

Intolerance of Uncertainty and Eco-anxiety: a Systematic Literature Review (2001-2005)

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Abstract

The declining climate conditions have introduced various forms of uncertainty in human society, leading to increased risks of environment-related anxiety known as eco-anxiety. This review aims to examine the relationship between intolerance of uncertainty (IU) and eco-anxiety. In line with the PRISMA 2020 guidelines, a search was conducted on 4 databases: Google Scholar, PubMed, Arxiv and Scispace for empirical research published between 2021 and 2025. The search yielded 179 unique records, which were screened by their abstracts. The review cut across different regions and population groups and selected seven primary empirical studies, which met the inclusion criteria. The evidence from these studies demonstrates a positive association between IU and eco-anxiety, with Positive IU playing an important role, as it is characterised by proactive information seeking, whereas inhibitory IU leads to paralysis and appears more peripheral. Intolerance of Uncertainty also plays a mediating role in the relationship between eco-anxiety and mental wellbeing. Using the ROBINS-1 assessment to assess the risk of bias, the result indicated a moderate overall bias across all included studies, particularly due to the cross-sectional nature of the data, which limits causal inference. Limited geographical diversity, absence of longitudinal designs and reliance on convenience samples were identified as significant gaps in the literature. Future research should prioritise prospective studies to establish temporal precedence and examine intervention targets for reducing maladaptive climate-related distress.

Keywords: Eco-Anxiety, Climate Change, Intolerance of Uncertainty, Systematic Review, Climate Distress

Introduction

Climate change represents one of the most pressing global challenges of the 21st century, with profound implications not only for environmental systems but also for human psychological well-being (Mougouama-Daouda et al. 2025). Eco-anxiety has emerged as a significant area of

psychological concern (Maral et al. 2025). It is defined as the chronic worry and distress related to environmental degradation alongside the resultant psychological impact. It encompasses emotional responses ranging from adaptive concern that motivates pro-environmental behaviour to maladaptive distress that

impairs functioning and well-being (Goldwert et al., 2023). Eco-anxiety as well as other anxiety disorders have been linked to Intolerance of Uncertainty (IU). Several models of psychopathology have suggested that uncertainty plays a significant role in anxiety. It is understood that anxiety is conditioned by uncertainty and the distress it causes (Carleton et al., 2016; Grupe & Nitschke, 2013). In another study by Dugas et al (1997), a link between generalised anxiety and IU across the life span has been well established (Laugesen et al., 2003)

Intolerance of uncertainty (IU) is defined as an “individual’s dispositional incapacity to endure the aversive response triggered by the perceived absence of salient, key or sufficient information, and sustained by the associated perception of uncertainty (Carleton, 2016). It is regarded as a transdiagnostic cognitive vulnerability factor characterised by negative beliefs about uncertainty and its implications and has been extensively studied in relation to anxiety disorders (O’Bryan et al., 2021). IU reflects an individual’s dispositional tendency to find uncertain situations aversive and threatening, regardless of their probability or consequences (Koerner, 2014; Koerner & Dugas, 2008). The perception or presence of threat may bring about a negative response to uncertainty, which literature has explained as a maladaptive response to uncertainty. The maladaptive response places individuals in a category of high intolerance of uncertainty. The distress experienced by individuals high in IU is underpinned by dysfunctional and maladaptive processing of uncertainty (Grupe & Nitschke, 2011). It

is theorised that uncertainty stimulates worry in high IU individuals, and this makes them engage with that worrying (Koerner & Dugas, 2008), running in the background while they navigate the world. For high IU individuals, uncertainty may lead to information seeking, even at a cost, or engagement in compulsive behaviours, such as always checking the light socket to avert danger, or seeking health-related tests and screenings (Fourtounas & Thomas, 2016; Rosen & Knäuper, 2009)

While some people find uncertainty exciting and motivating, easily interacting with it, others have difficulty coping with uncertainty and experience psychological distress when faced with it (Stewart et al., 2010). Intolerance of uncertainty has been identified in different manifestations, especially with reference to some psychometric tools. The Structural Equation model represents IU in two forms: the prospective IU and the inhibitory IU. The prospective IU refers to the predisposition for active information seeking to reduce uncertainty. In the work of Grupe & Nitchke (2013) on uncertainty and the Anticipation Model of Anxiety, prospective IU involves the anticipation of a future that is uncertain and negative. It is referred to as the fear of the unknown and anticipation of negative outcomes (Yang, 2024). The Inhibitory IU expresses the avoidance-oriented reactions to uncertainty. This reaction to uncertainty leads to paralyzing behaviour and an inability to act. The individual makes negative interpretations of current uncertainties (Shapiro, 2020), with the attitude of “why bother trying?” This, in turn, hinders such an individual from

making decisions or taking any action (O'Bryan, 2021). Comparing these forms of IU, side by side, Prospective IU focuses on cognitive appraisal, whereas inhibitory IU, beyond cognitive appraisal, demonstrates affective avoidance behaviour in response to uncertainty.

Theoretical evidence and the relevance of the relationship between IU and eco-anxiety have been identified (Heeren & Mouguiama, 2025). The understanding of the IU-eco-anxiety relationship is crucial for several reasons. First, it helps to illuminate individual differences in vulnerability to climate-related distress. Several factors, such as age, parenting style and situation, often affect the level of intolerance of uncertainty in individuals (Lauriola et al., 2024). Individual differences based on genetics and some other factors predispose the individual to cognitive appraisal of events, which invariably affects their intolerance of uncertainty levels. Secondly, it could identify potential intervention targets for reducing maladaptive anxiety while preserving adaptive environmental concern. Maladaptive IU are negative interpretation biases. Furthermore, Lauriola et al. (2024) in their work on stability and change in intolerance of uncertainty, reports that one-size fits all intervention might not be optimal, as some individuals may experience persistent high levels of IU while others may show variability.

Adaptive IU is the positive processing of uncertainty. As it applies to eco-anxiety and its nature of uncertainty, engaging in some behaviours often referred to as pro-environmental behaviour, which are

behaviours aimed at reducing human factor in environmental change, are adaptive mechanisms to manage ecologically induced distress. The subjective and experiential features of eco-anxiety could fulfil an adaptive function by prompting individuals to foresee future threats and to prepare for an appropriate response (Damasio & Carvalho, 2013).

Third, it may clarify the mechanisms through which climate anxiety influences mental health outcomes and behavioural responses. This systematic review aims to synthesise the current empirical evidence on the relationship between intolerance of uncertainty and eco-anxiety across different regions and populations (France, Turkey and the United States) on research published between 2021 and 2025. Specifically, we address the following research questions:

1. What is the nature and strength of the association between IU and eco-anxiety?
2. What are the implications of IU for climate-related outcomes, including mental health, policy support and pro-environmental behaviour?
3. What are the methodological approaches used to examine this relationship, highlighting strengths and limitations of the existing evidence base?

Methods

Search Strategy

A comprehensive literature search was conducted across four electronic databases: SciSpace, Google Scholar, PubMed, and ArXiv. The search strategy employed combinations of keywords related to intolerance of uncertainty (e.g.,

"intolerance of uncertainty," "uncertainty intolerance," "IU") and eco-anxiety (e.g., "eco-anxiety," "climate anxiety," "climate change anxiety," "environmental anxiety"). The search was restricted to publications from 2021 to 2025 on intolerance of uncertainty and eco-anxiety, across nationalities such as France, Turkey and the United States, with the sample involving adults and nursing students, to capture the most recent empirical evidence in this emerging field. The search was completed in February 2026.

Eligibility Criteria

Articles were included if they were primary empirical investigations employing quantitative, qualitative, or mixed methods designs, and if they measured both intolerance of uncertainty and eco-anxiety or climate anxiety using validated or novel instruments. Eligibility also included studies published or made available as preprints between 2021 and 2025 and reported in the English language. Studies were excluded if they were non-empirical in nature, including literature reviews, commentaries, and theoretical papers, or if they measured only one of the two focal constructs. Studies published outside the specified date range were also excluded.

Study Selection

The search yielded 179 unique records after deduplication. Two reviewers independently screened all abstracts against the eligibility criteria. Records were excluded for the following reasons: not primary research (n = 12), not measuring IU (n = 85), not measuring eco-anxiety (n = 60), or outside the date range or other

reasons (n = 15). A total of seven studies met the inclusion criteria and were included in the final review. No studies were lost during the retrieval process, and all seven studies assessed for eligibility were included.

Risk of Bias Assessment

Risk of bias was assessed using the Risk Of Bias in Non-randomized Studies of Interventions (ROBINS-I) tool, adapted for observational studies. Two reviewers independently evaluated each study across seven domains: confounding, participant selection, classification of interventions, deviations from intended interventions, missing data, outcome measurement, and selection of reported results. Disagreements were resolved through discussion. Given that all included studies were observational (predominantly cross-sectional), certain domains (classification of interventions and deviations from intended interventions) were marked as not applicable. Studies evaluated across the seven domains were also ranked using the ROBINS tool that classified the findings from the seven domains into moderate and low risk. Moderate risk indicates that findings from the study are generally useful, but due to some methodological flaws, caution is required in interpretation. In this case, this can be attributed to the heterogeneity of study designs. A low risk implies the findings are accurate and can be trusted.

Data Extraction and Synthesis

Data were extracted systematically from each included study, including study design, sample characteristics (size, population, geographic location), measures

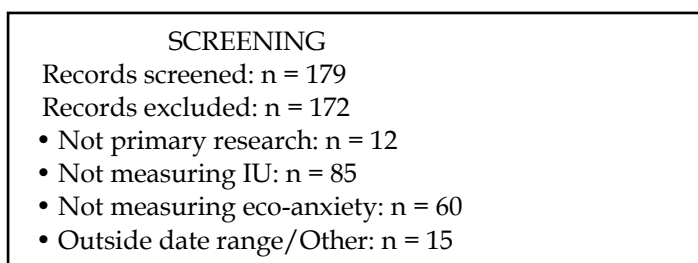
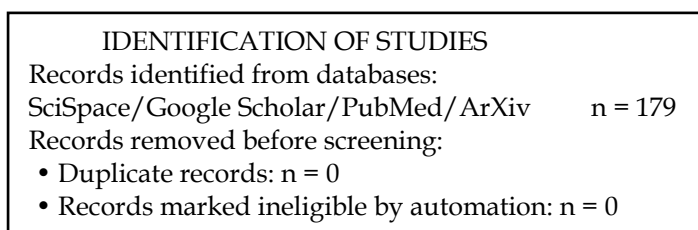
used for IU and eco-anxiety, statistical methods, and key findings regarding the IU-eco-anxiety relationship. Due to heterogeneity in study designs, measures, and analytical approaches, a narrative synthesis was conducted rather than a meta-analysis. The synthesis was organised thematically to address the research questions.

Results

Study selection: Figure 1 presents the PRISMA 2020 flow diagram detailing the study selection process. All seven studies received a moderate rating in the overall risk of bias rating. This rating was consistent across studies and primarily reflects two factors. First, the cross-sectional nature of all included studies limits the ability to establish temporal precedence and causal inference regarding the IU-eco-anxiety relationship. Second, the potential for confounding variables

(e.g., general anxiety, personality traits, and prior climate change experiences) that were not consistently measured or controlled across studies introduces moderate risk in the confounding domain. The selection of reported results was rated as moderate risk due to the exploratory nature of some analyses and the lack of preregistration in most studies (except Heeren & Mougouama-Daouda, which was preregistered)

Participant selection was rated as low risk across all studies, as sampling procedures were generally appropriate for the research questions, despite reliance on convenience sampling in most cases. Missing data was rated as low risk, as studies either reported minimal missing data or employed appropriate handling procedures. Outcome measurement was rated as low risk, as all studies used validated or systematically developed measures for both IU and eco-anxiety.



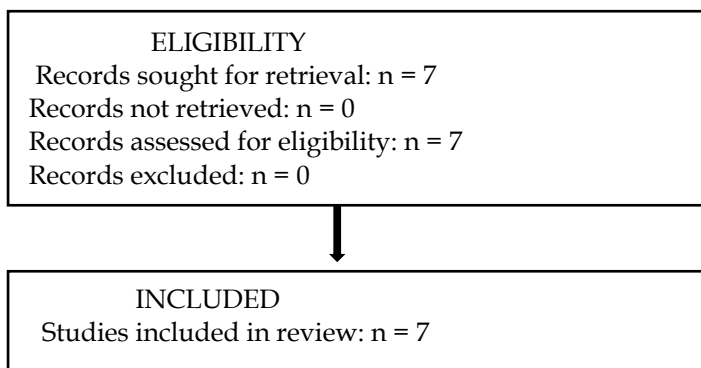


Figure 1. PRISMA 2020 Flow Diagram

Study Characteristics

Table 1 shows the characteristics of the seven included studies: Title of the study, year of publication, design employed by each study, sample and region the study was conducted, is presented below. The included studies were published between 2021 and 2025, reflecting the recent emergence of research in this area. All seven studies employed quantitative methods, with three utilising advanced network analysis approaches, one employing structural equation modelling, two focusing on scale validation, one using correlational analysis, and one incorporating an experimental video manipulation. Sample sizes varied, with most studies recruiting adult community samples or specific populations (e.g., nursing students), especially via an online platform. Geographic representation was

limited, with studies conducted primarily in French-speaking regions (France, French-speaking international samples) and Türkiye.

The evidence consistently demonstrates positive associations between IU and eco-anxiety across diverse samples and methodological approaches. Network analyses reveal that IU, particularly prospective IU, occupies a central and driving position in climate anxiety networks (Heeren, et al. 2025; Mougouama-Daouda et al. 2025). Mediation analyses indicate that eco-anxiety influences mental well-being through IU pathways (Maral et al., 2025). Importantly, IU independently predicts climate-related policy support and behavioural engagement beyond the effects of climate anxiety alone (Goldwert et al., 2023).

Table 1: Characteristics of the Reviewed Papers

Study	Year	Design	Sample	Country/Region	IU measure	Eco-anxiety measure	Interpretation
Heeren & Mouguiama-Daouda	2025	Cross-sectional network analysis (GGM & DAG)	N=968 adults	France	IU components Prospective & Inhibitory	Climate Anxiety	Prospective IU was central in the network and positively linked to climate anxiety and adaptation behaviours; inhibitory IU was peripheral
Mouguiama-Daouda et al	2025	Cross-sectional network analysis (GGM & DAG)	N-728 French-speaking participants	International :Belguim, France, Switzerland and other French speaking countries	IU Scale	Climate Change Anxiety Scale	IU and Climate change experience acted as driving forces of the climate anxiety network structure
Maral et al.	2025	Cross-sectional SEM	N = 392 adults (18-59 years)	Türkiye	IU (measure not specified)	Eco-anxiety (measure not specified)	Eco-anxiety and IU partially mediated the relationship between environmental identity and mental well-being; eco-anxiety affects well-being through IU
Güler & Günday	2024	Cross-sectional correlational	1-2-3 and 4th grade University nursing students	Not specified	Intolerance of Uncertainty scale	climate anxiety scale and Future anxiety scale	Significant correlations between IU and a positive relationship between prospective IU and behavioural engagements among Nursing students b. Ecological anxiety mediates between

EMEA Authors	2023	Mixed-method scale validation	N = 691 (Phase 1: 262; Phase 2: 429)	France	IU scale	EMEA (French eco-anxiety scale with 3 subfactors)	dysregulation and future anxiety Positive correlations between eco-anxiety and IU; negative correlations between "obsession with ecology" subdimension and IU
Goldwert et al.	2023	Experimental (video manipulation) and online Survey	N-441	Florida Residents	Intolerance of Uncertainty scale (IUS-12) short form	Climate change Anxiety Questionnaire	IU is an important factor in promoting pro-environmental behaviour and policy support. Climate anxiety may increase emotional distress without boosting meaningful behaviors and
Jalin et al.	2025	Scale validation	691 participants in 2-phased research	France	IU scale	EMEA scale	There were positive correlations between eco-anxiety, intolerance of uncertainty, and climate risk perception, and negative correlations between obsession with ecology (third EMEA subdimension) and intolerance of uncertainty.

Note: GGM = Graphical Gaussian Model; DAG = Directed Acyclic Graph; SEM = Structural Equation Modeling; EMEA = French eco-anxiety scale

Risk of Bias

Table 2 presents the risk-of-bias assessment for all included studies using the ROBINS-I framework. The table captures the title of the Study, the level of confounding effect, participant selection, and classification of interventions, deviations from intended interventions, missing data, outcome measurement, selected reported result and overall bias. All seven studies received a moderate rating in the overall risk of bias rating. This rating was consistent across studies and primarily reflects two factors. First, the cross-sectional nature of all included studies limits the ability to establish temporal precedence and causal inference regarding the IU-eco-anxiety relationship. Second, the potential for confounding variables (e.g., general anxiety, personality traits, and prior climate change experiences) that were not

consistently measured or controlled across studies introduces moderate risk in the confounding domain. The selection of reported results was rated as moderate risk due to the exploratory nature of some analyses and the lack of preregistration in most studies (except Heeren & Mouguiama-Daouda, which was preregistered). Participant selection was rated as low risk across all studies, as sampling procedures were generally appropriate for the research questions, despite reliance on convenience sampling in most cases. Missing data was rated as low risk, as studies either reported minimal missing data or employed appropriate handling procedures. Outcome measurement was rated as low risk, as all studies used validated or systematically developed measures for both IU and eco-anxiety.

Table 2: Risk of Bias

Study	Confounding	Participant selection	Classification of Intervention	Deviation from intended intervention	Missing data	Outcome measurement	Reported result	Overall bias
Heeren & Mouguiama-Daouda (2025)	Moderate	Low	N/A	N/A	Low	Low	Moderate	Moderate
Mouguiama-Daouda et al. (2025)	Moderate	Low	N/A	N/A	Low	Low	Moderate	Moderate
Maral et al. (2025)	Moderate	Low	N/A	N/A	Low	Low	Moderate	Moderate

Güler & Günday (2024)	Moderate	Low	N/A	N/A	Low	Low	Moderate	Moderate
Jalin et al., (2023)	Moderate	Low	N/A	N/A	Low	Low	Moderate	Moderate
Goldwert et al. (2023)	Moderate	Low	N/A	N/A	Low	Low	Moderate	Moderate
Jalin et al. (2025)	Moderate	Low	N/A	N/A	Low	Low	Moderate	Moderate

Note: N/A = Not Applicable (domains not relevant for observational studies without interventions)

Discussion of Findings

Nature of the IU-Eco-Anxiety Association

All seven included studies reported positive associations between intolerance of uncertainty and eco-anxiety/climate anxiety, indicating that individuals with higher IU tend to experience greater climate-related distress. In explaining correlational evidence, one study with nursing students reported significant correlations between IU and climate change anxiety, directly linking these constructs (Güler, et al., 2024). While specific correlation coefficients were not available in the extracted data, the study confirmed the positive association between IU and climate anxiety in a specific professional population that may be particularly attuned to health-related climate impacts.

The consistency of this finding across diverse samples, measures, and analytical approaches provides robust evidence for this relationship. In an exploratory study on the mediation role of intolerance of uncertainty and future anxiety, findings

highlighted that climate change worry had a significant positive effect on anxiety and stress levels and positively influenced intolerance of uncertainty and future anxiety (Regnoli et al., 2024). IU is regarded as a critical psychological vulnerability factor and an amplifier of negative mental health outcomes. Regnoli et al. (2024) mention the “trigger of war fear” as an example of future anxiety that can manifest as stress, anxiety or even depression. In his study, IU mediated the effect of fear of war and depression, and a positive association was found. The fear of war experienced by some individuals was amplified by IU, which made them depressed. IU affected how they processed their current experience and the cognitive assessment of the future. This study further supports other findings reporting the role that IU play, as a vulnerability factor in increasing anxiety or non- pathological worry.

Two studies employed sophisticated network analysis methods to examine the structural relationships among IU, eco-anxiety, and related constructs. (Heeren, A.

et al. 2025). Heeren and Mougouama-Daouda analysed data from 968 French-speaking adults using both graphical Gaussian models and directed acyclic graphs, revealing that prospective IU, characterised by proactive information-seeking and planning in response to uncertainty, occupied a central position in the network and was positively linked to both climate anxiety and adaptive behaviours (Heeren et al., 2025). Importantly, Heeren et al. (2025) in their study distinguished between two facets of IU: prospective IU (proactive responses) and inhibitory IU (paralysis in the face of uncertainty). While prospective IU was central and positively associated with climate anxiety, inhibitory IU appeared peripheral in the network structure. This finding suggests that not all forms of intolerance of uncertainty relate equally to eco-anxiety. This study has been translated from French to English, which made it meet the inclusion criteria for this review. Mougouama-Daouda et al. (2025), analysing an international sample of 728 participants, similarly found that IU acted as a driving force of the overall climate anxiety network structure, alongside climate change experience. These network findings indicate that IU is not merely correlated with eco-anxiety but occupies a structurally important position in the constellation of climate-related psychological conditions. IU is identified as a transdiagnostic risk factor in clinical psychology. It is a vulnerability trait that drives and maintains different mental health conditions, and as a result, it cannot be diagnosed alone. It is often linked to different mental conditions, ranging from

generalised anxiety disorders (Probert - Lindstrom, 2023) to eating disorders (Oglesby et al., 2019).

Mediation and Indirect Effects of IU on Mental Wellbeing

One study explicitly examined mediation pathways involving IU and eco-anxiety. Maral et al., (2023) conducted structural equation modelling with 392 Turkish adults and found that eco-anxiety and IU partially mediated the relationship between environmental identity and mental well-being (Maral et al., 2025). In other words, the study demonstrated that eco-anxiety affects mental well-being through IU, suggesting that the impact of climate-related distress on psychological functioning operates, at least in part, through uncertainty-related cognitive processes (Maral et al. 2025). This finding has important implications for understanding the mechanisms through which eco-anxiety influences mental health outcomes. Climate change results in an indirect impact such as famine, related to droughts, migration and property loss, which can trigger psychological distress. Scientific literature has confirmed that climate anxiety is a form of anxiety that can have long term implications for mental health and ability to function in day-to-day life. This impact of climate anxiety, especially on mental health, can manifest in three manners; directly, indirectly and vicariously (Lammel, 2025) with individuals experiencing extreme meteorological events, depression, anxiety and post-traumatic syndromes can be triggered, even thoughts of suicide. This

increased cognitive vulnerability, often occasioned by intolerance of uncertainty, could lead to anxiety and depression. Unfortunately, the mental health of individuals, especially those not directly or indirectly impacted by climate change, can still be compromised, as a result of their being aware of the changes already happening in the climate through the media and its projections of possible future catastrophes. Such projections are accompanied by ambiguity, which makes it intolerable for individuals with high IU. High IU individuals have difficulty tolerating and modulating negative emotions caused by uncertainty, thereby experiencing negative emotional and cognitive responses (Freeston 2020), which triggers a sequence of worry, problem orientation, negative problem orientation and cognitive avoidance (Osmanağaoğlu, 2018). Individuals with high IU feel more worried and pressured about ecological changes caused by the dysfunctional way they have processed the uncertain nature or impact of the ecological changes. However, people with low IU, regardless of the impact, engage in more adaptive behaviors in the face of uncertainty.

Measurement and Validation Studies

Two studies focused on the development and validation of eco-anxiety measures and examined correlations with IU as part of establishing convergent validity (Jalin, et al 2025, Jalin et al., 2023). Both studies, conducted in French-speaking populations, developed the EMEA (Échelle de Mesure de l'Éco-Anxiété) scale, which is a French language development and validation of the French language eco-anxiety scale. This

scale assesses the extent and severity of eco-anxiety on three: anxiety-depressive manifestations, relational disturbances, and obsession with ecology. The anxiety-depressive symptoms capture feelings of sadness, guilt and anxiety because of anticipated future ecological catastrophe. The dimension of relational disturbances captures the conflicts that may likely arise in an individual's relationships, professional life and social life because of opposing climate beliefs or values. Obsession with Ecology measures the functional impact of persistent thinking or rumination about ecology or living and developing ecologically driven habits. Both validation studies reported positive correlations between overall eco-anxiety and IU (Jalin, et al 2025). Interestingly, one study noted negative correlations between the "obsession with ecology" subdimension and low IU. Jalin et al., (2023) describes their findings on how an individual with a low IU can still score highly in an obsession with ecology subscale, as a paradox, which can be explained with pro-environmental actions of such people. Individuals with low IU accept that some climate conditions are not within their control, and so are open to accepting ambiguity. However, in response to the uncertainty, they channel their energy inwards and focus entirely on what they can control which is their local ecology, also regarded as environmental activism. Green living or a conscious effort by an individual to track and modify their environmental impact constantly, is what the EMEA scale captures as "obsession with ecology". However, this action does not cause emotional distress or anxiety attacks on the individuals with Low IU.

IU as a Predictor of Climate-Related Outcomes

One study examined the predictive roles of IU and climate anxiety for climate-related outcomes (Goldwert et al., 2023). Goldwert and colleagues found that both climate anxiety and IU were associated with greater distress following exposure to climate change information (via video). However, IU independently predicted greater support for climate change policies and higher levels of pro-environmental behavioral engagement, whereas climate anxiety did not show these independent effects (Goldwert et al., 2023). Their findings reveal that greater IU was associated with greater post-video distress, policy support and behavioural engagement, while greater climate change anxiety was significantly associated with greater post-video distress and policy support; the association between climate change anxiety and behavioural engagement was not significant (Goldwert et al., 2023)

Theoretical Implications

The findings have several important theoretical implications. First, the consistent positive association between IU and eco-anxiety supports the relevance of transdiagnostic cognitive vulnerability models to climate-related distress. Earlier research on Intolerance of Uncertainty (IU) describes it as a transdiagnostic vulnerability factor that has been associated with several dysfunctional behaviors and emotional disorders (Shihata et al, 2016). Such psychopathology includes generalized anxiety disorder, obsessive compulsive disorder, social

anxiety disorder, panic disorder, health anxiety, depression, post-traumatic stress disorders, eating disorders, substance use disorders and personality disorders (Bottesi et al., 2018, 2012; Gentes & Ruscio, 2011; Shihata et al., 2016). Beyond these identified disorders, IU have been extensively studied in relation to other anxiety conditions and appears to extend to anxiety about environmental threats characterized by inherent uncertainty. Climate change is characterized by high levels of uncertainty and threat, IU is regarded as an important factor contributing to climate change related distress (Morton et al., 2011).

Second, the network analysis findings suggesting that prospective IU is more central than inhibitory IU challenge simplistic conceptualizations of IU as uniformly maladaptive (Heeren et al., 2025) Prospective IU, characterized by proactive information-seeking and planning, may represent an adaptive response to climate uncertainty that motivates both psychological engagement (climate anxiety) and behavioral action (adaptation behaviors). This distinction aligns with emerging frameworks that differentiate adaptive from maladaptive forms of eco-anxiety.

Third, the finding that eco-anxiety affects mental well-being through IU pathways suggests that uncertainty-related cognitive processes may be a key mechanism linking climate concern to eco-anxiety which can manifest as psychological distress (Maral et al., 2023), or lead to pro-environmental or other forms of adaptive behavior. This has implications for intervention development,

suggesting that targeting IU (e.g., through uncertainty tolerance training) may help individuals maintain environmental concern while reducing maladaptive distress.

Fourth, the independent predictive role of IU for policy support and behavioural engagement, beyond climate anxiety, suggests that IU may function as a motivational factor for climate action (Goldwert et al., 2023). Individuals high in IU may be particularly motivated to support policies and engage in behaviours that reduce uncertainty about climate outcomes.

Strengths and Limitations

The included studies employed diverse methodological approaches, including network analysis, structural equation modelling, correlational designs, and scale validation. The use of network analysis in two studies represents a methodological strength, as this approach can reveal structural relationships and identify central nodes in complex psychological systems (Heeren et al., 2025; Mouguiama-Daouda et al., 2025). However, it is important to note that network models based on cross-sectional data cannot establish directionality or causation. The reliance on self-report measures for both IU and eco-anxiety across all studies introduces potential common method bias. Future research would benefit from integrating behavioural measures, physiological indicators, or ecological momentary assessment to complement self-report data. The geographic concentration of studies in French-speaking regions and Türkiye limits generalizability. Further reviews would benefit from integrating studies

with diverse populations like Africans and Asians, as cultural factors may influence both the experience of eco-anxiety and the role of IU.

Several limitations of the current evidence base warrant attention. First, all included studies employed cross-sectional designs, precluding conclusions about temporal precedence or causality. To predict the development of eco-anxiety over time, identify whether eco-anxiety influences IU, or the existence of a bidirectional relationship, future research should adopt longitudinal research. Second, sample characteristics limit generalizability. Most studies relied on convenience samples, and several did not report detailed demographic information. The study by Guler (2024), focused on a specific professional group (nursing students), however, none of the studies examined clinical populations with diagnosed anxiety disorder. Third, mean. However, heterogeneity complicates synthesis. Studies used different measures of both IU and eco-anxiety, and several studies did not specify the exact instruments used. The field would benefit from greater standardisation in measurement approaches. Fourth, potential confounding variables were not consistently addressed. Few studies controlled for general anxiety, depression, or personality traits that might influence both IU and eco-anxiety. The moderate risk-of-bias rating for confounding reflects this limitation. Fifth, the small number of included studies (n = 7) and the recent emergence of this research area mean that the evidence base remains preliminary.

Publication bias cannot be assessed with so few studies.

Conclusions and Future Directions

This systematic review provides consistent evidence for a positive association between intolerance of uncertainty and eco-anxiety. IU emerges as a central factor in climate anxiety networks and appears to influence both the psychological impact of eco-anxiety on mental well-being and behavioral responses to climate change. The distinction between prospective and inhibitory IU suggests important nuances in how uncertainty intolerance relates to climate-related distress and action. While the evidence base remains preliminary, this systematic review identifies IU as an important individual difference factor in understanding eco-anxiety. The findings suggest that uncertainty-related cognitive processes represent a promising target for interventions aimed at supporting psychological well-being in the context of climate change while preserving adaptive environmental concern and action.

Future research should prioritize several directions:

1. Longitudinal designs: Prospective studies are needed to establish temporal relationships and identify whether IU represents a vulnerability factor for developing eco-anxiety, a consequence of sustained climate worry, or both.
2. Intervention research: Given the potential role of IU as a mechanism linking eco-anxiety to mental health outcomes, intervention studies targeting IU (e.g., uncertainty tolerance training, cognitive-behavioral

approaches) could determine whether reducing IU helps individuals maintain adaptive environmental concern while minimizing maladaptive distress.

3. Mechanistic research: Studies should examine the cognitive, emotional, and behavioral mechanisms through which IU influences eco-anxiety and climate-related outcomes. Experimental designs and mediation analyses can clarify these pathways.
4. Diverse populations: Research is needed across diverse geographic, cultural, and demographic groups, including clinical populations, youth, older adults, and communities directly impacted by climate change.
5. Measurement refinement: The field would benefit from consensus on optimal measures for both IU and eco-anxiety, including validation of existing instruments across diverse populations and development of measures that capture adaptive versus maladaptive dimensions.
6. Multidimensional assessment: Future studies should examine how different facets of IU (prospective vs. inhibitory) and eco-anxiety (e.g., functional concern vs. impairing distress) relate to one another and to outcomes.
7. Contextual factors: Research should examine how contextual factors (e.g., direct climate change exposure, social support, access to climate information, political context) moderate the IU-eco-anxiety relationship.

References

Bottesi, G., Tesini, V., Cerea, S., & Ghisi, M. (2018). Are difficulties in emotion

- regulation and intolerance of uncertainty related to negative affect in borderline personality disorder? *Clinical Psychologist*, 22(2), 137-147. <https://doi.org/10.1111/cp.12163>
- Carleton, R. N. (2016). Fear of the unknown: one fear to rule them all? *Journal of Anxiety Disorders*, 41, 5-21. <https://doi.org/10.1016/j.janxdis.2016.03.011>
- Damasio, A., & Carvalho, G.B. (2013). The nature of feelings: evolutionary and neurobiological origins. *Nature reviews. Neuroscience*, 14(2), 143-152. <https://doi.org/10.1038/nrn3403>
- Dugas, M. J., Savard, P., Gaudet, A., Turcotte, J., Laugesen, N., Robichaud, M., Francis, K., & Koerner, N. (2007). Can the components of a cognitive model predict the severity of generalised anxiety disorder? *Behavior therapy*, 38(2), 169-178.
- Freeston, M., Tiplady, A., Mawn, L., Bottesi, G., & Thwaites, S. (2020). Towards a Model of Uncertainty Distress in the Context of Coronavirus (COVID-19). *Cognitive behaviour therapist*, 13, e31. <https://doi.org/10.1017/S1754471X2000029X>
- Gentes, E. L., & Ruscio, A. M. (2011). A meta-analysis of the relation of intolerance of uncertainty to symptoms of generalized anxiety disorder, major depressive disorder, and obsessive-compulsive disorder. *Clinical Psychology Review*, 31(6), 923-933.
- Goldwert, D., Dev, A. S., Broos, H. C., Broad, K., & Timpano, K. R. (2023). The impact of anxiety and intolerance of uncertainty on climate change distress, policy support, and pro-environmental behaviour. *British Journal of Clinical Psychology*. 63(1), 1-15. <https://doi.org/10.1111/bjc.12441>
- Grupe, D. W., & Nitschke, J. B. (2013). Uncertainty and anticipation in anxiety: An integrated neurobiological and psychological perspective. *Nature Reviews Neuroscience*, 14(7), 488-501. <https://doi.org/10.1038/nrn3524>
- Gülirmak Güler, K., & Albayrak Günday, E. (2024). Nature-friendly hands: The relationship between nursing students' climate change anxiety, intolerance of uncertainty, and anxiety about the future. *Public Health Nursing*, 41(6), 1391-1402. <https://doi.org/10.1111/phn.13388>
- Heeren, A., & Mougouama-Daouda, C. (2025). From mitigation to adaptation: Network analysis of their interrelations with climate anxiety, pessimistic future anticipation, and intolerance of uncertainty [Preprint]. OSF Preprints. https://doi.org/10.31234/osf.io/ybzqg_v1
- Heeren, A., & Mougouama-Daouda, C. (2026). From mitigation to adaptation: Network models of their interrelations with climate anxiety, future anticipation, and intolerance of uncertainty. *Climate change*, 179 (2). Article 32. <https://doi.org/10.1007/s10584-026-04130-7>
- Fourtounas & Thomas Fourtounas, A., & Thomas, S. J. (2016). Cognitive factors predicting checking, procrastination and other maladaptive behaviours: Prospective versus Inhibitory Intolerance of Uncertainty. *Journal of Obsessive-compulsive and Related Disorders*, 9, 30-35. <https://doi.org/10.1016/j.jocrd.2016.02.003>
- Jalin, H., Chandès, C., Boudoukha, A. H., Jacob, A., & Poinot, R. (2023). Assessing eco-anxiety with a mixed method: Creation and validation of a three dimensions scale [Preprint]. OSF Preprints. <https://doi.org/10.31219/osf.io/wnrjx>
- Jalin, H., Chandès, C., Boudoukha, A. H., Jacob, A., & Poinot, R. (2025). Better understanding eco-anxiety: Creation and validation of EMEA scale. *European Review of Applied Psychology*. 75(1), Article 101010. <https://doi.org/10.1016/j.erap.2024.101010>
- Jalin, H., Chandès, C., Boudoukha, A. H., Jacob, A., & Poinot, R., & Congard, A. (2023).

- Assessing eco-anxiety with a mixed method: creation and validation of a three dimensions scale (poster presentation). 49th Annual symposium of the Association Française des thérapies cognitives et comportementales, Paris, France.
- Koerner, 2014; Koerner, N., (2014). The importance of taking an integrative approach to the study of worry, intolerance of uncertainty and generalized anxiety disorder. *Canadian psychology/psychologie canadienne*, 55(1), 44-47. <https://doi.org/10.1037/a0035552>
- Koerner, N., & Dugas, M. J. (2008). An investigation of appraisals in individuals vulnerable to excessive worry: The role of intolerance of uncertainty. *Cognitive Therapy and Research*, 32(5), 619-638. <https://doi.org/10.1007/s10608007-9125-2>
- Lammel A., (2025) "Environmental crises and climate change: Eco-anxiety among young people and the urgent need for a transformative response", *Field Actions Science Reports* [Online], Special Issue 27. <https://journals.openedition.org/factsreports/7684>
- Lauriola, M., Malerba, A., Marini, M., Parisse, C., Prislei, L., Bottesi, G., Livi, S. (2024). Stability and change in intolerance of uncertainty and its association with interpretation bias in social situations: a longitudinal study of Italian adolescents. *Adolescents* 2024, 4, 564-586. <https://doi.org/10.3390/adolescents4040040>
- Maral S., Bilmez, H., Satici S.A (2025). Understanding the link between environmental identity, Eco-anxiety, intolerance of uncertainty and mental well-being. *The psychiatric quarterly*. <https://doi.org/10.1007/s11126-025-10184-0>.
- Maral, M., Bilmez, B., & Satici, S. A. (2025). Understanding the link between environmental identity, eco-anxiety, intolerance of uncertainty and mental well-being. *The Psychiatric quarterly*, July 10. Advance online publication. <https://doi.org/10.1007/s11126-025-10184-0>
- Morton, T.A., Rabinovich, A., Marshall, D., & Bretschneider, P. (2011). The future that may or may not come. How framing changes the response to uncertainty in climate change communications. *Global Environmental Change*, 21(1), 103-109.
- Mouguiama-Daouda, C., McNally, R. J., & Heeren, A. (2025). *Intolerance of uncertainty and climate change experience as driving forces of climate anxiety: Insights from a network perspective* [Preprint]. OSF Preprints. https://doi.org/10.31234/osf.io/dwsyx_v1
- O'Bryan, E. M., Stevens, K. T., Bimstein, J. G., Jean, A., Mammo, L., & Tolin, D. F. (2021). Intolerance of uncertainty and anxiety symptoms: Examining the indirect effect through anxiety sensitivity among adults with anxiety-related disorders. *Journal of Psychopathology and Behavioral Assessment*, 43(4), 1-11. <https://doi.org/10.1007/S10862-021-09912-0>
- Oglesby, M.E., Stentz, L.A., Portero, A.K., King, S.L., Schmidt, N.B. (2019). Exaggerated Interpretation Bias for Uncertain Information as a Predictor of Anxiety-Related Symptoms: A New Method of Assessment for IU. *Journal of Behavior Therapy and Experimental Psychiatry*, 63, 64-71. <https://doi.org/10.1016/j.jbtep.2019.02.010>
- Osmanağaoğlu, N., Creswell, C., & Dodd, H. F. (2018). Intolerance of Uncertainty, anxiety, and worry in children and adolescents: A meta-analysis. *Journal of affective disorders*, 225, 80-90. <https://doi.org/10.1016/j.jad.2017.07.035>
- Probert-Lindström, S., & Perrin, S. (2023). An examination of distress tolerance, anxiety sensitivity, and intolerance of uncertainty in adults in routine psychiatric care. *Acta Psychologica*, 235, 103902. 1561.

- <https://doi.org/10.1016/j.actpsy.2023.103902>
- Probert-Lindström, S., & Perrin, S. (2023). An examination of distress tolerance, anxiety sensitivity, and intolerance of uncertainty in adults in routine psychiatric care. *Acta Psychologica*, 235, 103902.
- Regnoli, G. M., Tiano, G., & De Rosa, B. (2024). Is climate change worry fostering young Italian adults' psychological distress? An Italian exploratory study on the mediation role of intolerance of uncertainty and future anxiety. *Climate*, 12(8), 118. <https://doi.org/10.3390/cli12080118>
- Rosen, N. O., & Knäuper, B. (2009). A little uncertainty goes a long way: State and trait differences in uncertainty interact to increase information seeking but also increase worry. *Health Communication*, 24(3), 228–238.
- Shapiro, M. O., Gros, D. F., & McCabe, R. E. (2020). Intolerance of uncertainty and social anxiety while utilizing a hybrid approach to symptom assessment. *International Journal of Cognitive Therapy*, 13(3), 189–202. <https://doi.org/10.1007/S41811-020-00068-5>
- Shihata, S., McEvoy, P. M., Mullan, B. A., & Carleton, R. N. (2016). Intolerance of uncertainty in emotional disorders: What uncertainties remain? *Journal of Anxiety Disorders*, 41, 115–124. <https://doi.org/10.1016/j.janxdis.2016.05.001>
- Stewart, J. L., Mishel, M. H., Lynn, M. R., & Terhorst, L. (2010). Test of a conceptual model of uncertainty in children and adolescents with cancer. *Research in Nursing & Health*, 33, 179–191. <https://doi.org/10.1002/nur.20374>
- Y. H., Hallford, D. J., Villanueva-Romero, C. M., Hernández-Viadel, J. V., & Ricarte, J. J. (2025). An examination of intolerance of uncertainty in schizophrenia. *Clinical psychology & psychotherapy*, 32(3), e70074. <https://doi.org/10.1002/cpp.70074>