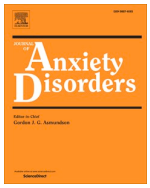
Journal of Anxiety Disorders 93 (2023) 102654

Contents lists available at ScienceDirect

Journal of Anxiety Disorders

journal homepage: www.elsevier.com/locate/janxdis



Editorial

Understanding climate anxiety: What decision-makers, health care providers, and the mental health community need to know to promote adaptative coping

1. Introduction

There is increasing awareness that climate change poses one of the most significant threats to all species living on earth by menacing their places, livelihoods, and health (IPCC et al., 2022). And, as people become increasingly aware of the current and future hazards associated with climate change, two terms initially confined to activists' circles to describe their inner experience of climate change as a significant threat—*climate anxiety* and *eco-anxiety*—have now entered the mainstream vocabulary. This anxiety relates to worries about the lack of climate action, current and future impacts of climate change, and uncertainty over the timing and location of these impacts (Clayton, 2020).

With many national and international polls pointing to startling rates of people reporting considerable climate anxiety, there is little doubt about its current escalating nature. For instance, in a recent 10-country study (i.e., Australia, Brazil, Finland, France, India, Nigeria, Philippines, Portugal, the U.K., and the U.S.), 59 % of a sample of 10,000 adolescents and young adults declared being *very* or *extremely* worried about climate change (Hickman et al., 2021). Moreover, more than 45 % reported that their worries about climate change had detrimental consequences on their daily functioning (e.g., the ability to go to schools), notably because they perceive that their future is doomed and that they feel that governments are failing young people (Hickman et al., 2021).

Broadly similar findings hold in adults. For instance, in two U.S. samples of participants aged 18–75 years, Clayton and Karazsia (2020) found that about one in every five (i.e., 17–19 %) reported experiencing cognitive and emotional features of climate anxiety, such as worrying about, crying over, or having nightmares about climate change. Most strikingly was the observation that one in every four of their participants (i.e., 26–27 %) endorsed a degree of climate anxiety that significantly interfered with their ability to function in everyday life (e.g., impact on the ability to socialize, focus on family, and work effectively). Similar alarming rates have been observed worldwide (e.g., Gibson, Barnett, Haslam, & Kaplan, 2020; Heeren, Mouguiama-Daouda, & Contreras, 2022). In a recent study among French-speaking participants ($n = 2080$) from eight African and European countries, approximately 12 % declared regularly experiencing features of climate anxiety (e.g., worrying about, crying, having nightmares about climate change), while 21 % reported feeling debilitated in their daily life because of climate anxiety (Heeren et al., 2022).

Because functional impairments in daily life have often been considered the ultimate proxy for identifying when worry, distress, and related issues have become a significant threat to psychological well-being, the aforementioned results all point to climate anxiety as a potential threat to mental health and, certainly, one deserving a more careful audit by mental health experts. Yet, psychological research on climate anxiety has remained scarce and often limited to online surveys aimed at gauging its prevalence. A quick search of Scopus, Web of Science, PsycINFO, and PubMed conducted November 4 2022 using the search terms "climate change anxiety" or "eco-anxiety" or "climate anxiety" and limited to empirical journal articles revealed 147, 140, 50, and 13 articles, respectively, and with the majority of articles (e.g., 89 % in Scopus, 93.6 % in Web of Science) published since 2020. This relative lack of scientific evidence makes it arduous for mental health experts, authorities, and professionals to understand it appropriately and, in turn, intervene accordingly. Actionable efforts are urgently required to improve our understanding of climate anxiety.

2. Is climate anxiety a threat to mental health?

Amidst the many challenges ahead, one of the most fundamental questions regarding climate anxiety is whether it should be seen as a threat to mental health or as an adaptive response to a genuine threat. Human evolutionary adaptedness has carved out anxiety as an evolved mechanism for monitoring, prioritizing, and coping with potential threats. As such, anxiety can foster adaptive responses, especially by helping to prompt behaviors to mitigate the source of threat (e.g., avoiding predators), and its absence would have likely consigned our species' survival and adaptation to the ashcan of history. In this way, one may simply consider climate anxiety as an adaptive response to a genuine threat. Yet, findings have remained unclear in this regard. On the one hand, a few studies do show moderate-to-strong associations between climate anxiety and pro-environmental behaviors (e.g., Sangervo, Jylhä, & Pihkala, 2022; Verplanken, Marks, & Dobromir, 2020). On the other hand, a few scholars have suggested that it may be the other way around, wherein climate anxiety inhibits people from taking adaptive steps (e.g., Albrecht, 2011), and a few studies have reported corresponding negative—though small—associations between climate anxiety and pro-environmental behaviors (e.g., Stanley, Hogg, Leviston, & Walker, 2021).

https://doi.org/10.1016/j.janxdis.2022.102654

Available online 17 November 2022

Recent findings indicate that the association between climate anxiety and pro-environmental behaviors may depend upon the level of climate anxiety, which can "freeze" people from taking actions when too high and, conversely, help trigger pro-environmental behaviors when not too intense (Heeren et al., 2022). As such, it is plausible that there exists a Goldilocks zone[3] wherein the degree of climate anxiety is neither too damaging for mental health nor for climate change mitigation but, instead, is "just right" for adaptive coping. Should such a Goldilocks zone be identified, it will need to be determined whether it varies as a function of other variables, such as environmental identity, neuroticism, climate change perception, psychological resilience, and so forth. Given the urgency to help lessen our carbon footprint, such basic knowledge will be vital for governmental authorities and healthcare professionals as it relates to strategies for helping to protect the psychological well-being of everyone while fostering pro-environmental behaviors.

Beyond its potential adaptive nature, much also remains to be learned about the damaging impact of climate anxiety on mental health. Despite numerous studies showing medium-to-strong associations between climate anxiety and depression, anxiety, and stress (e.g., Clayton & Karazsia, 2020; Mouguiama-Daouda, Blanchard, Coussement, & Heeren, 2022; Stanley et al., 2021; Wullenkord, Tröger, Hamann, Loy, & Reese, 2021), this research has almost exclusively relied upon cross-sectional data, thereby precluding any strong inference regarding the cause-effect relationships between these variables (Maurage, Heeren, & Pesenti, 2013). As such, one may wonder whether mental health issues might not merely precede debilitating climate anxiety (Taylor, 2020). Amassing longitudinal and more experimental work will help further elucidate this relation. Temporal network modeling approaches on intensive time-series data (for a review, see Blanchard, Contreras, Kalkan, & Heeren, 2022) may also be especially valuable in revealing how climate anxiety and other types of emotional vulnerabilities may trigger one another over time, and relate to adaptive and maladaptive correlates of climate anxiety. One may also wonder about potential "tipping points" whereby climate anxiety no longer serves its adaptive function and, instead, becomes detrimental to mental health. Although the prodromal signs of such a tipping point may prove tricky to detect (for an example in clinical psychology, see van de Leemput et al., 2014), a better understanding of this transition phase might prove especially useful in detecting how climate anxiety progresses from adaptive to maladaptive.

In addition to climate anxiety, there is also substantial evidence of other damaging consequences of climate change on mental health, including posttraumatic stress disorder, depression, and substance abuse among people who have experienced climate-related extreme weather like flooding, wildfires, or hurricanes (for a review, see Charlson et al., 2021). Drought, though less direct, can also significantly impair mental health. Drought-related financial hardship, lack of water, and forced migration can lead to significant emotional distress, and have been associated with increased suicide rates, especially in people living in rural areas (Carleton, 2017; Luong et al., 2021). More research is needed to understand the relationship between climate anxiety and these other by-products of climate change on mental health, especially among vulnerable groups such as those living in lower socioeconomic-status areas, who might have fewer resources to prepare for and recover from climate-related hazards. Likewise, more research is needed to delineate the precise impacts of climate anxiety among public safety personnel, firefighters, and the military, who often have to deal with the immediate consequences and aftermath of climate-related devastation.

[3] Named by analogy to the children's story "Goldilocks and the Three Bears," wherein a little girl named Goldilocks tastes three different bowls of porridge and finds she prefers porridge that is neither too hot nor too cold but has just the right temperature. This concept has now become used in many disciplines, such as economy or astrophysics, to reflect "just the right amount."

3. Understanding and mitigating maladaptive climate anxiety

There are clues in the existing literature that may help us understand how one can develop maladaptive climate anxiety. Early research on climate anxiety suggests that how people perceive and experience the impacts of climate change in their own environment can be a critical pathway leading to its adverse effect on functioning (e.g., Gibson et al., 2020; Hoffmann, Muttarak, Peisker, & Stanig, 2022). Yet, much remains to be learned about how the appraisal of climate change leads to maladaptive climate anxiety. From decades of basic research on fear and anxiety (e.g., Grillon, 2008), one may anticipate certain factors, such as proximity, predictability, and controllability of the perceived threat, to be at play. For instance, unpredictable threats are usually perceived as more distressing than predictable ones (Shankman, Robison-Andrew, Nelson, Altman, & Campbell, 2011). Given that climate change entails many uncertainties, including the very nature of the impacts (e.g., natural disasters, health issues, financial loss, forced migration) as well as their timing and precise locations, research on appraisal processes in climate anxiety may be especially valuable for better comprehending maladaptive climate anxiety. Research on the role of individual difference factors in threat perception (e.g., intolerance of uncertainty, harm avoidance) as they pertain to climate change might also be helpful. Moreover, since the possibility of avoiding a threat or handling its impact is important in managing fear and anxiety (Hartley, Gorun, Reddan, Ramirez, & Phelps, 2014) and in triggering adaptive behaviors when perceived controllability is high (Ruiter, Kessels, Peters, & Kok, 2014), appropriate and clear communications about what can be done to mitigate climate change may help prevent maladaptive and debilitating climate anxiety. As such, the communication strategy employed by governments and health authorities should not only focus on the consequences of climate change but should also strive to help people acquire a sense of controllability vis-à-vis climate change.

Are mental health professionals ready to deal with debilitating climate anxiety in their clinical practices? Unfortunately, there are few evidence-based recommendations for mental health care professionals. Early research has pointed to treatment options tapping into nature contact and connectedness as up-and-coming tools to alleviate climate anxiety (for a review, see Baudon & Jachens, 2021). Yet, most of these trials have been underpowered and conducted without control groups, and, as a consequence, the relative merits of such interventions remain to be investigated. Recent research also shows that environmental activism can buffer the mental health consequences of climate anxiety by helping combat feelings of hopelessness and promoting individual and collective resilience (e.g., Schwartz et al., 2022); but, others have identified possible long-term detrimental consequences of activism on mental health (e.g., Dwyer, Chang, Hannay, & Algoe, 2019). Practitioners should, therefore, carefully audit whether involvement in environmental activism yields restorative or harmful consequences for their clients.

Since adolescents and young adults can feel very debilitated by the perception that their future is doomed and that adults and governments are failing to react correctly to climate change, it will be critical to identify specific evidence-based recommendations to help lessen the burden of climate change in this group. A recent article in *Nature Climate Change* highlights the need for governments and public authorities to increase the empowerment of children and adolescents as a key stakeholder group representing the world's future adults (Crandon, Scott, & Charlson, 2022). Encouraging developmentally-appropriate school-based programs to build agency and facilitating family and community support may also help lessen despair and helplessness vis-à-vis climate change in youths, especially in lower-socioeconomic-status areas (e.g., Berse, 2017).

Finally, although the notion of climate anxiety (and eco-anxiety) has gained traction, there is a striking lack of consensus among authors regarding its very definition. In a recent scoping review, Coffey et al. (2021) identified more than 10 operationalizations in the existing

literature. In addition to stressing the lack of integrative theoretical formulations regarding climate anxiety, such a lack of consensus regarding its hallmark features hinders scientific progress. On the other hand, most recent empirical research has aligned with Clayton (2020) operationalization whereby climate anxiety refers to the experience of anxious feelings and worries associated with the perception of the potential scope of the anticipated impacts of climate change and the uncertainty over their nature, timing, and location, even among people who have not personally experienced any direct impact. Therefore, a requisite next step will be to delineate the fuzzy borders between these operationalizations and test whether they tap into the same psychological constructs. Methodological tools for theory building can reveal helpful in this task (e.g., Borsboom, van der Maas, Dalege, Kievit, & Haig, 2021).

4. Taking action and looking forward

Since climate change has (and will have) more and more visible impacts worldwide (IPCC et al., 2022), we can anticipate increasing rates of people reporting debilitating climate anxiety in the years to come. Failure to anticipate this issue might lead to damaging consequences for the mental health and well-being of many worldwide. Therefore, it is critical that we, as researchers and scientist-practitioners, strive to help better understand climate anxiety, its maladaptive presentations, and evidence-based mitigation strategies for intervention and prevention. In 2020, and with anticipation of the potential for various aspects of climate change to have significant negative implications for mental health on a global scale, the *Journal of Anxiety Disorders* published a special issue entitled *The Psychological Impact of Climate Change: Preparing for the Coming Challenges,* edited by Steven Taylor (Taylor, 2020). Also in 2020, and in response to another pressing global threat—the COVID-19 pandemic—the *Journal of Anxiety Disorders* launched a highly successful regular feature devoted to cutting-edge evidence regarding the mental health impacts of the pandemic, entitled *COVID-19 Content*.

In this volume of the *Journal of Anxiety Disorders*, and with the intent of highlighting important emerging evidence on understanding and mitigating maladaptive climate anxiety and, more broadly, on the impact of climate change on anxiety and anxiety-related disorders, we are launching the *Climate Change Content* section. The first article to appear in this section, from Heeren et al., (in press), employed a network approach to show that cognitive-emotional features of climate anxiety as a potential hub bridging general worry, the experience of climate change, pro-environmental behaviors, and the functional impairments associated with climate anxiety. Other related articles are currently under review, and we invite researchers working in this area to submit well-designed and methodologically-sound studies that address better understanding, assessing, treating, and preventing maladaptive expressions of climate anxiety. Our intent, and hope, is that this section will attract the highest quality research on issues pertinent to climate change and anxiety-related topics and, in doing so, will serve as a step toward reducing the global burden of climate change through the provision of knowledge that can inform evidence-based policy, communication, intervention, and preventive strategies.

References

Albrecht, G. (2011). Chronic environmental change: Emerging 'psychoterratic' syndromes. In I. Weissbecker (Ed.), *Climate Change and Human Well-Being. International and Cultural Psychology*. New York, NY: Springer.

Baudon, P., & Jachens, L. (2021). A scoping review of interventions for the treatment of eco-anxiety. *International Journal of Environmental Research and Public Health, 18*(*18*), 9636. https://doi.org/10.3390/ijerph18189636

Berse, K. (2017). Climate change from the lens of Malolos children: Perception, impact and adaptation. *Disaster Prevention and Management, 26*, 217–229. https://doi.org/10.1108/DPM-10-2016-0214

Blanchard, M. A., Contreras, A., Kalkan, R. B., & Heeren, A. (2022). Auditing the research practices and statistical analyses of group-level temporal network approach to psychological constructs: A systematic scoping review. *Behavior Research Methods*. https://doi.org/10.3758/s13428-022-01839-y

Borsboom, D., van der Maas, H. L. J., Dalege, J., Kievit, R. A., & Haig, B. D. (2021). Theory construction methodology: A practical framework for building theories in psychology. *Perspectives on Psychological Science, 16*(4), 756–766. https://doi.org/10.1177/1745691620969647

Carleton, T. A. (2017). Crop-damaging temperatures increase suicide rates in India. *Proceedings of the National Academy of Sciences of the United States of America, 114* (33), 8746–8751. https://doi.org/10.1073/pnas.1701354114

Charlson, F., Ali, S., Benmarhnia, T., Pearl, M., Massazza, A., Augustinavicius, J., & Scott, J. G. (2021). Climate change and mental health: A scoping review. *International Journal of Environmental Research and Public Health, 18*(9), 4486. https://doi.org/10.3390/ijerph18094486

Clayton, S. (2020). Climate anxiety: Psychological responses to climate change. *Journal of Anxiety Disorders, 74*, Article 102263. https://doi.org/10.1016/j.janxdis.2020.102263

Clayton, S., & Karazsia, B. (2020). Development and validation of a measure of climate change anxiety. *Journal of Environmental Psychology, 69*, Article 101434. https://doi.org/10.1016/j.jenvp.2020.101434

Coffey, Y., Bhullar, N., Durkin, J., Islam, M. S., & Usher, K. (2021). Understanding Eco-anxiety: A Systematic Scoping Review of Current Literature and Identified Knowledge Gaps. *The Journal of Climate Change and Health, 3*, 100047. https://doi.org/10.1016/j.joclim.2021.100047.

Crandon, T. J., Scott, J. G., Charlson, F. J., et al. (2022). A social–ecological perspective on climate anxiety in children and adolescents. *Nature Climate Change, 12*, 123–131. https://doi.org/10.1038/s41558-021-01251-y

van de Leemput, I. A., Wichers, M., Cramer, A. O. J., Borsboom, D., Tuerlinckx, F., Kuppens, P., … Scheffer, M. (2014). Critical slowing down as early warning for the onset and termination of depression. *PNAS Proceedings of the National Academy of Sciences of the United States of America, 111*(1), 87–92. https://doi.org/10.1073/pnas.1312114110

Dwyer, P. C., Chang, Y. P., Hannay, J., & Algoe, S. B. (2019). When does activism benefit well-being? Evidence from a longitudinal study of Clinton voters in the 2016 U.S. presidential election. *PloS One, 14*(9), Article e0221754. https://doi.org/10.1371/journal.pone.0221754

Gibson, K. E., Barnett, J., Haslam, N., & Kaplan, I. (2020). The mental health impacts of climate change: Findings from a Pacific Island atoll nation. *Journal of Anxiety Disorders, 73*, Article 102237. https://doi.org/10.1016/j.janxdis.2020.102237

Grillon, C. (2008). Models and mechanisms of anxiety: Evidence from startle studies. *Psychopharmacology, 199*(3), 421–437. https://doi.org/10.1007/s00213-007-1019-1

Hartley, C. A., Gorun, A., Reddan, M. C., Ramirez, F., & Phelps, E. A. (2014). Stressor controllability modulates fear extinction in humans. *Neurobiology of Learning and Memory, 113*, 149–156. https://doi.org/10.1016/j.nlm.2013.12.003

Heeren, A., Mouguiama-Daouda, C., & Contreras, A. (2022). On climate anxiety and the threat it may pose to daily life functioning and adaptation: A study among European and African French-speaking participants. *Climatic Change, 173*, 15. https://doi.org/10.1007/s10584-022-03402-2

Heeren, A., Mouguiama-Daouda, C., & McNally, R.J. (in press, this volume). A network approach to climate change anxiety and its key related features. *Journal of Anxiety Disorders*, 102625. ⟨https://doi.org/10.1016/j.janxdis.2022.102625⟩.

Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., & van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: A global survey. *Lancet Planet Health, 5*, e863–73. https://doi.org/10.1016/S2542-5196(21)00278-3

Hoffmann, R., Muttarak, R., Peisker, J., & Stanig, P. (2022). Climate change experiences raise environmental concerns and promote Green voting. *Nature Climate Change, 12* (2), 148–155. https://doi.org/10.1038/s41558-021-01263-8

IPCC. (2022). Climate Change 2022: Impacts, adaptation, and vulnerability. In H.-O. Pörtner, D. C. Roberts, M. Tignor, E. S. Poloczanska, K. Mintenbeck, A. Alegría, et al. (Eds.), *Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK and New York, NY, USA: Cambridge University Press.

Luong, T. T., Handley, T., Austin, E. K., Kiem, A. S., Rich, J. L., & Kelly, B. (2021). New insights into the relationship between drought and mental health emerging from the Australian rural mental health study. *Frontiers in Psychiatry, 12*, Article 719786. https://doi.org/10.3389/fpsyt.2021.719786

Maurage, P., Heeren, A., & Pesenti, M. (2013). Does chocolate consumption really boost Nobel award chances? The peril of over-interpreting correlations in nutrition and health studies. *The Journal of Nutrition, 143*, 931–933. https://doi.org/10.3945/jn.113.174813

Mouguiama-Daouda, C., Blanchard, M. A., Coussement, C., & Heeren, A. (2022). On the measurement of climate change anxiety: French validation of the Climate Anxiety Scale. *Psychologica Belgica, 62*(1), 123–135. https://doi.org/10.5334/pb.1137

Ruiter, R. A., Kessels, L. T., Peters, G. J., & Kok, G. (2014). Sixty years of fear appeal research: Current state of the evidence. *International Journal of Psychology, 49*(2), 63–70. https://doi.org/10.1002/ijop.12042

Sangervo, J., Jylhä, K. M., & Pihkala, P. (2022). Climate anxiety: Conceptual considerations, and connections with climate hope and action. *Global Environmental Change, 76*, Article 102569. https://doi.org/10.1016/j.gloenvcha.2022.102569

Schwartz, S. E., Benoit, L., Clayton, S., Parnes, M. F., Swenson, L., & Lowe, S. R. (2022). Climate change anxiety and mental health: Environmental activism as buffer. *Current Psychology*, 1–14. https://doi.org/10.1007/s12144-022-02735-6

Shankman, S. A., Robison-Andrew, E. J., Nelson, B. D., Altman, S. E., & Campbell, M. L. (2011). Effects of predictability of shock timing and intensity on aversive responses. *International Journal of Psychophysiology, 80*(2), 112–118. https://doi.org/10.1016/j.ijpsycho.2011.02.008

Stanley, S., Hogg, T., Leviston, Z., & Walker, I. (2021). From anger to action: Differential impacts of eco-anxiety, eco-depression, and eco-anger on climate action and well-being. *The Journal of Climate Change and Health, 1*, Article 100003. https://doi.org/10.1016/j.joclim.2021.100003

Taylor, S. (2020). Anxiety disorders, climate change, and the challenges ahead: Introduction to the special issue. *Journal of Anxiety Disorders, 76*. https://doi.org/10.1016/j.janxdis.2020.102313

Verplanken, B., Marks, E., & Dobromir, A. I. (2020). On the nature of eco-anxiety: How constructive or unconstructive is habitual worry about global warming? *Journal of Environmental Psychology, 72*, Article 101528. https://doi.org/10.1016/j.jenvp.2020.101528

Wullenkord, M. C., Tröger, J., Hamann, K. R. S., Loy, L. S., & Reese, G. (2021). Anxiety and climate change: A validation of the Climate Anxiety Scale in a German-speaking quota sample and an investigation of psychological correlates. *Climatic Change, 168*, 3. https://doi.org/10.1007/s10584-021-03234-6

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