



Distinguishing climate change worry from state climate anxiety across 32 countries: implications for subjective wellbeing

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Abstract

The concepts of “climate change worry” and “climate change anxiety” are often used interchangeably in climate research, but they may reflect distinct emotional responses to climate change, which could potentially have different implications for public mental health. This research brief aims to empirically examine the differences between these two constructs by comparing their associations with key indicators of subjective wellbeing. Using survey data from 32 countries ($N=12,246$), we compared how strongly climate change worry and state climate anxiety were each associated with subjective wellbeing, as measured by the WHO-5 Wellbeing Index and life satisfaction. State climate anxiety showed stronger associations with both WHO-5 Wellbeing Index and life satisfaction than climate change worry. This underscores the importance of treating the two as distinct emotional responses, each with different implications for public wellbeing. These insights are especially relevant for policymakers and climate communicators, who must carefully consider the emotional tone of climate messaging to foster constructive engagement while safeguarding the psychological wellbeing of the public.

Keywords Climate Emotions · Climate Change Worry · State Climate Anxiety · Subjective Wellbeing · Mental Health

Introduction

The escalating climate crisis has sparked widespread public concern and is driving a growing demand for urgent action, as reflected in numerous global surveys (Carrington 2021; Gubbala et al. 2022; Ipsos 2022; Pew Research Center 2022; UNDP 2021). More critically, growing awareness of climate impacts has been linked to a range of emotional and mental health outcomes, including insomnia, generalized anxiety, and depressive symptoms (Crandon et al. 2022; Hickman et al. 2021; Ogunbode et al. 2022; Reyes et al. 2023; Schwartz et al. 2023). These concerns have also been linked to self-reported disruptions across multiple domains of daily life, from routine activities such as socializing and

work performance to broader life considerations, including reproductive intentions (Dillarstone et al. 2023; Hickman et al. 2021). Recognizing the impact of negative climate emotions on public wellbeing, stakeholders are increasingly integrating climate-related psychological challenges into broader environmental and sustainability initiatives (Martin et al. 2024; United Nations 2015).

Recent research on climate emotions strongly focuses on the concepts of 'climate change worry' and 'climate change anxiety' (often referred to as 'climate anxiety'; Martin et al. 2024). Despite frequent usage of these terms, there remains limited clarity on how these terms are conceptually and empirically distinguished. Climate change worry is often conceptualized as a component of, or as closely related to,

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climate change anxiety (Hickman et al. 2021; Parmentier et al. 2024; Stewart 2021; Vecina et al. 2025). However, conceptual overlap does not imply equivalence or justify their interchangeable use in terminology or measurement. In practice, this overlap has nonetheless contributed to the frequent conflation of the two constructs, for example through interpreting levels of self-reported climate worry as indications of the prevalence of climate anxiety (e.g., Hadarics 2021). Without clear theoretical distinctions, this overlap creates conceptual ambiguity that can misguide messaging by assuming all forms of concern are equally motivating or impactful on wellbeing.

Beyond conceptual imprecision, the interchangeable use of climate change worry and climate anxiety poses substantive challenges for scientific inquiry into climate-related impacts on wellbeing. When distinct emotional processes are collapsed under a single label, measures may capture qualitatively different phenomena across studies, ranging from cognitively oriented concern to heightened affective distress, thereby limiting construct validity and hindering meaningful comparison of findings across samples, instruments, and cultural contexts. This conflation may contribute to inconsistent or attenuated associations with subjective wellbeing, not because such relationships are absent, but because different emotional mechanisms are being aggregated. As a result, theory development and empirical accumulation in climate psychology risk being undermined unless these constructs are examined and interpreted as potentially distinct emotional responses.

Hence, this research brief aims to contribute to the growing body of research clarifying these distinctions and to inform efforts to more precisely characterize climate-related emotional responses. Using cross-national survey data from 32 countries, this study compares the associations of climate change worry and state climate anxiety with subjective wellbeing, and tests whether these constructs show different patterns of association across countries.

Climate change worry vs. climate change anxiety

Climate change worry is typically defined as a psychological response involving specific concerns about the potential impacts of climate change, which often extend beyond personal consequences to include effects on others, such as threats to habitats, lifestyles, livelihoods, and public health (Clayton 2020; Stewart 2015). It involves verbal-linguistic thought patterns focused on potential changes in the climate system and their consequences (Borkovec et al. 1998; Meyer et al. 1990; Stewart 2021). In the psychological literature, worry is known to be associated with the conscious defense system, a set of higher-order cognitive processes activated when basic threat detection mechanisms indicate potential

danger (Dozier 1999). Unlike automatic fear responses, this system allows individuals to consciously assess emerging risks in their environment. It evaluates potential consequences and integrates this information into a preparatory response aimed at addressing and solving anticipated challenges. Hence, climate change worry reflects an effort to engage in mental problem-solving regarding climate issues and primarily functions as a mental approach to dealing with risks, representing an early stage in coping processes (Sweeny & Dooley 2017).

In contrast, climate change anxiety reflects a more emotionally driven response to climate-related threats (Clayton 2020; Pihkala 2022). In psychological literature, anxiety is characterized as a fundamental affective state involving heightened physiological arousal, such as increased heart rate, rapid breathing, and sweating, alongside a persistent sense of unease in anticipation of uncertain or threatening events. Importantly, anxiety is distinct from fear, which is typically a more immediate and short-lived response to an identifiable and proximal threat, a related distinction that is also not always clearly maintained in the climate literature. (Thomas & Benoit 2022). While anxiety may include cognitive features like worry, it is typically less structured and more reactive, representing an automatic response to perceived danger (Goodwin et al. 2017; Szabó, 2011; Zebb & Beck 1998). Anxiety is closely linked to the behavioral inhibition system, a neurobiological defense mechanism that automatically detects potential threats and prompts individuals to halt or avoid action, rather than pursue constructive or goal-directed behavior, in contrast to the more conscious, deliberative threat processing associated with worry. It drives precautionary responses at a subconscious level to enhance self-protection but, when overactive, can lead to chronic unease, avoidance, and hypersensitivity to perceived dangers, contributing to anxiety disorders. Nevertheless, anxiety can also trigger secondary cognitive processes that help evaluate perceived threats and inform judgment (Reser & Bradley 2020; Woodbury 2019), though it involves less deliberate thought than worry, as it remains largely rooted in emotional reactivity. Climate anxiety, therefore, tends to reflect a broad emotional response to the idea of climate change, rather than detailed or targeted thinking about specific impacts. In the present study, we operationalize this construct as *state climate anxiety* (Ogunbode et al. 2022; Pihkala 2022), focusing on heightened negative emotional states in response to climate change without incorporating symptoms of functional impairment, in contrast to clinically oriented conceptualizations that include such features (e.g., Clayton & Karazsia 2020).

Climate emotions and their associations with mental health

Existing evidence indicates that both climate change worry and climate anxiety are linked to mental health outcomes. Climate anxiety has particularly shown consistent associations with negative mental health outcomes. Studies with Swedish children (Ojala 2010) and adolescents (Ojala 2013) found that worry about impacts from climate change is linked with a tendency towards general negative affect, reflecting a broader emotional pattern marked by persistent distress and pessimistic thinking. Other cross-national studies have also shown that climate change worry can be negatively related to happiness, life satisfaction, and mental wellbeing, which are general indicators of subjective wellbeing (Martin et al. 2024; Ogunbode et al. 2024; Ojala et al. 2021). However, recent work by Vecina et al., (2025) found that eco-worry was positively associated with life satisfaction, and this association was mediated by individuals' willingness to engage in pro-environmental behavior. This finding is consistent with the view that climate change worry may be related to more constructive forms of engagement, and that such engagement may in turn be associated with greater wellbeing through a sense of agency and alignment with pro-social values.

Research on climate anxiety generally reveals a more pronounced link with poor mental health outcomes. In the United States, climate anxiety (Clayton & Karazsia 2020) has been linked with depression and general anxiety. A study of 433 Filipino young adults found that climate anxiety was associated with greater psychological distress, including symptoms of anxiety, depression, and loss of emotional control, but showed no significant relationship with psychological wellbeing indicators such as positive affect, emotional ties, and life satisfaction (Reyes et al. 2023). Ogunbode et al. (2022, 2023)'s work, which examined the relationship between state climate anxiety, an affect-based concept of climate anxiety that does not include symptoms of functional impairment, and various mental health indicators across populations in 32 countries, found that state climate anxiety was linked to poorer mental wellbeing, including insomnia symptoms, in most of the countries. However, it has been suggested that the link between climate anxiety and various mental health indicators may be influenced by the shared aspect of negative affect present in both climate anxiety and poor mental wellbeing (Ojala et al. 2021). Importantly, a stronger correlation between climate anxiety and mental health or wellbeing is observed when climate anxiety measurements also encompass elements of pathology or dysfunction (Clayton & Karazsia 2020; Reyes et al. 2023).

The present study

Although research on climate change worry and anxiety is expanding, there is very limited investigation of both constructs within a single study. Thus, the present study examines the extent to which climate change worry and climate change anxiety are empirically distinguishable constructs, and whether they demonstrate differential associations with two key indicators of subjective wellbeing: mental wellbeing (affective dimension) and life satisfaction (cognitive dimension).

For the purpose of directly comparing climate change worry and anxiety within a single analytical framework, we operationalized climate anxiety, as defined above, as state climate anxiety (Ogunbode et al. 2022; Pihkala 2022), which captures heightened negative emotions about climate change without functional impairment. We adopted this approach (rather than Clayton & Karazsia's clinically oriented measure, 2020) to ensure comparability with climate change worry (Ojala et al. 2021) and to avoid inflating associations with wellbeing.

Considering that worry is more cognitive in nature and serves as an early-stage risk management strategy within coping processes, whereas anxiety arises from emotional responses to perceived threats and is typically marked by affective arousal, making it inherently unpleasant and difficult to regulate (Lazarus & Smith 1988), we expect climate anxiety to be more closely linked with mental health and wellbeing outcomes than climate change worry. Building on this discussion, the main hypothesis of this paper is:

State climate anxiety has a significantly stronger negative association with subjective wellbeing (mental wellbeing and life satisfaction) than climate change worry.

The present research contributes to ongoing efforts to clarify and organize climate psychology terms in the literature by examining the differential associations of climate change worry and climate anxiety with subjective wellbeing.

Method

Participants and procedure

We gathered survey data in 32 countries [$N = 12,246$ (63.9% women and 32.7% men) $M_{\text{age}} = 23.1$ years, $SD_{\text{age}} = 7.0$] from 2019 to 2022. The survey was distributed either in paper or digital format, based on feasibility in each country. Participants were recruited from university research pools and through opportunity sampling among students. This study

draws on a subset of data from a larger international dataset. Full details of the recruitment procedures, data collection methods are available in Ogunbode et al. (2022), and readers are referred to these sources for further information. Although the current study uses the same dataset, it addresses different research questions and employs distinct analytical methods. Country-wise demographic details of the research participant sample are presented in Appendix A. Ethical clearance was obtained from the De Montfort University Health and Life Sciences Faculty Research Ethics Committee (Reference: 3434). Additional approvals were secured in countries where necessary.

Measures

Climate change worry

Climate change worry was assessed using a 5-item scale measuring the extent of participants' worry regarding the adverse effects of climate change on themselves, their loved ones, future generations, individuals in economically disadvantaged countries, and animals/nature (Ojala 2012; $\alpha=0.67\text{--}0.90$; see Table 1 for country-wise descriptives). Responses were recorded on a 5-point scale, varying from 1 = "not at all" to 5 = "extremely worried". This measure captures a cognitive-evaluative dimension of concern, as it directs respondents to consider and appraise concrete consequences of climate change for identifiable groups.

Table 1 Descriptive statistics and estimated correlations climate change worry and state climate anxiety

Country	Climate change worry		State climate anxiety		Correlation	95% CI of $r_{\text{ccw-sca}}$ (LL,UL)	Shared variance (%)
	α	M(SD)	α	M(SD)	$r_{\text{ccw-sca}}$		
1. Australia	0.90	3.55 (0.98)	0.90	3.22 (0.90)	0.67***	[0.60, 0.73]	44.6
2. Brazil	0.84	4.36 (0.87)	0.91	3.76 (0.91)	0.57***	[0.49, 0.65]	32.9
3. Canada	0.81	3.48 (0.81)	0.88	3.12 (0.78)	0.56***	[0.47, 0.63]	31.0
4. Chile	0.85	3.94 (0.94)	0.83	3.30 (0.74)	0.25***	[0.15, 0.34]	6.2
5. China	0.77	3.70 (0.67)	0.89	2.86 (0.81)	0.46***	[0.36, 0.55]	21.1
6. Colombia	0.84	3.96 (0.91)	0.79	3.13 (0.68)	0.36**	[0.21, 0.48]	12.6
7. Egypt	0.74	3.13 (0.78)	0.69	2.96 (0.66)	0.11*	[0.02, 0.20]	1.2
8. Finland	0.84	3.90 (0.88)	0.92	3.27 (0.95)	0.68***	[0.64, 0.72]	46.8
9. Germany	0.69	4.02 (0.69)	0.87	3.39 (0.84)	0.52***	[0.43, 0.61]	27.5
10. Italy	0.71	3.94 (0.63)	0.89	3.41 (0.73)	0.46***	[0.36, 0.54]	20.7
11. India	0.80	3.50 (0.85)	0.81	3.12 (0.76)	0.39***	[0.27, 0.49]	14.8
12. Indonesia	0.72	4.48 (0.54)	0.84	3.32 (0.68)	0.29***	[0.19, 0.38]	8.1
13. Iran	0.88	3.63 (1.08)	0.86	3.32 (0.84)	0.37***	[0.27, 0.46]	13.7
14. Japan	0.68	3.49 (0.73)	0.73	3.05 (0.65)	0.36***	[0.24, 0.44]	12.0
15. Malaysia	0.77	3.27 (0.75)	0.86	3.06 (0.71)	0.39***	[0.28, 0.49]	15.0
16. Netherlands	0.75	3.58 (0.71)	0.88	3.20 (0.78)	0.56***	[0.49, 0.62]	31.2
17. Nigeria	0.80	3.43 (0.98)	0.71	2.85 (0.73)	0.14***	[0.06, 0.22]	1.8
18. Norway	0.78	3.77 (0.74)	0.87	3.08 (0.81)	0.60***	[0.51, 0.67]	35.6
19. Oman	0.67	2.99 (0.74)	0.65	2.78 (0.63)	0.20***	[0.09, 0.31]	4.1
20. Pakistan	0.81	3.58 (0.91)	0.81	3.03 (0.79)	0.22***	[0.10, 0.34]	5.0
21. Palestine	0.76	3.33 (0.94)	0.80	2.97 (0.77)	0.34***	[0.25, 0.44]	11.8
22. Philippines	0.83	4.13 (0.74)	0.85	3.55 (0.73)	0.45***	[0.40, 0.49]	19.9
23. Portugal	0.72	4.50 (0.57)	0.87	3.43 (0.77)	0.31***	[0.20, 0.42]	9.8
24. Romania	0.84	3.74 (0.88)	0.86	2.90 (0.84)	0.48***	[0.40, 0.55]	23.2
25. Russia	0.89	3.77 (0.92)	0.75	2.71 (0.62)	0.30***	[0.21, 0.38]	8.8
26. Slovakia	0.81	3.72 (0.82)	0.83	2.99 (0.77)	0.38***	[0.27, 0.48]	14.7
27. Spain	0.71	4.26 (0.65)	0.86	3.66 (0.71)	0.35***	[0.27, 0.42]	12.0
28. Tanzania	0.85	3.72 (0.89)	0.75	2.91 (0.72)	0.31***	[0.19, 0.42]	9.6
29. Turkey	0.84	3.85 (0.81)	0.83	3.56 (0.68)	0.50***	[0.43, 0.57]	25.1
30. Uganda	0.84	3.83 (0.85)	0.84	3.17 (0.87)	0.35***	[0.29, 0.42]	12.5
31. UAE	0.76	4.02 (0.81)	0.87	3.33 (0.90)	0.55***	[0.44, 0.64]	30.0
32. United Kingdom	0.83	3.64 (0.83)	0.88	3.26 (0.80)	0.55***	[0.47, 0.62]	30.1
Pooled	0.83	3.79 (0.89)	0.85	3.21 (0.82)	0.45***	[0.44, 0.47]	20.4

Correlation estimates are Pearson Product-Moment correlations. Descriptive statistics for State Climate Anxiety presented in this table have been previously published in Ogunbode et al. (2022)

State climate anxiety

A 7-item state climate anxiety (SCA) scale (Ogunbode et al. 2022) was used to assess the current intensity of an individual's anxiety ($\alpha=0.65\text{--}0.92$; see Table 1 for country-wise descriptives). This component assesses an affect-based construct that reflects individuals' immediate emotional responses to climate change, without incorporating symptoms of functional impairment. Participants were prompted to consolidate their thoughts and concentrate on their feelings about climate change in the moment. They then rated how much they felt calm, tense, relaxed, anxious, peaceful, worried, or terrified about climate change at that moment. Ratings were captured on a 5-point scale, from 1 (not at all) to 5 (extremely), with the scores for 'calm', 'relaxed', and 'peaceful' being reversed for analysis.

Mental wellbeing

The assessment of mental wellbeing was conducted using the WHO-5 Wellbeing Index (WHO 1998) comprising five questions that inquire about the frequency of certain feelings (e.g., calm, energetic, waking up refreshed) in the past two weeks ($\alpha=0.71\text{--}0.89$; see Appendix B for country-wise descriptives). The scores from these items were averaged to create an aggregate measure for each participant.

Life satisfaction

Life satisfaction was assessed using a single-item measure (Cheung & Lucas 2014). Participants were asked to rate their overall satisfaction with life on a scale from 1 (very dissatisfied) to 4 (very satisfied), providing a cognitive appraisal of their general life circumstances (see Appendix B for country-wise descriptives).

Analysis

We tested the hypothesis by comparing the strength of dependent correlations using Steiger's (1980) method for comparing correlations from the same sample, with confidence intervals for the difference computed using Zou's (2007) approach. This involved: (1) calculating Pearson's zero-order correlations between state climate anxiety, climate change worry, and each of the two indices of subjective wellbeing, along with 95% confidence intervals derived from Fisher's r -to- z transformation; (2) calculating the correlation between state climate anxiety and climate change worry, as this is required when comparing two correlations that share a common variable (i.e., dependent correlations with overlapping groups); (3) using Steiger's (1980) Z-test to formally compare the magnitude of the two correlations

(e.g., state climate anxiety <> WHO-5 Wellbeing Index [r_1] vs climate change worry <> WHO-5 Wellbeing Index [r_2]), with differences deemed statistically significant if $p < 0.05$; and (4) computing 95% confidence intervals for the difference between correlations using Zou's (2007) method. This provides more accurate coverage than methods based solely on Fisher's z transformation. All analyses were conducted in R (version 4.5.1; R Core Team, 2025) using the *cocor* package (Diedenhofen & Musch 2015) for comparing dependent correlations. The data and analysis code are available on OSF (<https://osf.io/6vfeg>).

Results

Climate change worry showed significant positive associations with state climate anxiety in all countries even though these associations varied in magnitude (Table 1). The degree of shared variance between the two concepts ranged from a low of 1.2% in Egypt to a high of 47% in Finland. The cross-national pattern of correlations between the two constructs suggests that they capture substantially distinct aspects of climate-related emotional responding in most national contexts.

As hypothesized, state climate anxiety showed a stronger negative correlation with the WHO-5 Wellbeing Index ($r = -0.24$, 95% CI $[-0.25, -0.22]$) than climate change worry ($r = -0.05$, 95% CI $[-0.06, -0.03]$) in the pooled sample ($N = 12,246$). The difference between these correlations was statistically significant ($\Delta r = -0.19$, 95% CI $[-0.21, -0.17]$, $z = -20.45$, $p < 0.001$). A similar pattern emerged for life satisfaction, whereby state climate anxiety ($r = -0.17$, 95% CI $[-0.19, -0.15]$) was more strongly associated with life satisfaction than climate change worry ($r = -0.02$, 95% CI $[-0.04, -0.00]$), ($\Delta r = -0.15$, 95% CI $[-0.16, -0.13]$, $z = -15.52$, $p < 0.001$). Country-wise correlations of climate change worry and state climate anxiety with the WHO-5 wellbeing index and life satisfaction are presented in Fig. 1, while the difference in correlations including 95% confidence intervals and significance estimates are presented in Table 2.

Discussion

The study investigated the relationship between climate change worry and state climate anxiety, and their association with subjective wellbeing. Across 32 countries, the shared variance between climate change worry and state climate anxiety was as low as 1% in some contexts and up to 46% in others. Thus, this finding indicates that these two concepts cannot be considered interchangeable. This

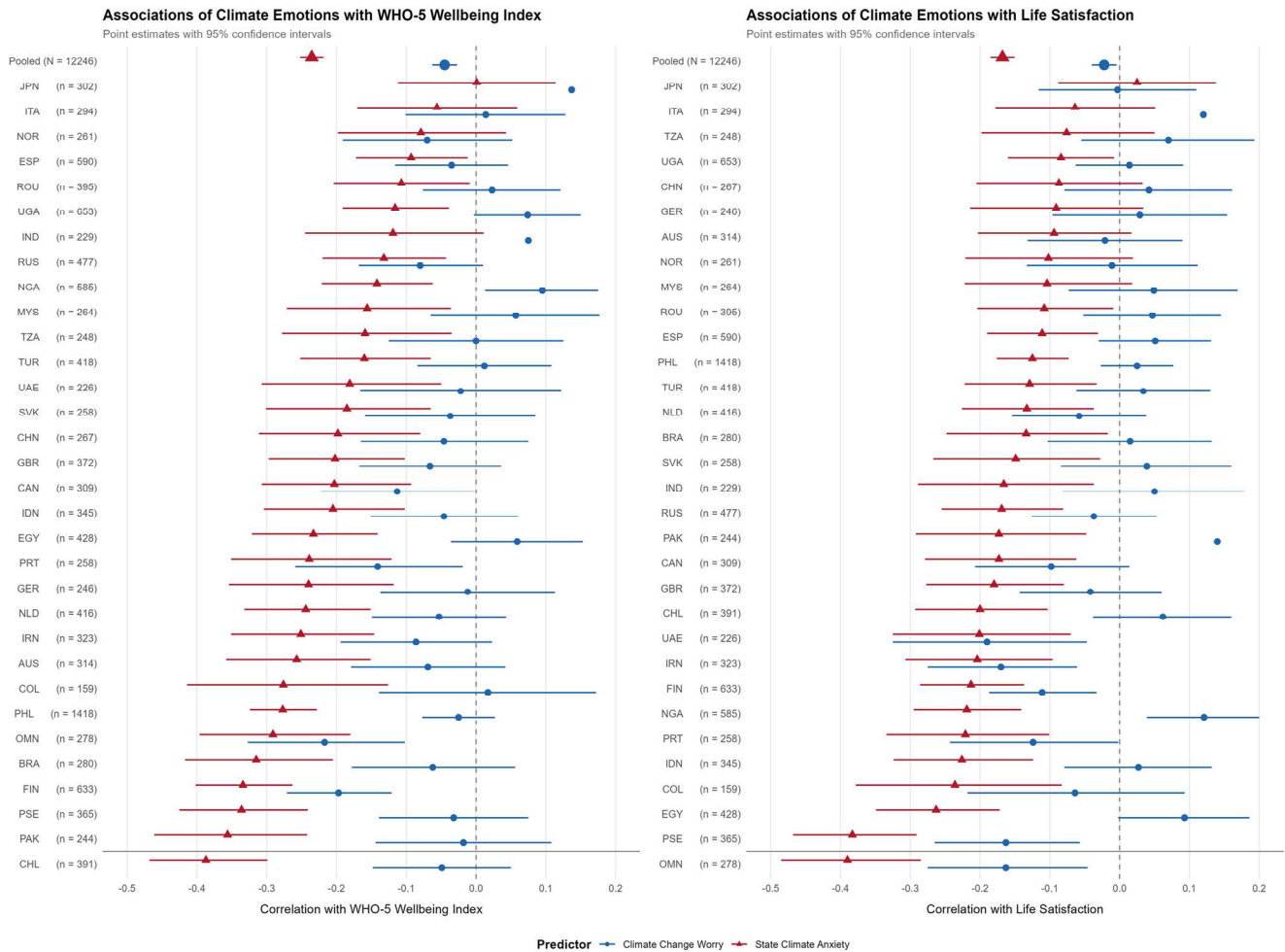


Fig. 1 Country-wise correlations of climate change worry and state climate anxiety with the WHO-5 wellbeing index and life satisfaction

distinction was further reinforced by the differing associations of climate change worry and state climate anxiety with subjective wellbeing indices. State climate anxiety showed a significant negative correlation with WHO5 wellbeing index in 87.5% of the country samples, whereas climate change worry was significantly correlated with WHO5 wellbeing index in only 18.8% of the country samples. A similar pattern was observed for life satisfaction, with state climate anxiety showing a significant negative correlation with life satisfaction in 75.0% of the countries. In contrast, climate change worry was significantly correlated with life satisfaction in only 28.1% of the countries.

Implications

Clearer theoretical definitions of climate emotions are essential for understanding public responses to the climate crisis and for shaping effective policy, communication, and adaptation strategies. Yet, key constructs like climate change worry and climate anxiety remain poorly defined

and often used interchangeably. While efforts to clarify these constructs are emerging, particularly through recent quantitative studies (Parmentier et al. 2024; Vecina et al. 2025), the field still relies heavily on qualitative analyses and lacks a coherent framework to meet this conceptual and empirical need (Ojala et al. 2021; Pihkala 2022). Building on this emerging line of research, the present study offers an empirical contribution by directly comparing climate change worry and climate anxiety, and examining their distinct associations with subjective wellbeing. However, it is also important to note that because the present study is correlational, it is not designed to establish causal effects or evaluate specific interventions; rather, it provides a conceptual and empirical basis for future research with more direct policy relevance.

Given the consistently stronger association observed in this study between state climate anxiety and reduced subjective wellbeing, compared with climate worry, the psychological implications of climate anxiety warrant attention. This concern extends beyond general mental

Table 2 Country-wise differences in correlations of climate change worry and state climate anxiety (SCA) with subjective wellbeing indices

Country	Difference in correlation of WHO-5 wellbeing with climate change worry vs SCA ($r_{ccw} - r_{sca}$)			Difference in correlation of life satisfaction with climate change worry vs SCA ($r_{ccw} - r_{sca}$)		
	(Δr)	95%CI	<i>z-score</i>	(Δr)	95%CI	<i>z-score</i>
1. Australia	-0.19***	[-0.28, -0.10]	-4.14	-0.07	[-0.16, 0.02]	-1.57
2. Brazil	-0.25***	[-0.36, -0.15]	-4.69	-0.15**	[-0.26, -0.04]	-2.70
3. Canada	-0.09	[-0.19, 0.02]	-1.68	-0.08	[-0.18, 0.03]	-1.41
4. Chile	-0.34***	[-0.45, -0.22]	-5.68	-0.26***	[-0.38, -0.14]	-4.25
5. China	-0.15*	[-0.27, -0.03]	-2.41	-0.13*	[-0.25, 0.00]	-2.02
6. Colombia	-0.29**	[-0.46, -0.12]	-3.29	-0.17	[-0.34, 0.00]	-1.92
7. Egypt	-0.29***	[-0.41, -0.17]	-4.57	-0.36***	[-0.48, -0.23]	-5.59
8. Finland	-0.14***	[-0.20, -0.08]	-4.54	-0.16**	[-0.16, -0.04]	-3.27
9. Germany	-0.23***	[-0.35, -0.11]	-3.69	-0.12	[-0.24, 0.00]	-1.93
10. Italy	-0.07	[-0.19, 0.05]	-1.14	-0.18**	[-0.30, -0.07]	-3.02
11. India	-0.19**	[-0.33, -0.05]	-2.64	-0.22**	[-0.36, -0.07]	-2.94
12. Indonesia	-0.16*	[-0.28, -0.04]	-2.50	-0.25***	[-0.38, -0.13]	-3.97
13. Iran	-0.17**	[-0.28, -0.05]	-2.68	-0.03	[-0.15, 0.09]	-0.54
14. Japan	-0.14*	[-0.26, -0.01]	-2.07	0.03	[-0.10, 0.16]	0.43
15. Malaysia	-0.21**	[-0.34, -0.08]	-3.12	-0.15*	[-0.28, -0.02]	-2.23
16. Netherlands	-0.19***	[-0.28, -0.10]	-4.19	-0.07	[-0.16, 0.02]	-1.62
17. Nigeria	-0.24***	[-0.34, -0.13]	-4.37	-0.34***	[-0.44, -0.24]	-6.31
18. Norway	-0.01	[-0.12, 0.10]	-0.16	-0.09	[-0.20, 0.02]	-1.64
19. Oman	-0.07	[-0.22, 0.07]	-1.02	-0.23**	[-0.36, -0.09]	-3.17
20. Pakistan	-0.34***	[-0.48, -0.19]	-4.37	-0.31***	[-0.46, -0.16]	-3.93
21. Palestine	-0.30***	[-0.41, -0.19]	-5.21	-0.22***	[-0.33, -0.11]	-3.87
22. Philippines	-0.25***	[-0.30, -0.20]	-9.18	-0.15***	[-0.20, -0.10]	-5.38
23. Portugal	-0.10	[-0.24, 0.04]	-1.37	-0.10	[-0.24, 0.04]	-1.34
24. Romania	-0.13*	[-0.23, -0.03]	-2.537	-0.16**	[-0.25, -0.06]	-3.03
25. Russia	-0.05	[-0.16, 0.05]	-0.973	-0.13*	[-0.24, -0.03]	-2.45
26. Slovakia	-0.15*	[-0.28, -0.01]	-2.15	-0.19**	[-0.32, -0.05]	-2.71
27. Spain	-0.06	[-0.15, 0.03]	-1.227	-0.16**	[-0.25, -0.07]	-3.46
28. Tanzania	-0.16*	[-0.30, -0.01]	-2.133	-0.15	[-0.29, 0.00]	-1.94
29. Turkey	-0.17***	[-0.27, -0.08]	-3.53	-0.16**	[-0.26, -0.07]	-3.33
30. Uganda	-0.19***	[-0.28, -0.10]	-4.27	-0.10*	[-0.19, -0.01]	-2.21
31. UAE	-0.16*	[-0.28, -0.04]	-2.52	-0.01	[-0.13, 0.11]	-0.18
32. United Kingdom	-0.14***	[-0.23, -0.04]	-2.78	-0.10**	[-0.23, -0.04]	-2.83
Pooled	-0.19***	[-0.21, -0.17]	-20.45	-0.15***	[-0.16, -0.13]	-15.52

$p < 0.05^*$, $p < 0.01$, $**p < 0.001^{***}$

health risks; it may also carry potential consequences for climate action. For example, Lukacs et al. (2023) found that climate change-related distress was negatively associated with environmentally friendly behaviors, suggesting that higher distress may coincide with reduced behavioral engagement, potentially reflecting experiences of emotional overwhelm (Chen & Cheng 2020; Keim 2008). Although the causal impact of climate anxiety on behavior remains unclear, as does the time frame over which climate anxiety may influence environmental behaviors (McLean 2024), the consistently stronger association observed between climate anxiety and reduced subjective wellbeing suggests that climate anxiety represents a plausible psychological risk that warrants policy attention. Policymakers should therefore consider targeted strategies that address climate anxiety as a public wellbeing concern, such as integrating psychosocial

support and mental health resources into climate adaptation and communication initiatives, and improving public awareness and access to evidence-based coping resources. These efforts are compatible with climate action and can be pursued in parallel to safeguard psychological wellbeing as climate impacts intensify.

The differential associations between climate change worry and climate anxiety with subjective wellbeing found in this study underscore the need for targeted climate communication strategies that are sensitive to distinct emotional responses. Existing evidence suggests that climate change worry, when framed in a constructive manner, is more consistently associated with proactive engagement and indicators of emotional resilience, whereas heightened climate anxiety has been more reliably linked to poorer subjective wellbeing and, in some studies, lower self-reported engagement

(Lukacs et al. 2023; Ogunbode et al. 2022). However, these patterns are largely derived from cross-sectional research, and causal pathways, as well as the temporal dynamics linking worry and anxiety to mental wellbeing and climate-related behavior, remain insufficiently established. Building on the distinctions identified in the present study, future longitudinal and prospective research is needed to examine the antecedents of climate change worry and climate anxiety, and to clarify how these emotional responses differentially influence wellbeing and behavioral engagement over time. Such evidence will be critical for informing the design of communication and intervention strategies that aim to foster constructive forms of climate concern while minimizing risks to psychological wellbeing in the context of climate adaptation.

In the present study, the relationship between climate change worry and state climate anxiety varied quite to a large extent, raising the question of whether linguistic differences affect how people interpret and report these emotional experiences (e.g., Larionow et al. 2022). Alternatively, these variations may reflect the influence of social norms, whereby individuals are more likely to report climate anxiety in environments where such expressions are common and familiar (e.g., Western countries; Ogunbode et al. 2022). Importantly, such normative contexts may shape not only mean levels of reported climate anxiety, but also how these emotional experiences are interpreted and expressed, which could in turn influence their observed associations with subjective wellbeing. Future research could adopt qualitative and linguistic methods, such as cognitive interviews and discourse analysis, to investigate how people from different cultural backgrounds interpret and articulate emotional responses to climate change. Understanding these cultural differences will be useful for developing context-appropriate climate communication strategies.

Limitations and future research

This study used self-reported data, which may introduce response biases. Given the growing prominence of climate change, respondents might have overstated their concerns or answered based on social expectations (Van de Mortel 2008). This concern is particularly relevant given that the majority of participants were young adults, a demographic shown to be especially attuned to social norms surrounding climate change (Deng et al. 2017) and thus potentially more susceptible to socially desirable responding (Zhu et al. 2024). While such biases are most likely to affect mean levels of reported climate change worry and anxiety, they may also influence the observed associations with subjective wellbeing if socially desirable responding differs systematically by emotional state. However, it is worth noting that

social desirability bias would not straightforwardly account for the differential associations observed between state climate anxiety and climate change worry, as both constructs would presumably be subject to similar reporting pressures. Additionally, socio-demographic factors, like gender and income, which we did not consider, can influence concern and fear of climate change, as resources for adaptation can alter perceptions (Finucane et al. 2000). As a result, these unmeasured factors may partially confound the observed relationships between climate emotions and subjective wellbeing. Future research should account for these factors to more precisely estimate the strength and generalizability of these associations.

Importantly, the correlational design of this study precludes drawing any conclusions about the causal effects of climate change worry or climate anxiety on subjective wellbeing. Negative emotional responses to climate change may reflect underlying mental health conditions rather than serve as their cause. For instance, Anttila et al. (2000) suggested that climate-related worry could be symptomatic of broader psychological disorders. The evidence for causal effects of climate change anxiety and climate change worry on mental health and wellbeing remains limited. One longitudinal study provides partial support for a causal link between climate concerns and mental health outcomes (McBride et al. 2021), while another showed that climate concerns have no causal relationship with mental health outcomes among young adults in the UK (Major-Smith et al. 2025). Further longitudinal and prospective studies are needed to clarify the extent to which climate-related emotional responses contribute causally to changes in mental wellbeing, or instead represent manifestations of pre-existing psychological vulnerabilities. Such insights will be critical for developing evidence-based strategies to safeguard wellbeing in the context of escalating climate change impacts.

Conclusions

The present study examined the distinction between climate change worry and state climate anxiety, and their respective associations with subjective wellbeing across 32 countries. While the two constructs were correlated, the strength of this association varied considerably across national contexts, and their differential associations with subjective wellbeing underscore their conceptual distinctiveness. State climate anxiety consistently demonstrated stronger negative associations with both mental wellbeing and life satisfaction compared to climate change worry. These findings highlight the importance of treating climate change worry and climate anxiety as separate constructs in future research, rather than using the terms interchangeably. For policymakers and climate communicators, the results suggest that careful

attention should be paid to the emotional tone of climate messaging. Approaches that foster constructive concern without amplifying anxiety may be more conducive to public wellbeing. Further research examining the antecedents, trajectories, and behavioural consequences of these distinct emotional responses will be valuable for developing evidence-based strategies that promote both climate engagement and psychological resilience.

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Data availability The data underlying the results described in this manuscript are available from the corresponding author upon reasonable request.

Declarations

Ethical approval All procedures in studies involving human participants were performed in accordance with the ethical standards. Ethical clearance was obtained from the De Montfort University Health and Life Sciences Faculty Research Ethics Committee (Reference: 3434). Additional approvals were secured in countries where necessary.

Informed consent Informed consent was obtained from all individual participants included in the study. Participants were fully informed about the purpose of the research, and their rights to confidentiality and withdrawal at any time were ensured throughout the study.

Conflict of interest The authors declare that they have no conflicts of interest that could have appeared to influence the work reported in this manuscript.

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