Journal of Childhood, Education & Society
Volume 6, Issue 2, 2025, 230-248
DOI: 10.37291/2717638X.202562558
ISSN: 2717-638X
Research Article

Climate anxiety in early childhood: A state-of-the-art review

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Abstract: As the climate crisis intensifies, young children are increasingly exposed to psychological stress linked to environmental change, manifesting in emerging forms of anxiety, sadness, and guilt. Although climate anxiety in children is gaining international recognition as a legitimate mental health concern, little is known about how these emotions specifically develop in children under the age of eight. This paper presents the first comprehensive state-of-the-art (SotA) review of research on climate anxiety in early childhood, systematically mapping current knowledge, identifying key conceptual and methodological gaps, and proposing priorities for future inquiry. Findings reveal that empirical studies in this area remain scarce, are often adapted from adult-centered frameworks, and predominantly situated within Euro-Western contexts. The review argues for developmentally appropriate, culturally responsive, and interdisciplinary approaches that seriously engage with both the emotional experiences and agentic capacities of young children. By highlighting critical gaps and outlining future research directions, this review lays the foundation for a more inclusive, child-sensitive, and globally relevant research agenda on climate anxiety in early childhood.

Article History
Received: 20 December 2024
Accepted: 23 April 2025

Keywords
Climate anxiety; Climate change; Early childhood; Mental health; Emotions; State-of-the-art review (SotA)

Introduction

Climate change is widely regarded as the most significant threat to the future well-being and prosperity of the planet and its inhabitants (Intergovernmental Panel on Climate Change [IPCC], 2023). Catastrophic weather events—including record-breaking heatwaves, wildfires, droughts, and floods—are occurring with increasing frequency, signalling that climate change is progressing more rapidly than anticipated. These events exacerbate existing inequalities, disproportionately affect vulnerable populations, and disrupt ecosystems and societies (IPCC, 2023; Royal College of Paediatrics and Child Health [RCPCH], 2025). As global temperatures continue to break records, the severity and complexity of climate change are expected to intensify, necessitating urgent and ambitious mitigation and adaptation efforts (IPCC, 2023).

Beyond its physical impacts, climate change has profound adverse effects on child development and mental health, including a rise in climate anxiety—a chronic fear of environmental doom (Organization for Economic Co-operation and Development [OECD], 2024; United Nations Children's Fund [UNICEF], 2021, 2022; World Health Organization [WHO], 2023). Extreme weather events and disasters can have immediate, traumatic impacts on children's mental health and well-being. Both direct experiences of climate-related events and indirect exposure through media and education can heighten anxiety, driven by perceived threats to children's futures and safety (Clayton & Brown, 2024; Clayton et al., 2023; Dodds, 2021). As a particularly vulnerable group, young children face an immense mental burden caused by a crisis largely attributable to older generations (Dodds, 2021). Notably, young children contribute the least to the climate crisis, yet they stand to lose the most if the situation remains unchecked (RCPCH, 2025: UNICEF, 2022).

Early childhood, spanning birth to age eight, is a critical period for psychological, emotional, and cognitive development. Understanding the effects of climate change on young children is essential, from disruptions caused by catastrophic weather events, to the pervasive anxiety about the future. Nevertheless,

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research on the intersection of climate change and early childhood mental health remains sorely neglected (Gil, 2024). This gap underscores an urgent need for scientific inquiry to identify both the short-term and long-term risk factors for climate anxiety for children's mental health (Sampaio & Sequeira, 2022). More importantly, the escalating severity of climate change necessitates prioritising early childhood research within the broader climate agenda. The OECD (2024) and United Nations Educational, Scientific and Cultural Organization [UNESCO] (2024) have made an urgent call for the integration of climate change education into school curricula, emphasising not only knowledge transfer but also social, emotional, and action-oriented learning. Such an approach would empower children to develop agency, self-efficacy, and the capacity to act.

In response to these gaps, this paper critically assesses and synthesises existing research on climate anxiety, with a particular focus on children under the age of eight. It aims to provide a comprehensive overview of current knowledge while identifying key areas for future research and practice.

Young Children and Climate Change

Research confirms that anthropogenic climate change adversely affects children's physical and mental health, beginning as early as the prenatal period (Squires et al., 2024; Harvard T.H. Chan School of Public Health, n.d.; RCPCH, 2025; WHO, 2023). Children are particularly vulnerable to climate change due to their physical and emotional dependence on adults (Mills & Giordano, 2023). Compared to adults, children will experience greater cumulative lifetime exposure to climate change impacts (Crandon et al., 2022; UNESCO, 2020; United Nations, 2023; van Valkengoed et al., 2023). Starting in utero, children are exposed to the direct and indirect effects of climate change, including weather extremes, malnutrition, and pollution (UNICEF, 2023). Their smaller bodies and underdeveloped immune systems make them especially susceptible to heat stress, respiratory issues, and disease (United Nations, 2023). These conditions also threaten their psychological well-being, contributing to increased rates of stress, anxiety, depression, and post-traumatic stress disorder [PTSD] (Clayton, 2020; Clayton et al., 2023; IPCC, 2023; UNESCO, 2023; United Nations Convention on the Rights of the Child [UNCRC], 2023).

Early childhood represents a critical period for psychological, emotional, and physical development. Prolonged stress during early childhood can significantly disrupt psychological, emotional, and physical development (Harvard T.H. Chan School of Public Health, n.d.; UNICEF, 2022). Climate change introduces multiple stressors, including more frequent and severe heatwaves, droughts, wildfires, floods, rising sea levels, and ecosystem degradation (European Commission, n.d.; United Nations, 2023; UNCRC, 2023; UNICEF, 2021; WHO, 2023). These events increase exposure to air pollution, vector-borne diseases, and malnutrition, thereby jeopardising children's physical health and exacerbating mental health challenges (Squires et al., 2024).

Beyond the immediate effects, climate change can drive forced migration, increased rates of hospitalisation, higher suicide rates, increase aggression and social conflict, and intensify feelings of anxiety (Hickman et al., 2021; Karabal, 2022; Lawrance et al., 2022). Emerging evidence suggests that many children are not only exposed to, but are increasingly aware of climate change and its implications (Hickman, 2024; Spiteri, 2023; Spiteri & Pace, 2023; Squires et al., 2024). This awareness can manifest as heightened anxiety, sadness, guilt, depression, and a need for appropriate psychological support (Clayton et al., 2023; RCPCH, 2025).

Climate Anxiety

The emotional and psychological impacts of climate change have given rise to various terms in the literature, including 'climate anxiety', 'eco-anxiety', 'climate grief', 'solastalgia', and 'eco-paralysis' (Albrecht, 2011; Cianconi et al., 2020; Coffey et al., 2021; Dodds, 2021; Hickman, 2024; Lawrance et al., 2022; Park et al., 2021; Pihkala, 2024). The terms 'eco-anxiety' and 'climate anxiety' are the most commonly used and often interchangeable. On the one hand, Albrecht (2011) introduced the term 'eco-anxiety' to describe emotional responses to environmental crises; on the other hand, 'climate anxiety' refers to persistent worry about climate change's real or perceived threats (Clayton, 2020; Clayton et al., 2023; UNESCO, 2022;

UNCRC, 2023). Despite frequent use, widely accepted definitions for these terms remain lacking.

This paper adopts the term 'climate anxiety', defined as a chronic fear of environmental catastrophe, triggered by both direct experiences of climate-related events and indirect exposure to global environmental threats (Clayton et al., 2023; Clayton & Swim, 2025). For children under eight years old, such anxiety is particularly significant due to their limited cognitive capacity to contextualise complex global issues (Spiteri & Pace, 2023) and their reliance on adults for emotional regulation (Spiteri, 2025). In this paper, climate anxiety in early childhood is conceptualised as persistent worry about the tangible and perceived threats of climate change, which manifests in emotional and psychological responses like fear, hopelessness, and rumination; this is particularly challenging for children under eight, who have heightened vulnerability and limited coping mechanisms during this period of rapid development. Symptoms include worry, hopelessness, fear, rumination, difficulty sleeping or studying, and impaired relationships (Dodds, 2021; Clayton, 2020; Clayton et al., 2023; Harvard. T.H. Chan School of Public Health, n.d.). Importantly, climate anxiety is not inherently pathological. Rather, climate anxiety represents a rational response to an existential, global threat and may even motivate adaptive coping strategies, such as problem-solving and pro-environmental behaviour (Dodds, 2021; Crandon et al., 2022). When anxiety becomes overwhelming and maladaptive, however, it can exacerbate existing mental health issues, leading to paralysis, avoidance, and despair (Cianconi et al., 2020; Ojala, 2012, 2022a, 2022b; Sanson et al., 2022).

While climate anxiety can impair functioning in some individuals, the aim is not to eliminate this response but to support children in developing self-efficacy and adaptive coping strategies (OECD, 2024). Currently, little is known about how climate anxiety manifests in children under eight, largely due to stigma surrounding anxiety and methodological challenges in studying young children. This lack of empirical data underscores the urgent need to foreground climate anxiety in early childhood within the broader scientific and educational discourse.

Theoretical Framework

We still lack a theoretical framework that reflects the complexities of early child development and climate change to guide empirical research and practical efforts to better support climate anxiety among young children (Sanson & Masten, 2023). To address this gap, this paper adopts an interdisciplinary framework grounded in developmental psychology, environmental science, public health, and education. This approach aims to provide a comprehensive understanding of how climate anxiety emerges and affects young children, situating it within the broader context of child development and global environmental stressors.

From a developmental perspective, climate anxiety is understood both as a rational emotional response to existential threats and as a potential disruptor of psychological development. While some level of concern can motivate adaptive behaviours, prolonged or intense anxiety may hinder emotional regulation and delay the achievement of developmental milestones. The framework recognises that early childhood is a crucial window for building emotional resilience and that children's vulnerability to climate anxiety is linked to their evolving cognitive capacities, emotional dependence on caregivers, and limited ability to make sense of abstract, global issues (Spiteri, 2025).

To contextualise these influences, the framework draws on Bronfenbrenner and Morris's (2006) ecological systems theory. This model emphasises that children's experiences are shaped by multiple, interacting systems—ranging from immediate environments (microsystems) to broader societal, cultural, and policy contexts (macrosystems). Climate anxiety is thus positioned as an outcome of stressors operating across various ecological levels, including direct physical risks (e.g., extreme weather), relational environments (e.g., emotionally reactive caregivers), and systemic factors (e.g., media narratives, educational policies). In doing so, the framework underscores the interconnection between physical and mental health outcomes, highlighting that children's cumulative lifetime exposure makes them disproportionately vulnerable compared to adults (Clayton et al., 2023; Clayton & Swim, 2025).

The framework distinguishes between adaptive responses and maladaptive responses to climate

anxiety. Adaptive responses may include increased environmental awareness, empathy, and engagement in climate action, while maladaptive responses may involve emotional withdrawal, denial, or feelings of helplessness (Ojala, 2022a). It posits that while some level of worry is a natural and even beneficial response to existential threats, excessive or unregulated anxiety can lead to emotional paralysis or withdrawal. The goal is not to eliminate climate anxiety but rather to support children in developing resilience through targeted interventions that promote emotional regulation and constructive engagement.

Education is identified as a critical mechanism for mitigating climate anxiety in early childhood. The framework advocates for integrating climate change education into early childhood curricula through approaches that combine knowledge transfer with social-emotional learning (SEL) (Ojala, 2022b). By enhancing children's agency, self-efficacy, and problem-solving skills, educators can help them develop adaptive coping mechanisms while empowering them to engage constructively with environmental challenges (Bandura, 1977). Action-oriented learning approaches are particularly emphasised as they enable children to feel a sense of control over their future.

Overall, by synthesising interdisciplinary insights and emphasising actionable strategies, this theoretical framework provides a comprehensive foundation for addressing climate anxiety in early childhood and underscores the importance of prioritising this vulnerable population within broader efforts to mitigate the psychological impacts of climate change globally.

Method

This paper employs a state-of-the-art (SotA) review methodology because "The fundamental purpose of state-of-the-art literature reviews is to create a 3-part argument about the state of knowledge for a specific phenomenon: this is where we are now, this is how we got here, and this is where we could go next" (Barry et al., 2022, p. 663). Rooted in a constructive research orientation, an SotA review methodology is a form of narrative review that aims to generate knowledge by reviewing and synthesising current research while identifying research gaps and positioning future directions (Barry et al., 2022; Barry et al., 2023). An SotA review is well-suited to explore new areas of research, particularly when developing scientific thinking about an innovative topic of research (Barry et al., 2022; Grant & Booth, 2009). Climate anxiety in early childhood represents one such emerging area.

In this paper, an SotA review methodology is particularly well-suited for reviewing the literature to explore why and how our current knowledge around climate anxiety in early childhood has developed, and to offer new research directions to help to move the field forward. Specifically, this paper argues for an SotA review because it aims to present new ways of how the literature presented here could be interpreted by researchers rather than providing a conclusive or absolute perspective on how the literature ought to be understood (Barry et al., 2022). The current SotA review is aimed at generating knowledge about climate anxiety in early childhood in order to help us understand where we are now; how we arrived at this stage; and where we need to go next (Barry et al., 2022; Barry et al., 2023). This approach aligns with the theoretical framework described above by emphasising reflexivity and iterative analysis to ensure rigour in tracing the trajectory of this emerging field. The SotA methodology also supports the aim of the theoretical framework in generating actionable insights by critically assessing how current knowledge has evolved and proposing pathways for advancing scientific inquiry.

The review followed the six-stage SotA review process outlined by Barry et al. (2022), described below.

Step 1- Determining the research question and field of inquiry: In recent years, there has been a growing interest in climate anxiety among children (Clayton et al., 2023). An initial literature search identified a number of studies that looked at children, climate change and climate change emotions. Yet a specific focus on climate anxiety in early childhood is a largely overlooked area, with limited and incidental references in the literature. More importantly, a consolidated review of the field is missing. Hence, the initial research question guiding this literature review is: What is the current state of research in climate anxiety in early childhood?

Step 2- Establishing the timeframe: The timeframe of the review begins with the publication of UNESCO's document *The contribution of early childhood education to a sustainable society* (Pramling Samuelsson & Kaga, 2008), which marks a significant milestone in the global recognition of early childhood education for sustainability (ECEfS). This can be considered the beginning of SotA thinking in ECEfS. As a result, the timeframe for this review is from 2008, extending up to March 2025.

Step 3- Finalising the research question(s): The original research question was revised to better align with the objectives of studying climate anxiety in early childhood. Such a process also led to the formulation of supplementary questions to guide the analysis process. The finalised research question is: What is the current state of research on climate anxiety in early childhood? The supplementary questions are: What is the general trend in publications? What aspects of climate anxiety in early childhood do these studies address? Where could we go next to advance this understanding?

Step 4- Developing the search strategy: An electronic search of five databases, including HyDi, PubMed, PsycINFO, Google Scholar and Web of Science, was conducted. These databases were chosen in order to capture the literature about climate anxiety in early childhood. The search strategy is outlined below, in Table 1.

Table 1
Search Strategy

Database	Search terms
HyDi	'young children', 'children', 'early childhood education', 'early childhood', 'climate anxiety', 'eco-anxiety', 'worry', 'sad', 'hopeless', 'guilt', 'climate change emotions', 'hope' and/or 'climate change education'
PubMed	
PsycINFO	
Google Scholar	
Web of Science	

The inclusion criteria for topics of interest were the connection between children, climate change, and climate anxiety, as well as other climate change emotions, and climate change education in early childhood. Eligible sources were journal articles, conference proceedings, reports, and books. The publication window spanned from 2008 to 2025, with the requirement that articles be published in English. Additionally, citation searching within included articles was used to identify relevant articles using the same inclusion criteria discussed above (See Table 2).

Table 2
Inclusion and Exclusion Criteria

Criteria	Inclusion criteria	Exclusion criteria
Language	The study is published in English	All other languages than English
Area of research	Climate change, climate anxiety and emotions, early childhood	Environmental issues in general
Participants	Children in early childhood education	Children in primary education onwards
Type of publication	Journal articles, conference proceedings, reports, books	Pilot studies, study protocols, guides, newspaper articles
Availability	The full-text of the study must be available	The full-text of the study could not be consulted via library systems or the Internet
Answers research questions	The purpose and/or research question of the publication contributes to answering the research questions of this review	The purpose and/or research question of the publication does not contribute to answering the research questions
Research design	The design of the study is either mixed methods, qualitative or quantitative	The design of the study is descriptive, systematic and/or narrative review
Discipline	Early childhood education	The education discipline is different than early childhood education

Step 5- Analysis: The analysis process consisted of two steps. In step 1, a data extraction tool was created to capture four types of information about each manuscript. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart (Fig. 1) was used to report the screening process (Page et al., 2021). An excel spreadsheet was used for data extraction. The extracted data included:

a) Article demographic data collected (e.g., year, authorship, journal);
b) Information specifically related to children and climate anxiety;
c) References to and/or descriptions of climate anxiety; and
d) Data looking at children of all ages.

Since all studies were qualitative in nature, the checklist for qualitative studies developed by Joanna Briggs Institute [JBI] (2020) was used to assess the methodological quality of the included studies. This tool is often used to assess the trustworthiness, validity, relevance, and results of publications (JBI, 2020). The included studies were then analysed systematically by the use of a coding scheme, to assess the main features of the studies. This scheme includes the sample characteristics (age, year of study), general study information (publication type, publication year, country), and a summary of the findings. This scheme ensures credibility. The classification of the included articles in the main research area was guided by the research questions. The main research area was determined after reviewing the keywords and findings from the data extraction table. This categorisation was performed by the author. Both the classification process and the identified research areas were presented to another scholar to ensure consistency in categorisation. Some articles were classified in more than one category because they focused on more than one aspect related to the research area.

In step 2, due to the expected heterogeneity of the research designs, methodologies and quantitative analyses were not pursued. Instead, an inductive approach to data analysis was conducted to answer the research questions. Initially, the literature was analysed to trace the trajectory of climate anxiety in early childhood and to identify key themes. Interpretive notes were created for each article to test and refine emerging patterns. An open coding/initial coding was utilised, generating codes that indicated the research area of the studies included. Subsequently, the codes were clustered into themes. The emerging themes were discussed with two other scholars to enhance credibility. Adjustments were made iteratively to ensure rigour and consistency.

Step 6- Reflexivity: The SotA review methodology is based on a relativist ontology and a subjective epistemology (Barry et al., 2023). Acknowledging that SotA reviews rely heavily on the researcher's subjective orientation, a reflexive approach was employed to mitigate potential biases (Barry et al., 2023). During the research process, the reflexive process helped me to neutralise my subjectivity by consciously acknowledging, critiquing and explaining my subjectivity and contextual influences in the research process (Olmos-Vega et al., 2022). Following guidance from Olmos-Vega et al. (2022), in the current study, I engaged in a continuous reflexive process involving:

a) personal reflexivity by examining, reflecting and clarifying my expectations, assumptions and conscious and unconscious influence and/or reactions to context;
b) interpersonal reflexivity by reflecting on how my engagement influenced the research process;
c) methodological reflexivity by critically assessing the impact of my methodological decision-making; and
d) contextual reflexivity by critically considering how my cultural and historical positioning may have shaped the research process.

These reflections were systematically recorded in a researcher's journal to enhance transparency.

Although this SotA review did not involve primary data collection or direct interaction with children, it adhered to rigorous ethical standards throughout. All reviewed materials were handled confidentially, and findings are disseminated with consideration of their potential impact on policy, practice, and research. The study followed the ethical guidelines set by the European Early Childhood Education Research Association (EECERA), demonstrating a commitment to integrity, accurate representation of literature, and continuous reflexivity to mitigate bias (Bertram et al., 2024; Olmos-Vega et al., 2022).

The review's aim—to advance understanding of climate anxiety in early childhood—aligns with the

principle of beneficence, contributing to the global well-being of young children. Recognising the topic's sensitivity, the study maintained an ethical stance in research design, interpretation, and reporting, avoiding alarmism while addressing the emotional vulnerabilities of young children affected by climate change.

A child-centred ethical framework guided the review, recognising children as active emotional and cognitive agents. Studies were assessed for alignment with ethical guidelines such as the United Nations Convention on the Rights of the Child (United Nations, 1989), particularly regarding children's rights to expression and protection from harm. Methodological transparency and the avoidance of coercion or psychological distress were critical evaluation criteria.

Given the affective dimension of climate anxiety, the review considered whether studies addressed potential psychological risks and highlighted those that integrated resilience-building and coping strategies as ethical best practice. It also applied a lens of equity and justice, examining how climate anxiety may be experienced across diverse socio-economic, cultural, and geographical contexts, and whether the literature avoided privileging dominant perspectives.

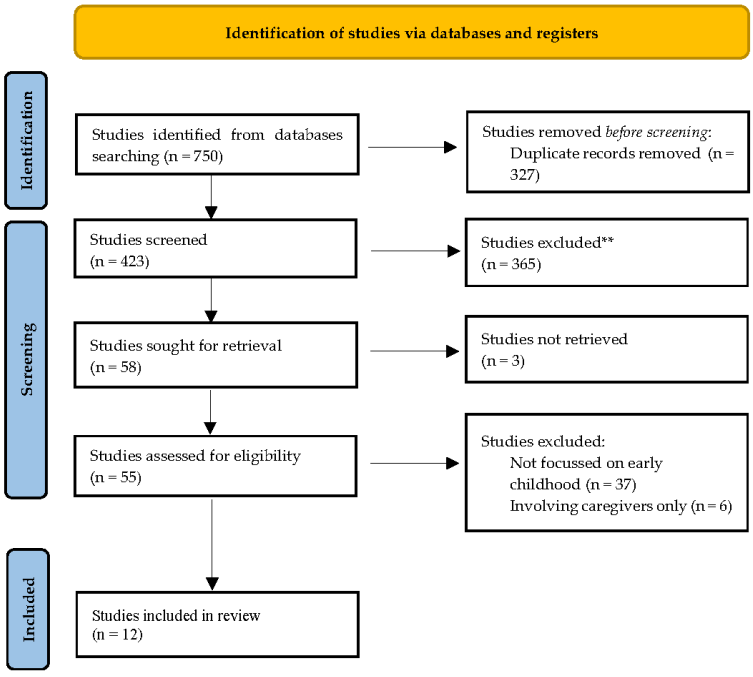
Finally, the review underscores the ethical responsibility of scholars to frame climate anxiety discourse in a manner that is balanced, non-alarmist, and empowering. Language in academic reporting should validate children's concerns while promoting agency, collective action, and constructive engagement. By embedding these ethical principles, this review seeks to contribute responsibly to the growing discourse on climate anxiety in early childhood.

Results

The database search yielded 750 articles, of which 327 were duplicates and subsequently removed. Titles and abstracts of the remaining 423 articles were screened based on predefined inclusion and exclusion criteria (Table 2), leading to the exclusion of 365 articles. This left 58 articles for full-text review. However, 3 full texts could not be retrieved. Articles were excluded at this stage if they were not in English, focused on older children, or were not peer-reviewed. Following the full-text review, 43 articles were excluded for not addressing climate anxiety, climate-related emotions, or early childhood. As a result, 12 studies were included in this review (Fig. 1).

Figure 1

PRISMA Flow Chart Showing Studies Found and Included in the Current Study (Page et al., 2021).



Study Characteristics

Research specifically examining climate anxiety in early childhood—typically defined as ages 0 to 8—is currently limited. A comprehensive review of the peer-reviewed literature revealed an absence of empirical studies that focus directly on this age group. Most available research addresses older children, adolescents, and young adults. While this reflects the state of the field at the time of writing, it is important to acknowledge that the absence of studies cannot be confirmed with absolute certainty, as new publications continue to emerge.

Given the lack of empirical research focused on climate anxiety in early childhood, the current SotA review draws on broader literature concerning climate change and early childhood education to help to move the field forward. This includes studies exploring young children's understandings of climate change as an environmental issue, pedagogical responses to climate change, and emotional development in the context of sustainability education. These contributions offer valuable, albeit indirect, insights into how young children may experience and process climate-related concerns (See Table 3).

Table 3
Studies Identified in the Search for the Literature

Authors	Pub. Year	Title of article	Publication Type (Chapter/Article)	Children's age	Country	Summary of the research findings
Bahtić, K., & Višnjić Jevtić, A.	2020	Young Children's Conceptions of Sustainability in Croatia	Article https://doi.org/10.1007/s13158-020-00266-4	3-7 years	Croatia	Children's understanding of sustainability
Burke, S.E.L., Sanson, A.V. & Van Hoorn, J.	2018	The Psychological Effects of Climate Change on Children	Article https://doi.org/10.1007/s11920-018-0896-9	5-18 years	Australia	Explores mental health risks due to climate change exposure, emphasising anxiety, PTSD, and developmental issues.
Duhn, I., McPherson, A., & Kirkwood, L.	2024	Creating a Climate for Change: Early Years Education, Climate Action, and Place-Based Learning with Young Children.	Chapter https://link.springer.com/chapter/10.1007/978-3-031-64900-4_5	3-5 years	New Zealand	Focuses on early childhood education and how place-based learning can foster climate action among young children by engaging them with local ecological issues.
Hackett, A., Kraftl, P., & White, J.	2025	Fractured stories and voices of the future; coproduced research with young children and trees	Article https://doi.org/10.1177/2043610625131521	4-7 years	UK	Uses co-produced research with young children and nature to explore how children imagine futures impacted by climate change.
Hannust, T., & Kikas, E.	2010	Young children's acquisition of knowledge about the Earth: A longitudinal study	Article https://doi.org/10.1016/j.jecp.2010.04.002	2-7 years	Estonia	What children know about the Earth and gravity and to see how children's answers change over time.
Kalhoff, H., Sinningen, K., Belgardt, A., Kersting, M., & Luecke, T.	2023	Climate change and fluid status in children: early education as one response to an emerging public health problem	Article https://doi.org/10.1017/S1368980023002562	5-11 years	Germany	Discusses how climate-induced heat can affect children's fluid balance and advocates for early education interventions to address this public health concern.
Mackey, G.	2012	To know, to decide, to	Article	3–7 years	New	Argues that young

		act: The young child's right to participate in action for the environment	https://doi.org/10.1080/13504622.2011.634494		Zealand	children are capable of participating in environmental action when supported with respectful pedagogical approaches.
Martin, G., Reilly, K., Everitt, H., & Gilliland, J.A.	2022	Review: The impact of climate change awareness on children's mental well-being and negative emotions – a scoping review	Article https://doi.org/10.1111/camh.12525	5-17 years	Canada	Review highlights that increased awareness of climate change is linked to negative emotions like anxiety and sadness, but also to increased environmental engagement.
Spiteri, J.	2023	Young children's understanding of environmental issues	Chapter https://doi.org/10.1007/978-3-031-04560-8_20	3-8 years	Malta	Children's understanding of environmental issues, including climate change issues.
Spiteri, J., & Pace, P.	2023	"When the sun gets very hot": Young children's perceptions of climate change	Article https://doi.org/10.1177/09734082231183481	4-8 years	Malta	Examines how young children express their understanding of climate change through metaphors and narratives; finds early awareness but conceptual gaps.
Wall, E. & Eapen, V.	2025	Nurturing tomorrow: Mental health effect on children and youth due to climate change	Article https://www1.racgp.org.au/ajgp/2025/january-february/nurturing-tomorrow	5-24 years	Australia	Highlights the increasing incidence of eco-anxiety among children and youth, and calls for mental health support integrated into climate change education.
White, E.J., Williams, N., & Martin, K.	2024	Worrying with Children and Water in ECEC: Exploring the Pedagogical framing Effects of Actions for Climate Change	Article https://doi.org/10.1007/s13158-024-00392-3	3-5 years	New Zealand	Analyses how early childhood educators frame climate-related water issues pedagogically, promoting action through empathy and inquiry.

The studies included in this SotA review present a diverse range of research examining young children's experiences, understandings, and responses to climate change and environmental issues. The studies were published between 2010 and 2025, and span a range of countries including New Zealand, Australia, the United Kingdom, Malta, Germany, Canada, Croatia, and Estonia. The children's ages across the studies range from as young as 3 years old to young adults aged 24, though most focus on early to middle childhood (approximately 3–11 years).

Most of the studies are empirical articles published in peer-reviewed journals, with a smaller number of book chapters. The methodologies vary, including empirical research, co-produced research, scoping reviews, and pedagogical analysis. Thematically, several studies focus on children's emotional and psychological responses to climate change, including emotional understanding (e.g., Burke et al., 2018; Martin et al., 2022; Wall & Eapen, 2025). Others investigate children's conceptual understandings of climate and environmental issues, often through narratives, metaphors, and structured learning environments (e.g., Hannust & Kikas, 2010; Spiteri, 2023; Spiteri & Pace, 2023).

A notable subset of studies explores educational interventions and pedagogical practices that support children's engagement with environmental issues. For instance, Duhn et al. (2024) and White et al.

(2024) examine place-based and water-focused climate pedagogies in early childhood education settings in New Zealand. Mackey (2012) emphasises the rights and capabilities of young children to participate in environmental action when pedagogical approaches are respectful and supportive. Similarly, Hackett et al. (2025) employ co-produced research to capture children's imaginaries of climate-affected futures through relationships with trees. Health-related concerns are also present in the literature, with Kalhoff et al. (2023) focusing on the public health implications of climate-induced heat on children's hydration in Germany, advocating for early education as a preventive strategy.

Together, these studies reflect a growing global interest in how young children understand, are affected by, and can actively respond to the climate crisis. They demonstrate an interdisciplinary approach that incorporates psychological, educational, and public health perspectives, highlighting both the vulnerabilities and the potential agency of children in the context of environmental change. Taken together, these observations highlight critical gaps and opportunities for future research. As young children are particularly vulnerable to emotional stress and are increasingly exposed to climate discourse in their homes, communities, and media environments, it is essential to investigate how they perceive and are affected by climate change. Building an empirical foundation in this area will be key to developing developmentally appropriate, culturally relevant, and ethically grounded educational and psychological interventions.

Discussion

The current SotA review addresses two key research questions: What is the current state of research on climate anxiety in early childhood? The supplementary questions are: What is the general trend in publications? What aspects of climate anxiety in early childhood do these studies address? Where could we go next to advance this understanding? The findings to address each question are detailed below.

What is the Current State of Research on Climate Anxiety in Early Childhood?

The findings indicate that the field is still in its infancy. Furthermore, the current literature paints a fragmented yet increasingly urgent picture of climate anxiety in early childhood. While there is broad consensus that children are both affected by and responsive to climate change, research specifically examining how climate anxiety manifests in children under eight remains limited and under-theorised (European Commission, n.d.; Graff Zivin et al., 2018). Studies frequently conflate general environmental concern with clinically significant anxiety, and few developmentally appropriate tools exist to differentiate between these experiences. As a result, our understanding of the emotional, psychological, and developmental impacts of climate anxiety in early childhood remains in its infancy.

Evidence shows that young children often respond to climate change with strong emotions—such as worry, fear, sadness, and confusion—particularly when the topic is introduced through education or caregiving settings (Wall & Eapen, 2025). However, these responses are rarely explored in terms of their long-term psychological implications. Although terms like 'eco-anxiety' and 'climate grief' are gaining recognition in adolescent and adult mental health research, they are seldom applied systematically in studies involving younger children.

There is growing awareness that children's climate-related emotions are shaped by a complex web of influences, including the emotional climate of the home (Raikes & Thompson, 2006; Spiteri, 2023, 2025), how environmental issues are framed pedagogically (White et al., 2024), and the availability of meaningful opportunities for action (Mackey, 2012). This represents a shift from viewing children as passive recipients of environmental stressors to recognising them as emotionally perceptive, relationally embedded, and potentially empowered individuals.

Methodologically, the field is still evolving. While innovative participatory and arts-based approaches are beginning to emerge (Hackett et al., 2025; Spiteri & Pace, 2023), much of the research remains reliant on adult-centric methods that risk oversimplifying or misrepresenting children's emotional experiences. Furthermore, the literature predominantly reflects Euro-Western contexts, with minimal

attention to Indigenous, non-Western, or low-income settings—despite the global and inequitable nature of climate-related risks and emotional impacts.

Emerging studies indicate that even very young children express deep concern about climate change, particularly regarding its effects on their future, communities, and the natural world (Martin et al., 2022; Masten, 2021; Spiteri & Pace, 2023). Their concerns frequently center on extreme weather, biodiversity loss, pollution, and resource depletion—demonstrating an early awareness of the interconnectedness between environmental degradation and their own well-being. Persistent worry, both immediate and anticipatory, is now recognised as a significant contributor to children's mental and physical health challenges (Perlant, 2023; UNCRC, 2023). Consequently, climate-related anxiety is increasingly viewed as a public health issue, particularly for vulnerable populations such as children, with potential outcomes including chronic stress, depression, and disrupted emotional and cognitive development (Godden et al., 2021).

The UNCRC (2023) has formally acknowledged climate anxiety in children as an urgent issue. Article 12 of the Convention (United Nations, 1989) affirms children's right to be heard on matters that affect them. Yet public health and education systems have been slow to develop comprehensive prevention or support mechanisms. Systemic barriers—such as limited participatory platforms and adult assumptions about children's capabilities—continue to exclude young children from climate policy and action (UNICEF, 2023). Climate change also directly threatens children's fundamental rights to clean water, nutritious food, safe shelter, and quality education—rights already under strain due to increasing displacement, extreme weather, and ecological disruption (UNICEF, 2023). In this context, the climate crisis is not only an environmental or political issue, but also a children's rights crisis (UNICEF, 2021).

Education is widely recognised as a key mechanism for climate change mitigation and adaptation (European Climate and Health Observatory, 2022; European Commission, 2021, 2023; United Nations, 2015). Global frameworks—including the Sustainable Development Goals (SDGs), the European Green Deal, and IPCC reports—emphasise the interdependence of education, climate resilience, and societal well-being. Early childhood education settings play a pivotal role in introducing environmental issues through media, curricula, and peer interaction. Climate anxiety is frequently observed as a recurring emotional response in these contexts (Spiteri & Pace, 2023). Yet has been slow, particularly in integrating emotional well-being into early childhood climate education (United Nations, 2023). Early childhood settings are therefore critical for fostering both cognitive understanding and emotional resilience. However, no studies to date have specifically examined how climate anxiety manifests and can be tackled in children under eight. This gap leaves the field under-resourced and poorly understood, raising unresolved questions about whether such anxiety is an adaptive response to a real threat or a maladaptive emotional burden (European Commission, n.d.; Graff Zivin et al., 2018).

Despite young children's capacity for environmental understanding (Spiteri, 2023), they often hold misconceptions that, if left unaddressed, may persist into adulthood (Spiteri & Pace, 2023). Effective climate education must go beyond cognitive knowledge to address emotional needs, equipping children with tools to respond constructively to environmental challenges (Ogunbode et al., 2022). The way climate change is presented in educational contexts significantly influences children's emotional responses. Without adequate emotional support, climate messaging can lead to denial, despair, or heightened anxiety (Sanson & Masten, 2023; Crandon et al., 2022). Yet the extent to which current educational programs address these emotional dimensions remains unclear.

To be effective, climate change education must create emotionally supportive environments that validate children's feelings and foster a sense of agency (Baker et al., 2021; Ojala, 2022b). Although international frameworks increasingly acknowledge the role of ECEC in climate change education, the sector remains under-utilised and under-theorised—highlighting an urgent need for developmentally informed, emotionally responsive approaches to climate anxiety in early childhood. Barriers to effective implementation include the lack of integration of climate content into national early childhood curricula and insufficient teacher training (Murphy et al., 2020; Sanson et al., 2022; UNESCO, 2024). Compared to other educational levels, ECEC significantly lags in incorporating climate change education and offering

professional development in this area. Addressing these gaps is critical to leveraging early childhood education as a foundation for climate resilience, emotional literacy, and sustainable action.

What is the General Trend in Publications?

The current SotA review reveals four major thematic clusters that define the current state of research on young children and climate change: (a) emotional and psychological responses, (b) conceptual understandings and meaning-making, (c) pedagogical responses and educational practices, and (d) children's agency in environmental action. A smaller but notable theme also concerns the public health dimensions of climate change as they affect children.

The first cluster – emotional and psychological responses, is particularly well-represented in the current literature. Studies such as Burke et al. (2018), Martin et al. (2022), and Wall and Eapen (2025) draw attention to the growing phenomenon of climate anxiety among children and youth. These works suggest that children exposed to information about climate change—whether through media, education, or lived experience—can exhibit symptoms of anxiety, helplessness, PTSD, and sadness.

The second thematic area concerns how children make sense of climate and environmental issues. Studies in this domain tend to focus on young children's cognitive and narrative frameworks—how they construct meaning around abstract or complex phenomena such as rising temperatures, weather patterns, and sustainability. Spiteri and Pace (2023), for instance, analyse children's understanding of climate change, revealing both early awareness and notable conceptual limitations. Hackett et al. (2025) extend this inquiry by engaging children in co-produced research with trees to explore future imaginaries in a warming world, showing how relational thinking and ecological empathy are integral to children's meaning-making. These works suggest that while young children may not fully grasp scientific mechanisms of a changing climate, they are capable of emotionally resonant and imaginative understandings of climate impacts.

The third theme emphasises pedagogical strategies used in early childhood settings to introduce climate change topics. Some studies—Duhn et al. (2024), Mackey (2012), and White et al. (2024)—investigate how early childhood educators can facilitate developmentally appropriate, emotionally sensitive, and action-oriented engagements with climate issues. Duhn et al. (2024) advocate for place-based education, arguing that grounding learning in local ecological contexts enables children to develop stronger environmental connections and fosters climate-related agency. Mackey (2012) frames pedagogy through a children's rights lens, arguing that young children have the capacity—and the right—to participate in environmental decision-making when educators adopt respectful, democratic teaching approaches. White et al. (2024) focus specifically on pedagogical framings of water-related climate issues, emphasising how educators' choices around language, materials, and emotional tone can either empower or overwhelm children. Collectively, these studies argue for a shift from avoidance, toward engaged, hopeful, and responsive pedagogies.

The fourth theme concerns children's agency and participation in the context of environmental and climate action. This is an emergent but powerful strand of research that contests the widespread assumption of young children as passive, cognitively immature, or emotionally fragile. Instead, studies such as Hackett et al. (2025) and Mackey (2012) frame children as active co-constructors of knowledge and potential contributors to climate solutions. Hackett and colleagues, for example, use arts-based and nature-mediated methods to support children in envisioning climate-affected futures, while Mackey (2012) calls for the recognition of children's environmental rights and competencies in global sustainability efforts. These perspectives align with broader movements in childhood studies and ECEfS that seek to reposition children as capable agents with moral, social, and ecological insight.

A final, though less frequently addressed, theme pertains to climate change as a public health issue. Kalhoff et al. (2023) provide a distinctive contribution in this area, examining how increased heat exposure due to climate change affects children's fluid balance and hydration, with potential long-term health implications. They argue for a stronger role for early education settings in mitigating these risks through

proactive health education, thus linking pedagogical practices with public health strategies. This study broadens the field by recognising the physiological vulnerabilities of children in addition to emotional and cognitive ones, yet it remains one of the few to bridge education and health in this way.

What Aspects of Climate Anxiety in Early Childhood do These Studies Address?

The reviewed studies reveal the emergence of a specialised vocabulary to describe children's emotional and psychological responses to climate change. Terms such as 'eco-anxiety', 'climate anxiety', and 'climate-related distress' appear frequently, reflecting a growing concern with the affective toll that climate awareness can have on young people. Martin et al. (2022), and Wall and Eapen (2025) explicitly use the term 'eco-anxiety' to denote persistent worry and psychological unease linked to environmental collapse and uncertainty about the future. Burke et al. (2018) adopt a clinical framing, discussing risks of PTSD, anxiety disorders, and developmental trauma associated with both direct and indirect exposures to climate-related disasters. Other studies, such as White et al. (2024), employ terminology like 'worrying with' children, emphasising inter-relational emotional work in climate pedagogy rather than shielding children from negative emotions.

In parallel, educationally-oriented studies make frequent use of terms like 'climate action', 'participatory rights', 'pedagogical framing', and 'place-based learning' to describe strategies for engaging children meaningfully and responsibly in climate-related discussions. These terms underscore a shift in discourse from protectionism to empowerment, focusing not only on what children feel or know, but what they can do in response to climate change. This evolving lexicon reflects broader shifts in both climate education and childhood studies, suggesting new interdisciplinary frameworks for understanding how emotions, cognition, and agency intersect in children's climate learning.

Where Could We go Next?

Most existing studies offer cross-sectional snapshots rather than longitudinal insights. These gaps—spanning developmental trajectories, emotional experiences, pedagogical strategies, and global representation—limit the field's ability to inform effective policy, practice, and theory. To move the field forward, climate anxiety in early childhood must be reframed not simply as an emerging psychological issue, but as a complex, multidimensional phenomenon that intersects with developmental, sociocultural, educational, and rights-based domains. Research that adopts interdisciplinary approaches, and that takes seriously both the emotional realities and the agentic capacities of young children living in a climate-altered world, is warranted—a foundational step is to create developmentally appropriate definitions of climate anxiety in early childhood. Scholars need to distinguish between normative developmental worry, general environmental concern, and clinically significant anxiety—anchoring these concepts in early childhood developmental theory. This clarity will help prevent over-pathologising children's emotions while also recognising when support is needed.

Progress in the field hinges on the use of methods that align with children's expressive and cognitive capacities. Existing tools often miss the nuance of children's emotional lives, particularly when it comes to complex and abstract threats like climate change. Research employing child-centred, participatory, and multimodal methods—including storytelling, drawing, play-based interviews, and arts-based inquiry—can allow young children to communicate meaningfully within their cultural and developmental contexts.

Longitudinal and cross-cultural research is especially needed to trace how climate change emotions evolve over time and how these trajectories vary across socioecological settings. Engaging children in communities already experiencing the direct effects of climate change can help generate more globally inclusive and ecologically grounded understandings of early emotional responses.

Given the recognition of climate change as a children's rights crisis (UNICEF, 2021), future research and policy must be aligned with the principles of the UN Convention on the Rights of the Child—particularly Articles 12 (right to be heard), Article 24 (right to health), and Article 29 (right to education that teaches children how to respect the environment early on) (United Nations, 1989). Embedding a rights-

based lens will affirm children's entitlements to emotional well-being and environmental protection, while supporting their meaningful inclusion in climate decision-making processes.

Early childhood education offers a crucial platform for addressing climate anxiety through emotionally attuned and resilience-building pedagogies. Educators need adequate training and resources to facilitate climate-related conversations in developmentally appropriate and hopeful ways (Spiteri, 2024). Future research should evaluate the effectiveness of pedagogical strategies that integrate emotional literacy, mindfulness, nature-based experiences, and opportunities for prosocial action—supporting both cognitive engagement and emotional resilience.

Children's emotional responses to climate change are shaped within the relational ecosystems of their families and communities (Spiteri, 2025). The roles of families, caregivers, and educators in mediating children's emotional responses are under-researched. The emotional tone of family and classroom discourse, media narratives, and broader cultural messages all influence how children perceive and respond to climate threats. Research must explore how climate anxiety is co-constructed in these social contexts, and how intergenerational patterns of concern, hope, and action shape children's emotional worlds.

The literature remains dominated by studies from high-income, Euro-Western contexts, neglecting the diverse experiences of children globally. This lack of geographic and cultural diversity constrains the field's relevance. Advancing the field requires a commitment to climate justice and equity. Research agendas must prioritise the inclusion of children from the Global South, Indigenous communities, climate-vulnerable regions (e.g., the Mediterranean basin), and low-income families. Without such inclusion, the field risks reproducing dominant Euro-Western perspectives and overlooking those children most affected by the climate crisis. Cross-cultural research is critical to understanding how diverse belief systems, traditions, and socio-economic realities shape children's emotional responses and adaptive strategies.

Taken together, these priorities highlight the need for a new research agenda—one that is interdisciplinary, inclusive, developmentally grounded, and action-oriented. The goal is not only to document children's climate awareness or anxiety, but to cultivate their emotional resilience, agency, and capacity for meaningful engagement. Addressing these gaps is not just a scholarly imperative; it is an ethical one. The youngest generations will inherit the consequences of today's climate decisions. There is a pressing ethical imperative for research to support children—psychologically, educationally, and socially—as they navigate an uncertain but shared future.

Strengths and Limitations

This review offers a pioneering examination of climate anxiety in early childhood, and provides a comprehensive overview of an emerging field, identifies significant gaps in empirical and theoretical knowledge, and outlines key directions for future inquiry. By adopting a child-centred, interdisciplinary, and ethically grounded approach, the review helps frame climate anxiety not only as a psychological concern but also as a developmental, educational, and rights-based issue.

Nevertheless, certain limitations must be acknowledged. First, the review focuses on the term 'climate anxiety' potentially overlooking related constructs such as 'environmental worry' or broader concepts of sustainability-related emotional distress. Second, reliance on peer-reviewed, English-language literature excludes grey literature and non-English studies, contributing to publication and regional biases. Third, the limited body of existing research restricts the ability to draw definitive conclusions.

Despite these limitations, the review provides a strong foundation for advancing research on climate anxiety in early childhood. It highlights the need for methodological innovation, greater cultural and geographic diversity, and more nuanced theoretical development in this under-explored area.

Conclusions

Children under the age of eight bear little responsibility for the climate crisis, yet they are among the

most vulnerable to its far-reaching impacts. Despite this, research into their emotional responses to climate change—particularly the phenomenon of climate anxiety—remains scarce and under-theorised.

This review highlights the urgent need for empirical and conceptual advancement to better understand how climate anxiety manifests in early childhood, and how best to support young children in navigating the emotional challenges of living in a climate-altered world. Addressing climate anxiety in young children requires comprehensive policy responses that not only mitigate the root causes of climate change but also respond to its psychological and developmental impacts. This includes age-appropriate mental health support and the integration of SEL-focused, emotionally attuned climate education into early childhood curricula, and the promotion of interdisciplinary collaboration among educators, psychologists, policymakers, and environmental scientists to design holistic, child-centred strategies.

Moving forward, a paradigm shift is needed—one that moves from reactive concern to proactive, inclusive, and systemic inquiry. We must redefine what climate anxiety means in early childhood, develop tools that authentically capture children's voices, embed emotional support within early education settings, and position children as legitimate participants in climate discourse and action. Grounding this work in developmental science, children's rights, and global justice will allow us to build a robust research and policy agenda that supports young children not only in coping with the climate crisis but in becoming resilient, hopeful, and empowered citizens of a shared and sustainable future.

Declarations

Authors' Declarations

Acknowledgements: This article benefited from involvement in the COST Action <Climate change impacts on mental health in Europe (CliMent), CA23113>, supported by COST (European Cooperation in Science and Technology).

Authors' contributions: This article was written solely by the author.

Competing interests: The author declares that she has no competing interests.

Funding: No funding was received for the current paper.

Ethics approval and consent to participate: This is not applicable due to the nature of the study, which is a systematic review.

Publisher's Declarations

Editorial Acknowledgement: The editorial process of this article was completed under the editorship of Dr. Mehmet Toran through a double-blind peer review with external reviewers.

Publisher's Note: Journal of Childhood, Education & Society remains neutral with regard to jurisdictional claims in published maps and institutional affiliation.

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