

From Anxiety to Action? Climate Anxiety and Pro-Environmental Behavior: A Systematic Review

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ABSTRACT

Climate change presents numerous physical and psychological problems, with adolescents and young adults experiencing significantly higher levels of climate anxiety. This systematic review synthesized evidence from 26 empirical studies published between 2012 and 2024 to examine the relationship between climate anxiety and pro-environmental behavior (PEB). Following PRISMA guidelines, we examined five databases and reviewed 1,847 records, generating a final sample of research including various regions, populations, and methodologies. The findings indicated that climate anxiety is a multifaceted construct. In several studies, climate anxiety revealed a positive relationship with pro-environmental behavior, including sustainable consumption, energy conservation, and climate activism. Excessive anxiety often resulted in "eco-paralysis." Environmental efficacy (the belief that one's actions can make a difference) appeared as a significant moderator; those with higher efficacy were more likely to translate distress into constructive engagement. Methodological limitations such as dependence on cross-sectional student samples, regional bias towards Western contexts, and inconsistent measurement instruments, restricted the generalizability of the findings. The study emphasizes the importance of longitudinal

and intervention studies, along with greater representation from the Global South. The findings highlight the importance of integrating climate anxiety into education, mental health care, and policy.

Keywords: climate anxiety, pro-environmental behavior, climate change anxiety, systematic review

INTRODUCTION

The escalating impacts of climate change such as heatwaves, droughts, and floods, pose serious health risks and impact the well-being of individuals worldwide (Intergovernmental Panel on Climate Change/IPCC, 2022; United Nations Children's Fund/UNICEF, 2021). Unsurprisingly, *climate anxiety*, which is defined as a fear of climate change that may result in emotional distress or physical symptoms (Clayton et al., 2023; Ojala, et al., 2021) is increasingly reported among adolescents across the globe (Hickman et al., 2021; Ogunbode et al., 2022). While climate anxiety can be a challenge, it may also represent a rational and constructive response to the real threats posed by climate change (Clayton & Karazsia, 2020; Crandon et al, 2022). Results of some recent studies suggest that experiencing climate anxiety may be associated with *pro-environmental behavior* (i.e., actions that protect or minimize harm to the natural environment; Ogunbode et al., 2022; Sarrasin et al., 2022;

Wullenkord & Ojala, 2023). However, other studies have shown that high levels of climate anxiety may also be associated with “eco-paralysis”, a state of behavioral inaction fueled by helplessness or fatalism (Albrecht, 2011; Innocenti et al., 2023; Verplanken et al., 2020). Thus, a key question arises: what is the exact nature of the relationship between climate anxiety and pro-environmental behavior? More specifically, in what contexts is climate anxiety associated with pro-environmental behavior, and in what contexts is it associated with eco-paralysis? Further, is this relationship purely correlational, or is there evidence of predictive or causal relationships? And finally, are there factors that significantly moderate or mediate this relationship?

LITERATURE REVIEW

Climate Change and Well-Being

Climate change is widely regarded as the most significant health threat of the twenty-first century (Costello et al., 2009; Ripple et al., 2020). The planet and human health are fundamentally interconnected. The quality of the air we breathe, the food we consume, and the resources on which we depend directly shape well-being (Whitmee et al., 2015). Increasingly, health impacts of climate change (such as malnutrition, asthma, and chronic respiratory diseases) are being documented, with part of the burden associated with overreliance on personal motorized transport rather than active or sustainable alternatives (Haines & Ebi, 2019).

While the physical impacts of climate change have been well documented, far less attention has been given to its psychological impact (Cianconi et al., 2020; Hayes & Poland, 2018; Rocque et al., 2021). This lack of focus is concerning, as surveys show that approximately two-thirds of people worldwide report concern about climate change (Akerlof et al., 2021; Le Quéré et al., 2021).

The psychological impacts of climate change can occur both directly and

indirectly. Direct impacts may include conditions such as heat stress or trauma from exposure to extreme weather events, whereas indirect effects may result from economic loss, threats to health and well-being, forced migration, displacement, and even collective violence (Palinkas & Wong, 2020; Verplanken & Roy, 2013). These consequences can result from acute (i.e., hurricanes), subacute (i.e., prolonged droughts), and chronic (i.e., sea-level rise) climate-related events. These events may even result in clinical mental health disorders such as post-traumatic stress disorder, depression, and anxiety, with the greatest vulnerability seen among women and girls, those of lower socioeconomic status, and older adults (Palinkas & Wong, 2020).

Climate Change Anxiety

Perhaps the most widely studied psychological impact of climate change is climate anxiety (sometimes also referred to as eco-anxiety). Climate anxiety and eco-anxiety are increasingly gaining global attention as awareness grows about the present and future threats facing our planet (Clayton, 2020; Pihkala, 2020; Stanley et al., 2021; Taylor, 2020). A comprehensive understanding of climate anxiety must consider relational, psychosocial, cultural, ethical, legal, and political dimensions (Pihkala, 2020), and it is often expressed through a range of emotions such as worry (Ojala, 2012), fear (Hickman et al., 2021), anger (Pavani et al., 2023; Stanley et al., 2021), sadness, despair, guilt, shame (Leite et al. 2023), and even hope (Ojala, 2012). Clayton (2020) explained that weather-related anxiety can represent an appropriate reaction to a realistic threat, serving as a motivator that prompts individuals to act against climate risks. However, Hrabok et al. (2020) added that others may experience helplessness and despair if they perceive their personal or collective efforts as inadequate to address climate change. Climate anxiety may also reach a clinically significant level when it becomes

uncontrollable and disrupts essential aspects of daily life, such as sleep, work, or social relationships (Clayton, 2020; Turcotte-Tremblay, et al., 2024). In some cases, it can become excessive, meaning it is highly disproportionate to the actual level of threat (Hrabok et al., 2020). In Ojala's (2012) research, participants described their concerns about climate change in ways consistent with symptoms of clinical anxiety, such as feelings of being overwhelmed and panic (Hickman et al., 2021). Climate anxiety has been conceptualized as both a set of clinically relevant symptoms, including sleep disruption, difficulty managing daily activities (Clayton & Karazsia, 2020) and an emotional response such as fear and worry about climate change (Searle & Gow, 2010). Despite several findings on the prevalence of such distress, differing approaches to conceptualizing and measuring climate anxiety reveal limited consensus about its nature. A central debate concerns whether climate anxiety is largely constructive (facilitating information gathering and reconsideration of personal behavior) or, at more extreme levels, unconstructive, leading to eco-paralysis (Albrecht, 2011; Pihkala, 2020). An important factor in this dynamic may be environmental efficacy (i.e., believing one's actions can make a difference). Individuals who see pro-environmental conduct as ineffective are less likely to translate their anxiety into meaningful action (Clayton, 2020). Conversely, those who believe their actions can contribute to climate change mitigation are more likely to channel climate-related distress into constructive engagement (Ojala, 2013). Other factors may also affect the constructiveness of climate anxiety, including resilience (Shao and Yu, 2023), coping strategies (Wullenkord and Ojala, 2023), and future self-continuity (Qin et al., 2024).

Climate anxiety affects individuals of all ages, but it appears to be especially prevalent in younger generations (Ballew et al., 2024). Studies indicate that individuals

under the age of 35 report the highest levels of climate-related distress (Searle & Gow, 2010), with some surveys suggesting prevalence rates as high as 80% (ReachOut, 2019). Work by Ballew et al. (2024) in the U.S. provides a much more conservative report, with only 20% of Gen Z/Millennial adults reporting climate-related distress, but the prevalence rate was still higher compared to Gen X adults (16%) and Baby Boomer/Silent Generation adults (12%). Adolescents in particular suffer disproportionately from climate anxiety, perhaps partially explained by the reality that they will be expected to endure its consequences throughout their lives (Burke et al., 2018; Philipsborn & Chan, 2018; Sanson et al., 2019). One recent multinational survey of adolescents in 10 countries (including Australia, Brazil, Finland, France, India, Nigeria, Philippines, Portugal, the UK, and the USA; 1000 participants per country) revealed that 45% felt climate change negatively affects their daily functioning, while 75% described their future as "frightening" (Hickman et al., 2021). A survey conducted by the United Kingdom's (UK) Royal College of Psychiatrists found that 57% of child and adolescent psychiatrists in England see young patients distressed about the climate crisis (Royal College of Psychiatrists, 2020). Perhaps because of this prevalence, there are a number of studies on climate anxiety which focus specifically on adolescents, or adolescents and young adults (e.g. Ojala, 2012; Turcotte-Tremblay, 2024; Becht et al., 2024).

Pro-environmental Behaviors

The dynamic nature of human behavior is widely recognized as a major factor in environmental problems. This is seen in the increasing challenges of climate change, biodiversity decline, and pollution, all of which promote the degradation of ecosystems (Ballew et al. 2024; Gifford, 2011; Kollmuss & Agyeman, 2002; Shao and Yu., 2023; United Nations Environment Program/UNEP, 2019; Whitmarsh et al.,

2022). To address these challenges, it is essential to encourage individuals to engage in pro-environmental behaviors, or intentional actions aimed at reducing negative environmental impacts (Becht et al., 2024; Kollmuss & Agyeman, 2002; Qin et al., 2024, Steg & Vlek, 2009). Such behavior involves a range of practices, including recycling, waste management, energy conservation, reliance on public transport, adopting sustainable agricultural practices, and so on. These actions are considered important in maximizing positive environmental outcomes and reducing the severity of ecological threats (Steg & Vlek, 2009). Moreover, environmental protection can be promoted indirectly through broader environmental citizenship behaviors and political support, highlighting that individuals can contribute not only through direct behavioral change but also through advocacy and collective responsibility (Leite et al., 2023; Stern, 2000).

The extent to which individuals currently engage in pro-environmental behaviors is somewhat complicated and is highly variable depending on several factors such as culture, nationality, political partisanship, and the type of pro-environmental behavior (Funk and Kennedy, 2020; Li et al., 2018; Vlascanneau et al., 2024). Interestingly, however, there appears to be a broad, worldwide belief in climate change, and a majority worldwide support for pro-environmental policy changes (Andre et al., 2024; Vlascanneau et al., 2024). Despite the widespread support for pro-environmentalism, there is evidence that people tend to believe that the public is less interested in pro-environmental activity than they actually are. Sparkman et al. (2022) found that 66-80% of Americans supported pro-environmental policy measures, but that Americans thought only 37-43% of people were supportive—a phenomenon they referred to as “pluralistic ignorance.” Andre et al. (2024) found this phenomenon to be true on a global scale. Further, a study by Bergquist (2019) produced results showing

that the majority of participants across several countries not only overestimated the extent to which they engage in pro-environmental behaviors, but also falsely perceived themselves as engaging in more pro-environmental behaviors than others.

Relationship between Climate Change Anxiety and Pro-Environmental Behaviors

The anxiety surrounding climate change may be linked to constructive climate change problem solving, by making individuals alert to the danger and motivated for action, inspiring them to find possible solutions to anxiogenic situations, and serving as a source of motivation to stimulate their environmental commitment (Clayton & Karazsia, 2020; Ojala, 2013; Pihkala, 2020; Verplanken, et al., 2020). According to a study by the American Psychological Association (APA, 2020), people who reported experiencing eco-anxiety were twice as likely to say they are motivated to change their behavior in order to reduce their contribution to climate change compared to those who did not. In contrast, Clayton and Karazsia (2020) concluded that climate anxiety was neither positively nor negatively correlated with pro-environmental behavior. With regard to the perception of climate change, it is known that the more people believe that climate change is happening, the more they are willing to act (Leite et al., 2023; Maduneme, 2024; van der Linden, 2015). A major obstacle to motivating climate change action is the fact that, for many people, the phenomenon seems impersonal and distant in space and time. In the study by Li et al. (2011), respondents who stated that the current day was hotter than normal believed more strongly in global warming, expressed greater concern, and exhibited more pro-environmental behaviors, such as donating more money to institutions related to climate support.

MATERIALS & METHODS

We conducted a systematic review of the literature in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to examine the relationship between climate anxiety and pro-environmental behavior (PEB). A PRISMA flow diagram summarizing the study selection process is presented in Figure 1. The review focused on empirical studies published between January 2012 and December 2024.

A comprehensive search strategy was adopted across five electronic databases: PsycINFO (n = 567), Scopus (n = 423), Web of Science (n = 389), PubMed/MEDLINE (n = 298), and EMBASE (n = 170). Additional records were identified through manual searches of reference lists, grey literature, and expert recommendations. The search strategy combined keywords and Boolean operators related to climate anxiety and pro-environmental behavior. Search terms included “climate anxiety,” “eco-anxiety,” “climate distress,” “environmental anxiety,” and “climate change anxiety,” combined with “pro-environmental behavior,” “environmental action,” “climate action,” “sustainable behavior,” and “green behavior.” Additional terms associated with emotional responses to climate change were included to maximize coverage of relevant literature.

The initial search yielded 1,847 records from database searches and 89 additional records from other sources. After removing 513 duplicate records, 1,423 unique studies remained for title and abstract screening. Two independent reviewers screened all records, with disagreements resolved through discussion and consultation with a third reviewer when necessary. During the screening phase, 1,245 records were excluded because they were unrelated to climate anxiety, lacked behavioral outcomes, were non-empirical studies, or were not published in English. A total of 178 full-text articles were assessed for eligibility.

Studies were included if they: (1) were empirical quantitative, qualitative, or mixed-method studies; (2) were published in peer-reviewed journals; (3) were written in English; (4) were published between 2012 and 2024; (5) included validated or clearly operationalized measures of climate anxiety or related emotional responses to climate change; (6) assessed pro-environmental behavior or climate-related action; (7) involved human participants; and (8) represented original research. Studies were excluded if they: (1) focused exclusively on interventions or treatment protocols without behavioral outcomes; (2) used case-study or single-participant designs; (3) were conference abstracts without full-text articles; (4) lacked measures of pro-environmental behavior; (5) used duplicate datasets; or (6) represented non-peer-reviewed literature.

Following full-text review, 152 studies were excluded for reasons including the absence of validated or operationalized climate anxiety measures, failure to assess pro-environmental behavior, publication outside the selected timeframe, or exclusive reliance on intervention designs. The final synthesis included 26 empirical studies that met all inclusion criteria.

Given the heterogeneity in study designs, populations, measures, and analytical approaches, a narrative synthesis approach was used instead of a meta-analysis. The review specifically examined temporal publication trends, geographical distribution of studies, participant characteristics, methodological designs, climate anxiety measures, pro-environmental behavior measures, and statistical relationships between climate anxiety and PEB. The synthesis also examined moderating and mediating mechanisms reported across studies.

Data were extracted and summarized based on publication year, country of study, participant demographics, study design, sample size, climate anxiety measures, pro-environmental behavior measures, analytical techniques, and primary findings. Particular

attention was given to the direction and strength of associations between climate anxiety and PEB, including correlational, predictive, longitudinal, curvilinear, moderation, and mediation findings.

Methodological quality was evaluated using an adapted version of the Hawker et al. (2002) quality assessment framework, which has been used across diverse study designs in systematic reviews. The assessment examined: (1) clarity of title and abstract; (2) appropriateness of study aims; (3) rigor of methods and data collection procedures; (4) sampling quality and representativeness; (5) appropriateness of statistical analyses; (6) management of potential bias; (7) interpretation of results; (8) generalizability of findings; (9) implications for research and practice; and (10) overall contribution to the field. Each study was independently evaluated by two reviewers. Quality scores ranged from 9 to 36, with higher scores indicating stronger methodological rigor. Discrepancies in ratings were resolved through discussion and consensus. Inter-rater reliability was high ($\kappa = 0.89$), indicating strong agreement between reviewers.

The included studies were synthesized thematically to identify recurring patterns in the relationship between climate anxiety and pro-environmental behavior. Themes emerging from the synthesis included positive correlational and predictive relationships, age-related differences, longitudinal and reciprocal effects, curvilinear associations, the influence of other climate-related emotions, and psychological moderators and mediators such as self-efficacy, coping strategies, resilience, hope, and future self-continuity.

RESULT

A total of 26 empirical studies met the inclusion criteria and were retained for synthesis (see Table 1). Table 2 provides an overview of the publication years of the final 26 studies spanning from 2012 to 2024. Notably, 24 of the 26 included studies were after 2019, highlighting a marked

acceleration in scholarly attention to climate anxiety and pro-environmental behavior. The period-based analysis in Table 3 further shows that only two studies (7.7%) were published in the early period (2012–2013). No eligible studies were published between 2014 and 2019, signaling a conceptual development phase without empirical output. A noticeable increase appeared during the 2020–2022 surge period with six studies (23.1%), followed by an even larger swell of 18 studies (69.2%) from 2023 to 2024, more than double the number from the previous ten years! To understand the broader context of these shifts, Table 4 highlights notable milestones, which include the first empirical paper in 2012, the reemergence of empirical work in 2020, and the rapid escalation beginning in 2022, likely influenced by increased public awareness, global climate activism movements (e.g., Fridays for Future), IPCC reports, and extreme weather events (Fridays For Future, n.d.; Matejova & Spáč, 2025).

Building on this temporal view, Table 5 provides a comparative analysis by period. Research published in the Early Period (2012–2013) was limited in scope. Aside from only producing two published studies, the studies in this period had smaller sample sizes (ranging from $N = 132$ to 723) and only sampled populations in the US and Europe. Further, Ojala's (2012) article from this period is the only study to focus specifically on climate hope. Yet these appear to be the only significant differences in these studies compared to those published after 2020; the design, methods, and analysis are otherwise similar.

After a period of relative silence (2014–2019), the Surge Period (2020–2022) saw not only a large increase in the number of studies, but also an expansion of study diversity. Studies were conducted in more locations (including Australia and Canada), sample sizes increased in range (ranging from $N = 306$ to $44,387$), and the first major international study was published, with a sample of 12,246 from 32 countries

(Ogunbode et al., 2022). Lastly, this period was characterized by a greater variety of research methods, including a variety of regression analyses, structural equation modeling, and correlational analyses. The Current Period (2023–2024) expanded diversity in research even further, adding study samples from China and Colombia, contributing more moderation and mediation analyses, and introducing several longitudinal studies.

Beyond temporal trends, Table 1 provides an overview of the study characteristics for each study. The majority of studies were exclusively cross-sectional ($n = 17$, 65.4%); three studies (11.5%) were both cross-sectional and longitudinal/cohort-comparison designs; two studies (7.7%) were exclusively longitudinal; two studies (7.7%) employed mixed-method designs, one study (3.8%) utilized both a cross-sectional and experimental approach; and one study (3.8%) used a daily diary method. This indicates that most of the available evidence is correlational rather than causal, although the number of longitudinal and experimental designs has increased in recent years, reflecting a degree of methodological maturation.

Research was most frequently conducted in Europe ($n = 9$, 34.6%), North America ($n = 6$, 23.1%), Australia ($n = 4$, 15.4%), China ($n = 2$, 7.7%), and multi-country collaborations ($n = 5$, 19.2%). Participant characteristics varied, with general adult populations representing the largest group ($n = 14$, 53.8%), followed by young adult/university students ($n = 7$, 26.9%), adolescents/youth ($n = 4$, 15.4%), and one study with both adolescent and young adult samples (3.8%).

While there were a wide variety of measures used, some measures were used much more frequently than others. For example, to measure climate anxiety, 11 studies (42.3%) used the Climate Change Anxiety Scale, a 13- or 22-item measure with four subscales: cognitive-emotional impairment, functional impairment, personal experience with climate change, and pro-climate behavioral

engagement. Four studies (15.4%) used or abbreviated the Hogg Eco-Anxiety Scale, a 13-item measure with four different subscales (affective symptoms, rumination, social/behavioral impairment, and personal-impact anxiety). Other scales used to measure climate anxiety included the State-Trait Anxiety Inventory (two studies; 7.7%) and the Habit Index of Negative Thinking Scale (two studies; 7.7%), and unnamed measures created or adapted by the authors (nine studies; 34.6%). Pro-environmental behavior was also measured by a variety of scales, though far fewer studies used named scales for PEB compared to climate anxiety. Four studies (15.4%) used the 10- or 19-item Pro-Environmental Behavior Scale, a scale with three subscales: household behavior, information-seeking behavior, and transportation choice. Three studies (11.5%) isolated the pro-climate behavior subscale from the Climate Change Anxiety Scale. Surprisingly, 20 studies (76.9%) created a custom or adapted scale for their studies, more than double the number of studies that created custom or adapted climate anxiety scales.

Upon reviewing all 26 studies, several consistent themes emerged. Firstly, 24 of the 26 studies found evidence of positive correlational or predictive relationships between climate anxiety and pro-environmental behavior (PEB). For example, through regression analyses, Ogunbode et al. (2022) found positive, predictive relationships between climate anxiety and PEB ($\beta = .17$) and environmental activism ($\beta = .25$). These predictive relationships were found in 24 out of 32 countries. Similarly, Becht et al. (2024) reported that adolescents showed small to moderate positive correlations between climate anxiety and private sphere PEB ($r = .17-.24$) and moderate to large correlations for public-sphere PEB ($r = .29-.58$).

A second important theme has to do with age: the positive association between climate anxiety and PEB appears across all ages studied (from middle-school to

adulthood), but this relationship may be more nuanced for adolescents. For example, Wullenkord & Ojala (2023) found moderate to large correlations between PEB and macro climate worry ($r = .51-.52$) and micro climate worry ($r = .35-.40$) in Swedish high school students. Conversely, Qin et al. (2024) found *negative* associations between climate anxiety and PEB in Chinese middle school students ($r = -.12$) and Chinese high school students ($r = -.09$). This was the only study reviewed that found negative associations between climate anxiety and PEB.

Thirdly, while several studies identified associations between climate change and PEB through regression analyses, longitudinal studies also provided evidence consistent with a potential causal relationship. For example, analysis from Pavani et al. (2023) found that eco-anxiety at Time 1 predicted higher PEB at Time 2 approximately 21 days later ($\beta = .15$), with cross-lagged models confirming reciprocal effects ($\beta = .11$). Additional longitudinal effects were also found by Kühner et al. (2024), who found that climate anxiety predicted PEB six months later ($\beta = .04$), and Becht et al. (2024), who found climate anxiety linearly predicted private and public PEB one year later (linear effect = .10 and .36, respectively).

A fourth pattern among these studies was demonstrated by a group of studies that reported curvilinear or inverted-U relationships, showing stronger correlations between climate anxiety and PEB when anxiety levels were moderate. For example, Maduneme (2024) found that climate anxiety had a negative curvilinear association with pro-environmental behavioral intentions, meaning that moderate anxiety predicted the strongest intentions, while both high and low anxiety predicted weaker intentions. Likewise, Coates et al. (2024) reported that eco-trait utility (i.e., the likelihood that an individual will choose to consider environmental factors over other factors when making a decision) peaked in individuals with

moderate climate anxiety, showing a negative quadratic effect ($\beta = -5.878$). Interestingly, using hierarchical multiple linear regression analysis, Hogg et al. (2024) found *both* linear and quadratic relationships between all 4 subscales of their climate anxiety scale and PEB, though the quadratic relationship only explained 1-2% of the variance.

Fifth, while most studies focused solely on climate anxiety, a few studies included other climate-related emotions. Verplanken et al. (2020), for example, found past PEB to be associated not only with habitual worry and anxiety related to climate change, but also with determination and other similar feelings. On the other hand, the authors found climate-related anger to be unassociated with past PEB. This was somewhat counter to the study by Stanley et al. (2021), who found positive, predictive relationships between eco-anger and both personal and collective PEB. Wullenkord and Ojala (2023) found that climate pessimism was correlated with PEB in high school students, while climate optimism was not. Contrarily, Ojala (2012) found that constructive hope was associated with PEB in teens and young adults, while denial-based hope was negatively associated. It is notable that these results for other climate-emotions were quite different across studies. Sixth and finally, several psychological mechanisms across the studies moderated or mediated the effect of climate anxiety on PEB. Self-efficacy was one of the strongest modifiers. For instance, Becht et al. (2024) found that environmental efficacy strengthened the relationship between anxiety and public-sphere PEB ($r = .27$ to $.37$); Qin et al. (2024) also showed that green self-efficacy moderated the negative effect of anxiety on behavior, and that future self-continuity mediated the anxiety and PEB pathway; and Innocenti et al. (2023) found self-efficacy mediated the relationship between cognitive components of climate anxiety and PEB (total indirect effect = $-.17$).

Other constructs proved to be modifiers as well: Leite et al. (2023) found that hope strengthened, while despair weakened the effect of anxiety on household PEB; Wullenkord and Ojala (2023) found that problem-focused coping mediated the relationship between macro climate worry and PEB across two studies; and Shao and Yu (2023) found resilience moderated the relationship between eco-anxiety and PEB when eco-anxiety acted as a mediator between media coverage and PEB.

In general, there is substantial evidence for a correlational and predictive positive relationship between climate anxiety and PEB. Effect sizes in these studies are largely in the small-to-moderate range. Further, there is also evidence that may suggest a curvilinear relationship between these constructs, with the strongest associations appearing at moderate levels of climate anxiety. likely to appear when anxiety is severe, hopeless, or paired with low self-efficacy, supporting the claim that climate anxiety becomes maladaptive only under specific conditions. Overall, moderate anxiety appears to be the most strongly associated with sustained pro-environmental behavior.

DISCUSSION

This systematic review synthesized 26 empirical studies published between 2012 and 2024 examining the relationship between climate anxiety and pro-environmental behavior (PEB). The findings demonstrate a significant rise in scholarly interest in this topic after 2020, reflecting the growing global visibility of climate-related psychological distress. The following sections discuss emerging research patterns, theoretical implications, methodological strengths and weaknesses, and directions for future research.

Emerging Trends in Literature

Publication trends indicate a pronounced increase in studies after 2020, with 69.2% of

all studies published between 2023 and 2024. This surge aligns with increased global climate events, youth-led activism such as the Fridays for Future movement and increased public recognition of eco-anxiety in policy and clinical discourse (Hickman et al., 2021; Ogunbode et al., 2022; Stanley et al., 2021). Several foundational studies also suggested that the COVID-19 pandemic and extreme climate events may have intensified public concern and academic interest in climate-related distress (Whitmarsh et al., 2022; Clayton & Karazsia, 2020).

Geographically, most studies were conducted in North America, Europe, and Australia, with fewer contributions from Asia and a near absence of research from Africa, Latin America, and the Middle East (Ballew et al., 2024; Ogunbode et al., 2022; Curll et al., 2022). This regional imbalance reflects a predominantly Western-focused evidence base, which limits the global generalizability of current findings and overlooks perspectives from populations in the Global South, areas disproportionately affected by climate change but underrepresented in peer-reviewed literature (Hickman et al., 2021; IPCC, 2022).

Conceptualizing Climate Anxiety

Across the studies, climate anxiety was defined inconsistently. Some studies conceptualized it as a psychological distress involving functional impairment, such as sleep difficulties or work impairment (e.g., Turcotte-Tremblay et al., 2024). Others treated it more broadly as worry, concern, or fear about environmental problems (e.g., Ojala, 2012; Verplanken & Roy, 2013). More recent studies adopted multidimensional scales, measuring cognitive, emotional, and functional components (e.g., Coates et al., 2024; Hogg et al., 2024). This is reflected by the frequent usage of the four-dimensional Climate Change Anxiety and Hogg Eco-Anxiety Scales.

Table 1 Characteristics of studies

S/N	Study	Population	N	Design	Variables	Key Findings
1	Ogunbode et al. (2022). Climate anxiety, wellbeing and pro-environmental action: correlates of negative emotional responses to climate change in 32 countries	Young adults/university students International (32 countries)	12,246	Cross-sectional	IV: Climate anxiety: 7-item adapted version of State-Trait Anxiety Inventory; Descriptive norms (climate anxiety of people close to participants): 4-item custom measure DV: Pro-environmental behavior: 8-item adapted scale; Environmental activism (protest attendance): 1-item measure	Climate anxiety had positive association with PEB in 24 countries, and with environmental activism in 12 countries. Regression analyses showed that climate anxiety predicted PEB ($\beta = .17$) and environmental activism ($\beta = .25$). These associations were stronger in individualistic cultures and in countries with higher GDP. Climate anxiety of people close to participants (i.e., descriptive norms) also served as a predictor of climate anxiety ($\beta = .23$).
2	Becht et al. (2024). Feeling anxious and being engaged in a warming world: climate anxiety and adolescents' pro-environmental behavior.	Adolescents Netherlands (all studies) and Colombia (studies 2 and 3)	259 (Study 1), 1,415 (Study 2), 537 (Study 3)	Multi-study (n=3); cross-sectional (all studies) & longitudinal (Study 2; 1 year)	IV: Climate anxiety symptoms: 13-item Climate Change Anxiety scale (Studies 1 and 3); Climate anxiety affect: 2-item Achievement Emotions Adjective List (Studies 2 and 3) Mod: Environmental efficacy: 4-item Environmental Efficacy scale (all studies) DV: Private sphere PEB: 40-item Behavior-Based Environmental Attitude scale (Study 1), 13-item, custom scale (Studies 2 and 3); Public sphere PEB: 5-item, unnamed scale (Studies 2 and 3);	Study 1: small positive correlation between climate anxiety symptoms and private PEB ($r = .19$). No moderation effect for environmental efficacy. Study 2: Both private and public PEB were positively correlated with climate anxiety affect ($r = .17$ and $.36$, respectively) and environmental efficacy ($r = .37$ for both). Climate anxiety symptoms at T1 had linear positive association with private PEB (linear effect = $.10$) and public PEB (linear effect = $.36$) at T2. Environmental efficacy moderated relationship between climate anxiety and public PEB, but not private PEB. Study 3: Both private and public PEB were positively correlated with climate anxiety symptoms ($r = .18$ and $.58$, respectively), climate anxiety affect ($r = .24$ and $.29$), and environmental efficacy ($r = .35$ and $.27$). Small linear positive association between prior climate anxiety symptoms and later private PEB (linear effect = $.14$), and prior climate anxiety affect and later private PEB (linear effect

						= .13). Large curvilinear association between prior climate anxiety symptoms and later public PEB (linear effect = .79), and prior climate anxiety affect and later public PEB (linear effect = .26). Environmental efficacy moderated relationship between both climate anxiety symptoms and affect and public PEB, but not private PEB.
3	Qin et al. (2024). The relationship between climate change anxiety and pro-environmental behavior in adolescents: the mediating role of future self-continuity and the moderating role of green self-efficacy.	Adolescents China	1,851	Cross-sectional	IV: Climate change anxiety: 13-item Climate Change Anxiety Scale Mod: Green self-efficacy: 17-item Green Self-efficacy Questionnaire Med: Future self-continuity: 10-item Future Self-Continuity Questionnaire DV: Pro-environmental behavior: 15-item Pro-Environmental Behavior Questionnaire	Multivariate analysis showed small, negative association between climate change anxiety and PEB in middle ($r = -.12$) and high school students ($r = -.09$), and between green self-efficacy and PEB in middle ($r = -.14$) and high school students ($r = -.10$). Climate change anxiety negatively predicted PEB in high school students ($\beta = -.07$), but not middle school students. Future self-continuity mediated relationship between anxiety and PEB for both middle schoolers and high schoolers in both mediated models and moderated mediation models. Moderated mediation model testing showed that climate change anxiety did not significantly predict PEB in either middle or high schoolers. Green self-efficacy was shown to moderate the mediation of future continuity for middle schoolers ($\beta = .07$) but not high schoolers.
4	Turcotte-Tremblay et al. (2024). Adolescents' impairment due to climate anxiety is associated with self-efficacy and behavioral engagement: a cross-sectional analysis in Quebec (Canada).	Adolescents Quebec, Canada	45,362	Cross-sectional; secondary data (from COMPASS study)	IV: Climate anxiety (sleep/work interference): 2-item measure DV: Pro-environmental behavioral engagement (behavior change, self-efficacy): 2-item measure	Climate anxiety (sleep/work interference) was positively associated with pro-environmental behavioral engagement. Graphs were presented showing the association, but no r values were given in the article or supplemental materials.

5	Hogg et al. (2024). Clarifying the nature of the association between eco-anxiety, wellbeing and pro-environmental behaviour.	Young adults Australia	530 (initial); 161 (follow-up)	Cross-sectional, Longitudinal (14 days)	IV: Eco-anxiety (affective symptoms, behavioral symptoms, rumination, personal impact anxiety): 13-item Hogg Eco-Anxiety Scale DV: Personal pro-environmental behavior: adapted 18-item scale; Low carbon readiness: 3-item custom scale	Personal PEB and low carbon readiness were each positively associated with all four eco-anxiety subscales: affective symptoms ($r = .38$ and $.31$, respectively), rumination ($r = .50$ and $.43$), behavioral symptoms ($r = .32$ and $.25$), and personal impact anxiety ($r = .40$ and $.44$). Hierarchical multiple linear regression showed PEB was predicted linearly by affective symptoms ($B = .20$), rumination ($B = .24$), behavioral symptoms ($B = .18$), and personal impact anxiety ($B = .18$), though a quadratic formula also had a predictive relationship ($\Delta R^2 = .01-.02$). Eco-anxiety scales were stable over time, as indicated by Pearson correlations between individual eco-anxiety subscales at T1 and T2 ($r > .64$), and cross-lagged panel modeling ($\beta > .40$).
6	Lutz et al. (2023). Eco-anxiety in daily life: Relationships with wellbeing and pro-environmental behavior.	Undergraduates Canada	132	Daily diary (14 days)	IV: Trait eco-anxiety: adapted 4-item Hogg Eco-Anxiety Scale and other adapted 1-item measure; Daily eco-anxiety: adapted 4-item Hogg Eco-Anxiety Scale and other adapted 1-item measure DV: Trait pro-environmental behavior (general, specific): 7-item adapted measure; Daily pro-environmental behavior (general, specific): 7-item adapted measure	Trait eco-anxiety was moderately associated with general PEB ($r = .32$) and specific PEB ($r = .34$). Daily eco-anxiety was correlated with same-day general PEB ($r(w)(flv) = .29$) and same-day specific PEB ($r(w)(flv) = .23$). Daily eco-anxiety was not correlated with next-day PEB.
7	Lutz et al. (2023). The continuum of eco-anxiety responses: A preliminary investigation of its nomological network.	Undergraduates Canada	319 (Study 5)	Multi-study ($n=5$) cross-sectional. Studies 1-4 did not measure PEB, so only study 5 is reviewed.	IV: Eco-anxiety (cognitive-emotional impairment, functional impairment): 5-item custom scale, 13-item Climate Change Anxiety Scale; Environmental concern: 1-item adapted measure, 12-item	All eco-anxiety/environmental concern measures and subscales were positively associated with environmental activism willingness ($r = .17-.51$). All eco-anxiety/environmental concern measures and subscales were positively associated with pro-environmental consumption

					Environmental Concerns Scale (biospheric, altruistic, egoistic subscales) DV: Pro-environmental consumption behavior: 10-item adapted scale; Environmental activism willingness 10-item adapted scale	behavior ($r = .17-.40$) except the functional impairment subscale of the Climate Change Anxiety Scale.
8	Ojala (2012). Hope and climate change: the importance of hope for environmental engagement among young people.	Adolescents (Study 1); Young adults (Study 2) Sweden	723 (Study 1) 381 (Study 2)	Multi-study (n=2) cross-sectional	IV: Constructive hope: 9-item custom measure (both studies), Hope via denial: 1-item custom measure (both studies) DV: Pro-environmental behavior: 8-item custom measure (note: Study 2 items were different from Study 1)	Constructive hope correlated positively with pro-environmental behavior in both studies ($r = .49$, teens; $r = .23$, young adults). Hierarchical multiple regression analysis confirmed a predictive relationship ($\beta = .21$, teens; $\beta = .12$, young adults). Denial-based hope correlated negatively with pro-environmental behavior in both studies ($r = -.11$, teens; $r = -.19$, young adults).
9	Verplanken et al. (2020). On the nature of eco-anxiety: How constructive or unconstructive is habitual worry about global warming?	Adults US and Europe	306 (Study 3)	Multi-study (n=3) mixed-methods. Studies 1 and 2 did not measure PEB, so only study 3 is reviewed.	IV: Habitual worry about global warming: open-text responses followed by 12-item Habit Index of Negative Thinking scale; Emotions related to global warming (determined, anxious, angry): 20-item adjusted Positive and Negative Affect Schedule DV: Past PEB behavior: 16-item custom scale	Habitual worry about global-warming is positively correlated with past PEB behavior ($r = .39$). Past PEB behavior was also positively correlated with determined ($r = .41$) and anxious ($r = .21$) emotions.
10	Stanley et al. (2021). From anger to action: Differential impacts of eco-anxiety, eco-depression, and eco-anger on climate action and wellbeing.	Adults Australia	3,063	Cross-sectional	IV: Eco-emotions (anxiety, depression, anger): 6-item custom scale DV: Pro-climate behaviors (personal and collective): 16-item custom scale	Correlational analysis showed that eco-depression, eco-anxiety, and eco-anger were all positively correlated with personal PEB ($r = .23$, $.24$, and $.30$ respectively) and collective PEB ($r = .39$, $.38$, and $.44$). Structural equation modeling showed eco-anger positively predicted both personal ($\beta = .46$) and collective ($\beta = .47$) pro-climate behavior; eco-anxiety negatively predicted

						collective action ($\beta = -.20$); and eco-depression positively predicted collective action ($\beta = .25$).
11	Wullenkord & Ojala (2023). Climate-change worry among two cohorts of late adolescents: Exploring macro and micro worries, coping, and relations to climate engagement, pessimism, and well-being	High school students Sweden	321 (Study 1) 474 (Study 2)	Cross-sectional; cohort comparison	IV: Climate worry (macro and micro worry): 5-item custom scale; Climate optimism and pessimism: 6-item custom scale Med: Problem-focused coping strategy: 3-item custom scale DV: Pro-environmental behavior: 12-item custom scale	In both Study 1 and 2, PEB was positively correlated with macro climate worry ($r = .52$ and $.51$, respectively), microclimate worry ($r = .40$ and $.35$), and climate pessimism ($r = .19$ and $.21$). In both studies, there was no significant correlation between climate optimism and PEB. Problem-focused coping partially mediated relationship between macro climate worry and PEB in both studies.
12	Whitmarsh et al. (2022). Climate anxiety: What predicts it and how is it related to climate action?	Adults UK	1,338 (initial) 891 (replication)	Cross-sectional; partial replication study	IV: Climate change concern: 1-item measure; Climate anxiety (cognitive-emotional impairment, functional impairment): 13-item Climate Change Anxiety Scale (CCAS) DV: Pro-environmental behaviors: 9-item custom scale	Climate concern was positively associated with climate anxiety ($r = .26$). Climate anxiety correlated positively with pro-environmental behavior ($r = .19$). When controlling for other variables through regression analysis, both climate concern and climate anxiety predicted some PEBs, including encouraging others to save energy ($\beta = .07$ and $.10$, respectively), recycling ($\beta = .11$ and $-.09$), avoiding wasting food ($\beta = .13$ and $-.07$), buying second-hand items ($\beta = -.05$ and $.10$). Climate anxiety predicted borrowing or renting items ($\beta = .11$), and repurposing items ($\beta = .09$), while climate concern did not. Climate concern predicted buying organic food ($\beta = .08$) and buying products with less packaging ($\beta = .198$), while climate anxiety did not predict. Climate anxiety did not predict overall PEB. It is notable that the climate concern and climate anxiety scales often misaligned in their predictive relationship.
13	Pavani et al. (2023). Eco-Anxiety Motivates Pro-	Adults France	167	Longitudinal (21 days)	IV: Eco-anxiety: 13-item Hogg Eco-Anxiety Scale	Eco-anxiety and PEB were positively correlated at both waves ($r_{t1} = .29$, $r_{t2} =$

	Environmental Behaviors: A Two-Wave Longitudinal Study.				DV: Pro-environmental behaviors: 19-item Pro-Environmental Behavior Scale	.38). Longitudinal regression showed eco-anxiety at Time 1 predicted higher PEB at Time 2 ($\beta = .15$). Change in Eco-anxiety from Time 1 to Time 2 also predicted PEB at Time 2 ($\beta = .13$). Cross-lagged modeling showed PEB at Time 1 predicted higher eco-anxiety at Time 2 ($\beta = .11$).
14	Innocenti et al. (2023). How can climate change anxiety induce both pro-environmental behaviors and eco-paralysis? The mediating role of general self-efficacy.	Adults Italy	394	Cross-sectional	IV: Climate Anxiety (cognitive and functional impairment): 13-item Climate Change Anxiety Scale (CCAS) Med: Self-Efficacy: 10-item General Perceived Self-Efficacy Scale (GSE) DV: Pro-Environmental Behaviors: 19-item Pro-Environmental Behaviors Scale (PEBS).	Cognitive and functional components of climate anxiety were positively correlated with PEB ($r = .440, .347$ respectively). Mediation analysis indicated cognitive components of climate anxiety had a positive, direct effect on PEB ($B = 1.49$) and a negative, indirect effect through self-efficacy ($\beta = -.32$ and $.53$; total indirect effect = $-.17$)
15	Shao & Yu (2023). Media coverage of climate change, eco-anxiety and pro-environmental behavior: Experimental evidence and the resilience paradox.	College Students China	284 (Study 1) 507 (Study 2)	Pre-registered experiment (Study 1); cross-sectional (Study 2)	IV: Media coverage: participants asked to read differing published news reports (Study 1); 2-item adapted measure (Study 2) Med: Eco-anxiety: 7-item State-Trait Anxiety Inventory (Study 1); 13-item Climate Change Anxiety Scale (CCAS; Study 2) Mod: Resilience: 6-item Brief Resilience Scale (Study 2) DV: Pro-environmental behavior: Amount of study reimbursement donated to environmental protection foundation (Study 1); 12-item Pro-environmental Behavior Questionnaire (Study 2)	Study 1: Mediation analysis showed climate change coverage predicted higher eco-anxiety ($\beta = .89$), and eco-anxiety predicted higher PEB ($\beta = .30$). The total indirect effect was non-significant. Study 2: Eco-anxiety was correlated positively with PEB ($r = .31$). Mediation analysis showed that climate change news predicted higher eco-anxiety ($\beta = .30$), and eco-anxiety predicted higher PEB ($\beta = .41$), with a total indirect effect of $.05$. Eco-anxiety also had a positive, direct effect on PEB ($\beta = .17$). Moderated mediation analysis showed that resilience moderated the relationship between eco-anxiety and PEB ($\beta = -.09$)
16	Kühner et al. (2024). Reciprocal relations between climate change	Adults Germany	1,355	Longitudinal (6 months)	IV: Climate change anxiety: 13-item Climate Anxiety Scale DV: Pro-environmental	Climate change anxiety was positively correlated with PEB at both Time 1 and Time 2 ($r = .25$ and $.33$ respectively).

	anxiety and pro-environmental behavior: A longitudinal study.				behavior: 19-item Pro-Environmental Behavior Scale	Longitudinal cross-lagged paths showed climate change anxiety at Time 1 predicted overall PEB at Time 2 ($\beta = .04$), and specifically environmental citizenship behavior ($\beta = .08$). Overall PEB at Time 1 predicted climate change anxiety at Time 2 ($\beta = .16$). Specifically, environmental citizenship behavior, food consumptions, and transportation behaviors at Time 1 predicted climate anxiety at Time 2 ($\beta = .14, -.04, .06$ respectively).
17	Tucholska et al. (2024). Climate change beliefs, emotions and pro-environmental behaviors among adults: The role of core personality traits and the time perspective.	Adults Poland	333	Cross-sectional	IV: Climate anxiety (cognitive-emotional impairment, functional impairment, experience of climate change): scales 1-3 of 22-item Climate Change Anxiety Scale (CCAS); Climate-related emotions: 15-item Climate Emotion Scale DV: Pro-environmental behavior (current, planned): 20-item custom scale; Pro-climate behavioral engagement: scale 4 of 22-item Climate Change Anxiety Scale	All measured climate-related emotions were correlated with planned PEB (13 correlated positively, 2 negatively). All but two climate-related emotions were correlated with current PEB (12 correlated positively, 1 negatively). Cognitive-emotional impairment, functional impairment, and experience of climate change (scales 1-3 of CCAS) were positively correlated with pro-climate behavioral engagement (scale 4 of CCAS; $r = .41, .39, .36$ respectively), current PEB ($r = .33, .36, .28$ respectively), and planned PEB ($r = .44, .41, .31$ respectively).
18	Verplanken and Roy (2013). "My worries are rational; climate change is not": Habitual ecological worrying is an adaptive response.	Adults US and Europe	132	Mixed-methods	IV: Habitual ecological worrying: 1-item open-ended question, and 12-item Habit Index of Negative Thinking) DV: Pro-environmental behavior: (16-item custom scale)	Habitual ecological worrying was positively correlated with PEB ($r = .37$). The number of listed ecological worries was also positively correlated with PEB ($r = .37$).
19	Ballew et al (2024). Climate change psychological distress is associated with political participation and support for climate policies.	Adults US	2,118	Cross-sectional survey, secondary data	IV: Climate change psychological distress (depression and anxiety): 4-item custom measure DV: Climate-related behavioral engagement (intention to	Independent sample t-tests showed individuals with some climate distress were more likely to have intention to engage in PEB, willingness to join campaign, past engagement in PEB, and engagement in climate discussions

					engage, willingness to join campaign, past engagement, engagement in discussion): 13-item custom measure	Regression models controlling for ideology, efficacy, and norms showed a positive association between climate distress and engagement ($\beta = .09-.31$). Independent sample t-tests showed individuals with high climate depression engaged in more past climate engagement than individuals with some climate depression. There were no other significant differences between high and some climate distress.
20	Thomson & Roach (2023). The relationships among nature connectedness, climate anxiety, climate action, climate knowledge, and mental health.	Adults Canada	327	Cross-sectional	IV, med: Climate change anxiety (cognitive-emotional impairment and functional impairment): 13-item Climate Change Anxiety Scale (CCAS) DV, med, mod: Climate action (individual and collective): 16-item unnamed scale	Overall climate anxiety and both cognitive-emotional and functional subscales were positively correlated with collective climate action ($r = .45, .47$, and $.38$, respectively). Overall climate anxiety and the cognitive-emotional impairment subscale were positively associated with individual climate action ($r = .13$ and $.14$, respectively).
21	Curll et al. (2022). Nature connectedness in the climate change context: Implications for climate action and mental health.	Adults Australia	3,875	Cross-sectional; Secondary data	IV, med: Climate Change Worry: 1-item measure DV, med, mod: Climate Action (collective and individual): 16-item unnamed scale	Climate worry correlated positively with individual action ($r = .42$) and collective action ($r = .49$).
22	Coates et al. (2024). The relationship between climate anxiety and pro-environment behaviors.	Adults Australia	256	Cross-sectional; use of DCEs	IV: Climate anxiety: 13-item Climate Change Anxiety Scale (CCAS; cognitive-emotional and functional impairment subscales); DV: Eco-trait utility: multiple-item DCE measure; Pro-environmental behavior: Factor 2 of CCAS (6-items)	Climate anxiety was positively associated with PEB ($r = .152$). Regression analysis revealed a negative quadratic effect between climate anxiety and eco-trait utility, with eco-trait utility highest at moderate climate anxiety ($\beta = -5.878$). Eco-trait utility was positively correlated with PEB ($r = .404$).
23	Sampaio et al. (2023). Validating a measure for eco-anxiety in Portuguese young adults and exploring	University students Portugal	623	Cross-sectional	IV: Eco-anxiety (affective symptoms, rumination, social/behavioral impairment, personal-impact anxiety): 13-	Bivariate correlation analyses showed positive correlation between PEB and all subscales of eco-anxiety: affective symptoms ($r = .223$), rumination ($r =$

	its associations with environmental action.				item Hogg Eco-Anxiety Scale (HEAS) DV: Pro-environmental behavior: 18-item adapted scale	.302), social/behavioral impairment ($r = .220$), and personal-impact anxiety ($r = .229$). Multiple linear regression analysis showed that rumination and personal-impact anxiety uniquely predicted PEB ($\beta = 0.066$ and $.059$, respectively).
24	Bouman et al. (2020). When worry about climate change leads to climate action: How values, worry and personal responsibility relate to various climate actions.	Adults Europe and Israel	44,387	Cross-sectional; secondary data	IV: Climate Change Worry: 1-item measure; Feelings of Personal Climate Responsibility: 1-item measure DV: Personal energy-saving behaviors (energy efficiency, energy curtailment): 2-item measure; Climate policy support (taxing fossil fuels, subsidizing renewables, banning unsustainable appliances): 3-item measure	Climate worry correlated positively with personal norms ($r = .42$) and pro-environmental behavior ($r = .34$) across countries. Regression paths showed that climate worry predicted energy efficiency ($\beta = .05$), energy curtailment ($\beta = .08$), and support for taxing fossil fuels ($\beta = .10$), subsidizing renewables ($\beta = .10$), and banning unsustainable appliances ($\beta = .12$).
25	Maduneme (2024). Some slice of climate anxiety ... is good: A cross-sectional survey exploring the relationship between college students media exposure and perceptions about climate change.	University students US	440	Cross-sectional	IV: Climate change anxiety: 13-item Climate Change Anxiety Scale (CCAS) DV: Pro-environmental behavioral intentions: 8-item unnamed scale	Correlation analysis found climate anxiety to be positively correlated with PEB ($r = .50$). Regression analysis revealed a negative quadratic relationship between climate anxiety and PEB both with and without covariates accounted for ($\beta = -.36$ w/o covariates; $\beta = -.22$ with covariates;).
26	Leite et al. (2023). Pro-environmental behavior and climate change anxiety, perception, hope, and despair according to political orientation.	Adults Portugal	535	Cross-sectional	IV: Climate change anxiety (cognitive-emotional impairment, personal experience of climate change, functional impairment): subscales 1 and 4 (13 items) of Climate Change Anxiety Scale (CCAS) Mod: Climate change hope: 8-item Climate Change Hope Scale (CCHS); Climate change despair: 4-item Climate Change Despair Scale (CCDS) Climate change perception: 8-	Climate-related cognitive-emotional and functional impairment were positively associated with PEB household behavior ($r = .218$ and $.180$, respectively), PEB information seeking ($r = .516$ and $.464$), PEB transportation choice ($r = .195$ and $.209$), and CCAS behavioral engagement ($r = .324$ and $.262$). Climate change hope was positively associated with household behavior ($r = .241$), information seeking ($r = .286$), transportation choice ($r = .155$), and CCAS behavioral engagement ($r = .403$). Climate change despair was not

					item Climate Change Perception Scale (CCPS) DV: Pro-environmental behavior (household behavior, information-seeking behavior, transportation choice): 10-item Pro-Environmental Behavior Scale (PEBS); Climate behavioral engagement: subscale two (6 items) of CCAS	significantly correlated with PEB directly. Regression analysis showed functional impairment uniquely predicted information-seeking behavior and transportation choice ($\beta = .301$ and $.160$, respectively). Climate hope also uniquely predicted information-seeking behavior ($\beta = .088$). Moderation analyses showed climate despair negatively moderated the correlations between the cognitive-emotional impairment subscale and PEB, and between the personal experience subscale and PEB. Moderation analyses also showed climate hope positively moderated the correlation between the cognitive-emotional impairment subscale and PEB.
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Table 2 Publication Years of Final 26 Studies (2012-2024)

Year	No. of Studies	Cum. Count	%	Cum. %
2012	1	1	3.8	3.8
2013	1	2	3.8	7.7
2014	0	2	0.0	7.7
2015	0	2	0.0	7.7
2016	0	2	0.0	7.7
2017	0	2	0.0	7.7
2018	0	2	0.0	7.7
2019	0	2	0.0	7.7
2020	2	4	7.7	15.4
2021	1	5	3.8	19.2
2022	3	8	11.5	30.8
2023	9	17	34.6	65.4
2024	9	26	34.6	100.0

Table 3 Period-Based Analysis

Time Period	Studies n (%)	Ave. Year	Research Intensity
2012–2015 (Early Period)	2 (7.7)	0.50	Low
2016–2019 (Growth Period)	0 (0.0)	0.00	Minimal
2020–2022 (Surge Period)	6 (23.1)	2.00	Moderate
2023–2024 (Current Period)	18 (69.2)	9.00	Very High

Table 4 Notable Research Milestones

Year	Studies	Milestone/Context	Possible Catalysts
2012	1	First study identified in the review	Early climate psychology research
2013	1	Continued exploratory research	Expanding conceptual groundwork
2014–2019	0	Conceptual development period with no eligible studies	Limited measures; emerging climate-anxiety constructs
2020	2	Re-emergence of research activity	COVID-19 context, increased climate awareness, extreme weather events
2021	1	Continued empirical expansion	IPCC reports, climate activism, COP26
2022	3	Acceleration of publication activity	Rapid scale-up of climate-anxiety research and broader sampling
2023–2024	18	Sustained peak publication period	Field maturation; cross-national, longitudinal, and moderation/mediation studies

Table 5 Comparative Analysis by Periods

Period	Years	No. of Studies (% Total)	Key Characteristics	Research Focus
Early Period – Foundational Years	2012–2015	2 (7.7)	Pioneering research, smaller samples, exploratory studies, limited geographic diversity	Initial examination of correlations between climate anxiety and pro-environmental behavior
Growth Period – Conceptual Development	2016–2019	0 (0.0)	Gap period with no eligible empirical studies identified	Conceptual groundwork and theoretical discussions outside the final review set
Surge Period – Empirical Expansion	2020–2022	6 (23.1)	Increased methodological diversity, larger samples, international studies, emergence of longitudinal designs	Predictive relationships, causal pathways, moderators and mediators
Current Period – Methodological Maturation	2023–2024	18 (69.2)	Cross-cultural studies, moderation/mediation analyses, longitudinal and mixed-method approaches	Theoretical integration, psychological mechanisms, behavioral applications

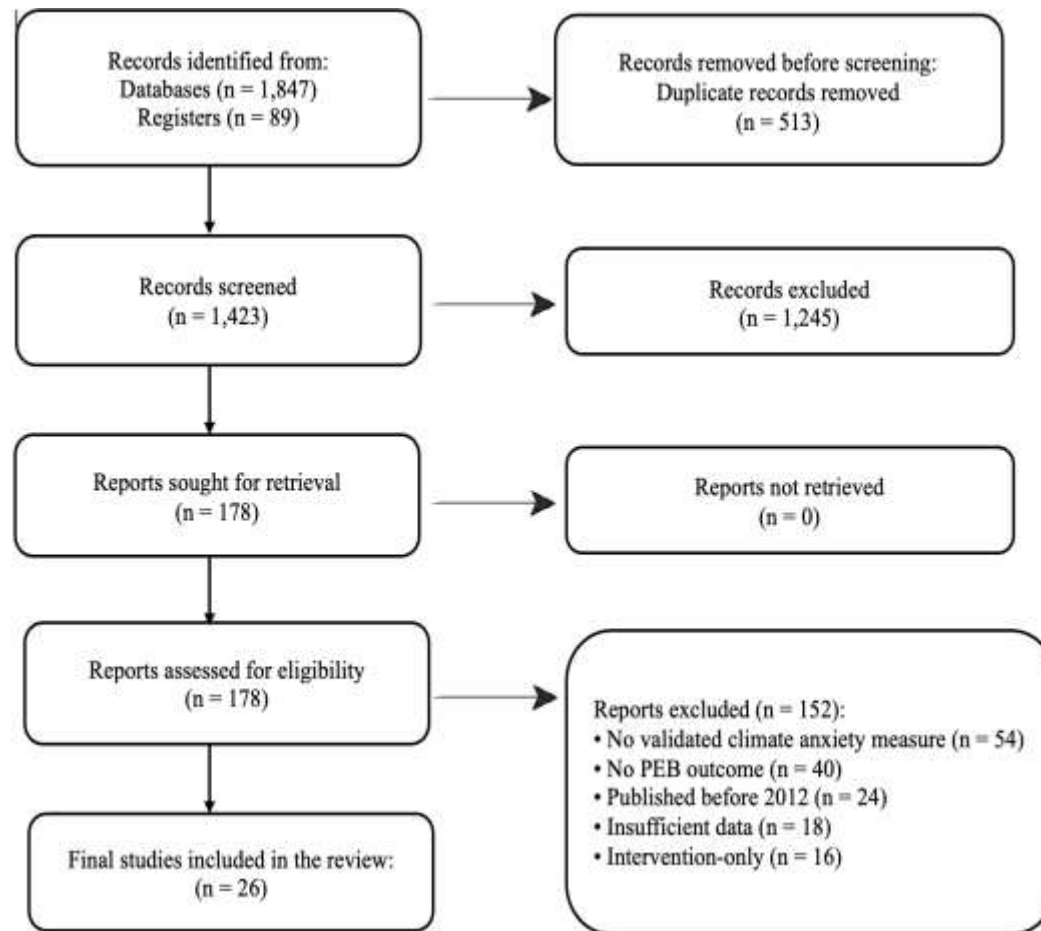


Figure 1 PRISMA Flow Diagram: Climate Anxiety and Pro-Environmental Behavior (2012-2024)

This variation highlights an evolving construct that spans both adaptive emotional responses and clinically significant distress. Findings from adolescents and young adults consistently suggest that anxiety about climate change is not inherently pathological but can become impairing when accompanied by low coping resources, low efficacy, or pessimism.

Climate Anxiety and Pro-Environmental Behavior

A central finding across most studies is that climate anxiety is positively associated with PEB, particularly at moderate levels. Studies involving adolescents, university students, and adults demonstrated that individuals who experience higher concern about climate change are more likely to engage in sustainable practices, participate in activism, or support climate policies (e.g., Ogunbode et al., 2022; Kühner et al., 2024; Leite et al., 2023). However, this relationship is not uniformly linear. Some studies reported curvilinear effects, showing that very high anxiety may lead to emotional exhaustion or “eco-paralysis,” where individuals disengage due to feelings of hopelessness (Innocenti et al., 2023; Maduneme, 2024). Environmental efficacy, hope, resilience, and problem-focused coping strategies all emerged as factors that influenced the degree to which anxiety was associated with pro-environmental action. Studies such as Becht et al. (2024), Turcotte-Tremblay et al. (2024), and Qin et al. (2024) emphasized that when individuals believe their actions matter, climate anxiety more consistently predicts behavior.

Methodological Patterns and Gaps

Cross-sectional studies were the dominant design (65.4%), providing correlational insights but limiting causal inference. However, six studies (23.1 %) did employ causal methods such as longitudinal elements or experimental methods, which provided some evidence that climate anxiety can precede and predict pro-environmental behaviors (e.g., Kühner et al., 2024; Shao &

Yu, 2023). The majority of samples consisted of university students or young adults, raising concerns about generalizability. Adolescents and marginalized communities, who may experience stronger or differing forms of climate anxiety, remain understudied. Measurement tools varied considerably across studies, with some relying on single-item indicators and others using validated multidimensional scales. Despite these limitations, studies with stronger methodologies, diverse samples, and validated instruments yielded more consistent findings.

Implications and Future Directions

Overall, the findings suggest that climate anxiety, especially when accompanied by hope, efficacy, and positive coping strategies, can function as a catalyst for meaningful action. Conversely, too little anxiety may lead to disengagement from pro-environmental behaviors, and too much could lead to overwhelm or paralysis. Only one study found negative correlations between climate anxiety and PEB (Qin et al., 2024), but these results certainly warrant further analysis, precisely because they contrast with all the other positive associations. Meaningful topics to explore could include cultural elements, age dynamics, or community contexts where anxiety is tied to fear, hopelessness, or low self-efficacy. Additionally, future research should prioritize longitudinal, experimental, and cross-cultural designs, especially in underrepresented regions such as Africa, Latin America, and Southeast Asia. Greater standardization of climate anxiety measures and, especially, pro-environmental behavior is also essential for advancing theoretical clarity and enabling meta-analytic comparisons. Interventions that enhance emotional resilience, collective efficacy, and climate education should also be explored to transform anxiety into constructive engagement.

Theoretical Contributions

This review contributes to theoretical claims by illustrating how climate anxiety fits within broader frameworks of emotion, motivation, and identity. From the perspective of appraisal theory, climate anxiety reflects appraisals of threat alongside with uncertain efficacy, thus, explaining variability in behavioral outcomes (Lazarus, 1991). Coping theory highlights the role of adaptive versus maladaptive coping strategies in determining whether anxiety leads to engagement or avoidance (Folkman & Moskowitz, 2004). Developmental frameworks emphasized adolescence as a critical period in which climate anxiety shapes environmental identities and lifelong behavioral trajectories (Otto et al., 2019). All of these viewpoints point to the need to view climate anxiety as a socio-emotional process that is rooted in cultural, developmental, and political contexts rather than only as a personal disorder.

Practical and Policy Implications

The findings of this review have significant implications for educators, mental health professionals, and policymakers. First of all, climate education must progress from merely increasing awareness of risks to cultivating agency, resilience, and collective efficacy, enabling young individuals to perceive themselves as competent contributors to solutions (Ojala, 2012). Secondly, mental health treatments should incorporate an understanding of climate anxiety, providing supportive interventions that address discomfort while directing it towards constructive involvement. Group-based interventions, including peer support and youth activism initiatives, may be especially helpful in converting fear into empowerment. Third, governments should clearly recognize climate anxiety in climate initiatives and communications. Research indicates that dismissive political reactions aggravate distress, whereas observable climate strategies can rebuild trust and

alleviate feelings of betrayal among youths (Hickman et al., 2021).

CONCLUSION

This systematic review reveals that climate anxiety is a prevalent multifaceted condition with major implications for pro-environmental behavior. Moderate anxiety can stimulate constructive involvement, whereas low or high levels of anxiety may lead to paralysis or disengagement. The relationship is influenced by environmental efficacy, resilience, hope or despair, and positive coping skills. Improvements in methodology and more worldwide inclusivity are necessary for the advancement of the field. Ultimately, climate anxiety should not be regarded merely as a disease but as a rational emotional reaction to an existential crisis, which, if constructively nurtured, can serve as a potent catalyst for sustainable behavioral transformation.

The literature continues to grow methodologically but is limited by an excessive dependence on cross-sectional student samples from Western countries, inconsistent measures of climate anxiety and pro-environmental behaviors, and a lack of longitudinal or intervention studies. Addressing such gaps will be needed for developing a more accurate and globally inclusive comprehension of how climate anxiety influences human behavior amid ecological crises. This paper posits that climate anxiety must be contextualized within wider frameworks of emotion, motivation, and coping, serving as both a cautious signal and a stimulant for identity development and social engagement. The findings demand immediate attention from educators, mental health practitioners, and policymakers. Empowering youth to convert climate anxiety into proactive engagement is necessary for cultivating resilience, maintaining optimism, and ensuring lasting environmental stewardship. Climate anxiety reflects the major psychological impact of existing in an increasingly warm environment. It is not

merely a peripheral issue; it is a fundamental aspect of the climate crisis, influencing both individual well-being and societal ability to respond. By recognizing, affirming, and effectively directing this anxiety, societies may transform a vulnerability into an important tool for promoting the pro-environmental behaviors essential for achieving a more sustainable and equitable future.

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