. Directions for further research, such as controlling for other possible influencing factors, including a wider range of questionnaires, including gender-diverse participants and looking at other demographic variables, are also given. In clinical practice, these results will help to inform the formulation of the reactions to climate breakdown by both individuals and communities.

Introduction

Climate breakdown is posing a major threat to ecosystems and humankind making it one of the most difficult challenges that humanity has faced (Intergovernmental Panel on Climate Change, IPCC, 2023). It is becoming clearer how human wellbeing and mental health are negatively affected by climate breakdown through extreme weather events, natural disasters, forced migration and conflict (Berry et al., 2010; Cianconi et al., 2020; Fritze et al., 2008; IPCC, 2023; Hayes et al., 2018).

The indirect impacts, through people's awareness of the devastating effects of climate disruption and environmental degradation, have also been found to cause significant psychological distress (Calabria & Marks, 2024a; Ojala et al., 2021; Pihkala, 2020). Although this is often referred to as climate or eco-anxiety in the literature, it can encompass a range of "negative" emotions, not only anxiety (Ojala et al., 2021).

There is an emerging consensus that the emotions and distress experienced due to climate breakdown and environmental degradation should not be pathologised but instead made sense of as understandable reactions to the threat humanity is facing (Adams, 2021; Hickman, 2020). This aligns with a wider perspective that the medical approach to understanding distress (for example, relying principally on diagnoses) can blur the link between distress and different forms of social injustice (e.g., Boyle, 2013; Dillon, 2019). Alternative conceptualisation frameworks such as the Power Threat Meaning Framework (PTMF) make sense of a person's struggles with distress by incorporating the impact of power imbalances, the threat a person faces, and the meaning a person makes of it all (Johnstone & Boyle, 2018).

Although climate anxiety can engage people in constructive pro-environmental action (Verplanken et al., 2020), just like any distress, studies have shown that climate anxiety can pose a threat to people's overall wellbeing (Gago et al., 2024; Ogunbode et al., 2022) and is associated with mental health difficulties (e.g., Clayton & Karazsia, 2020; Reyes et al., 2023). Furthermore, both climate and eco-anxiety have been shown to correlate with experiences of environmental problems (Hogg et al., 2023) and it is expected that as global policies stand climate breakdown will not be sufficiently mitigated and humans will face more threats to life in the future and consequentially more people are likely to experience distress, such as climate and eco-anxiety (Hogg et al., 2023; Wainwright, 2024).

Injustices, such as gender inequalities, racism and class oppression, have been suggested to compound the impact of climate breakdown making people more emotionally vulnerable with greater impacts on wellbeing and mental health (IPCC, 2023; Porter et al., 2020; WHO, 2014; Williams, 2021).

Women have been found to experience higher climate and eco-anxiety than men (Çimşir et al., 2024; Larionow et al., 2022; Rocchi et al., 2023; M. Wullenkord et al., 2021) but this has not been conclusively reported (Clayton & Karazsia, 2020; Hogg et al., 2024; Wullenkord et al., 2024) and may depend on the country of residence (Hogg et al., 2024). Given the growing, somewhat inconsistent, and at times overwhelming body of research on gender differences in climate and eco-anxiety, this meta-analysis sought to synthesise this research effectively to help understand whether gender differences exist in climate and eco-anxiety scores.

It is also important to differentiate between sex and gender, both of which are non-binary (Heidari et al., 2016; Schudson & Morgenroth, 2022). Sex refers to the person's biological characteristics, such as hormones and chromosomes, internal and external anatomy, etc., (National Institutes of Health, 2015), whereas gender often refers to the sociocultural construction facilitated through gender socialisation, such as social norms, roles, stereotypes and cultural expectations based on a person's biological sex (World Health Organisation, 2024). A binary gender model has been deconstructed and gender can include many other possibilities, such as gender diverse and non-binary identities (Vijlbrief et al., 2020; Wilson et al., 2024), these can include having no gender, having a genderqueer or fluid gender identity (Hegarty et al., 2018; Schudson & Morgenroth, 2022). Societal understanding of gender is still evolving, and language and constructions of gender possibilities are still emerging (Wilson et al., 2024).

The social role theory (Eagly & Wood, 2016) may offer some insight into gender inequalities and possible differences in climate and eco-anxiety scores. However, it simplifies the complexities of gender by focusing on binary gender identities (male and female). The theory posits that societal norms and expectations about gender roles influence people's behaviours and attitudes. The theory suggests that women may be socialised to be more nurturing and empathetic, which perhaps can be generalised to all life on Earth and, in turn, impact their experience of climate and eco-anxiety. Findings show that women are more sensitive about environmental issues than men, engage more in pro-environmental behaviour, and are more expressive about their concerns about their consumption's environmental impact (Brochado et al., 2017; Čater & Serafimova, 2019; Li et al., 2022).

Furthermore, women may be socialised to be more emotionally expressive (Chaplin, 2015; Fischer & LaFrance, 2015) and, therefore, may also be more expressive about their climate breakdown-related emotions. This can be linked to how mental health difficulties can be expressed differently across genders, for example, women are more likely to internalise their mental health difficulties, showing symptoms of depression and anxiety, while men are

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more likely to externalised mental health difficulties and face struggles with substance or alcohol use (Kessler & Wang, 2008).

Moreover, social norms and gender stereotypes can impact the lack of power women perceive when facing climate breakdown (WHO, 2014). Additionally, more generally, women tend to assess the world as more dangerous than men and perceive more environmental threats, which can lead to more worries about climate breakdown (Ortega-Egea et al., 2014).

As climate anxiety is a newly evolving concept, it has not been consistently conceptualised in the literature (Dijk et al., 2024; Ojala et al., 2021). Such variations in conceptualisation and measurement make it challenging to compare results across studies and thus make it harder to compare across groups, locations and time (Coffey et al., 2021; Heeren et al., 2022). The measurement tools that have recently been developed reflect the different conceptualisations of climate anxiety, with some questionnaires designed to measure different aspects of anxiety, distress, worry or concerns related to climate breakdown and environmental destruction. Recently, 12 questionnaires assessing the different conceptualisations of climate and eco emotions and concerns have been shown to have low content overlap suggesting that there is not enough consensus on what climate anxiety is and how to measure it (Dijk et al., 2024).

Therefore, to reduce possible heterogeneity in the data only two well-established and widely used questionnaires were used for this meta-analysis: the Climate Change Anxiety Scale (CCAS; Clayton & Karazsia, 2020) and the Hoggs Eco-Anxiety Scale (HEAS; Hogg et al., 2021), which measure climate anxiety and eco-anxiety, respectively, with the HEAS focussing not only on responses to climate breakdown but also on responses to environmental degradation. Although the two measures explore different conceptualisations and manifestations of climate and environment-related anxiety, their subscales were strongly positively intercorrelated (Hogg et al., 2023) and Dijk et al., (2024) suggested that the two measures most overlapped on question content compared to other measures.

The CCAS (Clayton & Karazsia, 2020) focuses on climate anxiety, capturing cognitive-emotional impairments measured by eight items (e.g., “Thinking about climate change makes it difficult for me to concentrate.”) and functional impairments measured by five items (e.g., “I have problems balancing my concerns about sustainability with the needs of my family.”) Clayton and Karazsia’s original version also included items that measure experience of climate change and behavioural engagement, however, these are not part of the commonly used 13-item version. Respondents indicate how often they experienced each statement over the last two weeks (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, 5 = *almost always*).

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The HEAS (Hogg et al., 2021) focuses on capturing the emotional responses to climate change and other environmental conditions via four items (e.g., “Feeling nervous, anxious or on edge”), rumination through three items (e.g., “Not being able to stop or control worrying”), behavioural symptoms in three items (e.g., “Difficulty enjoying social situations with family and friends”), and personal impact anxiety across three items (e.g., “Feeling anxious about the impact of your personal behaviours on the earth”). Respondents indicate the frequency they experienced statements over the last two weeks when thinking about climate change and other global environmental conditions (0 = *not at all*, 1 = *several of the days*, 2 = *over half the days*, 3 = *nearly every day*).

A meta-analysis to estimate the effect size of gender and sex differences of categorical identities (likely with a focus on women and men) in climate and eco-anxiety was conducted to help synthesise the inconsistent results on whether women score higher on climate anxiety and eco-anxiety scales than men. The research will also help to gain an overview of the literature on climate anxiety in gender-diverse identities, such as trans and non-binary gender identities. Understanding possible gender differences in climate and eco-anxiety is important for clinicians when formulating people’s or communities’ reactions to the ever-present stressors of climate breakdown. In formulation, it is important for the clinician to be informed about social and cultural factors that can impact people’s experience of difficulties, how they express them, and their sense of coping. For example, conceptual frameworks such as the Social GRRRAACCEEESSSS (Burnham, 2012), which suggests several characteristics, such as gender, race, age, class and spiritual beliefs, can be integrated into clinical practice and formulation. The Power Threat Meaning Framework (Johnstone & Boyle, 2018) can further help in broadening the understanding of how inequalities can impact people’s wellbeing and mental health.

Furthermore, a gender and sex-based analysis can help make research findings more generalisable and could lead to further research, which might increase the understanding of the underlying factors of the differences or similarities. This can then help people make further sense of their experiences and find ways to move forward.

The meta-analysis also looked at potential moderators of the estimated effect of gender and sex on climate and eco-anxiety scores, such as the average age of the samples and the type of questionnaire, CCAS and HEAS. Younger individuals have been shown to have higher climate anxiety scores (Milfont et al., 2021), and gender and sex differences may be more pronounced in younger samples before they are likely to experience parenthood, as parenthood can increase worries about climate breakdown in men (Ekholm, 2020). Furthermore, it is important to see whether the type of questionnaire moderates the estimated effect size of different scores across genders. Gender and sex effects were also

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inspected to see if they differed across countries of residence, as has been previously suggested (e.g., Hogg et al., 2024).

The meta-analysis is addressing the following questions:

Research Question 1: Is there a significant effect of gender and sex on climate and eco-anxiety, measured by the CCAS and the HEAS, respectively?

Research Question 2: How do gender and sex differences in climate and eco-anxiety change due to moderators, such as sample mean age (under 22 years, over 40 years) and type of measure (CCAS, HEAS)?

Research Question 3. Using visual inspection, do gender and sex effects differ across countries?

Methods

Search strategy

This systematic review was registered on the PROSPERO register, an international prospective register of systematic reviews, on September 27, 2024. The inclusion and exclusion criteria, the search and screening strategies, and the proposed analysis was outlined (registration number: CRD42024584169). The Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guideline (Moher et al., 2010) were used to inform the reporting of this review.

Using initial searches via the University of East Anglia's Online Library facility, the relevance of articles was reviewed. The databases that stored the relevant articles were recorded and included in the main search. The final electronic searches took place on the 1st of October 2024. Five databases were searched and included: PsycINFO, Academic Search Ultimate, MEDLINE, Web of Science and CINHALL Ultimate.

The search terms used to search the titles of articles were the following: A term referring to climate change i.e., "global warming" OR eco* OR climate OR "climate change" OR environment* OR "environmental change" OR "climate crisis" OR anthropocene and these were specified to be within three words of a term referring to people's emotions, i.e., anxiety* OR grief* OR emotions OR concerns OR fear* OR despair* OR anger* OR guilt* OR angst OR worry* OR distress*.

The abstracts of articles were searched for the following terms: Gender OR sex OR male OR female OR transgender OR non-binary OR man OR woman OR women OR men OR boys OR girls. The asterisk (*) was used to identify words with the same start of the word but different endings. OR was used to inform the system that only one of the terms needed to be present. Quotation marks around phrases were used to allow phrase searching. The search terms were run using the following parameters: full-text only and English language.

Inclusion and exclusion criteria

Several criteria were applied to ensure only the most appropriate studies were included. The inclusion criteria included the following: peer-reviewed studies (i.e., theses were excluded) and published in the English language. Only peer-reviewed studies were included, as the quality of these would have been thoroughly scrutinised, ensuring the quality of the data included in the meta-analysis. Upon an initial inspection of search results, it was decided to only include articles using the 13-item CCAS (Clayton & Karazsia, 2020) or the 13-item HEAS (Hogg et al., 2021). The rationale for this was that these questionnaires

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had shown good validity (Clayton & Karazsia, 2020; Hogg et al., 2021) and are currently among the more commonly used questionnaires and overlap most in their question content (van Dijk et al., 2024). This study focused on comparing climate or eco-anxiety across the different genders or sexes of people of all ages, this was to see if there might be variations in gender or sex effects across different ages; therefore, studies that included children were also considered. At least two genders or sexes needed to be compared to allow a between-groups effect size to be calculated. Studies were only retained if they provided adequate statistics to calculate relevant effect sizes. Longitudinal, follow-up and cross-sectional studies were included.

The exclusion criteria included studies that did not use either of the 13-item CCAS or the 13-item HEAS to assess climate and eco-anxiety, studies that did not compare climate and eco-anxiety across different genders or sexes, articles classed as secondary research (review articles or meta-analyses), articles using a qualitative approach, opinion or personal reflection articles, books, book reviews, case studies and animal studies. Articles that did not provide the necessary data to estimate the effect size of climate and eco-anxiety differences across gender or sex were also excluded.

Results

Screening and selection of studies

The final searches using the five databases, conducted on the 1st of October 2024, identified a total of 634 records, with the PsycInfo EBSCO database yielding 100 records, CINHAL Ultimate EBSCO yielding 38 records, Medline Ultimate EBSCO yielding 139 records, Academic Search Ultimate EBSCO yielding 116 records and Web of Science yielding 241 records. No hand searches via articles' references were conducted. After removing duplicates, 306 records were retained (see Figure 2.1) and screened by the first author (P. R.). An independent reviewer (N. E. A.) reviewed a randomly selected 30% of articles in order to blindly verify the title and abstract screening process and a further 26% of articles to blindly verify the full-text screening process. First, the studies were screened at the title and abstract stage. Following the title and abstract screening, 61 articles were retained and included in the full-text screening stage. This led to a further reduction, and 15 studies were included in the systematic review and meta-analysis, which met the inclusion criteria. The independent reviewer reviewed 92 articles at the title and abstract screening stage and 16 articles at the full-text screening stage. Screening results of both researchers were in 93% agreement (N= 86) at the title and abstract stage. Disagreements between the two reviewers were resolved through discussions during which the inclusion and exclusion criteria were consulted. The full-text screening results were 81% in agreement (N=13); here, the second reviewer did not reach an inclusion or exclusion decision for three articles. However, after discussing and referring to the inclusion and exclusion criteria, the reviewers came to a joint decision that was 100% in agreement with the first reviewers' screening results.

Figure 2.1

PRISMA flow chart showing the screening and selection process.

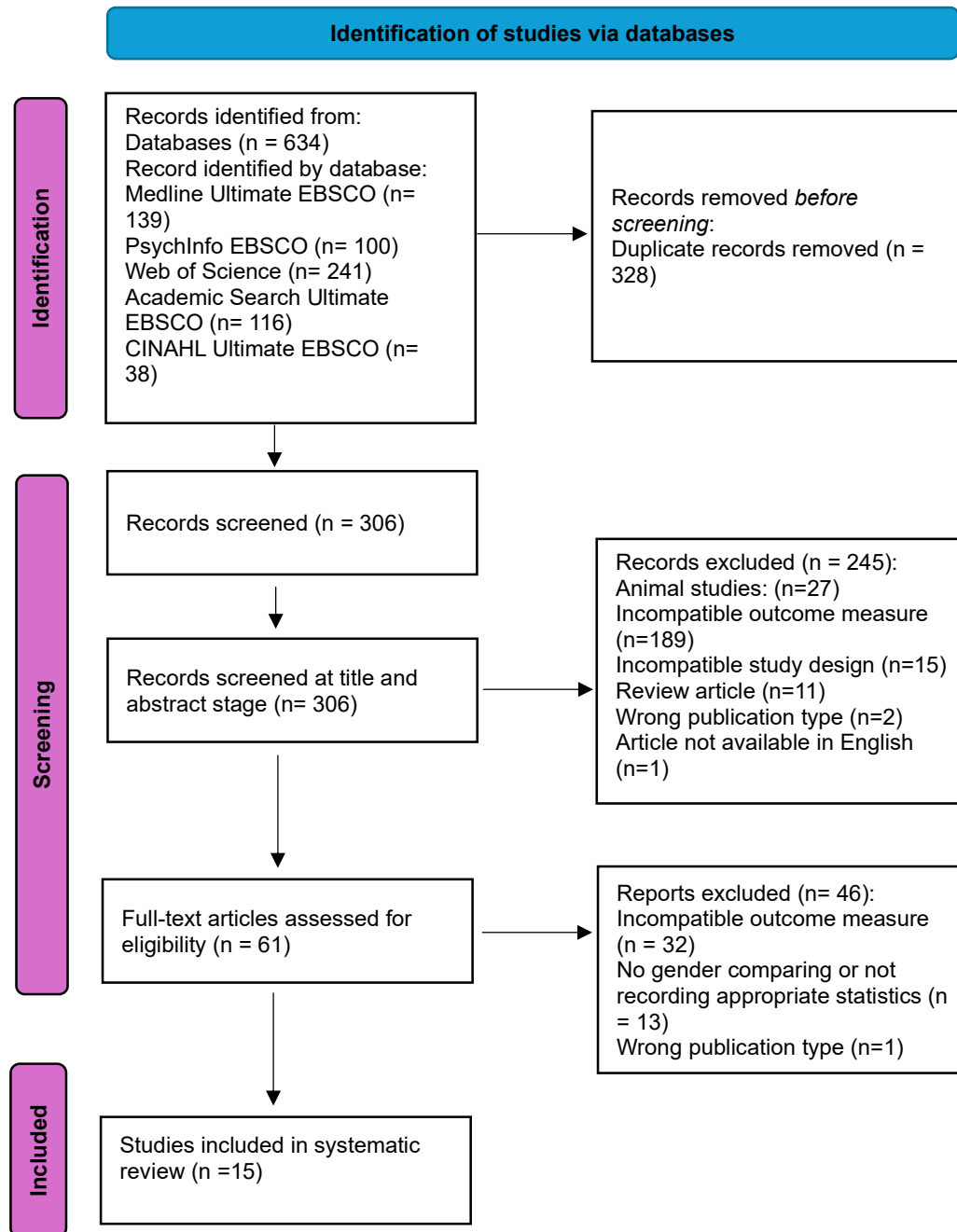


Table 2.1

Study characteristics.

Study	Measure	Age, mean (SD)	Location	Female N	Male N	Non-binary* or other** or no answer*** N	Total N	County's financial status	Total CASP score
Larionow et al. (2022)	CCAS	25.32 (9.59)	Poland	344	247	12*	603	HI	21
Rocchi et al. (2023)	HEAS	32.06 (11.26)	Italy	207	113	15 ***	335	HI	20
Fekih-Romdhane et al. (2024)	CCAS	28.57 (11.08)	Lebanon	484	279		763	LMI	18
Leite et al. (2023)	CCAS	25.73 (10.83)	Portugal	402	133		535	HI	17
Er et al. (2024)	HEAS	21.36 (1.74)**	Turkey	513	96		609	UMI	18
Çimşir et al. (2024)	HEAS	31.14 (11.75)*	Turkey	236	149		385	UMI	19
Wullenkord, et al., 2021	CCAS	43.91 (13.97)	Germany	517	494		1011	HI	21
Türkarslan et al. (2023)	HEAS	26.54 (8.25)	Turkey	423	182		605	UMI	17
Ramírez-López et al. (2023)	CCAS	21.4 (1.6)	Mexico	306	155		461	UMI	19
Rodríguez Quiroga et al. (2024)	HEAS	32.31 (14.16)	Argentina, Spain	1035	503		1538	HI, UMI	17
Kabasakal-Cetin (2023)	HEAS	21.19 (1.81)	Turkey	370	235		605	UMI	20
Heeren, et al., 2022	CCAS	43.04 (13.52)	French speaking African and EU countries	1079	1001		2080	HI to LI	17
Zimmermann et al. (2024)	CCAS	21.9 (1.84)	Switzerland	959	252		1211	HI	19
Pitron et al. (2024)	CCAS	32.7 (12.4)	Germany	282	123	16 ** & ***	421	HI	19
Wullenkord et al. (2024)	CCAS	44.65 (14.38)	Germany	1047	1005	21*	2073	HI	21

Notes: CCAS; Climate Change Anxiety Scale; HEAS = Hoggs Eco-Anxiety Scale; N = number of participants; HI = High Income; UMI = Upper Middle Income; LMI = Lower Middle Income; LI = Low Income; CASP = Critical Appraisal Skills Programme. * Indicates that the SD had to be estimated. ** Indicated that the mean and SD had to be estimated.

Data extraction

Several extraction criteria were set before data was extracted to clarify any uncertainties in the process. The means and standard deviation (SD) of climate and eco-anxiety scores presented by different genders or sexes, as well as alternative statistics such as correlation coefficients, were included. For longitudinal studies with multiple assessment time points of climate and eco-anxiety, effect sizes or means and SD were selected from the first available time point, and data from subsequent time points were omitted.

A data extraction spreadsheet was used to collate the following information from each study: type of study design, total number of participants, number of participants of each gender/sex, mean age and SD of study participants and participants' characteristics and country of residence. Information on the measures used, mean scores and SD on measures, and/or other relevant statistics reported. The data were extracted by the first author. Due to time constraints, authors were not contacted when the necessary descriptive or quantitative data could not be obtained from the article (i.e., means and SD).

Quality assessment and risk of bias

Study quality was assessed using the Critical Appraisal Skills Programme (CASP) Cross-sectional Study Checklist (2024). The first authors reviewed all 15 studies, with the independent reviewer (R. W.) reviewing 8 of these. The CASP covers three broad issues: study validity, precision and confidence in the results, and generalisability. The eleven questions were rated as “yes”, “can’t tell”, and “no”, with the subsequent scores given 2, 1, 0 for each question. A higher overall score indicated better quality. When appraising the articles, it was most focused on the aspects relevant to this meta-analysis. The articles scored between 17 and 21 out of 22 and were all included in the meta-analysis, as although the CASP does not provide cut-offs, the authors interpreted the scores as indicating satisfactory quality. Inter-rater reliability was calculated using intraclass correlation coefficient (ICC) analysis using a two-way mixed-effects model. The ICC indicated a high level of inter-rater reliability across the first author and R. W. (ICC = 0.939, 95% CI 0.72, 0.99).

Characteristics of included studies

The systematic search resulted in 306 studies (after duplicates were removed). 15 met the predefined eligibility criteria and were included in the meta-analysis (Figure 1). The characteristics of all studies are presented in Table 2.1. The 15 studies included a total of 13235 adults and children, with a mean age of 29.72 and an estimated SD of 10.64. The ages ranged from 14-89 years). Not a single study included only children, but some did

include children in their sample. Where mean ages or SD were not reported, they were estimated using the provided descriptive statistics. Among the male and female participants compared, 65.01% were female. In addition, 33 participants identified as non-binary, and 21 either selected "other" or chose not to disclose their gender. Two studies indicated that they recruited non-binary participants, and one study indicated that individuals could use the option of "other" to indicate non-binary genders. 14 studies compared CCAS or HEAS scores across men and women and one study included female and non-binary participants in one category and compared these to male participants. One study reported to have measured the participants' sex, another used the terms sex and gender interchangeably, and 13 studies reported to have measured gender.

No studies only looked at children; two studies included children and four studies only recruited students. Studies were carried out in Turkey (k=4), Germany (k=3), Poland (k=1), Lebanon (k=1), Switzerland (k=1), Mexico (k=1), Spain (k=1), Italy (k=1), French-speaking European and African countries (k=1) and Argentina (k=1). The majority of studies used the CCAS to measure climate change anxiety (k=9).

Statistical analysis

The analyses were performed using the metafor package (Viechtbauer, 2010) in R 4.1.0.(R Core Team, 2021). Random-effects models were used for each meta-analysis. The Hedges g statistic was derived for each between-group effect size in each study. Where means and SD were not reported by included studies, Cohen d statistics were derived from other reported statistics, e.g., Spearman's correlation coefficient. Heterogeneity estimates were calculated using the Q statistic and the I^2 statistic. $I^2 > 25\%$ indicate low heterogeneity, $> 50\%$ indicate moderate heterogeneity, and $> 75\%$ indicate high heterogeneity (Higgins et al., 2003). Positive Hedges g statistics indicate an effect of gender, where women report more climate anxiety than men.

Risk of bias

The 15 included studies were assessed using the critical appraisal tool, CASP. All studies scored relatively high, with studies scoring 17 to 21 out of 22, and were interpreted to indicate a low risk of bias.

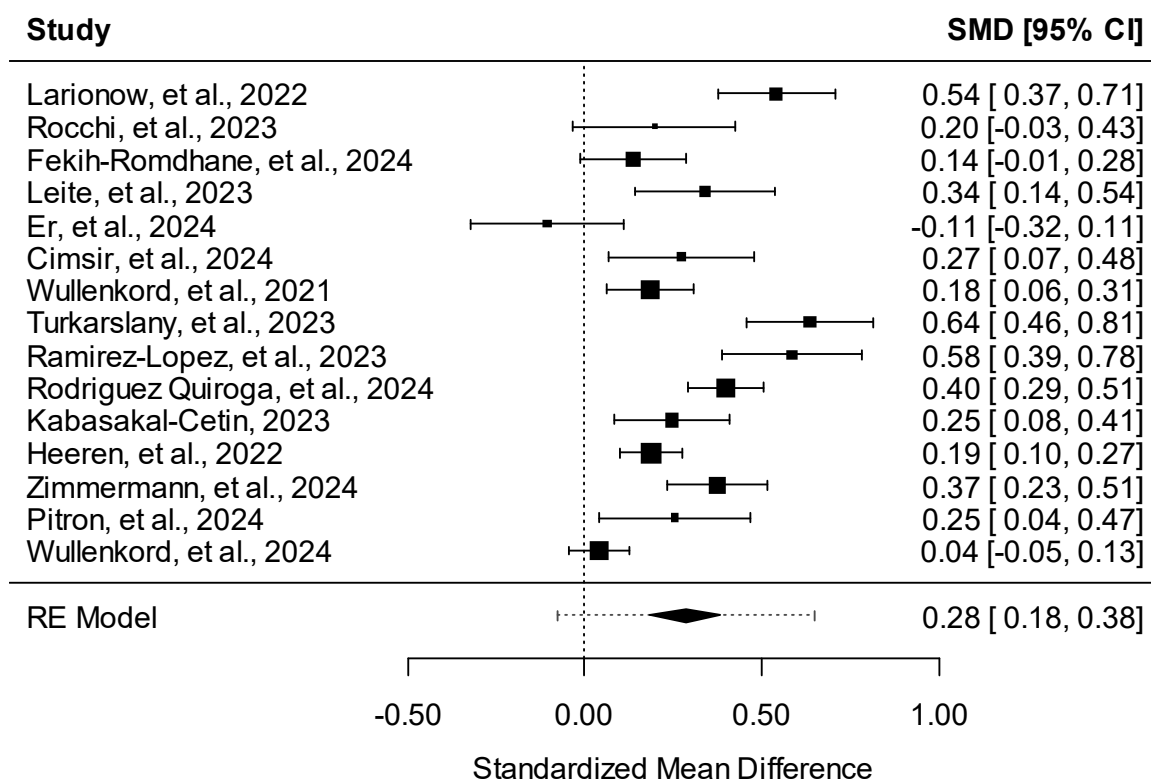
Gender and sex differences in climate and eco-anxiety scores

The meta-analysis included 15 studies that used the CCAS or the HEAS to assess climate and eco-anxiety. Overall, pooled effect sizes showed that women had significantly higher climate and eco-anxiety scores than men, with a pooled small effect size ($g = 0.28$,

95% CI [0.18, 0.38], $p < .0001$; Figure 2.2). A high CCAS and HEAS score represents higher climate and eco-anxiety. The total heterogeneity of the studies was high and indicated substantial variability among the study outcomes ($Q(14) = 90.98$, $p < .0001$, $I^2 = 86\%$).

Figure 2.2

Forest plot for gender and sex differences of CCAS and HEAS scores. The plot shows the Hedges' g and 95% confidence intervals for each study. The vertical 0.00 line represents no difference in CCAS and HEAS scores between the groups. A positive Hedges' g indicates higher CCAS and HEAS scores in women compared to men. Negative values indicate higher scores in men.



Moderator and subgroup analyses

Moderator analysis for sample age (mean age < 22 years, mean age > 40 years), and questionnaire type (CCAS, HEAS) showed that none significantly moderated the gender and sex effect of climate and eco-anxiety scores, ($Q(df = 2) = 3.16$, $p = .21$; $Q(df = 2) = 0.07$, $p = .97$). The heterogeneity of the studies was high and indicated substantial variability among the study outcomes ($Q(df = 12) = 56.18$, $p < .0001$, $I^2 = 83\%$; $Q(df = 12) = 81.90$, $p < .0001$, $I^2 = 88\%$). No moderator analysis was conducted for study quality, as all 15 studies were rated to be of satisfactory quality.

A subgroup analysis for questionnaire type (CCAS, HEAS) showed that both articles using CCAS and HEAS showed a small overall effect size ($g = 0.28$, 95 % CI [0.14, 0.41], $p < .001$; $g = 0.28$, 95 % CI [0.09, 0.47], $p < .05$), with women scoring significantly higher than men on both questionnaires. There was a high amount of heterogeneity among the results across the studies ($Q (df = 7) = 50.90$, $p < .001$, $I^2 = 89\%$; $Q (df = 5) = 31.00$, $p < .001$, $I^2 = 86\%$). The pooled effect sizes of studies using the CCAS and HEAS can be viewed individually in Figure 2.3 and Figure 2.4.

Figure 2.3

Forest plot of the effect of gender and sex in studies using CCAS, showing the Hedges' g and 95% confidence intervals for each study. The vertical 0.00 line represents no difference in CCAS scores between the groups. A positive Hedges' g indicates higher CCAS scores in women compared to men. Negative values indicate higher scores in men.

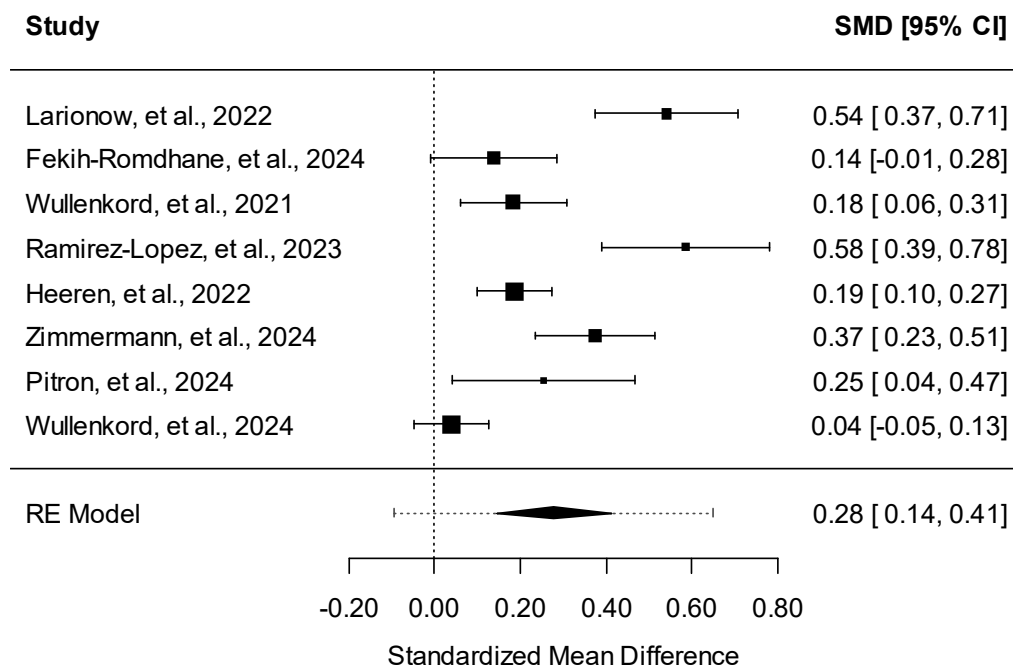
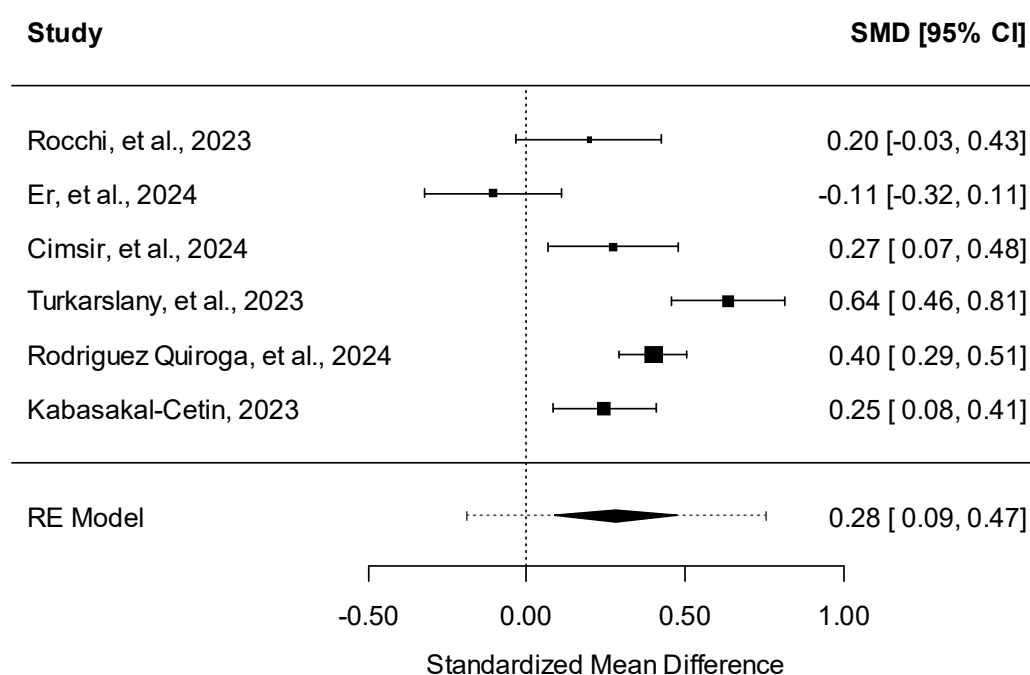


Figure 2.4

Forest plot of the effect of gender and sex in studies using HEAS, showing the Hedges' g and 95% confidence intervals for each study. The vertical 0.00 line represents no difference in HEAS scores between the groups. A positive Hedges' g indicates higher HEAS scores in women compared to men. Negative values indicate higher scores in men.



Visual inspection of gender effect across countries

Due to the low number of studies conducted in different countries, a moderator analysis would have been significantly underpowered. Therefore, visual inspection of the forest plot was used and found no obvious impact of country of residence on the gender and sex effect across studies.

Publication Bias and Sensitivity Analysis

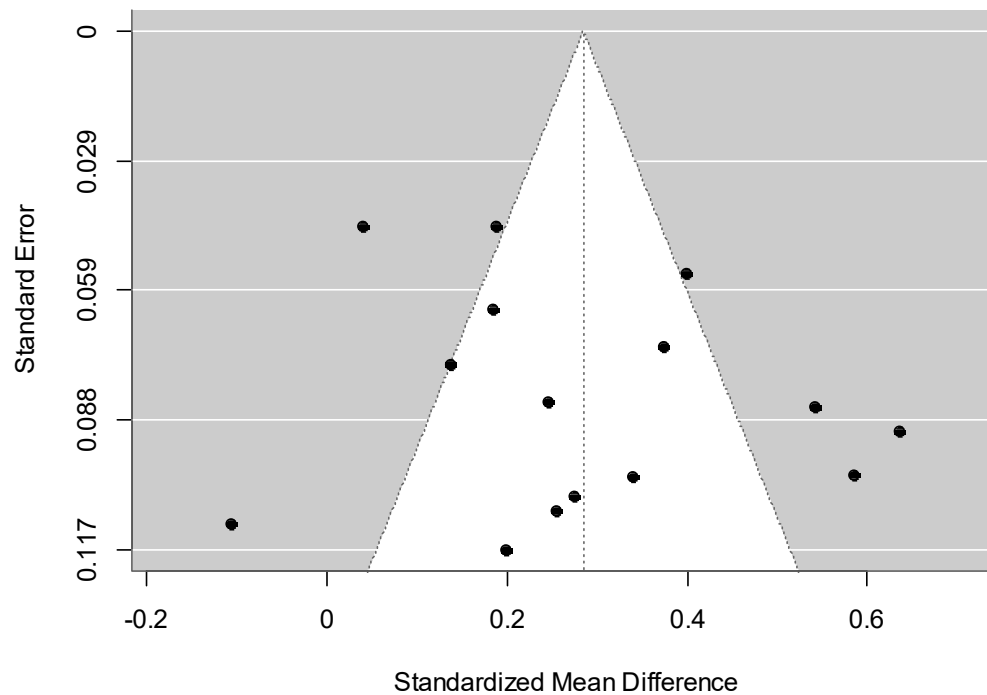
To assess for potential publication bias for the primary outcome measure the funnel plot was visually inspected and tested for asymmetry. To further estimate publication bias the trim-and-fill method (Duval & Tweedie, 2000) was used, and the leave-one-out models were also used as a sensitivity test.

The funnel plot (Figure 2.5) did not reveal significant asymmetry of climate anxiety scores across men and women ($z = 0.52$, $p = 0.61$), and therefore no evidence of a significant publication bias. A leave-one-out sensitivity analysis showed that no single study was driving

the overall effect size when compared to others. Furthermore, the Duval and Tweedie trim-and-fill method did not suggest that studies were missing.

Figure 2.5

Funnel plot of gender differences in CCAS and HEAS scores.



Discussion

Although there is a growing literature suggesting that women have higher climate and eco-anxiety scores than men, this has not been consistently reported. To our knowledge, this was the first meta-analysis aiming to synthesise the climate and eco-anxiety scores, measured by the CCAS and HEAS, across different genders and sexes (men and women, with one study including a small number of non-binary participants in a sample of female participants). The primary research question (Research Question 1) drew data from 15 articles and 13235 participants and showed that there is a small significant effect size indicating that women have higher climate and eco-anxiety scores than men. Due to a high degree of heterogeneity in the results of the studies, these results must be interpreted with some caution. However, despite this, the gender and sex differences in climate and eco-anxiety scores were somewhat consistent, as the direction of the effect was the same in 14 out of 15 studies. Therefore, this suggests a robust effect of women scoring higher on the CCAS and HEAS than men.

Moderators and subgroup analyses were used to answer Research Question 2. The moderator analyses showed no evidence of the gender effect differing across different mean ages or questionnaire types. There are likely other unidentified moderators, which were not accounted for in this review, which may explain the heterogeneity in the data. Subgroup analysis showed that there was no difference in the gender and sex effect across the questionnaire types, CCAS and HEAS, suggesting that women have higher climate change-specific anxiety but also broader climate and environmental anxiety than men.

These results are in line with literature showing that women consistently score higher than men on related scales, such as the Climate Change Worry Scale (CCWS; Donati et al., 2024; Regnoli et al., 2024; Shinan-Altman & Hamama-Raz, 2023; Stewart, 2021), the Eco-Anxiety Questionnaire (EAQ; Jalin et al., 2024; Micoulaud-Franchi et al., 2024), the Climate Emotion Scale (CES; Galway & Beery, 2022) and experience higher climate change distress (Searle & Gow, 2010). Similarly, a survey of 10,000 young people around the world also found a consistent small effect of gender differences, with female respondents reporting greater levels of concern and negative emotions (Clayton et al., 2023).

Others have found no significant differences between men and women using the CCAS (Clayton & Karazsia, 2020) but did not report the necessary statistics and, therefore, were not included in this meta-analysis. Another study found inconclusive results across different populations, with women scoring significantly higher than men in the US but not in the UK, using the Anticipatory Solastalgia Scale (Stanley, 2023). To the author's knowledge, only one study found that men have significantly higher scores than women, on a related scale, the Environmental Worry Scale (Akinbobola & Njor, 2014). Interestingly a recent

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study, by Wullenkord et al. (2024) included in our meta-analysis suggested that looking at averages of climate anxiety measures may not tell the whole story about gender differences, as they found looking at different ends of the climate anxiety spectrum, that more men were likely to report feeling impaired by their climate anxiety than women.

Research Question 3 was addressed through visual inspection of the results of the included studies, and there were no observable differences in the gender and sex effects of CCAS and HEAS scores of studies conducted across different countries. This echoed the findings of cross-cultural studies (e.g., Heeren et al., 2022). However, other research has indicated a strong interaction between gender and culture or biophysical vulnerability and showed that men and women experienced direct threat of climate disruption significantly differently with regard to perceived changes in the local ecology and loss of opportunities, such as financial or for future generations (e.g., du Bray et al., 2019).

In general, our data fits the overall pattern of the literature, where other scales are used to assess climate and eco-anxiety, distress or worry. Overall, this is in line with reports of women being involved more in environmental issues and therefore engaged more in pro-environmental behaviours (Clayton & Karazsia, 2020; Ogunbode et al., 2022; Ortega-Egea et al., 2014; Vicente-Molina et al., 2018), however, facing climate and environmental issues may also make women more vulnerable to experiencing strong emotions associated with the topic.

Interestingly only two studies indicated that they included non-binary participants, while one study used the option of “other” for participants to indicate non-binary genders. None of the studies compared scores of participants with non-binary genders, with the exception of Wullenkord et al. (2024), who combined non-binary and female participants in one sample. The binary gender comparison is echoed in research using different climate and eco-anxiety measures (e.g., Micoulaud-Franchi et al., 2024b; Regnoli et al., 2024; Shinan-Altman & Hamama-Raz, 2023). The power of a statistical test is based on the sample size of the smallest group being compared. As a result, it is likely that comparisons including gender diverse participants would have been underpowered. Future research should consider being more inclusive to gender-diverse participants to allow exploration of climate and eco-anxiety scores across all gender identities.

A key finding of the meta-analysis indicates that women exhibit significantly higher levels of climate and eco-anxiety than men. This finding supports the concerns raised by the WHO (2014) and the IPCC (2023) that women may be more emotionally vulnerable to the impacts of climate breakdown. This vulnerability is often driven by a perceived lack of power (e.g., policy-making and financial contexts) across different countries and cultures and these

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dynamics are often rooted in traditional Western gender roles (Aguilar Revelo, 2021; WHO, 2014; IPCC, 2023).

Lower climate and eco-anxiety scores in men may not necessarily mean that they experience climate anxiety less, but potentially, just that they do not express their emotions as openly as the women in these studies. This could have the potential consequence of men being overlooked if these questionnaires were ever to be used as screening tools for access to support services.

The results could also simply reflect the general gender differences of women having higher anxiety and depression rates (Altemus et al., 2014) and a greater tendency to internalise than men (Rosenfield, 2000). Similarly, future anxiety is also higher in women (Regnoli et al., 2024; Searle & Gow, 2010) which can impact climate distress (Searle & Gow, 2010) and thus might also have an impact on climate and eco-anxiety. Furthermore, women may also be better at noticing and expressing their emotions related to climate breakdown than men, as they have been reported to have overall higher insight and ability to express their emotions (e.g., Fischer & LaFrance, 2015; Meshkat & Nejati, 2017). This can be explained by women often being socialised to be more emotional and compassionate (Archer, 1996; McDonald & Kanske, 2023), which links in with women having been found to take more pro-environmental actions than men (e.g., Clayton & Karazsia, 2020; Hunter et al., 2004) and to have more awareness of the implications of their own actions (Mobley et al., 2010).

Therefore, it is important to acknowledge that this topic needs further investigation in order to understand the underlying factors of higher climate and eco-anxiety scores in women compared to men.

Clinical implications

As mental health practitioners are reporting an increase in eco-distress in people they support (Baudon & Jachens, 2021; Seaman, 2016), these results have key clinical implications. Climate disruption causes people anxiety and distress, with a significant small effect of women reporting higher climate and eco-anxiety than men. This is helpful to be aware of when accessing and formulating people's, families' or communities' difficulties, building rapport and supporting people to effectively manage the distress experienced. More specifically, this meta-analysis supports frameworks that highlight the need to understand and integrate social factors into psychological formulation and intervention, such as the conceptual framework of the Social GRRRAACCEEESSSS (Burnham, 2012). Similarly, it also supports the use of the Power Threat Meaning Framework (Johnstone & Boyle, 2018) in formulation, which helps widen the understanding of inequality and how this impacts

mental health and the relationship with engagement with pro-environmental action. For example, when the PTMF was used in a mining town community in South Africa, it described the complexity of responses to climate breakdown. This was done by focusing on power dynamics and highlighting the intersecting social justice issues (Barnwell et al., 2020). The PTMF can be used in different settings to help make sense of how people respond to climate breakdown whether this is associated with anxiety, distress or inaction. These frameworks can help people make sense of different climate reactions without pathologising them and allowing them to find ways to manage these and move forward (Morgan et al., 2022). The PTMF may help explain why women may be emotionally disproportionately impacted by climate breakdown, as they may perceive a lack of power. Making sense of their experiences can also help people feel that their experiences are validated and heard (Calabria & Marks, 2024b).

It is clear that the responsibility to reduce climate and eco-anxiety lies with those in power by reducing the threat itself by urgently mitigating the impact of climate disruption. However, psychological support approaches can offer understanding and care that works with individuals and communities (Marks & Hickman, 2023).

Although clinical research is still in its early stages, recent research has focussed on therapeutic approaches for those experiencing climate anxiety. These studies suggest that cognitive behavioural therapy (CBT), as well as third-wave CBT, approaches such as compassion focussed therapy (CFT), acceptance and commitment therapy (ACT) and group work that originates from the activist movement The Work That Reconnects (Calabria et al., 2024b; Jones & Johnstone, 2024; Marks & Cole, 2024; Williams & Samuel, 2024) can be helpful. Although most of the approaches can be used individually, the power of group work in the context of climate anxiety has been highlighted as it allows people to experience more validation, help de-stigmatise and de-pathologise their emotional experiences and build support networks and connections, which not only support wellbeing but also increases the capacity to take collective climate action (Jones & Johnstone, 2024).

Limitations

Although the meta-analysis showed a consistently small effect of women scoring higher than men on climate and eco-anxiety measures, the pattern of the results could potentially be based on reporting biases, e.g., the original study by Clayton and Karazsia (2020) did not report the necessary statistics of their gender comparison, and was not included in the current meta-analysis. It would be recommended that researchers report the statistics of any gender or sex-analysis they have completed. To minimise a potential publication bias, authors of articles with missing data could have been contacted in order to

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retrieve the necessary data to estimate the effects size of gender differences across climate and eco-anxiety scores (Young & Hopewell, 2011).

Interestingly, when looking at the countries where the studies were conducted, no studies were extracted through the search from the countries where the CCAS and HEAS were validated initially (i.e., the United States and New Zealand, respectively). This may have been due to the way results were presented, e.g., not reporting the relevant statistics of non-significant results like in the case of Clayton & Karazsia (2020). Another limitation of this systematic review is that it did not include any grey literature, such as unpublished theses; the exclusion of these could have introduced further publication bias.

Furthermore, the samples of the included studies often did not represent the countries' populations in which the study took place, often overrepresenting females, educated people, and students and possibly not being inclusive to people who identify as gender diverse. It is also likely that the recruitment methods biased samples towards including people interested in climate and environmental problems, who would have self-selected to participate in these studies. Therefore, it would be important for research to explore climate and eco-anxiety in more diverse samples, representative of the countries' populations in which the data is collected.

The CASP was used because it has a checklist specifically designed for assessing the quality of studies using cross-sectional data. The checklist allowed the researchers to assess the quality of the studies included in the systematic review and increased consistency in decision-making and provided a framework to document decisions for accountability. Using the CASP highlighted the importance of future cross-sectional and demographic studies to pay attention to recruitment strategies and include participants that fairly represent the population.

However, unlike other tools, such as the Risk of Bias Tool (Sterne et al., 2019), the CASP does not directly assess the risk of bias or provide a cut-off score to indicate when risk of bias is considered high, which would support decisions on whether to include studies in systematic reviews. While the CASP aims to provide a structured framework for consistency in scoring the quality of the studies, the interpretation of the questions and the use of the "can't tell" response option can be subjective. Future meta-analyses should consider whether they would benefit from a more rigorous risk assessment tool, such as the Risk of Bias Tool, which allows for the exclusion of studies with a high risk of bias from the analysis and thereby reduces the risk of bias in the meta-analysis.

It needs to be acknowledged that gender is a complex construct, and societal understanding of gender is still evolving, and language and constructions of gender

possibilities are still emerging (Wilson et al., 2024). Therefore, our results need to be interpreted with caution and conclusions drawn from them are limited.

It has been argued that calling the distress caused by climate breakdown “climate anxiety” can de-politicise the nature of the distress that is rooted in asymmetrical power dynamics (Barnwell et al., 2020), this was not our intention. The term was used to reach a wide audience, as it is a well-known term that communicates the measures on which the meta-analysis focused.

Future research could look to explore the possible underlying factors of women scoring higher on climate and eco-anxiety measures. For example, it could be explored whether higher climate anxiety scores in women than men could be explained by higher anxiety or depression scores more generally by controlling for general anxiety and depression (Heeren et al., 2022). Furthermore, qualitative research methods could be used to explore further the underlying processes and individual experiences of men and women. For example, this would allow exploring whether men and women might experience climate and eco-anxiety differently and whether this relates to cultural and societal norms. Future research would also benefit from being more gender inclusive.

It would also be of benefit for a future meta-analysis to include a wider range of validated climate and eco-anxiety scales, such as the CCWS, EAQ and CES, to synthesise the results of the wider aspects of climate and eco-anxiety.

Overall, this study is an important step to identifying demographic characteristics that may impact climate and eco-anxiety scores. The gender and sex effects found in this study need further research in order to be understood.

Conclusion

This meta-analysis found a significant small effect of women scoring higher on climate and eco-anxiety questionnaires than men. This result was consistent across mean sample ages, questionnaire type and, on inspection, country. These can inform the formulation of people’s and communities’ reactions to climate disruption. However, further research is needed to understand the underlying processes of these results.

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Chapter Three: Empirical Project

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Responses to the growing awareness of climate breakdown in students who experience climate anxiety or concerns: A grounded theory study

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Climate emotions: A grounded theory of climate emotions in students and a meta-analysis of gender differences in climate emotions

Responses to the growing awareness of climate breakdown in students who experience climate anxiety or concerns: A grounded theory study

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Abstract

Climate breakdown poses a significant threat to ecosystems and humankind. It is one of humanity's most difficult challenges, and immediate action is necessary to mitigate its worst effects (Intergovernmental Panel on Climate Change, IPCC, 2023). The awareness of climate breakdown is causing great distress, especially among young people. However, there is no clear consensus on the impact and how people manage their distress. More work is needed to conceptualise these experiences further. Therefore, this study looks at the development of climate breakdown awareness, its impact, and people's coping strategies. Qualitative methods were used to develop a grounded theory, and a critical realist approach was taken. 10 higher education students who identified as experiencing climate anxiety or significant concerns were interviewed.

A cyclical explanatory model was developed to understand how university students with climate anxiety or concerns develop climate breakdown awareness, leading to distressing emotions and impacting cognitions, relationships, and mental health. The model also suggested that students find making sense of climate breakdown and its impact helpful, along with practising acceptance and connecting with what is important and taking value-guided action, such as engaging in activism.

This study contributes to the current understanding of the climate breakdown awareness development process, its impact and how people manage this distress. More research is needed to explore these processes, especially in more diverse communities and those communities more directly impacted by climate breakdown. Implications for clinical practice and public health interventions are further discussed.

Introduction

Climate breakdown, as referred to in this article, encompasses the impact of climate change and environmental degradation, presenting a significant threat to both ecosystems and humanity and stands as one of the most difficult challenges faced by humankind (Intergovernmental Panel on Climate Change, IPCC, 2023). The authors of the IPCC (2023) report unequivocally confirmed that human activities have caused global warming and urged that immediate climate action is necessary to mitigate the worst effects.

It is becoming clearer how human wellbeing and mental health are negatively affected by climate breakdown through extreme weather events, natural disasters, forced migration and conflict (Berry et al., 2010; Fritze et al., 2008; Hayes et al., 2018; IPCC, 2023). There has also been an increase in research on the indirect impacts of people's awareness of the devastating effects of climate change and environmental degradation. It has been found that this awareness also causes significant psychological distress (Aston, 2022; Calabria & Marks, 2024; Ojala, 2012; Pihkala, 2020). Moreover, as climate breakdown progresses, humans will experience more threats to life, and more people will start to experience significant distress (Wainwright, 2024).

The psychological impact of the awareness of climate breakdown is commonly called climate anxiety or eco-anxiety. These terms describe a wide range of emotions, such as fear, anxiety, anger, grief, guilt, shame, despair and worry, as well as hope and empowerment (Aston, 2022; Hickman et al., 2021; Ojala et al., 2021; Stanley et al., 2021; Stewart, 2021). Research has found that people report that these emotions can be felt at the same time and can fluctuate in response to world events and personal situations (Aston, 2022; Hickman, 2019; Pihkala, 2020). Although research in this area is growing, there is still no clear consensus on climate anxiety and related experiences, with reviews suggesting that further work needs to be done to develop its conceptual understanding (Coffey et al., 2021; Dijk et al., 2024).

There is an emerging consensus that the emotions and distress experienced due to the awareness of climate breakdown can be conceptualised as an understandable reaction to a significant threat and should not be pathologised (Adams, 2021; Calabria & Marks, 2024; Hickman, 2020). Similarly, research shows that worries related to climate change can often be constructive and help engage people in pro-environmental behaviour (Verplanken et al., 2020). This raises the question of whether people's indifference towards climate breakdown might be more concerning.

Overall, this perspective moves away from the medical approach to understanding distress and highlights the importance of recognising the potential connections between distress and forms of social injustice (Dillon, 2019; Fernando, 2017). The Power Threat

Meaning Framework (PTMF; Johnstone & Boyle, 2018) was developed to make sense of people's threat responses, which the medical approach may describe as symptoms. The PTMF does this by aiming to link distress and forms of social injustice experienced on a personal or societal level. Threat responses are reconceptualised as a means of surviving the threats posed by the adverse operations of power. These responses are understood to be influenced by the meaning a person attributes to their experiences, alongside the strengths and resources of power available to them. It has been suggested that formulating people's threat responses to climate breakdown in this way helps people make sense of these, allows them to find ways to move forward and may help constructive engagement with the topic, which may alleviate distress (Morgan et al., 2022). It may also help people change their appraisal of the threat and form a stronger relationship with Earth (Wainwright, 2024).

Although the response to climate breakdown is not seen as pathological, it has been found to impact people's wellbeing and mental health (Ogunbode et al., 2022; Reyes et al., 2023; Schwarz et al., 2023). It has been suggested that the impact of awareness of climate breakdown is experienced as particularly distressing in younger generations, children, and younger adults (Ballew et al., 2024; Hickman et al., 2021; Lawrance et al., 2022; Martinsson & Ojala, 2024; Poortinga et al., 2023) as young people's future is most threatened, but also because they experience a sense of lack of power. For example, Hickman et al. (2021) reported that many young people feel unheard and betrayed by older generations and those in power.

How young people cope with strong climate emotions has been a research topic that has grown in interest (Daeninck et al., 2023; Ojala & Bengtsson, 2019). Lazarus and Folkman (1984) described coping as the adaptation of thoughts and behaviours in order to manage internal and external challenges with the resources one has available. Coping strategies to mitigate the impact of climate breakdown awareness have often been categorised into meaning-focused, problem-focused and emotion-focused coping (Calabria & Marks, 2024; Crandon et al., 2024a, 2024b; Ojala, 2012). Looking at young people in higher education, climate anxiety is particularly expressed by those studying degrees related to climate breakdown (Daeninck et al., 2023; Khalaim & Budziszewska, 2024). Those students also reported the more frequent use of a range of coping strategies compared to other students (Daeninck et al., 2023). Overall, students most use problem-focused coping (e.g., activism or pro-environmental behaviour), although this might not be the most sustainable strategy for problems with low levels of individual control (Clayton, 2020), and meaning-focused coping strategies (e.g., considering progress, and recognizing how the movement enriches one's life). Students were found to use emotion-focused coping the least

(e.g., soothing negative emotions through avoidance; Daeninck et al., 2023). Although emotion-focused coping can be helpful (Landis et al., 2007), if relied on too much it can have a negative impact on wellbeing (Frydenberg, 2008).

Young people, such as higher education students, are in a unique position with career and lifestyle choices and family planning ahead of them. University students may also apply their knowledge and share it informally, through educational positions, or drive research directions. Overall, it has been acknowledged that universities have a key role to play in the mitigation of climate breakdown (Baumber et al., 2019; Filho et al., 2021). Universities are thus required to further develop carbon literacy and the understanding of the impact of climate breakdown across all curricula, including psychology and clinical psychology training (BPS, 2024; Molthan-Hill et al., 2022). This need for further education on the topic is further supported by research showing that many mental health professionals feel under-informed to support people with climate anxiety (Hoppe et al., 2023).

Therefore, to make further sense of the emotional burden of climate breakdown awareness that many university students face it is important to help build a theoretical model of these experiences. For this purpose, more qualitative research is needed in this field and in the broader environmental psychology area to establish a more comprehensive body of research (Bercht et al., 2024; Ratcliffe et al., 2024).

The current study used a grounded theory approach (Strauss & Corbin, 1998) to contribute to the theoretical understanding of how students grow climate breakdown awareness, what impact this may have on them and what coping strategies they find helpful. Building this understanding through a theoretically sufficient grounded theory can help inform clinical practice and public health interventions.

Method

Study design

This study employed a grounded theory approach (Strauss & Corbin, 1998) to explore how higher education students become aware of climate breakdown, the emotional impact of this, how this relates to their mental health, and what coping strategies they use. A critical realist perspective was taken, which is an epistemological perspective that assumes that reality exists independently of human perceptions, theories and constructions (Bhaskar, 2013; Roberts, 2014). This perspective was taken as the first author identifies with this view, as she thinks that as a researcher, she can only ever observe results within a certain context, but that there are also unobservable aspects, such as underlying mechanisms. Additionally, Buch-Hansen and Nielsen (2023) argued that climate breakdown science is compatible with critical realism, as it is a real phenomenon, but that the science also continuously gains new insight and the conclusions we draw from these are changing. Therefore, our knowledge is incomplete and imperfect. Similarly, the first author thinks that the threat of climate breakdown and people's threat responses are real and that these responses can be shaped by experiences and social, cultural and linguistic influences.

Therefore, this study aims to explore the knowable and observable reality of how higher education students who report having climate anxiety or concerns grow awareness of climate breakdown, their threat responses to this and how this relates to their mental health as well as what coping strategies they find helpful. The study acknowledges that the data and results may only hold true in the specific context, but extrapolating may be possible in other social contexts (Willig, 2013). The data analysis used grounded theory to develop a theoretically sufficient explanatory model. The methodologies outlined by Corbin and Strauss (2014) were used to guide the methodology of this study. The active role of the researcher in data interpretation was acknowledged (Corbin & Strauss, 2014) and therefore it is assumed that the author's positioning (see Appendix C) and her own experiences will have guided her interpretation of the data. This assumption was also extended to the supervisory team.

This data-driven approach was hoped to allow the researcher to formulate and conceptualise students' emotional experiences regarding their awareness of climate breakdown, its impact, and the coping strategies they used.

Participants

Overall, the study focused on young, educated people who were well-informed about eco-anxiety and the climate crisis, with some seeing themselves as activists. Eligible

participants had to be between 18 and 25 years of age (inclusive) and be higher education students who considered themselves to have climate anxiety or significant concerns about climate change. Recruitment also focused on students who had accessed psychological services to address their emotional responses to climate breakdown or have thought about doing so (see Appendix H for the inclusion and exclusion criteria).

Participants were recruited through a university's student wellbeing service, posters across a university's campus and adverts in digital university and environmental activism newsletters. Students contacted the first author if they were interested in finding out more about the study. Eligible students who had expressed an interest were emailed an information sheet and a consent form, which were signed prior to taking part in the interview. Participants were given a token of gratitude in the form of a £5 voucher for a vegan café or a donation to the Woodland Trust of the same value.

Table 3.1

Participant demographics

Participant	Pseudonym	Gender	Ethnicity	Age	Study area
1	Rex	male	white British	25	Environmental Sciences
2	Max	male	white British	22	Liberal Arts
3	Ana	female	white British	21	Liberal Arts
4	Sam	female	white British	22	Biology
5	Flo	female	white European	25	Health care
6	May	female	white other background	25	International Relations
7	Ben	male	white	21	Psychology
8	Lee	male non-binary	white British	20	Environmental Sciences
9	Amy	binary	white	19	Environmental Sciences
10	Aoi	male	East Asian	22	Management

Table 3.1 shows that the participants were between the ages of 18 and 25. Participants were recruited from two universities. Nine out of 10 participants described themselves as white, white British, white European or white from another background. One participant was from an East Asian background. Two individuals also shared that they were autistic; one reported this to have been diagnosed, and the other was waiting for an assessment at the time of the interview. Eight out of 10 participants had accessed psychological support services previously.

Data collection

Five participants opted for face-to-face interviews and five participants opted for remote interviews via the Microsoft Teams video call option. The interviews were semi-structured and lasted between 54 minutes and 90 minutes, with an average of 71 minutes. Face-to-face interviews were audio recorded, and remote interviews were video and audio recorded.

The topic guide (see Appendix B) for the interviews helped guide the questioning throughout the interviews. Open-ended questions were employed to explore participants' perspectives and experiences (Silverman, 2011) and follow-up questions were used to further understand the respondents' answers (Rubin & Rubin, 2012). Participants were asked open questions about their experiences of climate emotions, for example, "How would you describe your experiences of climate and environmental concerns or climate anxiety?", "How have these experiences developed?", "How, if at all, do the thoughts and feelings you experience impact your life?", "How, if at all, do the experiences of climate emotions relate to mental health difficulties?" and "What has helped you cope with your climate change emotions?" A flexible and open approach was taken in the interview schedule, and the participants' experiences, reflections and language shaped the interviews. The iterative nature of grounded theory allowed the interview schedule to evolve within and across interviews, reflecting the emerging data, codes and analysis (Strauss & Corbin, 1998). Recognising that theoretical saturation is better seen as an aim rather than reality, as this would otherwise closely resemble quantitative completeness (Willig & Rogers, 2017), the study aimed for theoretical sufficiency. Braun and Clarke (2013) suggested that theoretical sufficiency can be reached with six to 10 participants.

Analysis

Interviews were anonymised by the first author and transcribed by the first author and a professional transcription service (Diva Transcriptions). Grounded theory was used to develop an explanatory model of students' (with climate anxiety or concerns) experiences of growing climate breakdown awareness, how this relates to mental health difficulties and helpful coping strategies. The analysis software NVIVO was mainly used for the analysis. Pen and paper were also used in the later stages of the analysis.

This study followed the methodological guidelines outlined by Corbin and Strauss (2014). However, some methodological compromises were made. In grounded theory, coding is a process of conceptual abstraction by assigning general concepts (codes) to singular incidences in the data. After having collected four data sets, the evaluation process began; due to time pressures, no further iterations of analysis and data collection were practically manageable.

This study used a three-stage model of data analysis with open, axial, and selective coding procedures. These coding procedures embody different ways of working with the data that were used together, and the researcher moved between them when needed (Mey & Mruck, 2011).

Open coding was used as a first step in the analysis. With open coding, the data was broken up into separate categories and codes were used to label these. This was an open-minded process, opening up new theoretical possibilities. The first author used a continuously comparative approach to similar events in the data, challenging her preconceived notions and biases about the topic. The second stage, axial coding, explored how codes relate to each other. The focused and selective coding was used to sort, separate, synthesise and integrate the data. Selective coding represented the final stage, in which all categories or concepts were connected, and an emerging grounded theory of the causation and responses to growing climate breakdown awareness in students who experience climate anxiety or concern was developed. To do this, the results from axial coding were further elaborated, integrated and validated while conceptualising a storyline around the categories. The key categories, subcategories and emerging model were reviewed regularly by the supervisory team.

Reflexivity and credibility

A researcher plays an active role in interpreting the reality of participants (Corbin & Strauss, 2014). All authors were familiar with the university context. This familiarity with the participants' context can support a better understanding of the participants' experiences (Greenhalgh & Manzano, 2022; Yardley, 2000, 2017). This is also in keeping with the critical realist perspective, where context is seen as the backdrop from which observable and non-observable mechanisms operate.

Grounded theory methodologies emphasise the importance of iteration in data collection and analytical stages to allow for theoretical saturation or sufficiency. Grounded theory traditionally involves an iterative cycle of data collection, coding, and theoretical sampling, where insights from earlier interviews inform subsequent rounds of data collection. In this project, data were collected in only two phases, due to practical reasons and time constraints, which may have limited the opportunity to refine questions or target emerging concepts through further participant sampling. However, as critical realism recognises the constraints of the real-world, it acknowledges the analysis process involves making sense of the data through a knowable reality using theory-informed interpretation and accepting that all knowledge is fallible.

The critical realist perspective in this study highlights the importance of the study adopting a reflexive stance, recognising that data interpretation is inevitably influenced by the researcher's assumptions, prior knowledge, and position within the research context. Rather than asserting a solely bottom-up approach, the analysis recognises the theory-laden nature of all observation, in line with the epistemological relativism of critical realism.

A reflective diary was used to record observations, experiences, interpretations and observed biases, which can improve rigour and transparency (Morrow, 2005), and track the iterative development of codes and categories. The first author's positioning and own climate emotions were also considered throughout the research process. For example, noticing feelings of fear and anger when thinking about the clarity of scientific evidence and the lack of mitigating actions, as well as feelings of guilt, e.g., for the current lack of climate action she engages in. She acknowledged assumptions about people's responses of climate breakdown awareness, which was crucial during the interviewing, coding and data analysis. The supervisory team was consulted regularly to discuss identified themes and the development of the emerging model. Alongside the reflective diary, this supported the iterative process of the data analysis, which allowed the researcher to conceptualise the emerging model.

Participants were aware of the first author's status as a student, and her environmental values were only indirectly conveyed through her research interest, though not explicitly stated to minimise any potential expectations affecting the participants' responses.

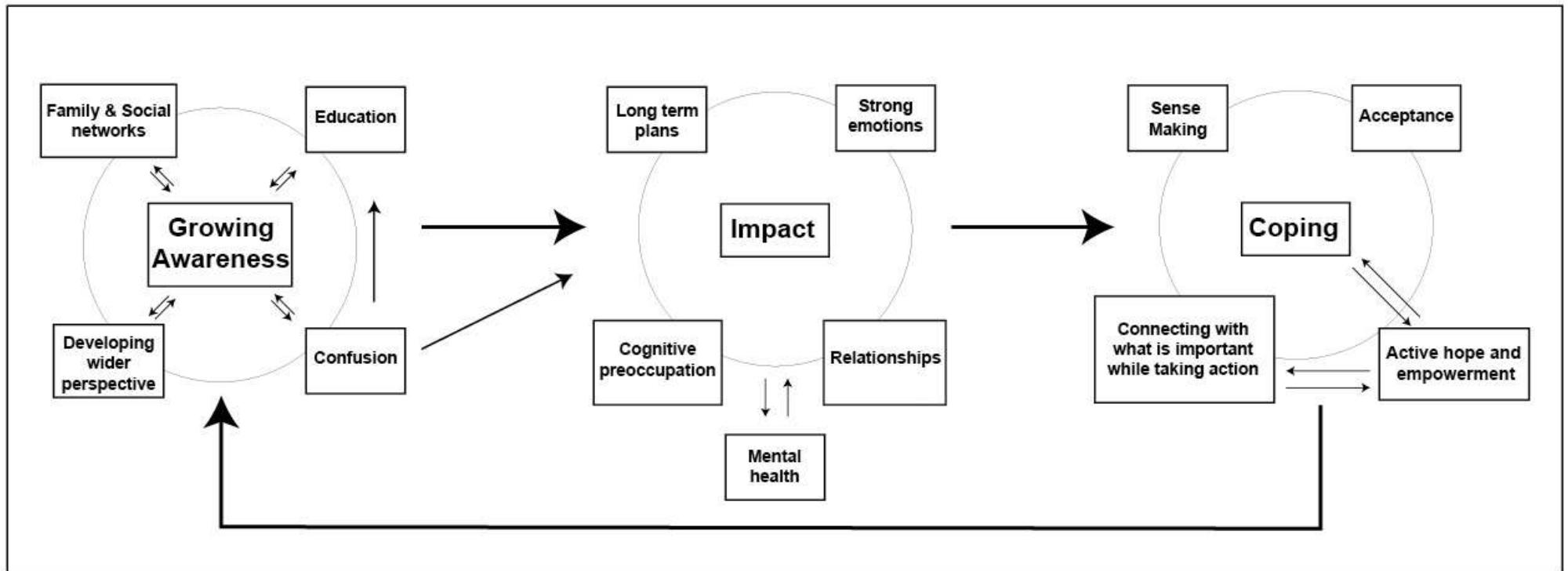
Results

The study focused on 10 university students who identified as having climate anxiety or concerns and were aware of climate breakdown, with some seeing themselves as activists. This work brings light to the experiences of these students and their views, and their connection to their mental health. The students described a journey that grew their climate breakdown awareness, which impacted them and was also linked to their mental health more generally. They also described what coping strategies they found helpful.

Constructed from the data, the emerging grounded theory (see Figure 3.1) suggested that students take a journey through three different stages (key categories with subcategories): the growing climate breakdown awareness stage, in which students start to understand the broader impact of climate breakdown and its associated social injustice. A distressing state of confusion often arises from the awareness of the incongruence of scientific evidence and the inaction of those in power, which leads students to become informed and make sense of the bigger picture. Their growing awareness leads to strong emotional, cognitive and relational threat responses, which impact their mental health and can impact long-term plans. These responses then lead to a range of helpful coping strategies, such as making sense of climate breakdown and their emotional experiences, acceptance, connecting with what is important (such as community and nature) and taking value-guided action, e.g., activism and other pro-environmental behaviours. These strategies can lead to further insight and more emotions, with some being “positive” emotions. Overall, the journey may be different for everyone, with stages reached through different mechanisms (subcategories) and circular, as students may experience stages repeatedly.

Figure 3.1

The grounded theory of growing climate breakdown awareness, the emotional, cognitive, relational and mental health impact, as well as coping strategies in students who identify as having climate anxiety or concerns. The arrows indicate how elements have interlinks and relationships.



Climate emotions: A grounded theory of climate emotions in students and a meta-analysis of gender differences in climate emotions

Growing awareness

The first phase of the model reflects students' journeys towards awareness of climate breakdown as a human justice issue, with power structures maintaining these and hindering mitigation. This awareness grew through family, social networks, education, and reaching a developmental stage that provided a broader perspective. This process was described as a gradual development of interests or a pivotal moment sparked by education and climate activism.

Sense of confusion

Participants commonly reported a sense of confusion and questioning of reality, resulting from the incongruence of the overwhelming amount of evidence that climate breakdown is a real threat to all life on earth and the lack of mitigating action. This caused great distress in students and also drove students to engage more in the topic to make sense of it.

Participant 9: *"I felt like I wasn't living in reality, I felt like no one was living in reality. It didn't feel like a crisis because we were all just pretending it was OK".*

Family and social networks

Four respondents shared that their awareness of climate breakdown developed through their parents and grandparents sharing their values with them and communicating the importance of looking after our planet through congruent and committed action, such as recycling, turning off lights, growing their own food, and supporting environmental organisations.

Participant 7: *"I was just I think in a generation, a household where these topics came up and I have memories of that when I was quite young, five years old."*

Respondents also described the Fridays for Future protests and other climate activism as a catalyst for becoming more aware of the wider impact of climate breakdown and political inaction. Activism was also described to validate students' strong feelings about the state of the planet.

Participant 3: *"I'd had concerns about the climate with the Fridays for Future movement and the building momentum around climate movement and politicians not taking it seriously."*

Education

Seven students acknowledged the vital role of education in enhancing their awareness of climate breakdown. Engagement in school and university projects was described as “turning points” in their awareness or deepening their understanding and validating their emotional responses. Furthermore, recognising the hypocrisy of universities, striving to be ethical institutions while accepting funding from oil companies, was described as an eye-opening realisation of the reality of climate breakdown. Some students also reported making a committed choice to enhance their knowledge and understand the topic more fully.

Participant 3: *“... just through studying that and researching that, and how climate policy is really not up to standard, how it’s just – yes, it’s just quite depressing...”*

Participant 1: *“... a lecture by one of the board at Shell [...] to Geosciences students which was very hush-hush [...] we had to distract security and then we stormed into the lecture, disrupted it. [...] I was like “Fuck, I was wrong.”.”*

Developing a wider perspective

Three participants reported that their deep care of animals and local ecosystem issues developed into deep care for humans and our planet as they started to build an understanding of the bigger picture. This was linked to developmental changes in their cognitions in the teenage years, opening their eyes to the wider humanitarian crisis that climate breakdown represents.

Participant 4: *“... when I was a teenager it was when I was realising that it was a humanitarian issue because I haven’t really had a conception of that when I was small.”*

Impact

Emotional responses

Respondents expressed a range of emotions about climate breakdown: anger, anxiety, sadness, despair, shame, guilt, hope, and empowerment. All emotional responses were viewed as non-pathological. They noted terms like “climate anxiety” could be helpful for describing shared experiences, connecting people and communicating how scary climate breakdown is. Some participants experienced multiple emotions simultaneously, while others noted oscillating patterns interspersed with numbness, which was described to result

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from overwhelmed and burnout-like states. Various aspects of climate breakdown evoked different but interlinked emotions.

Participant 6: *"Yeah, I think ... I am angry, I am sad in a grief type of way. I am anxious because I don't know what is happening [...] And, I think it should be considered as all interlinked."*

Participant 1: *"I think I go in waves. But sometimes I'm very impacted and it feels very overwhelming, and I have very strong emotional response to it. And there are months at a time where I feel very numb, and that's almost more disconcerting. It's like I don't care about any of this [...] This feels very inhuman. [...] it's almost feeling exhausted or tired, just not having the space to think like that."*

Anger

Most participants described anger as arising from an awareness of injustice and power imbalances, e.g., the obvious injustice (such as racism) that capitalist economic and neocolonial systems uphold, and corruption, hypocrisy, and greenwashing of companies and organisations with power, including universities. Respondents also experienced anger in reaction to short-sighted decisions by people in power, e.g., the removal of outdoor spaces, and they experienced annoyance and frustration in response to seeing uncaring behaviour by people in their immediate surroundings, e.g., littering. Respondents noticed that anger led to climate action, further research or other acts of defiance.

Participant 1: *"I was really angry at the inaction and the level of damage being done, and slowly coming to realise I guess what I now call neocolonialism and colonial power dynamics, and that being involved with the fossil fuel industry."*

Participant 2: "And when I'm angry I get productive"

Anxiety

Almost all participants experienced anxiety in response to their anticipated threat and changes to life (such as loss of rights, freedom and access to outdoor space) and the uncertainties of these, as well as a lack of trust in political leaders due to incompatible values and consequential climate inaction. Respondents also highlighted that they felt that feelings of anxiety were necessary in order to take action and make necessary changes.

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Participant 9: *"Whereas for climate anxiety, I can spiral because I can't reality check it, because if you reality check it, it is worse."*

Participant 3: *"... although it can be distressing if you have these concerns, if you have these anxieties about climate, then that – you can direct that towards action and that's what's going to motivate you."*

Sadness and grief

Participants noted that they felt sadness and grief in response to biodiversity loss, but also due to the loss of a future they had once envisioned. Sadness was also experienced when thinking about the consequential global injustice.

Participant 10: *"... I think the sadness is the closest word that I can come up and the reason why is that the climate change and like environmental degradations, is caused by, like the industrial revolution and how the expansion of capitalism."*

Despair

Four respondents talked about how despairing the situation felt, and some had recently experienced a loss of hope.

Participant 8: *"I just don't have very high hopes for our future. And, I do genuinely think we are just going to keep spiralling downwards and I don't think that we are going to be able to do enough to actually make big changes"*

Guilt and shame

Participants expressed feelings of guilt and shame for not "doing enough" and needing to prioritise their wellbeing and therefore, for example, giving up a zero-waste lifestyle or spending time outdoors away from climate activism. They also felt guilt for being in privileged positions associated with living in the "Global North".

Participant 3: *"I guess there's an element of maybe guilt just because, you know, living in the global north we are very privileged in that sense."*

Participant 6: *"I just lived off broccoli and potatoes, basically. It is not a good diet and so when I gave that up, I felt lots and lots of shame."*

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Cognitive preoccupations

Respondents reported that their awareness of climate breakdown also affected their functioning. Some students disclosed that worries were preoccupying them, consequently impacting their concentration and decision-making.

Participant 6: *“The more you become aware of how it is basically impossible to not have a negative effect with whatever you do. And, so every decision becomes ... debilitating...”*

Long-term plans

Three women in this study shared that their future plans, such family planning, were impacted.

Participant 5: *“And, then having children in that environment is definitely something that I consider.”*

Relationships

Respondents reported that their response to climate breakdown can affect relationships with those who don't share their awareness and emotions. Students described difficulty sharing their thoughts and feelings with those around them, leading to feelings of loneliness. However, strong relational connections formed through activism or university studies brought together like-minded individuals and helped them cope with shared emotions.

Participant 7: *“... and you can't tell anyone about it and your environment maybe doesn't understand, maybe the people around you are less concerned, well then yeah I think you can be feeling very alone with it and I think that is one of the ways at least in which it can get into your head”*

Mental health difficulties

Nine respondents reported mental health difficulties, such as anxiety and depression. One student noted not having significant mental health challenges but that she can feel anxious or low at times. Most described their responses to climate awareness to be interconnected with mental health struggles. Emotions in response to climate awareness were perceived as consistently present, either in the forefront or background, increasing general stress levels and affecting their ability to cope with other stressors. Respondents

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also described other challenges or mental health difficulties affecting their ability to engage in pro-environmental behaviours.

Participant 7: *“I think climate and the doom and gloom of the world in general contributes to kind of a constant drum of anxiety that can make the small stresses of life a lot more difficult to deal with.”*

Participant 8: *“...one feeds massively into the other.”*

Participant 10: *“...when my mental health is not good [...] I know it's important to do to recycle, but sometimes I just bin it straight because it's a lot easier for me.”*

Helpful coping strategies

Making sense

Participants shared that they valued making sense of climate breakdown, the power structures responsible for it, its worldwide impacts, their own emotional responses, and its impact on their mental health, as this validated their experiences. For some, this happened in therapy, using holistic approaches, which participants stressed as important in their making sense journey. Through this process, participants acknowledged that most of the responsibility lies with those in power, which eased their emotional burden and fostered a more compassionate perspective on challenging consumer choices, as well as the balance between activism and personal time.

Participant 1: *“And that was really useful for giving a bigger – what felt like a more holistic, more connected understanding.”*

Participant 6: *“... I felt the burden of the world was all on me and it was just completely opposite to the way I think of things now which is that community action is going to get us so much further...”*

Acceptance

Students reported that the acceptance of the state of the Earth and their emotional responses to it helped them manage their distress; for some, this was a process they had addressed in therapy. Although, students recognised the importance of accepting their emotions, they found it difficult to accept their emotions' intensity, fearing they could become

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overwhelming and challenging to manage, which might then demand an all-consuming commitment to protecting the planet. This struggle with emotional acceptance was particularly noted in respondents who felt anger or feared they might dampen the mood of others when discussing the future. They reflected that these societal expectations influenced this struggle with acceptance.

Participant 7: *"I want to find ways that I can be with this feeling, I want to find ways that I can be with the uncertainty of the future and still find happiness in my life."*

Participant 6: *"I think we are quite conditioned, socialised to not talk about our feelings as much, and even now you have invited me to talk about something that is very ... negative feeling, but I feel I am bringing down the vibe, I feel I am just going to ruin your day by saying all those things."*

Connecting with what is important while taking action

The respondents also talked about the importance of finding a community of like-minded people, often through their studies, activism or "doing their bit" in other ways, sharing thoughts and feelings and knowledge with these people, feeling understood and having a sense of belonging. Connecting with others and connecting with nature was also seen as a way to connect with what they are acting to protect.

Participant 4: *"... it does feel good to be at protests; there's such a sense of solidarity. [...] you can actually take that lid off and show that you're feeling these strong emotions, and you can also feel less like you're the only crazy person"*

Participant 9: *"Whenever I feel really "what am I doing this for?", I just go to the lake and just watch the birds on it and I am like, "There you go"."*

Hope and empowerment

The coping strategies, but particularly the shared experiences through activism, evoked feelings of empowerment and active hope.

Participant 1: *"... And then occasionally I feel empowered and I see – I have lots of friends and myself who are very involved in environmental activism, environmental projects, and sometimes spending time with them I feel like oh wow, there is a lot of change happening..."*

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Participant 1: *“... And I think that framing of hope I found really helpful and really empowering. There’s a quote by Rebecca Solnit [...] “Hope’s not a lottery ticket you sit on the sofa and clutch, hope is an axe you break down doors with in an emergency.” [Cries]”*

Discussion

The study focused on young, higher education students who report experiencing climate anxiety or concerns, are well-informed about climate breakdown, and some hold an activist identity. This study aimed to develop an explanatory model of how these students develop an awareness of climate breakdown, its emotional, cognitive, relational, and mental health impact, and the subsequent coping strategies employed. This research helped to bring to light the students' experiences and views on climate breakdown and the connection to their mental health. The work also built on the overall understanding of how people experience climate anxiety and supported that the awareness of climate breakdown without direct experience is sufficient to elicit distress (Clayton, 2020; Crandon et al., 2024a; Pihkala, 2020). Similar to other research (Crandon et al., 2024a; 2024b; Ojala, 2013; van Nieuwenhuizen et al., 2021) this model suggests that these responses lead to a range of coping strategies: making sense of climate breakdown and one's responses and that responsibility is shared with others and mainly lies with those in power, accepting the situation and one's responses, connecting with others and nature, and taking value-guided action, e.g., activism and other pro-environmental behaviour.

Growing awareness

The first stage in the model is the awareness development phase, in which students' understanding of climate breakdown develops, recognising it as a social justice issue upheld by "corrupt" power structures. Family, social networks, education, and the development of a wider perspective enabled engagement and understanding of the wide-reaching aspects of climate breakdown.

A drive to resolve the confused state that causes distress leads to further engagement with the topic. Research with teenagers also observed that some experienced a state of confusion (Payton, 2024). This can be linked to the moral conflict experienced between observed realities and leadership inaction, which can cause moral injury due to actions contradicting moral beliefs (Hickman et al., 2021; Labarthe & Marks, 2024; Weintrobe, 2021).

Impact

Our model indicated that climate breakdown awareness affects not only people's emotions, cognitions and relationships but also their overall mental health. This is akin to the idea that the perceived threat of climate breakdown can amplify threats people experience through social injustice, such as through existing mental health difficulties, gender, race and disabilities (Clayton et al., 2021; Gebhardt et al., 2023). The emotional response to climate

breakdown awareness is complex, including anger, anxiety, fear, sadness, grief, despair, and feelings of shame and guilt, supporting previous findings (Aston, 2022; Hickman et al., 2021; Ojala et al., 2021; Payton, 2024; Stewart, 2021). Although these were experienced differently, a pattern suggested that different aspects of climate breakdown evoked different emotions. For example, anger arose from perceived moral violations of others, while guilt surfaced when individuals reflected on their own moral violations, echoing previous research (Griffin et al., 2019). Anxiety prevailed over uncertainties regarding future changes and distrust in political leaders. Both anger and anxiety spurred information-seeking, climate action, and pro-environmental behaviour, supporting previous research (Stanley et al., 2021; Verplanken et al., 2020; Wullenkord et al., 2021). Sadness and grief connected to biodiversity loss, climate injustice, and loss of a type of future, once expected. Despair was often tied to “pessimistic” views about just how “doomed” the world is. Perhaps these emotions allowed the necessary processing of the gravity of the situation, thus allowing moves towards value-guided actions, similar to Aston (2022).

The research shows that cognitive preoccupations impacted students' concentration and decision-making. Relationships with people who did not share their concerns were negatively impacted, leading to feelings of loneliness, echoing some of Aston's (2022) findings. These responses support Cayton and Karazsia's (2020) suggestion that climate anxiety can impact people's functioning. Family planning was also impacted, particularly in women, replicating findings by Smith et al. (2023).

Though not seen as pathological, supporting the emerging consensus (Calabria & Marks, 2024; Hickman, 2020) participants regarded climate breakdown awareness as an ever-present stressor that amplifies distress and complicates addressing mental health difficulties. This supports research showing that climate anxiety can exacerbate pre-existing generalised anxiety disorders (Schwartz et al., 2023) and the idea that the awareness of climate breakdown acts as a threat amplifier (van Nieuwenhuizen et al., 2021). When experiencing mental health difficulties, some participants' pro-environmental engagement decreased, replicating data by Hogg et al. (2024).

Coping strategies

It was clear that students engaged in a range of different solution-focused, emotion-focused and meaning-focussed coping strategies, supporting previous findings (Calabria & Marks, 2024; Crandon et al., 2024a; 2024b; Ojala, 2013).

Making sense of climate breakdown, the power structures responsible, and its emotional impact was viewed as an important step in managing distress, and holistic therapeutic approaches were described to facilitate this process. This supports the important

role of contextual formulation, for example, through the PTMF or Bronfenbrenner's nested systems model (Bronfenbrenner & Morris, 2006) to make sense of people's, families or communities' unique threat responses, which can validate and help people to see ways forward through constructive engagement with the topic, which may alleviate distress and change people's appraisal of threat (Morgan et al., 2022; Wainwright, 2024).

Acceptance of the current state of the Earth and their emotional responses were also noted to be an important strategy for coping, and therapy was found helpful in this process. Acceptance also helped students to engage constructively with the topic through activism, for example. Others have also suggested acceptance as an important step in managing climate emotions (Aston, 2022; Crandon et al., 2024b).

Another important aspect in coping was connecting with what is important (community and nature), as this helped students connect with their values, allowed them to be with their emotions, gave them a sense of belonging and allowed them to take value guided actions, i.e., pro-environmental actions, for example activism. Activism in particular was said to evoke feelings of empowerment and active hope, supporting previous findings (Aston, 2022; Crandon et al., 2024b) and thus may ease cognitive and emotional difficulties (Schwartz et al., 2023).

Our findings support the idea that problem-focused coping combined with meaning-focused coping may be particularly helpful when faced with a complex problem (Park & Folkman, 1997), such as climate breakdown.

Moreover, our model suggests that the causation and impact of growing climate breakdown awareness is multifactorial and complex. The impact of climate breakdown awareness aligns with some aspects of the Ecological Awareness Cycle (Hawkins & Ryde, 2019). Our model is also cyclical, where coping strategies lead to deeper awareness. However, this process is more complex and perhaps more fluid in the current model and does not necessarily follow the stages or order suggested.

Clinical Implications

This research gave a voice to students and conceptualised their strong emotional responses to the awareness of climate breakdown and its associated social injustice and their subsequent coping strategies. It supports the emerging consensus that strong responses to climate breakdown can be healthy, rational and important but can also impact people's overall wellbeing and mental health. With this in mind, it is important not to dismiss the stress that awareness of climate breakdown places on people and communities, but instead support them in therapy, public health interventions and policy-making.

Therapeutic support was welcomed, and two key aspects of coping, sense-making and acceptance, were highlighted to be helpfully facilitated through therapy and helped students find ways in which they could engage with the topic in a sustainable way and not lead to burn-out (Huxley & Lambrick, 2020). Here, a holistic perspective, taking into account the impact of wider systems, was valued. Suggesting that contextual psychological formulation approaches such as the PTMF (Johnston & Boyle, 2018) to make sense of people's threat responses can be particularly helpful in supporting people. The current model could also provide a structure that clinical psychologists could use when collaboratively formulating people's difficult experiences.

The results also support the suggestion that therapists need to be informed about climate breakdown (Clayton & Karazsia, 2020; Van Susteren & Al-Delaimy, 2020). The study's findings of strategies students found helpful to help cope with their responses to climate breakdown awareness could support the idea that Acceptance and Commitment Therapy (ACT), Compassion Focused Therapy (CFT), and the Work That Reconnects could be particularly useful in supporting people (Calabria et al., 2024; Jones & Johnstone, 2024; Williams & Samuel, 2024). Drawing from previous work by Holland (1992), group work could be particularly beneficial for individuals with strong reactions to climate breakdown awareness. Holland (1992) took a community approach when developing a mental health group for women to help understand their responses to life experiences, often joined experiences and consequently leading to social action. This way to conceptualise group work has since been adopted by Homes (2010), which supports people's coping strategies, understanding the roots of the difficulties, and subsequently taking community action. The Understanding Depression guidelines by Bowden et al. (2020) also underscore the need for connections with others for support and prevention of, in their case, depression and the need to address the underlying causes, e.g., through social action. This perspective can be applied to the distress caused by the awareness of climate breakdown to support those with strong responses and spark the necessary culture shift.

This research strengthens the importance of clinical psychology training in supporting learning about how broader issues of society, such as climate breakdown can impact people's wellbeing and mental health and what coping strategies can be helpful.

The results also support the idea that public health interventions can support people to engage with the topic and facilitate helpful coping strategies. This could be done, for example, by supporting the change in the appraisal, a real threat that collectively is important to try to mitigate and connecting with what is important by forming a deeper relationship with Earth (Wainwright, 2024).

Schools, colleges, and universities have ethical responsibilities and are crucial in supporting people to engage in this topic in a meaningful way (Baumber et al., 2019; Filho et al., 2021), however climate education is still limited (Greer et al., 2023; Molthan-Hill et al., 2022; Payton, 2024) and teaching should be offered across all degrees, with specific relevance to each degree (Molthan-Hill et al., 2022).

Limitations and Future Areas of Interest

The objective of qualitative research is not to generalise the findings of all students in a traditional sense (Myers, 2000). This echoes the critical realist stance of the research exploring the knowable reality of awareness-building, its impact and the coping strategies a group of students explained within their context.

The researcher was aware of the influence of her own perspectives on the interpretation of the data, and subjectivity is inherently part of qualitative research (Starks & Trinidad, 2007). The researcher acknowledges that she had to engage in reading on the topic of climate anxiety and emotions as part of proposing this research. Therefore, despite efforts to analyse data inductively, existing knowledge of related literature and theories has likely influenced the conceptualisation of categories. A reflective diary and regular research supervision were used to increase reflexivity. Further research is needed to raise the voices of marginalised people and those who are most directly impacted by climate breakdown, who may experience acute threat responses.

Two out of 10 participants in this study reported having autism. Taylor's et al. (2021) quantitative research did not find an association between autism traits and environmental attitudes but that autism traits may be a barrier to pro-environmental behaviour. It would be interesting to explore the relationship between autism and climate breakdown awareness further using qualitative research methods.

In this study, only women reported that family planning was impacted, which perhaps could indicate that there may be subtle gender differences in the impact that the awareness of climate breakdown has on people of different genders. This sparked an interest in broader gender differences in climate anxiety, which were subsequently explored in the systematic review.

We would also recommend that future research continues to use diverse methods to further the understanding of the responses to climate breakdown awareness.

Conclusion

Climate breakdown is a significant threat to all life on Earth and immediate action is needed (IPCC, 2023). The study focused on 10 higher education students who reported

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experiencing climate anxiety or concerns and were well-informed about climate breakdown, with some participating in activism. Grounded theory methods developed an explanatory model of how these young students are growing their awareness of climate breakdown and how this subsequently impacts their emotions, cognitions, relationships, long-term plans, and interacts with their mental health. The model also found that the students interviewed found making sense of climate breakdown and its impact helpful, along with practising acceptance, connecting with what is important, and taking action, such as engaging in activism. This study contributes to the current understanding of climate anxiety that people can have in response to climate breakdown awareness and helps to inform clinical psychology practice and public health interventions. However, more research is needed to explore these processes, especially in more diverse communities and those communities more directly impacted by climate breakdown.

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Chapter Four: General Discussion

Word count: 5194

This thesis portfolio aimed to explore gender differences in climate anxiety and eco-anxiety scores, as well as how higher education students who identify as having climate anxiety or significant concerns experience this through exploring the causation and impact of climate breakdown awareness and coping strategies that can be helpful. This chapter will further discuss the findings of the systematic review and the empirical paper. A critical evaluation of the methodological strengths and weaknesses will be provided. Discussion of how this research can inform clinical practice and public health interventions will also be provided. Reflections on the process of conducting this research are also discussed.

Overview of findings

Systematic review and meta-analysis

To the authors' knowledge, this was the first meta-analysis to synthesise the climate and eco-anxiety scores, measured by the Climate Change Anxiety Scale (CCAS; Clayton & Karazsia, 2020) and Hoggs Eco-anxiety Scale (HEAS; Hoggs et al., 2021), across men and women, primarily. The primary research question drew data from 15 articles and 13235 participants and showed that there is a small significant effect size indicating that women have higher climate and eco-anxiety scores than men. However, there was also a high degree of heterogeneity across the study results. Therefore, some caution should be applied when interpreting these results. However, despite this, the gender and sex effect found was somewhat consistent, as the direction of the effect was the same, with women, on average, scoring higher in all but one study. Therefore, this indicated a robust effect of women scoring higher on the CCAS and HEAS than men.

A moderator analysis showed no evidence of the gender and sex effect differing across different mean ages. Upon visual inspection, no obvious variability of gender differences was observed across studies from different countries. There are likely other unidentified moderators which were not accounted for in this review, which may explain the heterogeneity in the data. A moderator and subgroup analysis showed that there was no difference in the gender effect across the questionnaire types, CCAS and HEAS, suggesting that women have higher climate change-specific anxiety but also broader climate and environmental anxiety than men.

These results align with literature suggesting that women consistently score higher on related scales, such as the Climate Change Worry Scale (CCWS; Donati et al., 2024; Regnoli et al., 2024; Shinan-Altman & Hamama-Raz, 2023; Stewart, 2021), the Eco-Anxiety Questionnaire (EAQ; Jalin et al., 2024; Micoulaud-Franchi et al., 2024), the Climate Emotion

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Scale (CES; Galway & Beery, 2022) and experience higher climate change distress (Searle & Gow, 2010). Similarly, a survey involving 10,000 young people worldwide also revealed a consistently small effect of gender differences, with female respondents indicating higher levels of concern and negative emotions (Clayton et al., 2023). Moreover, women also score substantially more highly epidemiologically speaking on anxiety scales and their anxiety disorders are associated with greater illness burden than men (McLean et al., 2011).

Empirical project

This study aimed to develop an explanatory model of how higher education students who report experiencing climate anxiety or significant concerns about climate breakdown grow their awareness of the phenomenon, how they experience its impact and what coping strategies they find helpful. This research builds on the overall understanding of how people experience the impact of awareness of climate breakdown or climate anxiety and what coping strategies can be helpful, informing psychological support. The results suggest that students experience different journeys to become aware of the wider impact of climate breakdown. A distressing state of confusion often arises from the incongruence in scientific evidence and the inaction of those in power, which leads students to become informed and make sense of the bigger picture. Their awareness leads to strong and distressing emotions, impacting cognitions, relationships, long-term plans and mental health. That this awareness, through media and education, is sufficient to elicit distress is a widely accepted phenomenon (Clayton, 2020; Crandon et al., 2024; Pihkala, 2020). Similar to other research (Crandon et al., 2024; Ojala, 2013; van Nieuwenhuizen et al., 2021) the current model suggests that these responses lead to a range of coping strategies: making sense of climate breakdown and one's emotional experiences, practising acceptance and connecting with others and nature, and taking value-guided action, e.g., activism and other pro-environmental behaviours. However, this can also lead to growing further awareness of climate breakdown and further threat responses.

Critical appraisal

Systematic review and meta-analysis

The meta-analysis includes several strengths and limitations, which are addressed below. To our knowledge, this was the first meta-analysis aiming to synthesise the effect of gender on climate and eco-anxiety measures and, therefore, addressed a gap in the research and helped to synthesise the data.

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A wide variety of emotional terms were used during the literature search, such as anxiety, grief, emotions, concerns, fear, despair, anger, guilt, angst, worry, and distress. Although this generated more results, it reduced the chances of missing relevant articles.

The quality of the articles was assessed using the Critical Appraisal Skills Programme (CASP) cross-sectional study checklist (2024), this process is recommended to be done to allow authors to obtain reliable conclusions and be aware of possible limitations to the studies included (Tod et al., 2022). The CASP tool helped to assess the studies' quality by assessing whether their design, conduct, analysis, and presentation were appropriate to answer their research question.

Despite the above-mentioned strengths, this meta-analysis also had its limitations, one of which was the high levels of heterogeneity observed across the results of the included studies. The heterogeneity of results is important to consider when thinking about the generalisability of the findings of the meta-analysis. The heterogeneity of the results could possibly be explained through variability in study designs, populations, and assessment methods across the studies. This is not uncommon, especially when reviewing psychological research, with around a quarter of meta-analyses containing high levels of heterogeneity (Higgins et al., 2003). As only studies written in English were included, this may have introduced a cultural bias, which could limit the generalisability of the results. Due to time constraints, the authors of studies with missing data were not contacted, and therefore, these studies were excluded from the review. This could have introduced a publication bias, and future reviews should attempt to include all studies that compared climate and eco-anxiety scores across gender or sex. The review also only included peer-reviewed articles to ensure the quality of the data used in the meta-analysis. However, not including unpublished thesis studies could have also introduced further publication bias. This is because unpublished studies may be unpublished because they produced relatively small effect sizes, and if they were included, they might reduce the pooled effect size estimate.

Although the overall number of participants in this meta-analysis was adequate, the meta-analysis could not perform some moderator analyses due to limited participants in potential subgroups, which limited statistical power. Therefore, it was not possible to provide further insight into the observed heterogeneity.

Furthermore, it has been suggested that differences in men's and women's emotional reactions to climate breakdown may depend on the study/social context and location (du Bray et al., 2019). As this meta-analysis lacked sufficient studies from various countries, a moderator analysis by country would have been underpowered. It was considered to divide study samples by country categories, such as "Global North" and "Global South" or low, middle, and high-income. However, two studies included different countries that could be

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classified differently, and most other studies were carried out in high-income and upper-middle-income countries within the “Global North”. Furthermore, these categorisations would have oversimplified the complex cultural, financial and biophysical vulnerability factors to lead to meaningful results.

Another limitation is that the studies included in this meta-analysis were mostly methodologically homogenous, using self-report measures (CCAS and HEAS). Although methodological homogeneity is good for producing reliable and interpretable results, it can also limit the conclusions that can be drawn. While we have learned that, on average, women score higher than men on climate and eco-anxiety questionnaires, we have not learned whether this increased anxiety score indeed represents higher anxiety or, perhaps, can be explained by women expressing their emotions more openly generally. Alternatively, a higher climate anxiety score may be linked to other negative outcomes for women, such as worse mental health. Furthermore, it is unknown whether higher climate anxiety scores in women compared to men are linked to engagement in coping strategies that result in pro-environmental action. All these interesting questions need to be explored on their own using appropriate research methods.

Furthermore, the meta-analysis only focussed on total scores; it would be interesting if future meta-analyses explored if effects may vary across the different subscales of the CCAS and the HEAS.

Gender is a complex and evolving construct, and therefore, our results and interpretations likely oversimplify a complex construct and need to be viewed with caution. The meta-analysis was based on data from studies that mostly coded gender and sex as a binary variable (male/female), and only one study included people with non-binary gender identities in their analysis. However, they were grouped together with female participants. Therefore, we are missing information about how people with gender-diverse identities experience climate anxiety. It would be important for future studies to include transgender and gender-diverse participants to allow for statistical comparisons across different genders. Recently, a population-based study showed that people who identify as transgender and gender-diverse have a higher prevalence of mental health difficulties (Eccles et al., 2024). The minority stress model may explain the mental health discrepancies between people identifying as transgender and gender-diverse compared to cis-gendered people (Budge et al., 2020). Thinking about how climate breakdown can amplify existing threats, we may be able to hypothesise greater climate and eco-anxiety in people who identify as transgender or gender diverse.

Empirical project

At the time of the research proposal, a grounded theory approach was proposed because existing research mainly tried to explain climate anxiety using existing frameworks or theories. As climate anxiety is a relatively new concept, using only existing theories to understand the concept may not be sufficient. Using a more bottom-up approach, such as grounded theory, asking students who identify as having climate anxiety or have significant concerns about climate breakdown to share their experiences and understandings gave an opportunity to develop an explanatory model grounded in people's experiences. It was also important for the model to emerge organically from the data without being constrained too much by pre-existing themes. Furthermore, its iterative process allowed for more in-depth explorations and refinements to develop an emerging theory. However, grounded theory is a complex and time-consuming methodology to use due to its iterative approach and complex coding process. Due to the time-limited nature of the clinical psychology thesis research, methodological compromises had to be made.

As the researcher was relatively new to qualitative research, she needed to shift her understanding of the quality of research away from the quantitative criteria of reliability and validity, as these are not applicable when judging the quality of qualitative research (Willig, 2013). The critical appraisal is based on the framework that Yardley (2000, 2017) developed for qualitative research. This encompasses a number of essential criteria: sensitivity to context, commitment and rigour, transparency and coherence, and impact and importance. These principles can be used flexibly across diverse theoretical orientations and methodologies. Therefore, these principles will be used to appraise the strengths and limitations of the empirical paper.

It has been highlighted that good quality qualitative research is sensitive to the contexts in which it is situated (Yardley, 2000). The first author was familiar with and sensitive to some of the contexts in which the participants operated. She herself was a student at the university which most of the participants attended, and she also experienced similar emotional responses due to her climate breakdown awareness and shared common values with the participants. Reflecting on the first author's own experiences allowed her to think about how she may cope with these herself. These common experiences enhanced the researcher's engagement with the data and uncovered conceptual relationships between categories. However, during the coding and interviewing process, the researcher tried not to simply impose her preconceived assumptions on the data but instead carefully considered the participants' experiences. Although, arguably, this is a very difficult and perhaps an impossible process the researcher valued research supervision and the reflective diary to support this. This helped the researcher to be explicit in her own positions and transparent in

her approaches. In the interviews, the use of open-ended questions and flexibility in how questions were posed also enabled participants to express what they deemed important and fostered sensitivity to their viewpoints. However, it also needs to be noted that the participants did not only operate in the context of the university settings, and some of the contexts they operated in may have been unfamiliar to the researcher.

Commitment and rigour were demonstrated by the in-depth engagement with the research topic, the comprehensive data collection and the sufficient depth of analysis. The researcher's personal interest in the topic of climate breakdown and the impact this has on people helped the engagement in this topic. The researcher also started to engage in this topic on a professional level, bringing her ecological values into clinical psychology placements. Furthermore, the interview schedule was piloted and continually refined further after the interviews. During interviews, the researcher used clarification questions to ensure that she had accurately interpreted the data. Codes and categories were regularly shared with supervisors and reflected on in supervision to ensure that they were grounded in the data. For example, all students reported that they viewed climate breakdown as a social justice issue. As the researcher also sees it as a social justice issue, she wondered about potential biases, especially when thinking about generalising these results to other students, as it is likely that not all students, who are aware of climate breakdown see it in this way. These reflections highlighted the importance of clear descriptions of results and the limits of generalisability when interviewing a self-selected subgroup of students who identify as having climate anxiety or significant concerns about climate breakdown.

The current study demonstrated coherence and transparency by having adopted a clear and logical, consistent reporting style of the research and by guiding the reader through how the grounded theory was developed from the data through carefully selected quotes. Quotes enable the reader to understand the researcher's analytical process, interpretations and conclusions. Keeping a reflective diary has helped the researcher to evaluate and scrutinise her own perspectives and analytical choices and uncover implicit assumptions (Bryant & Charmaz, 2019).

The research demonstrates impact and importance as it has given university students a voice to express their experiences, the impact of climate breakdown awareness, and the coping strategies they find helpful. Overall, the study enhanced the understanding of these experiences, and the research highlights the practical implications and recommendations for people providing support to students with these experiences.

Given the time restraints within the context of a Clinical Psychology Doctorate and the argument that theoretical saturation is better used as an aim rather than reality, as this would otherwise closely resemble the quantitative concept of completeness (Willig &

Rogers, 2017) the study aimed for theoretical sufficiency. Other guidance suggests that theoretical sufficiency can be reached with six to 10 interviews (Braun & Clarke, 2013).

This study followed the methodological guidelines outlined by Corbin & Strauss (2014). In grounded theory, coding is a process of conceptual abstraction by assigning general concepts (codes) to singular incidences in the data. After having collected four data sets, the evaluation process began. Overall, the study would have benefited from further data collection and evaluation iterations, as this would have given more opportunities to refine questions or target emerging concepts through further participant sampling. Overall, this would have allowed the emerging grounded theory to further guide data collection and help refine the analysis. However, due to time pressures, no further iterations of data collection and evaluation were practically manageable.

The constructivist perspective could be critical of this, suggesting that the study may have missed emergent concepts and that the model built from the data is less robust. However, the critical realist perspective focuses more on making sense of knowable reality through some theory-informed interpretation and accepting that all knowledge is fallible. As critical realism recognises the constraints of real-world research, the lack of further iterations is seen as a limitation of the study, but not as a fatal flaw.

Keeping a reflective diary and engaging with participants during data analysis stages supported the achievement of sufficient credibility of this study. However, conducting follow-up interviews based on a summary of initial results would have been beneficial in ensuring that these represented the voices of the participants. This would have further ensured credibility of this study and would have further allowed for theoretical sampling to refine the key and subcategories through the more focused retelling of experiences on perhaps more specific aspects of their experiences of climate breakdown awareness.

It also needs to be acknowledged that the empirical project mainly included students with white British or other white backgrounds, with one student being from an East Asian background. Future research would benefit from focussing on people from more diverse racial and ethnic backgrounds. This would give underrepresented voices a platform to be heard and build a more comprehensive picture of the causation and impact of climate breakdown awareness. Recent research from the US has suggested that people of colour can experience climate breakdown as more traumatising, and their climate emotions impact plans to have fewer future children than white people (Sasser & Merchant, 2024).

The emerging grounded theory of the impact of growing climate breakdown awareness and people's coping strategies supports some aspects of the Ecological Awareness Cycle (Hawkins & Ryde, 2019). Overall, the current model can be cyclical in

nature, with coping strategies leading to deeper awareness, but not necessarily in the stages or order suggested by the Ecological Awareness Cycle, but more broadly and fluidly and with more complexities.

Similarly, comparing the emerging grounded theory model in this thesis to the Stages of Change model (Prochaska & DiClemente, 1983), it also shares the cyclical nature of behaviour change, and links can be made between the pre-contemplation stage and perhaps the assumed stage in our model, of not being aware of climate breakdown, with the contemplation stage being the growing awareness stage of the studies' emerging grounded theory model, in which people start to recognise that certain problematic behaviours need to change, with these problematic behaviours in the current model being collective and especially enacted by those in power.

The results of the empirical project showed that although the impact of the climate breakdown awareness was not viewed as pathological by participants, participants regarded it as an ever-present stressor that amplifies distress and has an impact on mental health difficulties. This further supports the idea that the awareness of climate breakdown acts as a threat amplifier (van Nieuwenhuizen et al., 2021). Therefore, it may be beneficial for some people to seek additional therapeutic support, which many students interviewed welcomed, and had accessed. As part of therapeutic support, they particularly found two aspects helpful for coping with their emotions: sense-making and acceptance. In therapy, a holistic perspective, taking into account the impact of wider societal issues and oppressive systems, was valued. It could be argued that this, in turn, suggests that therapists need to be informed about climate breakdown, similar to previous research (Clayton & Karazsia, 2020; Van Susteren & Al-Delaimy, 2020). Interestingly, Aston (2022) highlights the need for therapists to reflect on the impact that climate breakdown has on them in order to provide better support to others.

The findings of this empirical project underscore the importance of supporting individuals to accept distressing emotions while engaging in committed, values-based action. This aligns with and further reinforces existing research by Williams and Samuel (2024), suggesting that Acceptance and Commitment Therapy (ACT) can be particularly helpful in addressing climate anxiety. Given that many of the emotions involved, such as shame and guilt, can be particularly challenging to experience, Compassion-Focused Therapy (CFT) may also provide valuable support by fostering self-kindness (Calabria et al., 2024). Additionally, the importance of collective action underscores the potential value of group-based approaches, such as The Work That Reconnects (Jones & Johnstone, 2024), which provides space for shared reflection, fostering a sense of belonging and empowerment through community connection.

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Overall, this research strengthens the importance of Clinical Psychology Training, supporting learning about broader issues of society, such as climate breakdown, and how these can impact people's wellbeing and mental health and what coping strategies can be helpful. This supports the argument that therapy should not disregard social issues (Winter, 2019). As discussed in the portfolio introduction, using the Power Threat Meaning Framework (PTMF, Johnstone & Boyle 2018) and Bronfenbrenner's Ecological Systems theory (Bronfenbrenner & Morris, 2006) can be helpful in formulating broader societal issues.

The results also support the idea that public health interventions can support people to engage with the topic and facilitate coping strategies. This could be done, for example, by supporting communities to change their appraisal of the phenomenon as a real threat that collectively is worth trying to mitigate, as well as connecting with what is important by forming a deeper relationship with Earth (Wainwright, 2024).

Furthermore, social identity theory (Turner et al., 1979) can help think about how climate action can become empowering and be linked to people's identity in a positive frame. Social identity theory suggests that people's sense of identity is especially shaped by the groups they belong to, for example, their community or climate activist groups. Furthermore, the theory helps explain how individuals are more likely to act in support of planetary health when they perceive their group's values to align with those of planetary health. Planetary health identities can be reinforced through community initiatives, as individuals are more likely to behave in pro-environmental ways to maintain group cohesion. Connecting with others who have similar values, through collective action, can further solidify people's identity as being someone who cares for their environment and planetary health.

As climate action requires a collective response, it is also important to consider how the social identity theory can inform leadership roles, especially in times of crisis, to foster group or societal climate action. Bamberg et al. (2015) showed that social identity more strongly predicts climate action (defined as the intention to engage in pro-environmental activities) than factors like cost-benefit analysis, perceived efficacy, and group-related emotions, although all these factors have significant effects.

Fielding and Hornsey (2016) summarised the ways in which social identity theory can inform leadership strategies. They suggested that forging a more inclusive superordinate identity that unites conflicting subgroup identities can help to soften negative subgroup relations. This thereby shifts the focus from "us and them" thinking to considering the "we" by reducing ingroup bias and outgroup hostility. This can help to reduce blame between groups,

which may have been contributing to inaction, and instead increase global negotiations about mitigating the worst effects of climate breakdown and support collective action.

Another aspect that social learning theory suggests is where the messaging for environmental action is coming from, as we know, ingroup members are generally viewed as more trustworthy and credible, making them more influential (Hornsey et al., 2002; Kahan et al., 2011). This suggests the need for pro-environmental messages to come from ingroup sources whenever possible, and that people in leadership may be more influential if they take a collective approach and hold an identity of the superordinate group. An example of this is seen in behaviour change strategies, which are based in workplaces, in which a workplace champion supports the rest of the workforce to make positive changes.

These principles are also in line with leadership styles, such as transformational leadership theory (Bass & Riggio, 2006), which emphasises the importance of leaders inspiring people by uniting shared values and fostering a collective vision. If leaders model a strong environmental identity within their teams or communities, and foster a sense of belonging and common purpose, they may be able to empower individuals by making them feel part of meaningful and positive change.

Personal reflections

My motivations for undertaking this research are deeply rooted in my personal interest in climate breakdown and other social justice issues and their impact on people's wellbeing, as well as my deep care for people and our Earth.

The fundamental interest in this topic helped me see this project through from start to finish and keep going when things were difficult. The recruitment process was particularly challenging at times. The first recruitment pathway was through The University of East Anglia's (UEA) student wellbeing service, which was very supportive of this project. 72 students, during a 6-month recruitment period, indicated in their self-referral forms to the student wellbeing service that they had significant climate and environmental concerns or climate anxiety. However, upon receiving the study information and the invitation to take part in the research, only one person responded and subsequently decided to take part in the research.

Due to the challenges in recruitment, the inclusion criteria were widened to people who had not accessed psychological services but had thought about accessing such services and thus could reflect on whether they thought psychological services would have potentially been helpful for them. Additional recruitment pathways were also included. The additional recruitment pathways included adverts in digital newsletters across different UEA

departments and newsletters with a clear focus on environmental activism, as well as posters across the UEA campus. The posters and newsletter information about the study contained a QR code, with a link to a prewritten email indicating interest in the study and requesting further information. Seven of out 10 of the recruited participants used the QR code to contact the researcher. Eight out of 10 participants had accessed psychological support services previously. See Appendix H for inclusion and exclusion criteria.

At points during this thesis project, I wondered about how society, including clinical psychology as a profession, may underestimate the relevance and importance of climate breakdown on people's physical and mental health. I hope that this thesis portfolio may allow clinical psychologists to engage more deeply with the topic of climate breakdown and perhaps encourage further reflection on how we can support others in engaging with the topic of climate breakdown. Furthermore, I hope the thesis demonstrates the need for urgent action, especially by those in power, and perhaps this will encourage more people to engage in climate activism.

What has struck me from the beginning of my thesis work was that Tony Wainwright (2009) first published his ideas on how clinical psychology might need to adapt in response to climate breakdown 15 years ago and although the impact of climate breakdown on clinical psychology is starting to be considered more widely, it is clear that the field has currently not advanced enough to make a significant impact at the urgency required. However, a significant step is that the Committee for Clinical Psychology Training now recognises the importance of a healthy planet for the health of people and that climate breakdown and environmental degradation are disproportionately driven by privileged groups of people who also hold more power and that the impacts of this disproportionately impact marginalised and vulnerable people, and that thus climate breakdown is a social justice issue (BPS, 2024; Williams at al., 2024). More specific training on how best to support distress related to climate breakdown awareness and the impact on mental health has been highlighted by mental health professionals in the UK to be helpful (Croasdale et al., 2023). This training should allow mental health professionals and clinical psychologists to think about how their psychological insights and techniques could support collective change and support the people most impacted as well as those who work in the highly emotive field of sustainability and climate activism. While training would be important it also needs to be acknowledged that clinical psychologists could signpost people to local services such as Climate Psychology Alliance events and Climate Cafes.

Overall, it is clear that clinical psychologists are well-placed in conceptualising the challenges caused by climate breakdown, behavioural adaptation, and mitigation. Furthermore, they hold responsibilities to advocate for health, prevent ill health in

communities and understand how broader societal issues can impact mental health in populations (HCPC, 2023). However, clinical psychologists still face professional barriers to voicing concerns and taking action for planetary health within their professional roles (Walker, 2021).

I hope that with support and training more clinical psychologists can use their knowledge of human behaviour change and use their voices more to demonstrate that climate actions are consistent with their responsibility to promote health, wellbeing, equity, inclusivity and diversity.

I am aware of my role in contributing to climate breakdown. I notice feelings of fear and anger when thinking about the clarity of scientific evidence and the lack of mitigating actions, as well as feelings of guilt, e.g., for the current lack of climate action I currently engage in. A sense of loneliness with these experiences encouraged me to conduct this study. This has also driven how I conducted this study, making pro-environmental choices, such as cycling to in-person interviews and weighing up the need to use AI. I acknowledge that recognising my assumptions about people's experiences with climate-related emotions was crucial during the interviewing, coding and data analysis.

Overall, in a way, this research has been part of my journey to grow further awareness, acknowledge and engage with difficult thoughts and feelings and take value-guided actions, mirroring to some extent the experiences of the participants in the empirical project. Overall, this project has helped me make sense of my own reactions more, which I see as an important step in being able to support others with their reactions in the future.

Part of this journey can be seen in my use of language throughout the development of the empirical project. In my proposal and participant materials, I used terms such as 'climate change.' During the interviews, I also noticed being hesitant to use more emotional and more accurate terms, such as climate breakdown. Driven by the data showing that most students use more emotive terms, and upon my own reflection, I decided that the term 'climate breakdown' was the most appropriate term to use throughout this thesis portfolio. However, it is worth considering that the more neutral term 'climate change' might have elicited different responses in some students than had I used the more emotive term 'climate breakdown.' Therefore, it may be necessary to assume that students might have referred to slightly different climate change-related concepts.

Throughout the period of research, multiple political events have introduced further uncertainty to our future, for example, the re-election of Donald Trump, as well as significant weather events, for example, in parts of Africa, Europe and the US. I often wondered how interviews would have differed shortly after these events and whether people's experiences might have changed or intensified.

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Overall, I would like to see more people allowing themselves to connect with their climate awareness-related emotions, as this may increase climate action (Ballew et al., 2024; Boluda-Verdú et al., 2022; Ogunbode et al., 2022) and perhaps eventually trigger a much-needed culture shift.

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Appendices

- A. Author guidelines for the Journal of Environmental Psychology
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APPENDIX A - Author guidelines for the Journal of Environmental Psychology

Introduction

The *Journal of Environmental Psychology* is the premier journal in the field, serving individuals in a wide range of disciplines who have an interest in the scientific study of the transactions and interrelationships between people and their surroundings (including built, social, natural, and virtual environments, the use and abuse of nature and natural resources, and sustainability-related behavior). The journal publishes internationally contributed empirical studies and systematic and meta-analytic reviews of research on these topics that advance new insights.

As an important forum for the field, the journal publishes some of the most influential papers in the discipline that reflect the scientific development of **environmental psychology**.

Contributions on theoretical, methodological, and practical aspects of all **human-environment interactions** are welcome, along with innovative or interdisciplinary approaches that have a psychological emphasis.

Research areas include:

- Psychological and behavioral aspects of people and nature
- Cognitive mapping, spatial cognition and wayfinding
- Ecological consequences of human actions
- Theories of place, place attachment, and place identity
- Environmental risks and hazards: perception, behavior, and management
- Perception and evaluation of buildings and natural landscapes
- Effects of physical and natural settings on human cognition, health, and well-being
- Theories of proenvironmental behavior, norms, attitudes, and personality
- Psychology of sustainability and climate change
- Psychological aspects of resource management and crises
- Social use of space: crowding, privacy, territoriality, personal space
- Design of, and experiences related to, the physical aspects of workplaces, schools, residences, public buildings and public space

The journal does not typically publish highly exploratory, descriptive case studies, narrative reviews, or rapid scoping reviews. The desk rejection rate of the *Journal of Environmental Psychology* is about 75%.

Submission checklist

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:

- E-mail address
- Full postal address

All necessary files have been uploaded:

Manuscript

- Include keywords
- All figures (include relevant captions)
- All tables (including titles, description, footnotes)
- Ensure all figure and table citations in the text match the files provided
 - Indicate clearly if color should be used for any figures in print

Graphical Abstracts / Highlights files (where applicable)

Supplemental files (where applicable)

Further considerations:

- Manuscript has been 'spell checked' and 'grammar checked'

- All references mentioned in the Reference List are cited in the text, and vice versa
- Permission has been obtained for use of copyrighted material from other sources (including the Internet)
- A competing interests statement is provided, even if the authors have no competing interests to declare
- Journal policies detailed in this guide have been reviewed
- Referee suggestions and contact details provided, based on journal requirements

For further information, visit our [Support Center](#).

Before you begin

Ethics in publishing

Please see our information on [Ethics in publishing](#).

Declaration of interest

All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double anonymized) or the manuscript file (if single anonymized). If there are no interests to declare then please state this: 'Declarations of interest: none'. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. [More information](#).

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[redundant or concurrent publication'](#) for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify compliance, your article may be checked by [Crossref Similarity Check](#) and other originality or duplicate checking software.

Use of inclusive language

Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Content should make no assumptions about the beliefs or commitments of any reader; contain nothing which might imply that one individual is superior to another on the grounds of age, gender, race, ethnicity, culture, sexual orientation, disability or health condition; and use inclusive language throughout. Authors should ensure that writing is free from bias, stereotypes, slang, reference to dominant culture and/or cultural assumptions. We advise to seek gender neutrality by using plural nouns ("clinicians, patients/clients") as default/wherever possible to avoid using "he, she," or "he/she." We recommend avoiding the use of descriptors that refer to personal attributes such as age, gender, race, ethnicity, culture, sexual orientation, disability or health condition unless they are relevant and valid. When coding terminology is used, we recommend to avoid offensive or exclusionary terms such as "master", "slave", "blacklist" and "whitelist". We suggest using alternatives that are more appropriate and (self-) explanatory such as "primary", "secondary", "blocklist" and "allowlist". These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.

Reporting sex- and gender-based analyses

Reporting guidance

For research involving or pertaining to humans, animals or eukaryotic cells, investigators should integrate sex and gender-based analyses (SGBA) into their research design according to funder/sponsor requirements and best practices within a field. Authors should address the sex and/or gender dimensions of their research in their article. In cases where they cannot, they should discuss this as a limitation to their research's generalizability. Importantly, authors should explicitly state what definitions of sex and/or gender they are applying to enhance the precision, rigor and reproducibility of their research and to avoid ambiguity or conflation of terms and the constructs to which they refer (see Definitions section below). Authors can refer to the [Sex and Gender Equity in Research \(SAGER\) guidelines](#) and the [SAGER guidelines checklist](#). These offer systematic approaches to the use and editorial review of sex and gender information in study design, data analysis, outcome reporting and research interpretation - however, please note there is no single, universally agreed-upon set of guidelines for defining sex and gender.

Definitions

Sex generally refers to a set of biological attributes that are associated with physical and physiological features (e.g., chromosomal genotype, hormonal levels, internal and external anatomy). A binary sex categorization (male/female) is usually designated at birth ("sex assigned at birth"), most often based solely on the visible external anatomy of a newborn. Gender generally refers to socially constructed roles, behaviors, and identities of women, men and gender-diverse people that occur in a historical and cultural context and may vary across societies and over time. Gender influences how people view themselves and each other, how they behave and interact and how power is distributed in society. Sex and gender are often incorrectly portrayed as binary (female/male or woman/man) and unchanging whereas these constructs actually exist along a spectrum and include additional sex

categorizations and gender identities such as people who are intersex/have differences of sex development (DSD) or identify as non-binary. Moreover, the terms "sex" and "gender" can be ambiguous--thus it is important for authors to define the manner in which they are used. In addition to this definition guidance and the SAGER guidelines, the [resources on this page](#) offer further insight around sex and gender in research studies.

Studies in humans and animals

If the work involves the use of human subjects, the author should ensure that the work described has been carried out in accordance with [The Code of Ethics of the World Medical Association](#) (Declaration of Helsinki) for experiments involving humans. The manuscript should be in line with the [Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals](#) and aim for the inclusion of representative human populations (sex, age and ethnicity) as per those recommendations. The terms [sex and gender](#) should be used correctly.

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1. that autonomous consent free from coercion was obtained from the donor(s) or their next of kin; and
2. that organs/tissues were not sourced from executed prisoners or prisoners of conscience.

All animal experiments should comply with the [ARRIVE guidelines](#) and should be carried out in accordance with the U.K. Animals (Scientific Procedures) Act, 1986 and associated guidelines, [EU Directive 2010/63/EU for animal experiments](#), or the National Research Council's [Guide for the Care and Use of Laboratory Animals](#) and the authors should clearly indicate in the manuscript that such guidelines have been followed. The sex of animals must be indicated, and where appropriate, the influence (or association) of sex on the results of the study.

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Studies on patients or volunteers (including organ/tissue donors) require informed consent, which should be documented in the paper. Appropriate consents, permissions and releases must be obtained where an author wishes to include case details or other personal information or images of patients and any other individuals in an Elsevier publication. Written consents must be retained by the author, but copies should not be provided to the journal. Only if specifically requested by the journal in exceptional circumstances (for example if a legal issue arises) the author must provide copies of the consents or evidence that such consents have been obtained. For more information, please review the [Elsevier Policy on the Use of Images or Personal Information of Patients or other Individuals](#).

Unless the author has written permission from the patient (or, where applicable, the next of kin), the personal details of any patient included in any part of the article and in any

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For transparency, we require corresponding authors to provide co-author contributions to the manuscript using the relevant CRediT roles. The [CRediT taxonomy](#) includes 14 different roles describing each contributor's specific contribution to the scholarly output. The roles are: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Roles/Writing - original draft; and Writing - review & editing. Note that not all roles may apply to every manuscript, and authors may have contributed through multiple roles. [More details and an example](#).

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To ensure high reproducibility standards in the field of environmental psychology, whenever possible, all manuscripts should include and report; a) confidence intervals, b) effect-sizes, c) appropriately visualize raw (experimental) data with error bars, d) include a power analysis or discussion of how sample size was determined, and e) include a clear statement or discussion of institutional ethics review and approval.

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Authors may choose among five different types of submissions:

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This section describes the revised submissions process for this journal.

Use of word processing software

Regardless of the file format of the original submission, at revision you must provide us with an editable file of the entire article. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the [Guide to Publishing with Elsevier](#)). See also the section on Electronic artwork.

To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

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This section describes the article structure for this journal.

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Divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. (the abstract is not included in section numbering). Use this numbering also for internal cross-referencing: do not just refer to 'the text'. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

Introduction

State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

Material and methods

Provide sufficient details to allow the work to be reproduced by an independent researcher. Methods that are already published should be summarized, and indicated by a reference. If quoting directly from a previously published method, use quotation marks and also cite the source. Any modifications to existing methods should also be described.

Theory/calculation

A Theory section should extend, not repeat, the background to the article already dealt with in the Introduction and lay the foundation for further work. In contrast, a Calculation section represents a practical development from a theoretical basis.

Results

Results should be clear and concise.

Discussion

This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

Conclusions

The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

Appendices

If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

Essential title page information

- **Title.** Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.
- **Author names and affiliations.** Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter

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Highlights

Highlights are mandatory for this journal as they help increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the [example Highlights](#).

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Abstract

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Acknowledgements

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Reference to a chapter in an edited book:

Mettam, G. R., & Adams, L. B. (2009). How to prepare an electronic version of your article. In B. S. Jones, & R. Z. Smith (Eds.), *Introduction to the electronic age* (pp. 281-304). E-Publishing Inc.

Reference to a website:

Powertech Systems. (2015). *Lithium-ion vs lead-acid cost analysis*. Retrieved from <http://www.powertechsystems.eu/home/tech-corner/lithium-ion-vs-lead-acid-cost-analysis/>. Accessed January 6, 2016

Reference to a dataset:

[dataset] Oguro, M., Imahiro, S., Saito, S., & Nakashizuka, T. (2015). *Mortality data for Japanese oak wilt disease and surrounding forest compositions*. Mendeley Data, v1. <https://doi-org.uea.idm.oclc.org/10.17632/xwj98nb39r.1>.

Reference to a conference paper or poster presentation:

Engle, E.K., Cash, T.F., & Jarry, J.L. (2009, November). *The Body Image Behaviours Inventory-3: Development and validation of the Body Image Compulsive Actions and Body Image Avoidance Scales*. Poster session presentation at the meeting of the Association for Behavioural and Cognitive Therapies, New York, NY.

Reference to software:

Coon, E., Berndt, M., Jan, A., Svyatsky, D., Atchley, A., Kikinzon, E., Harp, D., Manzini, G., Shelef, E., Lipnikov, K., Garimella, R., Xu, C., Moulton, D., Karra, S., Painter, S., Jafarov, E., & Molins, S. (2020, March 25). *Advanced Terrestrial Simulator (ATS) v0.88 (Version 0.88)*. Zenodo. <https://doi-org.uea.idm.oclc.org/10.5281/zenodo.3727209>.

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Canter, D. (1983). Intention, meaning and structure: Social action in its physical context. In M. von Cranach, G. P. Ginsburg and M. Brenner (Eds.), *Discovery strategies in the psychology of social action* (pp. 1-34). New York: Academic Press.

Pedersen, D. M. (1999). Model for types of privacy by privacy functions. *Journal of Environmental Psychology*, 19, 397-406, <https://doi-org.uea.idm.oclc.org/10.1006/jevp.1999.0140>.

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APPENDIX B- Topic Guide for Interviews

Topic Guide

1. How would you describe and understand your experience of concerns about climate and environmental changes or climate anxiety?
2. How have you come to say that the climate or the environment is something that you are worried/ anxious/ sad about? How do people come to feel this way?
3. Why do you think do some students get caught up in their feelings of worry/ anxiety/ sadness/ despair and others do not?
4. What do you think contributes to your experience of concerns/ worry/ anxiety/ despair about climate change?
5. How, if at all, do your concerns impact your life? How do they impact your everyday life?
6. How do your experiences of concerns/ worry/ anxiety/ feelings about climate change relate to other concerns in your life or maybe mental health conditions that you have experienced?
7. Sometimes climate and environmental concerns are termed climate anxiety or eco anxiety. What do you think about the terms climate anxiety or eco anxiety? Do you use these terms to describe your concerns? What makes the terms useful, or not useful?
8. What have you found helpful? What would you find helpful?
9. Have you had experiences with MH/support services?
10. On the news weather happenings do they have an impact on your concerns about the climate? Across the world? Where does this rank in terms of what else you are concerned about?
11. What changes are you expecting in the upcoming decades?
12. Anything you would like to add?

APPENDIX C- Authors and supervisors positioning statements

First author:

The first author (PR) has an interest in how clinical psychology can contribute to looking after the health of the earth and, therefore, the health and mental health of people. The first author is a white European, middle-class, cis-gendered female in her 30s and acknowledges the privilege she experiences. She also acknowledges that she experiences strong emotions towards climate change and is aware of the threat posed by humans on themselves via climate change and how this sits within the context of capitalistic values and societal expectations. She has been interested in understanding how people develop an appraisal of climate change as a threat, experience strong emotions and distress climate and then learn to cope with these to help inform public health interventions and clinical practice. She has significant emotions related to climate change, co-organises climate community events, and attends peaceful climate protests with her young family.

Ms Kiki Mastroyannopoulou's positioning:

"My interest in climate change began at University and I have found myself increasingly concerned about the ongoing climate breakdown. In some senses this has been brought to light to me further through the eyes of my children as they grew up. They showed great interest in the environment and expressed disbelief that the world was being damaged by human behaviour. I feel a responsibility to contribute to mitigating the climate crisis for future generations and make conscious decisions in my daily life to reduce my environmental footprint. Having said that, I have not taken part in any active campaigning but I do believe that changes on an individual level can have some impact. I have found myself adjusting my behaviours and actions as time has gone on and feel more strongly about this as I have got older. I remain distressed and frustrated by the actions of politicians who continue to downplay the importance of the climate crisis in favour of short term interests."

Dr Tony Wainwrights positioning:

"Tony Wainwright traces back his interest in the climate and environment to growing up in a family where exploring the natural world was encouraged; an A levels in Biology and a subsequent undergraduate degree in zoology gave him a grounding in the environmental sciences. He followed this with an experimental psychology master's and D.Phil, and these were concerned with ecological systems as well. As a clinical psychologist he witnessed early warnings of climate change being ignored while the science became increasingly clear that we have been on a pathway to catastrophe. He has been a campaigner for decades,

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none of which has made much difference. Emotionally he remains engaged with these challenges, encouraged by the many people, particularly young people, who are clear that action is needed, not words, and the emerging social science literature on possible social tipping points that may enable the necessary rapid social change.”

Dr Gillian Bowden reflections on climate and environmental changes:

“Firstly, I think I need to define what I mean when I describe my thoughts and feelings in relation to this. By ‘thoughts’ I am referring to my internal narrative or commentary about something and my way of making sense of things. By ‘feelings’, I am referring to my mental and physical responses to events. These may evoke closely related ‘emotions’ which I think of partly as a form of energy which may evoke action on my part.

All have relevance for my experiences related to climate change. When I think generally about climate and environmental changes, I usually don’t feel any particular bodily sensations that I would describe as unusual. I may have some thoughts such as ‘this is an important issue (to me)’. When I hear in the news about a climate related event, depending on the event, I might feel bodily sensations such as my breathing changing, a tightening in some areas where I typically hold tension or I might sigh and feel concern or sadness, which feels like an emotion or sometimes, depending on the circumstances, I may experience anger, which I think I’d call an emotional response.

I recognise that some of my thoughts about climate and environmental changes and human responses to it are influenced by my psychological background. I may think about how hard it is for people in general to confront complex and difficult issues and to comprehend the importance of human behaviour change which we all need to make to reduce our habits of pollution and lack of respect for our planet and other life forms. I sometimes also feel irritation or anger that the economic systems we have developed promote the short-term financial interest of some without due regard for the long term and global impact of their immediate profit. I also have (more positive) thoughts about transformation, and these relate to my personal feelings in general. Our planet and we are always changing and adapting to circumstances and, ultimately, some form of rebalancing pattern will occur (and already is happening in some ways). However, humanity has choices, we can choose to operate divisively and in ways that might appear to further individual and group self-interests which may destroy and poison things or take us on paths to wars; or we have a chance to move to a more inclusive, holistic, compassionate, respectful place which could help the necessary rebalancing feel positive. This of course needs to happen collectively at individual, family and community levels.

We are all interrelated and part of life on our planet. We are also all vulnerable in different ways which can feel hard to acknowledge. It seems useful to have collective conversations that can help us think honestly about our realities and make useful behaviour changes. I am hopeful that our planet will continue to be a beautiful place for many generations to come in which to live, grow and thrive but I know our planet is changing dramatically and we are continuing to destroy it which, when I think about it, makes me feel sad.

Another thought on this which may be helpful /relevant. If I were a student and say, in my late teens or 20s at this point in time, I would think differently and probably be much more anxious than I feel now about this. I remember when I was a student in the 1980s, the threat of nuclear war felt very possible and was referred to a great deal in the Student Union which felt troubling in different ways and at different times. I think I've developed different ways to think about (see para 3) and hopefully to act as positively as I can in the face of global threats but, of course, they remain concerning."

APPENDIX D – Examples of reflective diary notes

“My language during the interviews was often hesitant, and I noticed holding back from emotional terms such as climate breakdown or climate catastrophe. Using words like “climate concern” in the context of what the students experienced may have felt dismissive of the strength of people’s emotional experiences; further, the word may be leading and assuming mainly feelings of anxiety and worry in relation to climate change.”

“The language I have used throughout the thesis changed; I started off with terms like “climate concerns” and moved to “climate and eco-anxiety”. This, in part, was due to the participant’s language used, who mainly found the terms climate and eco-anxiety helpful.

I also see my leaning into more emotional and accurate language as a way to engage with the state of the Earth and the impact it has on us more fully. This may be one element towards dropping the struggle and making room for engagement and mitigation”

APPENDIX E- Faculty of Medicine and Health Sciences Ethical Approval

University of East Anglia

Study title: Climate and environmental concerns in students: A grounded theory study

Application ID: ETH2122-0835

Dear Paula,

Your application was considered on 13th May 2022 by the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee).

The decision is: **approved**.

You are therefore able to start your project subject to any other necessary approvals being given.

If your study involves NHS staff and facilities, you will require Health Research Authority (HRA) governance approval before you can start this project (even though you did not require NHS-REC ethics approval). Please consult the HRA webpage about the application required, which is submitted through the [IRAS](#) system.

This approval will expire on **31st July 2024**.

Please note that your project is granted ethics approval only for the length of time identified above. Any extension to a project must obtain ethics approval by the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) before continuing.

It is a requirement of this ethics approval that you should report any adverse events which occur during your project to the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) as soon as possible. An adverse event is one which was not anticipated in the research design, and which could potentially cause risk or harm to the participants or the researcher, or which reveals potential risks in the treatment under evaluation. For research involving animals, it may be the unintended death of an animal after trapping or carrying out a procedure.

Any amendments to your submitted project in terms of design, sample, data collection, focus etc. should be notified to the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) in advance to ensure ethical compliance. If the amendments are substantial a new application may be required.

Approval by the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) should not be taken as permission given by the Student Insight Review Group (SIRG) to send out university wide recruitment communication. Please await notification from student.survey.request@uea.ac.uk confirming whether the SIRG review has been successful.

Approval by the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) should not be taken as evidence that your study is compliant with the UK General Data Protection Regulation (UK GDPR) and the Data Protection Act 2018. If you need guidance on how to make your study UK GDPR compliant, please contact the UEA Data Protection Officer (dataprotection@uea.ac.uk).

Please can you send your report once your project is completed to the FMH S-REC (fmh.ethics@uea.ac.uk).

I would like to wish you every success with your project.

On behalf of the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee)

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Yours sincerely,

Paul Linsley

[Ethics ETH2122-0835: Dr Paula Regener](#)

University of East Anglia

Study title: Climate and environmental concerns in students: A grounded theory study

Application ID: ETH2324-3031 (significant amendments)

Dear Paula,

Your amendment to your study was considered on 25th July 2024 by the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee).

The decision is: **approved**.

You are therefore able to start your project subject to any other necessary approvals being given.

If your study involves NHS staff and facilities, you will require Health Research Authority (HRA) governance approval before you can start this project (even though you did not require NHS-REC ethics approval). Please consult the HRA webpage about the application required, which is submitted through the [IRAS](#) system.

This approval will expire on **20th July 2025**.

Please note that your project is granted ethics approval only for the length of time identified above. Any extension to a project must obtain ethics approval by the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) before continuing.

It is a requirement of this ethics approval that you should report any adverse events which occur during your project to the FMH S-REC

(Faculty of Medicine and Health Sciences Research Ethics Subcommittee) as soon as possible. An adverse event is one which was not anticipated in the research design, and which could potentially cause risk or harm to the participants or the researcher, or which reveals potential risks in the treatment under evaluation. For research involving animals, it may be the unintended death of an animal after trapping or carrying out a procedure.

Any amendments to your submitted project in terms of design, sample, data collection, focus etc. should be notified to the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) in advance to ensure ethical compliance. If the amendments are substantial a new application may be required.

Please can you send your report once your project is completed to SIRG (student.survey.request@uea.ac.uk).

Approval by the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee) should not be taken as evidence that your study is compliant with the UK General Data Protection Regulation (UK GDPR) and the Data Protection Act 2018. If you need guidance on how to make your study UK GDPR compliant, please contact the UEA Data Protection Officer (dataprotection@uea.ac.uk).

Please can you send your report once your project is completed to the FMH S-REC (fmh.ethics@uea.ac.uk).

I would like to wish you every success with your project.

On behalf of the FMH S-REC (Faculty of Medicine and Health Sciences Research Ethics Subcommittee)

Yours sincerely,

Dr Paul Linsley

Ethics ETH2324-3031 (Significant amendments): Dr Paula Regener

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APPENDIX G - Recruitment poster



Climate and Environmental Concerns in Students

Looking for:

- **students (18-25 years old)** experiencing significant **climate and environmental concerns, climate anxiety/ eco anxiety**
- have discussed this when using the wellbeing service or intend to discuss this in therapy/ other supportive settings.

What is involved?

- A **recorded interview** lasting **1 hour**.
- The interview is done via TEAMS, telephone or at UEA.
- Receive a **£5 voucher for Tofurei** or a **donation to a tree planning charity**.

Contact me if:

- you want to take part in this research
- or want to find out more about the study

Principal Investigator: **Paula Regener**

Check out the recruitment [video](#).

Email: p.regener@uea.ac.uk or scan QR code

I look forward to hearing from you!



APPENDIX H – Inclusion and exclusion criteria

Inclusion Criteria and exclusion criteria

This study aims to recruit students who have experienced or are experiencing climate and environmental concerns or may describe themselves as having climate anxiety or eco anxiety. This study aims to understand how students describe and understand their experience of climate and ecological concerns or climate anxiety, so the study is looking for participants who can talk about their experiences to contribute to this understanding.

Inclusion criteria include: UEA Students between the 18-25 years who have or experiencing some climate and ecological concerns and have accessed the UEA Wellbeing Service.

Exclusion criteria include: Students younger than 18 years old or older than 25 years old.

Given the iterative nature of grounded theory, theoretical sampling will also be used to identify the participants who are most likely to provide the information needed to saturate the categories being developed. For example, this study might initially recruit students who have climate and ecological concerns but do not have experience with mental health conditions or other concerns and then recruit students who have climate and ecological concerns who have experienced mental health conditions or other concerns to identify new properties and dimensions of specific categories, needed to reach theoretical saturation.

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APPENDIX I- Participant Information Sheet

Participant Information Sheet

“Climate and environmental concerns in students: A grounded theory study”

My name is Paula Regener and I am a Trainee Clinical Psychologist at the University of East Anglia. As part of my Doctorate in Clinical Psychology, I am conducting a research study looking how students experience climate and ecological concerns.

I would like to invite you to participate in this research study. Before you decide it is important that you understand why the research is being done and what participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the research?

For young people to have concerns about the climate and environmental change is becoming more common but the topic has received limited attention in Clinical Psychology. The study aims to understand the experience of climate and ecological concerns in students who have accessed UEA's student wellbeing service and have discussed their concerns in talking therapy.

Why have I been chosen?

You have indicated that you experience climate and ecological concerns and are interested to find out more about this study. You are a UEA student between 18-25 years of age and have or are experiencing climate and ecological concerns and have accessed the UEA Wellbeing Service.

Do I have to participate in the study?

No, your participation in this study is entirely voluntary. It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep (and be asked to sign a consent form). You can withdraw at any time and you can request that your data is destroyed and not included in the research for up to 2 weeks after the

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interview. You do not have to give a reason to withdraw from the study. Deciding not to take part in the study will not affect the support you receive at the Wellbeing Service.

What does the study involve?

You would be asked to take part in an audio-recorded interview lasting up to one hour. The meeting could be conducted via Microsoft Teams in person at the University of East Anglia or over the telephone. If the interview is conducted via Microsoft TEAMS, the interview will be audio-video-recorded, if it takes place face-to-face or over the phone it will be audio-recorded.

The interview will involve a discussion with me about your experience and perspective of climate or environmental concerns. As part of the interview, the researcher will ask you a bit about yourself, such as your name, gender and age. However, the data will be anonymised and no identifiable information will be disclosed. More specifically, in the interview we will talk about: Your experience and perspective of climate and environmental concerns. Your experience or understanding of how these concerns relate to other concerns in your life or mental health difficulties. Your experience or perspective of what helps you cope with your concerns.

If you decide to participate in this study, you will be asked to complete a consent form to confirm that you understand what your involvement and that you are happy to proceed. The study also values your involvement in the analysis and will send a summary of the theory to you. At that point you will be asked to feedback to the researcher whether there are any areas of the theory that you don't quite agree with and areas that you agree with. This will ensure that the theory is reflective of your experiences or perspectives of CECs

Are there any possible benefits to taking part?

One of the possible benefits of taking part in the study is to have an opportunity to share your experience of climate and ecological concerns. It is hoped that the study will help to develop a better understanding of the experience of climate and ecological concerns, and how services can best support students with these experiences.

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All participants can choose between a £5 Tofurei gift voucher or a donation of the same value to Plant a Tree - Woodland Trust as a thank you for participating in this study. To receive the voucher or a donation confirmation you will need to consent to this as it will be sent to your email address. This information will be stored separately to all other study information. The vouchers or donation confirmation will be sent to participants once recruitment has finished.

What are the possible disadvantages of taking part?

It is possible that talking about your experience or understanding of climate and ecological concern may be difficult and can cause you to feel upset or distressed. However, you do not have to answer any questions you do not wish to and can stop the interview at any time.

Should you need support with your mental health, I would advise that you discuss this with your GP or the UEA Wellbeing Service, as they will be able to provide appropriate advice and guidance. If you require immediate support and cannot keep yourself or others safe, please call 999 for the local emergency services. If you require immediate support but are not in any immediate danger please call 111, option 2, for a 24/7 mental health support service.

Should any further support or advice be needed, you can find some additional sources of support below.

Samaritans (24-hour service)

Contact number: 116 123 (UK number)

Email: jo@samaritans.org

Website: <https://www.samaritans.org/how-we-can-help-you/contact-us>

Mind (9AM –6PM, Mon-Fri, except bank holidays)

Contact number: 0300 123 3393

Email: info@mind.org.uk

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Text: 86463

Website: <https://www.mind.org.uk/>

Confidentiality

All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any reports or publications. Any identifiable information will be stored securely and separately from your consent form and video-recorded or audio-recorded interview. Your data, including your recorded interview and transcripts, will be stored using a password-protected device. Only the research team and professionals at the transcription service will access your interview data. Interview transcripts will be anonymised and you will be given a different name. A lot of care will be taken not to include information that could identify you. However, in this type of research quotes are used to support the points made by the researcher and there is a small chance that people who know you well may guess which quotes belong to you if they know you are participating in the study. Therefore, we cannot guarantee 100% anonymity. All data will be stored according to current data protection legislation and will be destroyed after 10 years. The £5 Toforei gift voucher or donation confirmation and a summary of the findings of the study will also be sent to you by email, if you consent to this. Your email address will be stored on a password-protected folder until the end of the research project, after which it will be deleted.

Can confidentiality be breached?

Yes, if you disclose information that makes the researcher think that you or someone else, might be at risk of harm, they will have to contact relevant third parties, but will try to discuss this with you first. This is in line with the British Psychological Society's Code of Ethics and Conduct.

Findings of the study

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A summary of the findings will be made available to all participants once the study is complete. If you consent to this, the summary will be sent to you by email. The findings of this study will be included in my doctoral thesis and might also be published in a peer-reviewed journal. Anonymised quotes of your contributions might be published.

Who has organised and reviewed this study?

This study is funded and organised by the University of East Anglia. It has received full ethical approval by the Faculty of Medicine and Health (FMH) UEA ethics committee. This research is being undertaken as a part of a Professional Doctorate in Clinical Psychological.

Information and contact details

Should you have any questions, please do not hesitate to contact the researcher to discuss these. If you would like to take part in this research, please contact me (Paula Regener) so that an interview can be scheduled (please see my details below). Before your involvement in the study, you will be asked to read and sign a consent form.

Principal Investigator: Dr Paula Regener

Email: p.regener@uea.ac.uk

Address: Department of Clinical Psychology and Psychological Therapies,
Norwich Medical School, Norwich Research Park, University of
East Anglia, Norwich, Norfolk, NR4 7TJ

Primary Supervisor: Kiki Mastroyannopoulou

Email: K.Mastroyannopoulou@uea.ac.uk

Address: Department of Clinical Psychology and Psychological Therapies,
Norwich Medical School, Norwich Research Park, University of East Anglia, Norwich,
Norfolk, NR4 7TJ.

Secondary Supervisors: Dr Tony Wainwright

Email: t.w.wainwright@exeter.ac.uk

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Address: Washington Singer Laboratories, University of Exeter, Perry
Road, Prince of Wales Road, Exeter, EX4 4QG

and Dr Gillian Bowden

Email: g.bowden@uea.ac.uk

Address Department of Clinical Psychology and Psychological Therapies,
Norwich Medical School, Norwich Research Park, University of
East Anglia, Norwich, Norfolk, NR4 7TJ

What if I have a complaint?

Should you have any complaints or concerns about how this study has been carried out, please feel free to contact the Director of the Doctorate in Clinical Psychology, Professor Niall Broomfield, whose contact details are included below.

Email: n.broomfield@uea.ac.uk

Address: Department of Clinical Psychology and Psychological Therapies,
Norwich Medical School, Norwich Research Park, University of
East Anglia, Norwich, Norfolk, NR4 7TJ.

Thank you for taking the time to read this information sheet.

APPENDIX J – Participant Consent Form

Participant Consent Form

“Climate and ecological concerns in students: A qualitative grounded theory study”

Ethical Approval Number: ETH2223-1676

Name of researcher: Paula Regener, Trainee Clinical Psychologist

1. I confirm that I have read and understood the participant information sheet for the above study and have been able to answer any questions to my satisfaction. ☐
2. I understand that my participation in the study is entirely voluntary and that I am able to withdraw from the study before or during the interview and for two weeks after the interview without giving any reasons. ☐
3. I understand that my interview will be either video-recorded using the recording function in Microsoft TEAMS (through the researcher’s university account) or audio-recorded using a digital recorder, and I consent to this recording. ☐
4. I have been told and I understand how any information about me or related to my involvement in the study will be handled: I understand how it will be stored and kept secure, who will have access to it and how it will be used. ☐
5. I understand and agree that quotes from my interview may be included in research reports and publications, where all data used will be treated anonymously and confidentially. ☐
6. I understand that if the researcher thinks that I or someone else might be at risk of harm, they will have to contact relevant third parties, but will try to discuss this with me first. ☐
7. I understand that a summary of the research finding will be sent to me via email. I consent to this. ☐
8. I agree to take part in the above study. ☐

Name of Participant

Date

Signature

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Name of Principal
investigator

Date

Signature