
Dual-Process Model of Eco-Anxiety: A Scoping Review of Mental Health and Pro-Environmental Behavior

Aasma Aziz¹, Ruqia Safdar Bajwa^{2*}, Areeba Husnain³

¹ Ph.D. Scholar, Department of Applied Psychology, Bahauddin Zakariya University, Multan

² Assistant Professor, Department of Applied Psychology, Bahauddin Zakariya University, Multan, Punjab, Pakistan

³ Ph.D. Scholar, Department of Applied Psychology, Bahauddin Zakariya University, Multan

Corresponding Author: Ruqia Safdar Bajwa* Email: ruqiasafdar@bzu.edu.pk

DOI: <https://doi.org/10.70670/sra.v4i1.2156>

Abstract

Eco-anxiety, as an incessant worry, distress and fear associated with climate change and environmental depletion, has emerged as a corner stone of psychology, but its implications on behavior and mental health remain a conceptually debatable point. Some studies conceptualize eco-anxiety as a maladaptive distress, whereas other studies posit that it could be a motivator to pro-environmental action. This scoping review summarized empirical evidence on the relationships between eco-anxiety, mental health outcomes, and pro-environmental behavior, and identified the psychological processes underlying these associations. A systematic search was performed in Google Scholar, followed by backward reference-list screening, using the framework by Arksey and O'Malley (2005) and the PRISMA-ScR guidelines. Papers that were published between 2019 and April 2026 were taken into consideration. The operationalization of eco-anxiety across included studies was achieved using validated measures such as the Climate Change Anxiety Scale (Clayton and Karazsia, 2020), the Hogg Eco-Anxiety Scale (Hogg et al., 2024), and similar multidimensional measures. Fourteen empirical studies that met the inclusion criteria were selected and analyzed using thematic synthesis. Eco-anxiety was consistently associated with psychological distress, including elevated anxiety, depression, and reduced well-being. Its association with pro-environmental behavior was generally positive but weaker and more variable across studies. There is some early evidence pointing to a tentative non-linear pattern in which moderate eco-anxiety may support behavioral engagement, while very high levels may be associated with avoidance, although this pattern is to be directly empirically tested. The most important mediating and moderating variables were found to be emotional regulation, coping strategies, self-efficacy, and environmental identity. Eco-anxiety is a dual-process construct that has both adaptive and maladaptive pathways. The individual and contextual conditions predetermine its psychological and behavioral outcomes and justify the necessity of integrated mental health and environmental engagement strategies in the context of climate change.

Keywords: Eco-Anxiety, Climate Anxiety, Mental Health, Psychological Wellbeing, Pro-Environmental Behavior, Scoping Review

Introduction

Climate change is commonly known as one of the most urgent global issues of the 21st century, with far-reaching implications for environmental sustainability, human health, and overall wellbeing. Although significant studies have been conducted to investigate the physical and ecological effects of climate change, its psychological effects have only recently started to receive systematic attention (Clayton et al., 2017; Cianconi et al., 2020). One of these growing concerns is eco-anxiety, which is a term used to describe lingering apprehension, distress and fear in relation to environmental deterioration and the foreseen impacts of climate change (Pihkala, 2020). The recent studies signifies that eco-anxiety is prevalent among younger age groups who are supposed to bear the long-term effects of climate change. Several international researches and surveys have portrayed that significant number of individuals showcase fear, uncertainty, concern about climate change, with numerous showing negative emotional reactions such as sadness, helplessness and anxiety (Hickman et al., 2021; Ogunbode et al., 2022). These affective reactions are now more pertinently considered as critical elements of mental well-being and behavioral involvement in the climate change plot.

Studies that explore the psychological consequences of eco-anxiety have persistently found it to be linked to poor mental health. Higher levels of eco-anxiety have been connected with more symptoms of anxiety, depression, stress, and diminished psychological wellbeing (Reyes et al., 2021; Ogunbode et al., 2022). Simultaneously, there is also a parallel body of research that suggests that eco-anxiety can also play an adaptive role in motivating individuals to adopt pro-environmental behavior. These behaviors are sustainable consumption, lifestyle change, and environmental activism to reduce ecological damage (Lutz et al., 2023). Nevertheless, despite these findings, there is a significant inconsistency in the literature. Although it is evident that eco-anxiety is clearly linked to poor mental health outcomes, its connection to pro-environmental behavior is not so obvious. Some studies are positive and indicate that eco-anxiety encourages environmental action, whereas others report that excessive levels of anxiety can result in avoidance, disengagement, or eco-paralysis (Hogg et al., 2024). This incongruity points to a metaphorical void in the literature: eco-anxiety has been probed either as a dysfunctional psychological reaction or as a motivating force of behavior, but hardly ever as a construct that constitutes both of these dimensions simultaneously. Moreover, there has been little focus on the mechanisms that underlie these relationships. Emerging evidence suggests that the effects of eco-anxiety may be shaped by mediating and moderating factors such as emotional regulation, coping strategies, self-efficacy, and environmental identity (Mathers-Jones & Todd, 2023; Qin et al., 2024). Nonetheless, these aspects have not been methodically incorporated into the current reviews.

Thus, the current scoping review will attempt to map and synthesize the empirical evidence on the relationships between eco-anxiety, mental health, and pro-environmental behavior. In addition to descriptive synthesis, the current review aims at advancing a subtler concept of eco-anxiety as a dual-function construct, finding patterns, inconsistencies, and underlying mechanisms that determine when eco-anxiety results in adaptive or maladaptive outcomes. This review was guided by three research questions: (1) What is the relationship between eco-anxiety and mental health outcomes? (2) What is the relationship between eco-anxiety and pro-environmental behavior? (3) What factors moderate or mediate these relationships?

Theoretical Framework

Understanding the role of eco-anxiety requires situating it within broader psychological theories of emotion and anxiety. From a functional perspective, anxiety is an adaptive emotional response that serves to alert individuals to potential threats and prepare them for action (Barlow, 2004).

Anxiety in this sense is not necessarily pathological, but only becomes maladaptive when it is overwhelming, chronic, or disproportionate to the perceived threat.

When applied to the situation of climate change, it is possible to conceptualize eco-anxiety as a reaction to a concrete and current danger to the planet. Climate change is a complex, large-scale, and often uncontrollable risk that, unlike many traditional anxiety triggers, is complex and large-scale and can often be uncontrollable (Clayton, 2020). Consequently, eco-anxiety can be both considered a rational evaluation of environmental risk and a cause of psychological distress. This duality of eco-anxiety can be further explained by functional theories of emotion, which postulate that emotions play a central role in the process of guiding behavior (Frijda, 1986). Negative emotions like fear and anxiety may encourage people to participate in protective or goal-directed actions, especially when the negative emotions are coupled with a sense of agency or efficacy. Within the climate change context, therefore, eco-anxiety may serve as a motivational force to encourage people to engage in pro-environmental behaviors that can be used to minimize environmental harm. The correlation between eco-anxiety and behavior is, however, not linear. The Yerkes-Dodson law offers a useful framework of understanding this dynamic, according to which moderate levels of arousal promote performance, whereas excessively high levels of arousal hamper functioning (Yerkes and Dodson, 1908). When applied to eco-anxiety, this framework suggests that moderate levels can result in adaptive engagement, whereas excessive levels can cause emotional overwhelm, avoidance, and decreased behavioral action.

This interpretation is supported by emerging empirical studies that have shown that eco-anxiety is a multi-dimensional concept with unique psychological implications. As an example, the cognitive components (rumination and concern) can be positively correlated with pro-environmental behavior, and the affective and symptomatic components are more strongly related to psychological distress (Hogg et al., 2024). This implies that eco-anxiety needs to be theoretically conceptualized as a multidimensional construct instead of a single unified experience. Moreover, social cognitive theory emphasizes the role of perceived self-efficacy in the process of determining whether emotional responses translate into action (Bandura, 1997). The stronger the perception of control, the greater the likelihood of engaging in pro-environmental behavior by individuals, and the reverse is also true. The perception of control also increases the likelihood of engaging in pro-environmental behavior by individuals, and vice versa. Equally, the coping theories focus on how emotional control and coping mechanisms influence the development of psychological outcomes, with adaptive coping linked to resilience and maladaptive coping related to distress (Pihkala, 2020). Social and identity-based models also add to this realization. It has been demonstrated that environmental identity and values reinforce the relationship between environmental concern and behavioral engagement, indicating that identity is a key factor in changing eco-anxiety into action (Ogunbode et al., 2022). Furthermore, eco-anxiety may negatively impact psychological well-being, which can be mitigated by social support and collective action and enhanced by adaptive responses.

Collectively, these theoretical approaches imply that the concept of eco-anxiety should be viewed as a context-specific and multidimensional concept. Its impacts are not inevitably bad or good but are contingent on a variety of contextual and psychological variables, such as self-efficacy, cognitive processing, emotional regulation, and social context. This framework can provide a basis to interpret the conflicting results found in the empirical literature

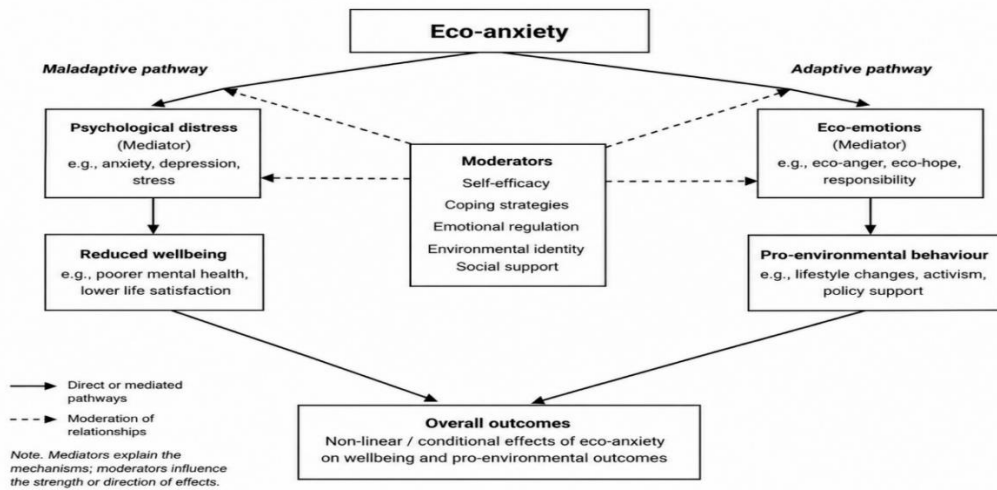


Figure 1. Conceptual model illustrating the dual-process nature of eco-anxiety, showing adaptive (pro-environmental behavior) and maladaptive (psychological distress) pathways, mediated by emotional processes and moderated by contextual and individual factors.

Method

Study Design

The study used a scoping review methodology to outline the existing empirical studies on eco-anxiety and its relationships with pro-environmental behavior and mental health outcomes. A scoping approach was selected due to the emerging and heterogeneous nature of the literature. The scoping reviews are especially applicable in exploring emerging and heterogeneous research areas to allow identifying key concepts, patterns, and gaps in the literature (Arksey and O'Malley, 2005; Munn et al., 2018). The review was conducted based on the methodological framework suggested by Arksey and O'Malley (2005) and further elaborated by Levac et al. (2010). The PRISMA-ScR (Preferred Reporting Items to Systematic Reviews and Scoping Reviews) guidelines were followed to report (Tricco et al., 2018)

Search Strategy

A systematic literature search was performed in Google Scholar and further enhanced by backward reference-list screening of relevant articles. Empirical studies published between 2019 and the last search date of April 2026 were included in the search, considering the recent emergence of eco-anxiety research. Search terms included combinations of keywords such as: “eco-anxiety,” “climate anxiety,” “mental health,” “depression,” “stress,” “wellbeing,” “pro-environmental behavior,” and “climate action.” The search strategy was iterative in nature, which allowed refining search terms and inclusion criteria with increasing familiarity with the literature, which is also consistent with recommended scoping review practices (Levac et al., 2010). Because Google Scholar returns a large and dynamically changing number of records, screening was limited to the first 190 results sorted by relevance across the search combinations, supplemented by backward reference-list screening. Although Google Scholar has a wide range of coverage, it might not have the indexing accuracy of subject databases.

Inclusion and Exclusion Criteria

Studies were included if they:

(1) were empirical (quantitative or qualitative), (2) examined eco-anxiety or closely related constructs, (3) reported outcomes related to mental health and/or pro-environmental behavior, (4) were published in peer-reviewed journals, (5) were available in English. Studies were excluded if they were theoretical papers, editorials, or did not directly assess eco-anxiety.

Study Selection

Titles and abstracts were screened initially, followed by full-text assessment of eligible studies. Screening and data extraction were conducted by **one reviewer**, with uncertain cases revisited during full-text review to ensure consistency. This process was done in two stages, First, only the titles and abstracts were screened for pertinence. Second, full-text articles were analyzed according to the inclusion criteria. Duplicate records were eliminated and a total of 190 records were initially recognized through database searching. After the eligibility assessment and rigorous screening process, 14 studies have included in the final review. This process corresponds to the established scoping review procedures for study selection and screening (Arksey & O’Malley, 2005; Tricco et al., 2018).

Data Extraction

Data was extracted from each study comprised of: author(s), year, characteristics of sample, study design, measures of eco-anxiety used, mental health outcomes, pro-environmental behaviors, and key findings of the study. This method aligns with the suggestions on systematic data charting in scoping reviews (Levac et al., 2010).

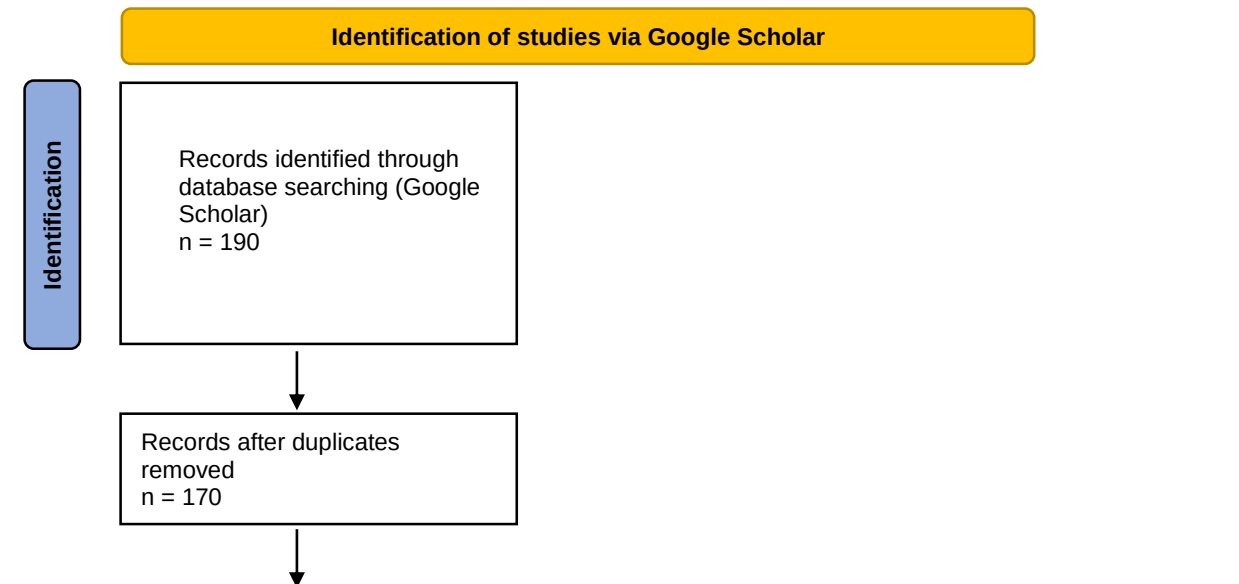
Data Synthesis

Narrative synthesis method was used to understand the pattern in studies. Themes were categorized that are associated with: (1) mental health outcomes, (2) pro-environmental behavior, and (3) moderating and mediating factors (Munn et al., 2018).

The result of this process developed three widespread analytical themes:

- 1. The relationship between eco-anxiety and mental health outcomes
- 2. The relationship between eco-anxiety and pro-environmental behavior
- 3. Moderating and mediating factors influencing these relationships

The thematic synthesis enable the researcher to pinpoint the patterns and inconsistencies across studies, confirming the deeper understanding of eco-anxiety as a complex and context-dependent phenomenon.



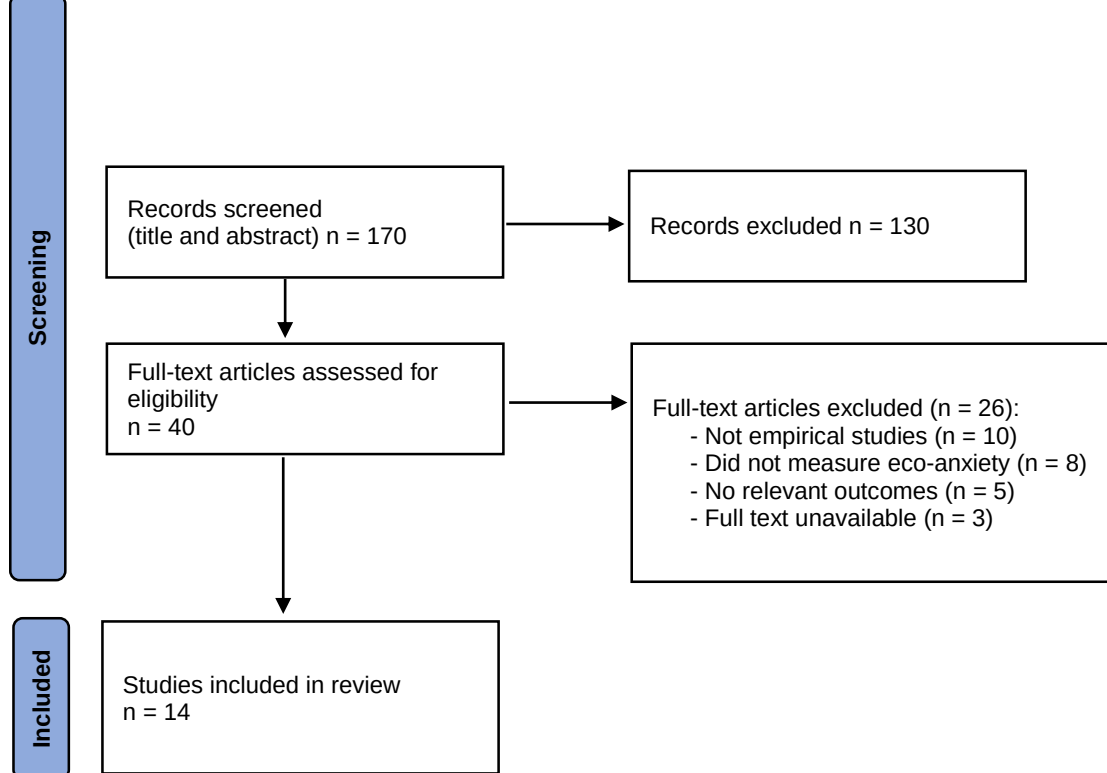


Figure 2. PRISMA flow diagram illustrating the study selection process for the scoping review.

Results

Overview of Included Studies

A total of 14 studies were included in this review that were published between 2019 and 2026 till the last search date. Most of the studies were executed in Western contexts, mostly North America, Australia and Europe with small representation of non-Western populations. Most of the studies used cross-sectional survey designs, while some used longitudinal and daily diary methodologies. The sample population was mainly consisting of adolescents and young adults, due to the increased concern over climate among these groups (Lutz et al., 2023; Ogunbode et al., 2022). A supporting evidence from Verplanken et al. (2020), Wullenkord et al. (2021), Er et al. (2024), and Žukauskienė et al. (2025) further reinforces the view that eco-anxiety is linked to psychological distress while also showing variable associations with environmental concern, behavior or identity.

Theme 1: Eco-anxiety and Mental Health

Among the reviewed studies, eco-anxiety was consistently paired with poorer mental health outcomes. Higher levels of eco-anxiety were positively correlated to psychological distress, including anxiety, stress symptoms and depression (Reyes et al., 2021; Ogunbode et al., 2022). Ogunbode et al. in 2022, conducted a multi-national study and results from 31 out of 32 countries showed that eco-anxiety was negatively correlated with mental wellbeing, indicating a vigorous and consistent pattern across available cross-national studies. Likewise, eco-anxiety was associated to increased negative affect and reduced positive affect in daily life, proposing both trait-level and state-level impacts on wellbeing (Lutz et al., 2023). Additional evidence indicates that eco-anxiety is associated with broader psychological vulnerability, including insomnia, panic symptoms, and general anxiety disorders (Mathers-Jones & Todd, 2023).

However, the strength of these relationships varied across studies. Some findings indicated non-significant associations with life satisfaction, suggesting that eco-anxiety may not uniformly impair all dimensions of well-being. Developmental differences were also evident, with adolescents and young adults showing stronger emotional responses, including fear, hopelessness, and future-related distress (Reyes et al., 2021). Overall, these findings indicate that eco-anxiety

is strongly associated with psychological distress, although its impact on well-being may vary depending on contextual and individual factors.

Theme 2: Eco-anxiety and Pro-Environmental Behavior

The correlation between eco-anxiety and pro-environmental behavior was generally positive but more fluctuating compared to its correlation with mental health. Several studies found that the higher the eco-anxiety, the greater the involvement in pro-environmental behaviors, such as sustainable lifestyle behaviors, environmental consumption, and climate activism (Lutz et al., 2023; Ogunbode et al., 2022). In the empirical studies included, the association was found to be small to moderate in strength, which implies that eco-anxiety is a motivational factor but not a single determinant of behavior. As an example, in journal-based methodologies, eco-anxiety was linked to higher levels of pro-environmental behavior daily (Lutz et al., 2023). Nevertheless, the results pertaining to group behaviors like activism were inconsistent. Although some studies found positive correlations, others found that high levels of eco-anxiety can decrease engagement because of emotional overwhelm or psychological distress (Hogg et al., 2024). This implies that the relationship between eco-anxiety and behavior might not be linear, but there is still a lack of empirical data. This interpretation is supported by some studies, which show that moderate levels of eco-anxiety can promote adaptive engagement, but excessive anxiety can lead to avoidance, denial, or feelings of helplessness, thus reducing behavioral action (Mathers-Jones and Todd, 2023). All in all, eco-anxiety seems to be a conditional motivator of pro-environmental behavior, and its effects are contingent upon its intensity and psychological context

Theme 3: Moderating and Mediating Mechanisms

The observed variability of outcomes was accounted for by many mediating and moderating mechanisms, which means that the effects of eco-anxiety are not direct but context dependent. Emotional pathways were found to be key mediators. Increased depression, stress, and anxiety were linked to eco-anxiety, which in turn led to poorer mental health outcomes and, in some cases, reduced behavioral engagement (Reyes et al., 2021). Simultaneously, various emotional reactions to climate change have had different impacts. As an example, eco-anger and concern were more strongly related to pro-environmental action, with eco-anxiety and eco-depression being associated with poorer wellbeing (Maggi et al., 2023). Other significant moderators were coping strategies and emotional regulation. Problem-focused coping and meaning-making were adaptive coping strategies that were linked to better psychological outcomes and increased engagement with the environment. Conversely, maladaptive coping mechanisms such as avoidance and denial exacerbated distress and minimized behavioral reactions. Cognitive processes, such as attentional processes and rumination, also had an impact. Attentional bias in relation to climate-related information was linked to eco-anxiety, which was also the independent predictor of behavior, but variability in attention moderated this relationship (Mathers-Jones and Todd, 2023). Poor mental health outcomes were associated with excessive rumination and constant worry (Hogg et al., 2024). Factors that were social and related to identity were also critical. Both increased eco-anxiety and increased pro-environmental behavior were linked to strong environmental identity and values, indicating that identity enhances the relationship between concern and action (Ogunbode et al., 2022). Also, psychological distress was buffered by social support and collective engagement and facilitated adaptive coping. Lastly, self-efficacy was found to be a major moderating variable. People who had a stronger perceived ability to make a difference were more likely to transform eco-anxiety into positive action, but those with reduced perceived ability experienced more helplessness and disengagement (Qin et al., 2024).

Integrated Findings

Collectively, the findings suggest that eco-anxiety is a dual-process construct, whose psychological and behavioral implications vary in intensity, context, and individual psychological resources. Eco-anxiety was always the predictor of higher levels of psychological distress among the participants of the studies in different countries. Its correlation with pro-environmental behavior was positive but more variable, with effect sizes generally small to moderate - indicating that it acts as a contributing motivational factor rather than a sufficient driver of behavior on its own. Moderating and mediating role of coping strategies, self-efficacy, environmental identity and emotional regulation can explain this variability.

These results support the conditional model of eco-anxiety, wherein the same emotional state can create psychological burden or constructive engagement depending on the context of experience. The non-linear and tentative pattern of the data is an empirical question that remains open, suggesting a useful organizing framework with which future research and intervention design can be approached.

Table 1

Summary of Studies on Climate Anxiety and Mental Health and Behavioral Outcomes

Study	Country/ Context	Sample	Design	Mental Health Findings	Behavior Findings	Key Contribution
Clayton & Karazsia (2020)	United States	Adults	Scale development and validation	Climate anxiety associated with cognitive-emotional and functional impairment	Functional impairment assessed; behavior examined indirectly	Developed Climate Change Anxiety Scale
Verplanken et al. (2020)	United Kingdom	Adults	Survey	Ecological worrying linked to psychological burden	Environmental identity/concern assessed; direct behavior not central.	Worry is both burdensome and identity-related
Reyes et al. (2021)	Philippines	Gen Z / young adults	Cross-sectional	Predicted psychological distress	Not examined	Climate anxiety relevant in non-Western youth
Stanley et al. (2021)	Australia	Adults	Survey	Linked to poorer wellbeing	Eco-anger linked to activism	Differentiated eco-emotions
Hickman et al. (2021)	Global	Children and young people	Large-scale survey	High worry, distress, hopelessness	Not directly assessed; Concern about government inaction	Global youth impact
Wullenkord et al. (2021)	Europe / Germany	Adults	Cross-sectional	Associated with emotional distress	Linked to action tendencies	Dual distress and engagement

Ogunbode et al. (2022)	32 countries	Adults (N = 12,246)	Cross-sectional	Lower wellbeing (31/32 countries)	Higher pro-environmental behavior	Strong cross-national evidence
Lutz et al. (2023)	Canada	Undergraduates (N = 132)	Daily diary	Higher negative affect	More daily pro-environmental behavior	Trait and state eco-anxiety
Mathers-Jones & Todd (2023)	Australia	Adults	Experimental / diary	Psychological symptoms	Predicted behavior	Attention as mechanism
Maggi et al. (2023)	Canada	Students (N = 912)	Cross-sectional	Linked with mental health indicators	Predicted climate action	Different emotions, different effects
Qin et al. (2024)	China	Adolescents (N = 1,851)	Mediation/moderation	Reduced control and distress	Shaped by self-efficacy	Mechanisms identified
Er et al. (2024)	Türkiye	Nursing students	Cross-sectional	Linked to depression, anxiety, and stress	Not examined	Student mental health link
Hogg et al. (2024)	Australia	Adults	Cross-sectional + longitudinal	Poorer mental health	Rumination linked to behavior	Dimension-specific effects
Žukauskienė et al. (2025)	Lithuania	Adults	Cross-sectional	Lower wellbeing	Pro-environmental consumption	European evidence

Note. N = sample size. Eco-anxiety signifies psychological distress in response to climate change. Behavior findings indicate pro-environmental or climate-related actions that were assessed.

Discussion

This scoping review tried to summarize the findings about the connection between eco-anxiety, mental well-being, and pro-environmental behavior. It is evident that the correlation in question is very strong yet rather complicated, since eco-anxiety correlates highly with poor mental well-being and, at the same time, might be capable of inducing pro-environmental actions. Such a connection proves that it would be appropriate to treat eco-anxiety as contextually contingent psychological response rather than psychopathology.

Eco-anxiety as a Psychological Risk Factor

Consistent with the earlier findings, eco-anxiety was strongly correlated with psychological distress, with higher prevalence rates of anxiety, depression, and stress, as well as lower levels of general wellbeing. These findings are in keeping with the current research trends which demonstrate that emotional experiences associated with global warming led to adverse effects on mental well-being across various demographics (Ogunbode et al., 2022; Reyes et al., 2021). The overall negative correlation between eco-anxiety and wellbeing across various national settings implies that climate-related distress is a large and globally pertinent mental health issue. Notably, eco-anxiety seems to go beyond general worry to include more enduring and affectively intense experiences, such as rumination, fear, and anticipatory distress about the future environmental degradation (Pihkala, 2020). Such traits are in line with larger models of anxiety, whereby

protracted exposure to perceived uncontrollable threats is a factor leading to psychological vulnerability (Barlow, 2004). The results thus uphold the perception that at some higher levels, eco-anxiety can play similar roles as maladaptive anxiety processes, especially when it is accompanied by a sense of helplessness and lack of control. The patterns of development also contribute to this interpretation. The younger age groups, especially the adolescents and young adults, had stronger emotional reactions to climate change such as hopelessness and existential concern about the future. This aligns with the results of earlier studies that younger people might be more psychologically impacted because of increased awareness of the environmental risks in the long term and perceived insufficient agency (Hickman et al., 2021). In that way, eco-anxiety can be a specifically relevant mental health risk factor among younger generations.

Eco-anxiety as a Motivation to Pro-Environmental Behavior.

In contrast to its negative correlation with mental health, eco-anxiety showed an overall positive correlation with pro-environmental behavior. People with greater eco-anxiety levels were more apt to take on environmentally responsible behaviors, such as sustainable consumption, lifestyle change, and environmental activism. These results are consistent with the idea that eco-anxiety may have an adaptive, action-focused role, in line with functional models of emotion which posit that negative affect can play an action-oriented, protective role (Frijda, 1986). Empirical data also indicate that eco-anxiety can lead to more behavioral engagement by increasing perceived environmental threat and personal relevance to activate coping responses aimed at mitigating that threat (Ogunbode et al., 2022). The magnitude of this association was, however, generally small to moderate, implying that eco-anxiety per se is not sufficient to bring about sustained behavioral change. This is in line with past studies that have shown that pro-environmental behavior is determined by a combination of factors, which include social norms, values, and the perceived efficacy (Steg & Vlek, 2009). It is important to note that the association between eco-anxiety and behavior was not consistent across behavioral domains. Individual level behavioral strategies, which include consumption and lifestyle modification, demonstrated more consistent positive effects while collective level strategies, which included activism, exhibited inconsistent positive effects. The reason behind this discrepancy may be attributed to an issue of perceived control, since individual level actions are often easier to implement than collective or systemic actions.

A Tentative Non-Linear and Dual-Process Model of Eco-Anxiety

The theoretical relevance, but empirical infancy, of this review lies in the idea that eco-anxiety could potentially be a construct with both a dual process and nonlinear nature. The existing evidence is in line with, but not yet directly confirming, a pattern where moderate levels of eco-anxiety can be supportive of adaptive behavioral engagement, whereas very high levels may point to emotional overwhelm, avoidance, and disengagement. The Yerkes-Dodson law (Yerkes and Dodson, 1908), according to which moderate arousal maximizes performance and excessive arousal impairs it, provides a useful theoretical framework in understanding this pattern; though it is important to note that this law was not derived by studying climate psychology, and the application of this law here is heuristic rather than empirically validated.

The evidence that various dimensions of eco-anxiety have varying psychological and behavioral implications indirectly supports this suggestion. Hogg et al. (2024) discovered that cognitive aspects of eco-anxiety, including rumination and personal concern, were positively related to pro-environmental behavior, whereas symptomatic and affective aspects were more strongly associated with psychological distress. This finding is also in agreement with a dual-process explanation where the consequences of the construct are highly dependent on which dimension predominates and at what intensity. Similarly, Mathers-Jones and Todd (2023) have found that

very high levels of eco-anxiety were linked to avoidance responses, only to be observed in a very limited sample under special experimental conditions.

It is important to note that none of the included studies directly tested a curvilinear relationship between the intensity of eco-anxiety and behavioral outcomes. The non-linear model suggested herein is therefore a theoretically informed hypothesis - one which is plausible based on the evidence base available and consistent with the established psychological theory - rather than a finding that can be drawn out of the evidence base available. To test this suggestion empirically, future studies that incorporate continuous measurement of eco-anxiety at a full range of intensity levels would be required. However, despite being a theoretical model, the dual-process model is practically applicable. Instead of viewing eco-anxiety as either uniformly negative or uniformly motivating, it positions this emotional response as context-dependent: shaped by the intensity of the anxiety experienced, regulatory resources and sense of efficacy of the individual experiencing it, and the social and environmental supports available.

The role of moderating and mediating mechanisms.

The results also emphasize the need to mediate and moderate variables in determining the result of eco-anxiety. Emotional processes emerged as key mediators, with eco-anxiety contributing to increased distress, which in turn negatively impacted mental health and, in some cases, behavioral engagement. At the same time, different emotional responses—such as eco-anger and hope—were associated with more adaptive outcomes, including increased pro-environmental action (Maggi et al., 2023). Cognitive and regulatory mechanisms were also crucial factors. An example is that attentional biases toward climate-related information and patterns of rumination were related to both behavioral engagement and psychological distress, which suggests that the way people process environmental information affects the outcomes (Mathers-Jones and Todd, 2023). Likewise, adaptive coping was associated with better wellbeing and maladaptive coping with higher distress (Pihkala, 2020). Self-efficacy was one of the most influential moderating factors. Those who perceived themselves as more capable of taking action to solve environmental issues were more apt to turn eco-anxiety into constructive action, and those with low perceived control experienced greater feelings of helplessness and disengagement (Qin et al., 2024). This observation can be explained by the social cognitive theory, which explains that perceived agency plays a critical role in determining behavioral outcomes (Bandura, 1997). These pathways were further strengthened by social and identity related factors. Both high levels of eco-anxiety and high levels of pro-environmental engagement were linked to strong environmental identity, indicating that values and identity enhance the translation of concern into action (Ogunbode et al., 2022).

Implications

Theoretical Implications

The current results are related to the expanding body of literature on eco-anxiety as they contribute to a more sophisticated conceptualization of the construct. Instead of considering eco-anxiety as necessarily maladaptive, the findings are consistent with a dual-process and context-dependent model where eco-anxiety can have both adaptive and maladaptive effects. This criticizes the classical models of anxiety based on deficit and is consistent with the functional theories of emotion, which postulate that negative affect can be used to facilitate adaptive behavioral responses under some conditions (Frijda, 1986). Moreover, the fact that mediating and moderating mechanisms, such as self-efficacy, coping strategies, and emotional regulation, are identified, highlights the need to integrate eco-anxiety into broader psychological frameworks, including social cognitive theory (Bandura, 1997) and the stress-coping models.

Practical Implications

The results have significant implications for mental health practitioners. Since eco-anxiety has always been correlated with psychological distress, there is an evident necessity to establish the interventions that would address the emotional reactions to climate change. Nonetheless, the interventions must not be oriented towards the complete eradication of eco-anxiety. Rather, therapeutic interventions must be aimed at assisting individuals in regulating and directing eco-anxiety into positive coping and action. For example, the interventions that increase adaptive coping strategies, enhance emotional regulation, and foster a sense of meaning and purpose could help mitigate distress without disrupting the motivational aspects of eco-anxiety (Pihkala, 2020). Moreover, the inclusion of climate-related issues into the current mental health systems can enhance the relevance and efficacy of psychological support, especially in younger populations who are disproportionately impacted.

Policy and Societal Implications.

On a larger scale, the results highlight the significance of considering eco-anxiety as a societal mental health concern and a possible source of environmental action. Policymakers and educators must consider that climate-related distress is not only an individual psychological problem but a systemic reaction to the actual environmental dangers. The educational and public communication approaches must be designed to balance awareness of climate risks with the messages that promote the agency, efficacy, and actionable solutions. Enhancing individuals' perceived ability to contribute to environmental change may reduce feelings of helplessness and increase pro-environmental behavior (Qin et al., 2024). In addition, community-based and collective approaches could be especially helpful in managing eco-anxiety. Psychological distress can also be buffered by strengthening social support networks and opportunities to take collective action (Ogunbode et al., 2022). Overall, these results suggest that more holistic solutions are needed, which can promote both mental health and environmental sustainability.

Limitations

Some limitations of this review must be recognized. First, the most immediate methodological constraint is related to the process of the study selection and data extraction by a single reviewer. Although best practices in scoping review frameworks usually suggest at least two independent reviewers to conduct screening to reduce selection bias and subjectivity (Levac et al., 2010), screening and extraction, in this case, were done by a single reviewer. To enhance consistency and minimize the risk of error, pre-defined and operationally specific inclusion and exclusion criteria were used at each stage. Borderline cases were revisited during full-text review with explicit reference to the criteria, and data were extracted using a structured charting form aligned with Levac et al. (2010). Arksey and O'Malley (2005) recognize that scoping reviews that are carried out by a single reviewer can be a valid approach to scoping reviews when there are well-structured criteria and systematic procedures. It is suggested that future scoping reviews in this field use a dual independent review.

Second, the literature supporting the existence of a non-linear relationship between eco-anxiety and behavior, a key theoretical hypothesis of this review, is sparse. The Yerkes-Dodson framework has been used here as a heuristic theoretical framework rather than an empirically determined result: few of the included studies directly tested a curvilinear or threshold effect, and none of them was designed specifically to test whether a moderate versus a high eco-anxiety produced a systematically different behavioral outcome. This non-linear model is thus introduced as a theoretically informed hypothesis, which should be empirically investigated with the help of the proper study designs, e.g., longitudinal or experimental paradigms, with eco-anxiety introduced as a continuous variable. Thirdly, the measurement of eco-anxiety was non-

homogeneous across studies. The instruments varied between broad climate concern items and multidimensional scales that capture cognitive, affective, and behavioral dimensions, which makes cross-study comparisons of instruments difficult, and can partly explain discrepancies in the findings. More standardization of measurement, especially more widespread use of validated measures, such as the Climate Change Anxiety Scale (Clayton and Karazsia, 2020), would enhance the comparability of future studies. Fifth, the use of self-report measures presents the possibility of social desirability and response bias, especially in pro-environmental behavior, where reported behavior will overestimate the actual behavior. Lastly, the use of Google Scholar as the only database, with the assistance of backward reference screening, might have led to the exclusion of the relevant studies that are only indexed by discipline-specific databases, such as PsycINFO, MEDLINE, or Web of Science. The multi-database searching on a pre-registered protocol would be beneficial in future reviews.

Conclusion

This scoping review summarized empirical data on the linkage between eco-anxiety, mental health, and pro-environmental behavior. The results indicate that eco-anxiety is most likely to be perceived as a multidimensional and context-dependent phenomenon. Although it is consistently associated with psychological distress and poorer well-being, it can also lead to pro-environmental action with the support of adaptive coping, perceived efficacy, environmental identity, and social engagement. Instead of conceptualizing eco-anxiety as pathological or adaptive, or both, future research and practice should focus on the conditions under which it becomes harmful or adaptive, or both. This dual process approach offers an effective model to combine mental health and environmental behavior research in the climate change context.

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