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STUDY PROTOCOL

Coping with unpleasant eco-emotions: A scoping review protocol

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Abstract

Objective

This review aims to map and synthesise existing evidence on coping strategies associated with unpleasant eco-emotions across populations and contexts worldwide.

Introduction

As the impacts of climate change intensify, unpleasant eco-emotions, such as eco-anxiety or grief, are experienced across populations and age groups. Although these emotions are largely adaptive responses to a genuine threat, they can be overwhelming and are sometimes linked to poorer mental health. Coping strategies are a crucial link between such

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emotions and mental health, well-being, and engagement with environmental challenges. However, we currently know little about the variety of coping strategies people use in response to unpleasant eco-emotions, the outcomes associated with these strategies, and the contextual factors shaping them. This scoping review seeks to address this gap by identifying coping strategies associated with unpleasant eco-emotions and informing evidence-based research, policies, and practices.

Eligibility criteria

Empirical studies involving participants of all ages that examine coping with unpleasant eco-emotions will be considered regardless of the cultural or geographical context. Eligible designs include qualitative, quantitative, and mixed-methods research. Reviews, dissertations, and policy reports lacking original data will be excluded. Preprints and grey literature containing empirical data will be included following a credibility assessment. The search will not be limited by date.

Methods

This review will follow the JBI methodology for scoping reviews. Literature that meets the inclusion criteria will be searched in Scopus, PubMed, Web of Science, PsycINFO, CINAHL, CENTRAL, and preprint repositories (PsyArXiv, SocArXiv, MedRxiv, OSF). Evidence will be documented using a pre-determined data extraction form aligned with the review's objectives and presented in tables and charts, accompanied by a narrative summary highlighting dominant coping strategies, contextual factors, and research gaps.

Review registration

OSF: https://osf.io/nh7ba/

Keywords
eco-anxiety, coping strategies, climate emotions, environmental disasters, climate change, psychological adaptation

Plain language summary

Climate change and environmental degradation can evoke difficult emotions, including anxiety, grief, anger, guilt, and hopelessness. These responses are often described as eco-emotions, which are natural reactions to environmental threats, but they can sometimes become overwhelming and affect people's mental health and well-being. Despite growing interest in these emotions, relatively little is known about how people cope with them.

This review will bring together existing research to answer three main questions. What strategies do people use to manage unpleasant eco-emotions, such as taking environmental action, practising mindfulness or seeking social support? How are these strategies related to people's mental health, well-being, sense of agency and involvement in environmental issues? How do factors such as age, culture, social support and exposure to environmental crises influence the ways people cope?

We will search scientific databases and credible reports for relevant studies. The review will describe what is currently known and identify important gaps in the evidence. Its findings may help researchers decide what should be studied next. They may also help healthcare professionals, educators and policymakers develop more informed and sensitive ways of supporting people experiencing climate-related distress and encouraging constructive responses to environmental challenges.

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1. Introduction

Populations worldwide are experiencing increasingly unpleasant and sometimes disturbing or troubling emotions about climate change and other environmental disruptions, collectively termed *eco-emotions*.[1–4] The terms *eco-anxiety*, *climate anxiety*, and *eco-emotions* are frequently used interchangeably to denote (often unpleasant) affective responses to environmental degradation. Many individuals report heightened anxiety and distress due to their awareness of the current and anticipated effects of climate change and other biospheric issues, often described as *eco-anxiety*.[5–8] *Climate anxiety*, on the other hand, refers to emotional responses more specifically triggered by the perception of the impacts of climate change.[2,3,9] *Eco-emotions* extend beyond anxiety to include, for example, ecological grief, eco-anger, or hopelessness, reflecting a multifaceted emotional landscape.[10,11] Eco-emotions may arise through both direct and indirect exposure to environmental degradation and climate-related catastrophes. Direct exposure involves first-hand encounters with such events and their consequences, whereas indirect exposure refers to emotional responses shaped by mediated or relational awareness, including learning about affected others or engaging with climate-related media.[12,13] In this review, eco-emotions are conceptualized as the emotional responses to anticipated or experienced impacts of climate and environmental changes, which may encourage adaptive engagement, lead to rumination and disengagement, or other outcomes.[2,9]

Eco-emotions, especially unpleasant or negatively valenced ones,[14] such as eco-grief, eco-anger, and eco-anxiety, are strongly prevalent worldwide across all age groups, affecting over 30% of the population, and notably impacting young people.[3,6,15–18] Although there is growing consensus that the experience of unpleasant eco-emotions is an adaptive, rational response to existential threat, these emotions are sometimes linked to negative mental health outcomes including distress, solastalgia, depression, and anxiety.[7,8,19,20] Given their links to mental health outcomes, unpleasant eco-emotions warrant attention in research examining the psychological effects of the environmental crisis.[9,20,21] Furthermore, they are also linked to pro-environmental behavioural outcomes, making it relevant to understand how they are associated with pro-environmental engagement and well-being.

Coping involves the cognitive and behavioural strategies individuals use to manage both internal and external demands perceived as stressful.[22] Coping responses are typically initiated in response to unpleasant emotions, often stemming from the perception that significant personal goals or values are threatened, lost, or harmed.[23] Hence, coping strategies are a crucial link between emotions and mental health, particularly in the context of climate-related stressors.[24]

One theoretical approach to coping is Lazarus and Folkman's[23] *Transactional Model of Stress and Coping*, later expanded by Folkman to distinguish between problem-focused, emotion-focused, and meaning-focused approaches.[22,25–27] Problem-focused coping involves strategies that directly address or alter the source of stress, such as seeking information to understand the issue more fully, or acquiring skills to mitigate the stressor. In contrast, emotion-focused coping aims to regulate emotional responses, rather than modify the stressor itself. Examples include using self-soothing or mindfulness techniques, or avoiding or denying the threat.[23] Expanding the original theory, meaning-focused coping describes cognitive and behavioral processes that cultivate positive emotions and reframe the stressor in light of personal values or engaging in purposeful activities to derive growth from the experience.[25]

From a functional perspective, coping strategies can be categorised as adaptive when they reduce the adverse effects of the stressors or lower the likelihood of stressor occurrence.[28] Applied to unpleasant eco-emotions and associated threats, coping strategies are adaptive when they promote sustained individual well-being, mental health, agency and engagement in addressing and mitigating climate and environmental challenges.[29] Conversely, maladaptive strategies may exacerbate unpleasant emotions and undermine well-being and agency.[30] Nonetheless, determining when a coping strategy is adaptive or maladaptive is a complex, relative issue,[23] and some argue that it is insufficient to consider only mental health or behavioral outcomes in the context of climate and environmental change.[29]

Several reviews have documented eco-emotions or mental health outcomes related to environmental issues, including psychological distress, solastalgia, post-traumatic stress, depression, anxiety, and suicidality as well as unpleasant affective states such as worry, anger, grief, frustration, hopelessness and guilt.[13,17,31–34] These studies consider diverse populations: children and young people,,[16,17,31,33,35–39] adults or mixed-age populations which include climate scientists,[40] indigenous people,[41,42] or individuals with disabilities or medical conditions.[43,44] In these reviews, coping strategies include problem-focused actions, social and collective engagement, emotion-focused reflection, rumination, catastrophising, and self-blame and meaning-focused coping (e.g., cognitive reappraisal, trust, and hope).[16,26,27,34,38–40,45–51] Other strategies involve nature connection, place attachment, and cultural continuity,[35,42,52,53] while collective mechanisms, such as community empowerment and government preparedness, have also been identified.[54]

Despite this body of work, there remains a lack of synthesis regarding coping strategies in relation to the wide range of unpleasant eco-emotions.[55] Existing reviews either focus narrowly on specific emotions (e.g., eco-anxiety[56] or eco-grief[35]), or target particular subpopulations,[40,57] resulting in fragmented evidence and inconsistent reporting of outcomes. Furthermore, the diversity of outcomes associated with coping strategies has been insufficiently explored. Research has predominantly focused on mental health and well-being, but there is a need to go beyond these metrics and consider other potential outcomes, such as varying levels of pro-environmental engagement, agency, or collective action. Additionally, the role of contextual factors in shaping the adoption of specific coping strategies, such as exposure to climate change impacts, socio-demographic characteristics, and cultural settings, remains underexplored. Similarly, little is known about how associated variables, including environmental literacy, personal values, and social support, are related to the adoption of these strategies.

To address these gaps, a scoping review is warranted to document the diversity, nature, and outcomes of coping strategies associated with different types of unpleasant eco-emotions. Scoping reviews are particularly well-suited to areas characterised by conceptual plurality and methodological heterogeneity, enabling the clarification of key constructs, research traditions, and evidence gaps across fragmented literature.[58] Research on eco-emotions and coping currently spans multiple disciplines, including psychology, education, environmental studies, health, and the social sciences, yet remains unevenly theorised and empirically dispersed.[10,24,59] By synthesizing this interdisciplinary body of work, the review will not only identify critical knowledge gaps to guide future empirical research, but also contribute to the development of a more robust evidence base capable of informing theory, policy, and practice. In doing so, it aims to support emotional resilience and adaptive forms of engagement in the context of accelerating climate change.

2. Review questions

Guided by the scoping review's overarching aim to map and characterise coping strategies associated with unpleasant eco-emotions, three interrelated research questions were developed.

1. What coping strategies have been described in the literature in response to unpleasant eco-emotions?

2. What associated outcomes (e.g., mental health, well-being, and agency) are reported, associated with these strategies?

3. How do contextual factors (e.g., exposure to climate change, socio-demographics, cultural settings) and associated variables (e.g., environmental literacy, values, and social support) relate to these coping strategies?

3. Eligibility criteria

3.1 Population

This review will include studies involving the general population across all age groups, encompassing children, adolescents, adults, and older individuals, to capture a comprehensive range of coping strategies. In accordance with the worldwide impact of climate change, no geographic restrictions will be applied. Specific exclusion criteria include studies focusing exclusively on non-human subjects or theoretical models without empirical human data.

3.2 Concept

The central concept of this review is coping strategies employed by individuals to manage unpleasant eco-emotions including, but not limited to, fear, anxiety, helplessness, grief, guilt, anger, and despair. These emotions are understood as affective responses to the anticipated or experienced impacts of climate and environmental change. This review will include studies examining all forms of coping strategies, whether explicitly labelled as such or described in terms of their function (e.g., adaptive or maladaptive, problem- or emotion-focused), as long as they address individual ways of dealing with unpleasant eco-emotions. Exclusion criteria encompass studies that do not address coping mechanisms (even implicitly) or that examine unrelated psychological phenomena (e.g., general anxiety disorders not linked to environmental or climate stressors).

3.3 Context

The review will consider diverse geographical, social, and environmental settings, encompassing both direct experiences (e.g., environmental disasters) and indirect experiences (e.g., awareness of global climate threats) of climate change or other environmental issues (e.g., biodiversity loss, pollution). Studies conducted in a variety of cultural or subcultural contexts will be included to give justice to the breadth of coping responses across sociocultural conditions. No restrictions will be applied to specific regions or population groups. Exclusions will apply to contexts unrelated to environmental or climatic change, such as industrial, occupational, or medical stress unrelated to environmental factors.

3.4 Type of sources

This scoping review will consider empirical studies employing qualitative (e.g. narrative, phenomenological, ethnographic, case studies), quantitative (e.g. cohort studies, case-control studies, cross-sectional studies), or mixed-methods designs that report original data on coping strategies associated with unpleasant eco-emotions. Peer-reviewed journal articles and pre-prints hosted on recognised repositories such as PsyArXiv, SocArXiv, MedRxiv, and OSF will be considered to ensure transparency and capture emerging research in this rapidly evolving field. This review will also consider grey literature from credible sources, including reports, theses, and policy documents. These will be included only if they present original empirical findings directly relevant to studied coping strategies, thereby enhancing the comprehensiveness of the evidence base while maintaining methodological rigour. Secondary sources such as reviews, policy summaries, and dissertations without empirical data will be excluded to avoid duplication. In alignment with Joanna Briggs Institute (JBI) guidance, publications in English, French, German, and Turkish will be eligible for final inclusion, reflecting available linguistic expertise of the author team. Because different languages employ distinct emotion terms, automatic translation of publications in other languages may not guarantee adequate analysis of their content.

4. Methods

Following the methodological guidance of the JBI and the most recent *JBI Manual for Evidence Synthesis*,[60,61] this scoping review will identify and categorise the spectrum of coping strategies reported in the empirical literature in relation to unpleasant eco-emotions. It will distinguish between major categories of coping strategies, including problem-focused, emotion-focused, and meaning-focused,[23,27,47,62] and will examine the association with different unpleasant eco-emotions, as well as contextual factors across diverse populations and settings or other studied variables. The review will adhere to the PRISMA-ScR guidelines (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews*) to ensure methodological transparency, reproducibility, and conceptual clarity.[63] This scoping review protocol has been registered in the Open Science Framework (osf.io/nh7ba/).

4.1 Search strategy

The search strategy for this scoping review will aim to identify both published and unpublished empirical studies examining coping strategies for unpleasant eco-emotions. A comprehensive three-step search strategy will be implemented.

The first step consisted of initial limited searches of PubMed, Scopus, and Web of Science to identify papers on the topic and key terminology. Keywords from the titles, abstracts, and index terms of relevant papers were used to develop a full search strategy.

In the second step, the refined strategy was applied to the following electronic databases in July 2025: *Web of Science Core Collection, Current Contents Connect, KCI-Korean Journal Database, ProQuest Dissertations & Theses Citation Index, and SciELO Citation Index (Clarivate)*, *Scopus (Elsevier)*, *PubMed (MEDLINE)*, *APA PsycINFO (EBSCO)*, *CINAHL (EBSCO).* To capture emerging and pre-publication research, pre-print repositories were also searched, including *PsyArXiv*, *SocArXiv*, *MedRxiv*, and *OSF Preprints.* The search strategy for each database was adapted to the relevant indexing systems (e.g., MeSH and Thesaurus terms) to ensure sensitivity and specificity. The full Boolean strings for PubMed database search are provided in Table 1.

The search combined two main conceptual clusters — *eco-emotions* and *coping* — connected by the Boolean operator **AND**. The eco-emotions cluster included terms such as “eco-emotion*”, “climate anxiety”, “eco-grief”, “solastalgia”, “eco-anger”, “eco-helplessness”, “eco-fear”, “eco-guilt”, and “eco-hopelessness”. The coping cluster included terms such as “cop*”, “problem-focused coping”, “emotion-focused coping”, “meaning-focused coping”, “self-compassion”, “hope”, “mindfulness”, “activism”, “social support”, and “pro-environmental behaviour”. Truncation, phrase searching, and Boolean operators were used to ensure inclusivity and precision across multiple disciplines.

No language restrictions were applied during the searches. No publication year limits were applied: all studies published up to the search date (2nd July 2025) will be included to reflect the rapidly developing nature of research in climate-related emotional health. The search may be repeated using the established search strategy at the end of the writing-up phase to capture any newly published studies.

The third step will involve the following additional methods to maximise coverage and further identify grey literature: The reference lists of all included studies will be screened for further eligible publications. To capture grey literature, targeted web searches will be performed using *Google Advanced Search* and *MedNar*, limiting results to trusted institutional domains (*.gov*, *.int*, *.eu*, *.org*). This will include reports, theses, and policy documents from recognised

Table 1. Search strategy.

PubMed		
Search conducted 02 July 2025		
#	**Keywords or controlled vocabulary**	**Records retrieved**
1	(("climate change"[MeSH Terms] OR "climate"[MeSH Terms]) AND ("emotions"[MeSH Terms] OR "Social Isolation"[Mesh] OR "mental disorders"[MeSH Terms])) OR "eco-emotion*"[TIAB] OR "ecological emotion*"[TIAB] OR "climate emotion*"[TIAB] OR "climate change emotion*"[TIAB] OR "environmental emotion*"[TIAB] OR "eco-anx*"[TIAB] OR "ecological anx*"[TIAB] OR "climate anx*"[TIAB] OR "climate change anx*"[TIAB] OR "environmental anx*"[TIAB] OR "eco-fear"[TIAB] OR "ecological fear"[TIAB] OR "climate fear"[TIAB] OR "climate change fear"[TIAB] OR "environmental fear"[TIAB] OR "eco-worr*"[TIAB] OR "ecological worr*"[TIAB] OR "climate worr*"[TIAB] OR "climate change worr*"[TIAB] OR "environmental worr*"[TIAB] OR "eco-dread"[TIAB] OR "ecological dread"[TIAB] OR "climate dread"[TIAB] OR "climate change dread"[TIAB] OR "environmental dread"[TIAB] OR "eco-helpless*"[TIAB] OR "ecological helpless*"[TIAB] OR "climate helpless*"[TIAB] OR "climate change helpless*"[TIAB] OR "environmental helpless*"[TIAB] OR "eco-powerless*"[TIAB] OR "ecological powerless*"[TIAB] OR "climate powerless*"[TIAB] OR "climate change powerless*"[TIAB] OR "environmental powerless*"[TIAB] OR "eco-overwhelm*"[TIAB] OR "ecological overwhelm*"[TIAB] OR "climate overwhelm*"[TIAB] OR "climate change overwhelm*"[TIAB] OR "environmental overwhelm*"[TIAB] OR "eco-terror"[TIAB] OR "ecological terror"[TIAB] OR "climate terror"[TIAB] OR "climate change terror"[TIAB] OR "environmental terror"[TIAB] OR "eco-panic"[TIAB] OR "ecological panic"[TIAB] OR "climate panic"[TIAB] OR "climate change panic"[TIAB] OR "environmental panic"[TIAB] OR "eco-sad*"[TIAB] OR "ecological sad*"[TIAB] OR "climate sad*"[TIAB] OR "climate change sad*"[TIAB] OR "environmental sad*"[TIAB] OR "eco-distress*"[TIAB] OR "ecological distress"[TIAB] OR "climate distress"[TIAB] OR "climate change distress"[TIAB] OR "environmental distress"[TIAB] OR "eco-grie*"[TIAB] OR "ecological grie*"[TIAB] OR "climate grie*"[TIAB] OR "climate change grie*"[TIAB] OR 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Table 1. *Continued*

PubMed		
Search conducted 02 July 2025		
#	**Keywords or controlled vocabulary**	**Records retrieved**
2	"Coping Skills"[Mesh] OR "Environmentalism"[Mesh] OR "Communication"[Mesh] OR "Self Efficacy"[Mesh] OR "mindfulness"[MeSH Terms] OR "self care"[MeSH Terms] OR "denial, psychological"[MeSH Terms] OR "self compassion"[MeSH Terms] OR "relaxation"[MeSH Terms] OR "rationalization"[MeSH Terms] OR "optimism"[MeSH Terms] OR "cognitive restructuring"[MeSH Terms] OR "creativity"[MeSH Terms] OR "religion"[MeSH Terms] OR "trust"[MeSH Terms] OR "emotional regulation"[MeSH Terms] OR "social behavior"[MeSH Terms] OR "social media"[MeSH Terms] OR "exercise"[MeSH Terms] OR "substance related disorders"[MeSH Terms] OR "self assessment"[MeSH Terms] OR "Cope"[TIAB] OR "coping" [TIAB] OR "problem-focused coping"[TIAB] OR "environmental behavior"[TIAB] OR "environmental behaviour"[TIAB] OR "activis*"[TIAB] OR "eco-activis*"[TIAB] OR "eco-engagement"[TIAB] OR "ecological engagement"[TIAB] OR "climate engagement"[TIAB] OR "climate change engagement"[TIAB] OR "environmental engagement"[TIAB] OR "eco-action"[TIAB] OR "ecological action"[TIAB] OR "climate action"[TIAB] OR "climate change action"[TIAB] OR "environmental action" [TIAB] OR "knowledge sharing"[TIAB] OR "shar* knowledge"[TIAB] OR "low-carbon footprint"[TIAB] OR "discuss*"[TIAB] OR "communicat*"[TIAB] OR "foster* efficacy"[TIAB] OR "gain* efficacy"[TIAB] OR "foster* self-efficacy"[TIAB] OR "gain* self-efficacy"[TIAB] OR "emotion-focused coping"[TIAB] OR "emotional coping"[TIAB] OR "avoid*"[TIAB] OR "distract*"[TIAB] OR "withdraw*"[TIAB] OR "resignat*"[TIAB] OR "escape-oriented coping"[TIAB] OR "disavow*"[TIAB] OR "denial"[TIAB] OR "deny*"[TIAB] OR "climate sceptic*"[TIAB] OR "de-emphasiz*"[TIAB] OR "deemphasiz*"[TIAB] OR "de-emphasis*" [TIAB] OR "deemphasis*"[TIAB] OR "mindful*"[TIAB] OR "emotional engagement"[TIAB] OR "griev*"[TIAB] OR "self-care"[TIAB] OR "self-compassion*"[TIAB] OR "paus*"[TIAB] OR "relax*"[TIAB] OR "distanc*" [TIAB] OR "rationaliz*"[TIAB] OR "rationalis*"[TIAB] OR "ruminat*"[TIAB] OR "meaning-focused coping"[TIAB] OR "emotional coping"[TIAB] OR "cultivat* hope"[TIAB] OR "foster* hope"[TIAB] OR "positive reapprais*"[TIAB] OR "wishful thinking"[TIAB] OR "positive thinking"[TIAB] OR "cognitive restructuring"[TIAB] OR "self-criticism"[TIAB] OR "positive thinking"[TIAB] OR "nature connect*"[TIAB] OR "nature related*"[TIAB] OR "nature contact"[TIAB] OR "creativ* expression"[TIAB] OR "religio*" OR "trust*"[TIAB] OR "foster* sense of coherence"[TIAB] OR "foster* optimis*"[TIAB] OR "tech* optimis*"[TIAB] OR "emotion* regulation"[TIAB] OR "emotional management"[TIAB] OR "blaming others"[TIAB] OR "self-criticism"[TIAB] OR "relaxation"[TIAB] OR "seek out social connection"[TIAB] OR "seek* social connection"[TIAB] OR "seek* out social support"[TIAB] OR "seek* social support"[TIAB] OR "using* social media"[TIAB] OR "social media use"[TIAB] OR "news break*"[TIAB] OR "nature connect*"[TIAB] OR "physical activity"[TIAB] OR "substance use"[TIAB] OR "flexib*"[TIAB] OR "open-minded*"[TIAB])	5,356,607
4	#1 AND #2	1559

organisations such as the *World Health Organization (WHO)*, *United Nations Environment Programme (UNEP)*, or *American Psychological Association (APA).* This step ensures that the review includes diverse sources that may not appear in traditional bibliographic databases.

4.2 Study/Source of evidence selection

Following completion of the search, all identified citations will be imported into *Rayyan*[64] for duplicate removal and blinded independent screening. Titles and abstracts of all retrieved records will be screened independently by at least two reviewers against the pre-specified inclusion and exclusion criteria. A pilot test of the screening form will be conducted on a subset of studies (~30 records) to ensure consistency in the application of eligibility criteria among reviewers. The full text of selected articles will be uploaded into *Rayyan* and will be assessed in detail against the eligibility criteria by two or more independent reviewers. All reasons for exclusion of articles after full-text screening will be reported in the final review, including language limitations.

Any conflicts between reviewers will be resolved by a third independent reviewer. Calibration meetings will be held online at regular intervals during the screening process to maintain consistency of judgments and minimise potential bias. The overall selection process and results will be documented transparently and presented in a *PRISMA-ScR* flow diagram in the final scoping review publication.[63]

4.3 Data extraction

Pairs of reviewers will independently extract data from the included studies using a structured charting tool developed by the authors in accordance with JBI guidance.[60,61] The tool, created specifically for this review, will be tested on a sample of ten studies to ensure clarity, consistency, and completeness. Reviewers will receive training on the use of the data extraction form before starting the process. Meetings will be held online at regular intervals to discuss variable coding and maintain consistency of judgments.

Data will be charted and recorded within the designated and secure workspace for transparency and version control. Extracted variables will include bibliographic information, study design, participant characteristics (including gender), types of eco-emotions examined (e.g., anxiety, grief, anger, and sadness), coping strategies (e.g., problem-focused (e.g., seeking information about climate change or engaging in environmentally protective behaviours); emotion-focused (e.g., downplaying consequences of climate change as exaggerated), meaning-focused (e.g., trusting scientists and politicians)), contextual factors (e.g., direct or indirect exposure to climate change or environmental catastrophes, social support), and outcomes related to mental health, well-being, or pro-environmental engagement. Coping strategies, particularly, will be extracted verbatim and subsequently categorised using a theoretically informed framework derived from stress-coping theory[23] and climate-specific adaptations.[22,27,65,66] The structured extraction form is provided in Table 2 and will be refined as needed. All modifications will be documented in the final review. Individual coping strategies will be additionally coded with respect to the problem/emotion/meaning-focused framework (see Table 2), which proved useful for the two existing scales measuring environmental crisis-related coping strategies.[26,67] In case eco-emotions, coping strategies and other variables are measured with scales comprising several factors (e.g., Hogg Eco-Anxiety Scale,[68] climate change coping scale[26,69]). Factor-related results will be extracted when possible.

Table 2. Data extraction instrument.

	Description	Answer type
Citation details		
Rayyan ID	List the specific nine-digit number assigned to an article in the Rayyan system	Nine-digit Number
First author	List surname(s) of first author(s)	Text-box – verbatim
Publication date	List the year of publication	Four-digit Number
DOI/URL	DOI or – if no DOI: URL	Text-box – verbatim
Population details		
Study settings	Specify the context in which the study sample or population operates, such as construction sites, farms, or other relevant settings where the study was conducted. If there is no specified data, add "n.d."	Text-box – verbatim
Sample size	Refer to the total number of participants in the study. If there is no specified data, add "n.d." For complex studies, add each study # in brackets separated by ";"	Number
Participants' country of residency	Indicate the country where the participants currently reside (e.g. Germany). If there is no specified data, add "n.d."	Text-box – verbatim
Country of origin	List the participants' country (ies) of origin (e.g. Turkiye for the migrants from Turkiye in Germany). If there is no data, add "n.d.".	Text-box – verbatim
Age *(range (M ± SD))*	Provide the age range of participants and mean age and standard deviation (M ± SD) if indicated. If there is no specific data available, please indicate as "n.d." (e.g. 18–90 (45.5 ± 9.1), 18–90 (n.d.), n.d. (45.5 ± 9.1), or 18–90 (45.5 ± n.d.)).	Text-box – verbatim

Table 2. *Continued*

	Description	Answer type
Gender (Female/ Male/other/no data: n(%))	List the total number and percentage proportion of Female (F), Male (M) participants, and "other" if participants considered themself non-binary. In case the participants did not wish to indicate their gender, or there is no data available, add "n.d." (e.g. F: 270 (51.7%) / M: 246 (47.1%) /other: 1(0.002%) /n.d.: 5(0.01%).; or e.g. F: 20(50%)/M: 20(50%)).	Text-box – verbatim
Study details		
Research methods	Indicate whether the study used quantitative, qualitative or mixed-methods	Select which one that apply ○ Quantitative ○ Qualitative ○ Mixed-method
Study design	Specify the study design as it is indicated in the report	Select all that apply: ○ Case control study ○ Case report ○ Case series ○ Cohort study (retrospective) ○ Cohort study (prospective) ○ Cross sectional study ○ Longitudinal study ○ Field-testing study ○ Qualitative research ○ Randomised controlled trial ○ Others, please specify
Study aim(s)	Provide the study aim as it is indicated in the report (use direct text from the study's objective or aim section).	Text-box – verbatim
Study question(s)/ hypothesis(es)	If the study clearly states its question(s), use the core version of them. If a hypothesis is provided, include the key points. If the study questions and hypotheses are not specified, add "n.d.".	Text-box – verbatim
Measures for quantitative studies	List the abbreviations of tools, their full names (with references) and subcomponents, if available. Indicate "N/A" (not applicable) for qualitative studies.	Text-box – verbatim
Analysis methods – statistics for quantitative studies	If the study is quantitative, list the statistical methods used (e.g., linear and/or logistic regression, ANOVA, ANCOVA, Spearman or Pearson correlation analyses, etc). Indicate "N/A" for qualitative studies.	Text-box – verbatim
Data collection methods for qualitative studies	Include data collection methods, such as audio-recorded semi-structured interviews, focus groups, in-depth interviews, observations, or other relevant methods. Indicate "N/A" for quantitative studies.	Text-box – verbatim
Analysis methods for qualitative studies	If the study is qualitative, specify the analytic approach (es) used, such as ethnography, grounded theory, phenomenology, thematic analysis, or other methods reported in the study. If available, provide the software used for qualitative data analysis (e.g. RQDA, NVivo, and ATLAS.ti), as it may influence the depth and methodology of analysis. Indicate "N/A" for quantitative studies.	Text-box – verbatim

Table 2. *Continued*

	Description	Answer type
Context details		
Exposure	Describe the situations or events to which participants were exposed (e.g. floods, heat waves, etc.), and whether it was direct or indirect exposure. Additionally, indicate if the exposure was measured, observed, or self-reported, as this might vary across studies.	Select all that apply: ○ Direct (First hand exposure to climate-related event: being physically present at the site of event) ○ Indirect or Vicarious (learning about or witnessing climate-related catastrophes through media, stories, or the experiences of others) ○ Not mentioned
		Select all that apply: ○ Floods ○ Heat waves ○ Droughts ○ Hurricane/storm/cyclone ○ Water pollution ○ Air pollution ○ Loss of biodiversity/pest outbreaks ○ Human-caused earthquakes
		Select all that apply: ○ observed ○ measured ○ self-reported ○ not studied
Intervention	If any intervention was applied, please provide its name; otherwise, state "n.d.".	Text-box – verbatim
Additional context variables	Please specify any additional context variables considered like additional geographical location, type of settlement (urban/rural), perceived or received social support, media consumption (type/ intensity of media exposure), and specific occupation	Text-box – verbatim
Concepts details		
Unpleasant eco-emotions	List which unpleasant eco-emotions were considered	Select all that apply*: ○ anxiety ○ worry ○ anger ○ sadness ○ grief ○ guilt ○ hopelessness ○ frustration ○ shame ○ others, please specify. **The list may be updated*

Table 2. *Continued*

	Description	Answer type
Coping strategi(es)	List which coping strategies associated to any eco-emotion were considered: indicate the specific ones if they are mentioned (text box). Add in parenthesis whether these were assigned to a category (see nomenclature below) by the authors. If studied by categories only (e.g. subcomponent of measures), list which categories were considered as stated by the authors. If there are no indicated coping strategies in the article, please exclude it from further data analysis.	Text-box – verbatim
		Select all that apply*: ○ problem-focused coping ○ emotion-focused coping ○ meaning-focused coping (MFC) ○ De-Emphasising/Avoidance Coping ○ adaptive coping (AC; e.g., resilience building, and hope cultivation); ○ social/collective coping (SCC; e.g., group activism, and eco-therapy); ○ self-compassion (SC; e.g., mindfulness, and self-compassion); ○ others, please specify. **The list may be updated*
Coping strategies outcomes	Report any reported outcome related to the coping strategies employed (e.g., significant improvement in mental health, stress reduction, etc.). Add clarification on the time frame for outcome measurement (e.g., immediate effects, long-term outcomes). If there is no specified data, indicate "n.d."	Text-box – verbatim
Main quantitative results	Include key outcomes of quantitative studies, and their relationships (e.g., correlation coefficient, p-value, confidence intervals, etc.). For example, the relationship between a coping strategy and the reported eco-emotion, such as eco-anxiety, should be specified, including correlation and/or regression coefficients, to indicate their association direction. Indicate "N/A" for qualitative studies.	Text-box – verbatim
Main qualitative results	Provide the main themes or categories identified in qualitative studies (e.g., "themes of resilience"). Indicate "N/A" for quantitative studies.	Text-box – verbatim
Main common results	For mixed-method studies, summarise key findings by integrating both quantitative and qualitative data. Provide additional information if the integration of the results was explicitly discussed in the study.	Text-box – verbatim
Other comments that have not been previously mentioned	May include limitations mentioned in the manuscript relevant to our review	Text-box – verbatim
Abbreviations	List any abbreviations used in the study (e.g., "PEB" for pro-environmental behavior).	

Discrepancies between reviewers will be resolved through discussion and consensus between pairs of reviewers and, if needed, adjudication by a third reviewer. When necessary, study authors will be contacted to clarify missing or unclear information. In accordance with JBI guidance, no formal critical appraisal will be undertaken, as the purpose of this scoping review is to identify and synthesize the breadth of evidence rather than assess study quality.

4.4 Data analysis and presentation

Extracted data will be analyzed using a combination of descriptive quantitative analysis and qualitative thematic content analysis.

In accordance with the JBI guidelines for descriptive mapping, counts/frequencies (e.g., study characteristics, populations, coping typologies) will be represented in tables and figures. For qualitative data, we will employ thematic content analysis to capture patterns across coping typologies (problem-focused, emotion-focused, and meaning-focused, and others) and contextual factors such as age, gender, culture, personal values, environmental crisis literacy, environmental exposure, social support or other emerging variables.

Findings will be presented in the final scoping review publication using a combination of tables, figures, and visual maps to highlight conceptual relationships, evidence clusters, and research gaps. A narrative synthesis will accompany the charted results, explaining how the evidence relates to the review's objectives and research questions.

More precisely, for research question 1 (What coping strategies have been described in the literature in response to unpleasant eco-emotions?), we will compile and classify all coping strategies identified in response to eco-emotions, categorizing them according to existing frameworks[25,70] (e.g., problem-focused, emotion-focused, meaning-focused; or problem solving/avoidance, positive emotional coping) and related eco-emotions (e.g., anxiety, grief). Visual summaries including charts or heatmaps (Emotion x coping) will be used to display the distribution and frequency of coping strategies across eco-emotions. For research question 2 (What outcomes (e.g., mental health, well-being, agency) are reported, associated with these strategies?), we will compile all outcomes identified for the studied coping strategies, organising them into categories emerging from qualitative and quantitative analyses. Identified outcomes will be summarised both narratively and visually, for example using bar charts. For research question 3 (How do contextual factors (e.g., exposure to climate change, socio-demographics, cultural settings) and associated variables (e.g., environmental literacy, values, social support) relate to these coping strategies?), we will compile the examined contextual factors in association with coping strategies for eco-emotions, organising them into categories emerging from qualitative and quantitative analyses. Identified factors will be summarised both narratively and visually, for example using bar charts. The representation of genders among all included studies will be analysed. Any modifications to the analytic or presentation methods arising during data synthesis will be transparently reported in the final review.

Experts will be identified based on authorship of relevant publications, recommendations from professional societies in the field of climate change, and nominations from members of the research team. The consultation will aim to validate preliminary findings, identify any significant gaps in the literature, and provide insights into the practical applicability of the results.

5. Conclusion and Discussion

This scoping review protocol presents the methodology of a study that will address an important gap in understanding how individuals cope with the psychological and emotional effects of climate change and environmental degradation. Research on unpleasant eco-emotions is expanding but remains conceptually and methodologically fragmented across the fields of psychology, environmental science and public health. By mapping the available empirical evidence, the review will characterise the coping strategies examined across different populations and contexts, the outcomes reported in relation to these strategies, and the principal gaps in current knowledge.

The findings are expected to benefit several groups. For researchers, the review will identify priorities for future investigation, including understudied populations, cultural differences and longer-term outcomes. For practitioners, it will identify coping approaches and forms of support that warrant further development and evaluation. For policy-makers, it will demonstrate how mental health, well-being and community resilience have been addressed within the wider context of climate adaptation. However, as the review is intended to map rather than critically appraise the evidence, it will not determine which coping strategies or interventions are most effective.

The present protocol serves to safeguard the scoping review process while remaining critical of necessary trade-offs towards ensuring reliable and generalisable conclusions. We hereby anticipate some of the possible limitations of the planned review. First, we acknowledge that the search will be limited to publications and reports containing original data, which may hinder the taking into account of conceptual analysis independently of data; however, we will take into account the most recent frameworks about coping strategies in general as well as related to climate change in our discussion section. Also, even though we widened our search by including full-text manuscripts in languages other than English, final inclusion will be restricted to European languages the authors are fluent or knowledgeable enough to be confident in AI-translation of these languages. We will address this limitation of our research by quantifying the number

of articles that did not go through the full-text screening because of language limitations. More broadly, the interdisciplinary scope of the review reflects the multidimensional nature of eco-emotions, which are shaped by individual experiences and wider social, cultural and environmental conditions. Nevertheless, the findings may be affected by language restrictions, unequal geographical representation, reliance on predominantly Western-oriented academic databases, and conceptual and methodological differences among the included studies.

Overall, the review will clarify how coping with unpleasant eco-emotions has been conceptualised and investigated. It will provide a foundation for more focused research and may inform the development of sensitive, contextually appropriate approaches to supporting individuals and communities experiencing climate-related distress.

Declarations

This protocol was developed with input from a multidisciplinary team, including experts in public and environmental health, epidemiology, social psychology, environmental psychology, geography, educational psychology, clinical psychology, psychiatry, neuroscience, neuropsychology, cognitive psychology, molecular and biological psychiatry, counselling psychology and nursing.

During the preparation of this work, the authors used "Le Chat" and "Vibe" (Mistral AI, powered by GLM) to check and improve the English language of the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

Ethics and consent

Ethical approval and consent were not required.

Data availability

Underlying data

No data are associated with this article.

Extended data

No data are associated with this article.

Should any data or materials be requested during the open peer review process, they will be deposited in the OSF repository "Coping with unpleasant eco-emotions: A scoping review" (https://doi.org/10.17605/OSF.IO/GAUHK) and made available under the terms of the Creative Commons Attribution 4.0 International license (CC BY 4.0).

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