On climate anxiety and the threat it may pose to daily life functioning and adaptation:

A study among European and African French-speaking participants

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This is a preprint of a manuscript that has been peer-reviewed for publication and accepted for publication in ***Climatic Change***[1]. The de-identified data and supplementary materials are available at https://osf.io/g2cre/.

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Abstract

The notion of climate anxiety has gained traction in the last years. Yet uncertainty remains regarding the variations of climate anxiety across demographic characteristics (e.g., gender, age) and its associations with adaptative (i.e., pro-environmental) behaviors. Moreover, the point-estimate proportion of people frequently experiencing climate anxiety has seldom been probed. In this study, we assessed climate anxiety (including its related functional impairments), along with demographic characteristics, climate change experience, and pro-environmental behaviors, in 2,080 French-speaking participants from eight African and European countries. 11.64% of the participants reported experiencing climate anxiety frequently, and 20.72% reported experiencing daily life functional consequences (e.g., impact on the ability to go to work or socialize). Women and younger people exhibited significantly higher levels of climate anxiety. There was no difference between participants from African and European countries, although the sample size of the former was limited, thus precluding any definite conclusion regarding potential geographic differences. Concerning adaptation, climate anxiety was associated with pro-environmental behaviors. However, this association was significantly weaker in people reporting frequent experiences of climate anxiety (i.e., eco-paralysis) than in those with lower levels. Although this observation needs to be confirmed in longitudinal and experimental research, our results suggest that climate anxiety can impede daily life functioning and adaptation to climate change in many people, thus deserving a careful audit by the scientific community and practitioners.

Keywords: Climate anxiety, Climate change anxiety, climate change, anxiety, eco-anxiety

1. Introduction

There is increasing awareness that climate change poses one of the most significant threats to human health and well-being (Cissé et al., 2022; Trewin et al., 2021). On these grounds, a growing body of research has pointed to climate change's current and potential consequences on mental health (Cissé et al., 2022; Clayton, 2020). For instance, there is already substantial evidence of the impact of climate-related extreme weather on mental health, notably via increased post-traumatic stress disorder, depression, and substance abuse among people who have experienced flooding, wildfires, or hurricanes (for a review, see Charlson et al., 2021). Likewise, although more gradual, drought can impair mental health, especially among workers impacted by its consequences (e.g., farmers; Carleton, 2017).

Alongside these consequences, a small but growing empirical literature has revealed the experience of climate anxiety (aka eco-anxiety), in the sense of apprehension and worry about the potential scope of the anticipated impacts of climate change and the uncertainty of their specific nature, timing, and precise location, even among people who have not personally experienced any direct impact (Clayton, 2020; Cunsolo et al., 2020). This emerging literature also aligns with worldwide media attention about climate anxiety (Clayton, 2020) and recent reports of spikes of online searches about it in the general community (Cunsolo et al., 2020).

At the empirical level, several national polls have accordingly pointed to climate change as a rising source of anxiety and stress in the general community (e.g., American Psychological Association, 2020; Reser et al., 2012). However, most of these surveys varied the way they assessed climate anxiety and related phenomena, with delineations ranging from anxiety feelings related to anthropogenic climate change to a generalized sense that the ecological foundations of the existence are on the brink of collapsing (for discussion, see Coffey et al., 2021). Such variations render particularly challenging the comparison across studies, thus thwarting any comparison across groups, geographic locations, and time (for a discussion, see Coffey et al., 2021).

To tackle these issues, Clayton and Karazsia (2020) recently developed and validated a 13-item scale to measure climate anxiety, the Climate Anxiety Scale (CAS). This 5-point Likert-type scale relies upon items adapted from previous surveys about climate anxiety wherein adaptation was grounded in existing clinical measures of functional impairments and rumination. The resulting scale has two subscales. One assesses cognitive-emotional features of climate anxiety through items like "I found myself crying because of climate change." The other subscale taps onto the functional impairments and aims at assessing whether thinking about climate change has undermined respondents' ability to socialize, work or concentrate at work or school with items like "My concerns about climate change interfere with my ability to get work or school assignments done" or "My concern

about climate change makes it hard for me to have fun with my family or my friends" (Clayton, 2020; Clayton & Karazsia, 2020).

In two U.S. samples studies (*n1*= 197; *n2* = 199), Clayton and Karazsia (2020) found that about a fifth of their samples exhibited cognitive and emotional features of climate anxiety, as denoted by 17-19% of the respondents with a mean score higher than the scale-midpoint on the cognitive-emotional subscale. Most strikingly, they also found that about a quarter of their respondents reported a degree of climate anxiety interfering with their ability to function, as reflected by 26-27% of the respondents with a mean score higher than the scale-midpoint on the functional impairments' subscale. Such levels of functional impairments thus point to climate anxiety as a potential threat to well-being, deserving a thorough audit by mental health experts.

Of critical importance, prior research suggests that climate anxiety might not be equally distributed among people. First, women might be more vulnerable to climate change impact (Cissé et al., 2022; World Health Organization, 2014), notably because of their perceived relative lack of power when facing a threat in many cultures (World Health Organization, 2014). Moreover, gender difference can also be seen through women's negligible participation in decision-making structures and limited access to and control of agricultural lands, inputs, and services as resources to foster their adaptation to climate change (Aguilar, 2008). Yet, several cross-national studies showed that women engage more in pro-environmental behavior than men (e.g., Allen et al., 2019; Hunter et al., 2004). Moreover, prior research on the psychological impact of climate change has pointed to gender differences, with women reporting more concern and distress than men in response to climate change (e.g., Searle & Gow, 2010; Zelezny et al., 2000). However, although these phenomena are conceptually close to climate anxiety, gender differences in climate anxiety have seldom been investigated. To our best knowledge, only two studies examined this question. In two US samples, Clayton and Karazsia (2020) found no gender differences in climate anxiety per se, but only gender differences in pro-environmental behaviors. In contrast, Wullenkord et al (2021) found that, in a German-speaking sample, women reported more climate anxiety than men. As such, a critical step would thus be to clarify whether gender difference in climate anxiety varies across cultures and geographic locations.

Second, prior national polls and surveys have shown that young adults experience higher levels of climate anxiety (e.g., Clayton & Karazsia, 2020). For instance, Clayton & Karazsia (2020) reported that the youngest US adults (aged between 18-35 years old) scored higher than the older ones on both the cognitive-emotional and functional subscales of the Climate Anxiety Scale. A recent survey conducted among young adults (between 16-25 years old) from around the globe corroborated that climate change particularly impairs this group's

psychological and social functioning, notably because of their perception that their future is doomed (Hickman et al., 2021).

Third, early reports have also suggested that those directly affected by climate change in their local environment experience higher levels of anxiety vis-à-vis climate change. For instance, in a study conducted in the Pacific Island atoll nation of Tuvalu, 95% of the participants reported experiencing considerable anxiety about climate change, with this latter interfering in their daily life functioning in 87% of the cases (Gibson et al., 2020). In the same vein, climate anxiety had a medium-sized correlation with participants' reported experience of climate change in US samples (Clayton & Karazsia, 2020). However, to the best of our knowledge, this link has never been explored across more diverse and culturally different samples.

Finally, one of the most critical questions in today's climate anxiety research is whether this latter may prompt adaptive behavioral responses vis-à-vis climate change. Several Australian and British studies reported an association between climate anxiety and pro-environmental behaviors (e.g., Reser et al., 2012; Verplanken et al., 2020). Likewise, in a large US sample, people who reported climate anxiety identified themselves as more motivated to change their behavior than those who did not (American Psychological Association, 2020). However, participants were only assessed regarding their motivation to change their behavior, not their actual behaviors. Moreover, prominent views on the emotional responses to climate change hold that climate anxiety might actually inhibit people from taking real behavioral action (Albrecht, 2011), a notion termed "eco-paralysis" (Albrecht, 2011). However, in Clayton and Karazsia's (2020) study, pro-environmental behaviors were neither positively nor negatively associated with climate anxiety. As such, uncertainty still abounds regarding how and when climate anxiety may or not trigger adaptive responses' deployment (for a discussion, see Pihkala, 2020). From a basic anxiety research framework, one may even wonder whether this effect of « eco-paralysis » may not only be at play among individuals with high levels of climate anxiety; an observation that would align with prominent views of the maladaptive—i.e., no longer adaptive—nature of anxiety in people with anxiety disorders (e.g., Öhman, 2008).

Therefore, we had three goals in this study. First, we aimed at examining how age, gender, educational background, previous experience of climate change, and geographical locations impact climate anxiety. Of particular interest was to capitalize on Clayton and Karazsia (2020)'s recent conceptualization of climate anxiety and their dissociation between climate anxiety's cognitive-emotional and functional features. Adopting similar operationalization can ease more stringent between-study comparisons and ultimately facilitate cumulative science regarding climate anxiety across geographic locations. The geographical location was reflected here by various countries sharing the same language—i.e., French— but relying on very different cultural backgrounds

and geographic regions (e.g., European and African French-speaking countries). Because ongoing and long-term consequences of climate change are significantly more adverse for people living in African countries than in European countries, notably in terms of human health and safety, food and water security, and socio-economic development (e.g., Collier et al., 2019; World Meteorological Organization, 2020), we anticipated between-country differences regarding climate anxiety. Second, we followed Clayton and Karazsia (2020) to estimate the proportions of people reporting "frequent" (i.e., more than sometimes) climate anxiety to allow a more stringent comparison with prior research. Of particular interest was better understanding the demographic characteristics, climate change experience, and pro-environmental behaviors of these individuals. Finally, we dared to examine whether individuals with lower values of climate anxiety would be more prone to deploy adaptive behavioral responses vis-à-vis climate change than those with higher levels or, in other words, whether people with higher levels of climate anxiety would show higher levels of eco-paralysis.

2. Method

2.1. Participants

We recruited 2,080 French-speaking participants, wherein 51.88% (n = 1,079) were women and 48.12% (n = 1,001) men. Participants were recruited from the general community via online social media and listserv advertisements. The data collection took place from May 2021 to July 2021. Participants were between the age of 17 and 84 (M = 43.04, SD = 13.52). Regarding nationality, 72.45% (n = 1507) were from France, 23.80 % (n = 495) from Belgium, 1.54 % (n = 32) from Switzerland, 0.82 % (n = 17) from Gabon, 0.43% (n = 9) from Rwanda, 0.34% (n = 7) from Morocco, 0.34% (n = 7) from Algeria, and 0.29% (n = 6) from Congo. Their years of education completed since primary school ranged from 0 to 21 (M = 16.77, SD = 2.71).

The study was approved by the Institutional Review Board and conducted according to the Declaration of Helsinki. Each participant provided written informed consent before completing the survey.

2.2. Measures

2.2.1. Climate anxiety. We assessed climate anxiety using the Climate Anxiety Scale (CAS; Clayton & Karazsia, 2020). The CAS is a 13-item self-report questionnaire wherein participants rate each on a 5-point Likert-type scale, from 0 (*Never*) to 5 (*Almost always*). For each item, a higher score reflects a greater endorsement of the content covered by the item. Although one may compute a total scale score (e.g., Clayton, 2020; Clayton & Karazsia; 2020), the scale also includes two subscales: (a) eight items measuring the cognitive and emotional impairments of climate anxiety (e.g., “Thinking about climate change makes it difficult for me to concentrate“; “I

found myself crying because of climate change") and (b) five items measuring the functional impairments (e.g., "My concerns about climate change interfere with my ability to get work or school assignments done", "My concern about climate change make it hard for me to have fun with my family or my friends"). We used the validated French version of the scale (Mouguiama-Douada et al., 2022). As in previous studies (e.g., Clayton & Karazsia, 2020), the internal reliability of CAS was high in the present sample, with a Cronbach's alpha of .89 for the global scale score (.81 for the cognitive-emotional impairments subscale and .82 for the functional impairments one).

To align with Clayton and Karazsia (2020) and ease future between-studies comparison, we computed, for each participant, mean scores for the CAS total scale score and the mean score for each of the two subscales (i.e., cognitive-emotional and functional impairment of climate anxiety).

2.2.2. .Experience with climate change. Following Clayton and Karazsia (2020), we assessed the experience of climate change via three items (i.e., "I have been directly affected by climate change"; "I know someone who has been directly affected by climate change"; "I have noticed a change in a place that is important to me due to climate change"). Each item was assessed using a 5-point Likert-type scale, ranging from 0 (*Never*) to 5 (*Almost always*). We used the validated French version of these items (Mouguiama-Douada et al., 2022). with a Cronbach's alpha of .78, items' internal reliability was good in the present sample. We computed a scale mean score for each participant.

2.2.3. Pro-environmental behaviors. We measured participants' engagement in pro-environmental behaviors using the five items (e.g., "I try to reduce my behaviors that contribute to climate change," "I feel guilty if I waste energy"; "I turn off lights") proposed by Clayton and Karazsia (2020). Each item was assessed using a 5-point Likert-type scale, ranging from 0 (*Never*) to 5 (*Almost always*). We used the validated French version of these items (Mouguiama-Douada et al., 2022), and their internal reliability was acceptable in the present sample, with a Cronbach's alpha of .69. For each participant, we a computed scale mean score.

2.3. Statistical procedures

We examined potential differences between men and women through separated independent-sample *t*-tests. Because of limited participants for some countries, we collapsed the different countries into African and European countries, respectively, to maximize statistical power. Potential differences between African and European countries were also assessed through independent-sample *t*-tests.

We tested whether climate anxiety was associated with age, education, the experience of climate change, as well as pro-environmental behavioral engagement via separate zero-order Pearson product-moment correlations. Values of .10, .30, and .50 or larger are respectively considered as benchmarks for small, medium, and large associations (Cohen, 1988).

Using a strategy similar to that of Clayton and Karazsia (2020), we operationalized individuals reporting low and high climate anxiety by computing the percentage of participants with a CAS mean score below and above the midpoint of the scale (i.e., reporting experiencing climate anxiety less or more than "sometimes", respectively). Because of our interest in distinguishing the cognitive-emotional from the functional features of climate anxiety, we also applied a similar procedure to each subscale of the CAS. Independent sample *t*-tests were then used to probe potential differences between people below and above the midpoint value for continuous variables, and reported effect sizes in the form of Cohen's *d*. Cohen's *d* values lower than .3, around .5, and larger than .8 are considered benchmarks for small, medium, and large effect sizes (Kotrlik et al., 2011). For categorical variables, we implemented χ^2 tests and reported effect sizes in the form of φ. A value of $\varphi = 0.1$ depicts a small effect, 0.3 a medium effect, and 0.5 a large effect (Kotrlik et al., 2011).

Finally, to test whether the association between climate anxiety and pro-environmental behaviors differs between individuals with a mean score below and above the midpoint, we compared each group's zero-order Pearson product-moment correlations via Fisher's *r*-to-*z* transformations. We implemented a similar approach for examining potential differences in the association between experience of climate change and climate anxiety between people below and above the midpoint.

Due to the size of our sample and the number of variables, we only reported findings of *t* and χ^2 tests that are significant at the $p < .005$ to be confident that our results are genuine (Ioannidis, 2018). Likewise, we implemented a Bonferonni correction for the 21 correlations examined to account for potential Type I error.

3. Results

3.1. Differences between geographic locations

There were no significant differences between participants from African and European countries (see *Table S1* in the Supplementary Materials section).

3.2. Gender differences

Women scored significantly higher than men on the CAS mean score as well as the cognitive-emotional subscale. However, there was no significant difference regarding the functional subscale. Moreover, pro-environmental behaviors were significantly higher in women than men. Results are in *Table 1*.

3.3. Associations with age and education

Age had a small, but significant negative correlation with the CAS mean score, and with both the cognitive-emotional and functional scores. Regarding education, none of the correlations were significant. All the correlations are shown in *Table 2*.

3.4. Associations with experience of climate change

As shown in *Table 2*, the experience of climate change had significant positive small-to-medium correlations with the CAS mean score, as well as with both cognitive-emotional and functional scores.

3.5. Associations with pro-environmental behaviors

The CAS score significantly and positively correlated with participants' pro-environmental behaviors. Similar findings stood out for the cognitive-emotional and functional subscales. Note that pro-environmental behaviors were also significantly associated with the experience of climate change. All these correlations were small-to-medium sized. Results appear in *Table 2*.

3.6. Proportions of individuals reporting frequent climate anxiety

From our entire sample, 11.64% of the participants scored higher than the midpoint of the CAS mean score — or, in other words, experienced climate anxiety more often than "sometimes". When applying a similar procedure to the mean score of the cognitive-emotional and functional subscales, the proportions were 10.82% and 20.72%, respectively.

We also examined potential differences between individuals with a score below and above the midpoint of the CAS mean score. As shown in *Table 3*, those above the midpoint were significantly younger, more behaviorally engaged, and reported significantly higher levels of climate change experience, with all these differences being of moderate-to-large effect size (Cohen's d between .49 and .68). However, there were no significant differences in gender, education, and countries between those above and below the midpoint.

Similar patterns of observations emerged when comparing those below and above the midpoint on the cognitive-emotional and functional subscales (see *Table S2* and *Table S3* in the Supplementary Materials section). The only exception was for gender, wherein there were significantly more women (i.e., 14.1% of the entire sample) than men (i.e., 7.3%) among those scoring above the midpoint for the cognitive-emotional (see *Table S2* in the supplementary materials).

3.7. Associations between climate anxiety, pro-environmental behaviors, and experience of climate change as a function of climate anxiety levels

The CAS mean score correlated significantly more strongly ($Z = 3.96$, $p < .001$) with pro-environmental behaviors in people scoring below the CAS midpoint ($r = .40$, $p < .0001$) than those above ($r = .15$, $p = .02$). Similar observations stood out for the association between pro-environmental behaviors and the cognitive-emotional subscale ($Z = 3.92$, $p < .001$) as well as with the functional scores ($Z = 4.28$, $p < .001$). Regarding climate change experience, there was no significant difference between groups. Results are presented in *Table 4*.

A very similar pattern of findings emerged when comparing those with a mean score below and above the midpoint on either the cognitive-emotional or functional subscales. Results are available in the Supplementary Materials (see *Table S4* and *Table S5*).

4. Discussion

The aims of this study were three-fold. First, we aimed at assessing the relationship between climate anxiety with gender, age, educational background, previous experience of climate change, and geographical locations. A second goal was to determine the *point-estimate* proportions of people reporting "frequent" (i.e., more than sometimes) climate anxiety to ease comparison with prior U.S. research. Finally, we also aimed to examine the relations between climate anxiety and pro-environmental behaviors.

Perhaps the most striking observation was that 11.64% of the participants experienced climate anxiety more often than "sometimes" and that this proportion was 10.82% and 20.72% when distinguishing the cognitive-emotional and the functional climate-anxiety-related impairments, respectively. In other words, our findings suggest that a substantial proportion of people shows a degree of climate anxiety that impedes their ability to function in their daily life (e.g., impact on the ability to go to work or socialize). Of particular interest, these proportions were comparable, though slightly lower, to those reported in two U.S. samples, wherein the proportions were 17-19% for the cognitive-emotional impairments and 26-27% for the functional impairments (Clayton & Karazsia, 2020). Because functional impairments in daily life often yield further harming mental health outcomes (e.g., McKnight & Kashdan, 2009), our findings point to climate anxiety as a potential threat deserving a careful audit by the mental health experts.

Moreover, several variables were either associated with climate anxiety or among those characterizing people with higher levels of climate anxiety. A first key observation across our results was that women exhibit significantly higher levels of climate anxiety than men. This finding dovetails with the World Health Organization

(2014) and Intergovernmental Panel on Climate Change (Cissé et al., 2022) 's concern that women might be more emotionally vulnerable to climate change, notably because of the relative perceived lack of power associated, in many countries and cultural backgrounds, with female gender roles when facing natural threats (Aguilar, 2008; Cissé et al., 2022; World Health Organization, 2014).

However, although our observation of women's higher levels of climate anxiety fully aligns with the only previous study relying on the CAS in non-US samples (i.e., Germany; Wullenkord et al., 2021), it departs from prior research conducted in the USA (i.e., Clayton & Karazsia, 2020). Strikingly, since we found no gender difference between participants from European and African countries in the present study, and that climate change is, to some extent, culturally constructed (Clayton, 2020), one may thus wonder whether cultural differences in gender perceptions and response to climate change may explain such a discrepancy between US and non-US samples. Cross-cultural research has pointed to strong gender-culture interaction regarding the lived experience of climate change as a threat, with substantial variations between men and women regarding their lived experience of the perceived changes in the local ecology, loss of economic opportunity, and implications for the future generations (e.g., Du Bray et al., 2019). An essential step in future research would thus be to explore the daily life experience of climate anxiety in women from various cultural backgrounds.

On the other hand, since anxiety and related disorders are approximately twice as common in women as in men (e.g., McLean et al., 2011), one may wonder whether the gender difference reported in this study does not merely mirror gender differences in general anxiety and depression. Likewise, prior research has pointed to gender differences in emotional intelligence, especially in women's higher ability to identify and express their emotions (e.g., Meshkat & Nejati, 2017). As such, one may wonder whether women might not merely be better at noticing and reporting their emotional experiences vis-à-vis climate change than men. On the other hand, in line with prior research (e.g., Clayton & Karazsia, 2020; Hunter et al., 2004), we found that women have more pro-environmental behaviors than men, an observation suggesting that the gender difference is not limited to emotional features but also included behaviors. A critical next step in future iterations would thus be to assess whether gender difference in climate anxiety remains when controlling for general anxiety, depression, and emotional intelligence.

Consistent with prior U.S. research on climate anxiety (e.g., APA, 2018; Clayton & Karazsia, 2020), we also evidenced that younger were more impacted than older adults. And that is not surprising. There is mounting evidence that adolescents and young adults are increasingly worried about and functionally burdened by climate change because of their perception that their future is doomed and their feelings of betrayal and abandonment by

adults and governments that are failing to react appropriately (Hickman et al., 2021). As pointed out by several mental health experts (e.g., Crandon et al., 2022; Vergunst & Berry, 2021), increasing their empowerment as a key stakeholder group, representative of the world's future adults, may help lessen the burden of climate change in this group. Encouraging school-based programs to build agency and facilitating family and community support may also help foster climate change resilience in youths (Crandon et al., 2022).

Another key observation was that the perceived experience of climate change was strongly associated with all the climate-anxiety-related features, though there were no significant differences between African and European countries in terms of climate anxiety. Moreover, people scoring above the scale-midpoint reported significantly higher experiences of climate change than those below. In other words, this pattern of findings suggests that the personal experience of climate change might be more decisive vis-à-vis climate anxiety than the geographic locations per se. This observation echoes with other reports pointing to the importance of the perceived changes in the local environment in the emotional responses to climate change (du Bray et al., 2019; Ellis & Albrecht, 2017, Middleton et al., 2021). Should the existence of a direct link between the perceived experience of climate change and climate anxiety be confirmed, one may wonder about a potential increase in the prevalence rates of climate anxiety, given that climate change is having more and more visible consequences worldwide (e.g., Trewin et al., 2021; World Meteorological Organization, 2020).

Finally, in line with prior research (e.g., Reser et al., 2012; Verplanken et al., 2020), there were moderate-to-strong associations between climate-anxiety-features and pro-environmental behaviors. As such, climate anxiety may thus prompt individual behavioral responses vis-à-vis climate change. Of note, this observation echoes with the assumed (evolutionary) adaptive nature of anxiety as an emotion. Indeed, anxiety is a future-oriented emotion characterized, at the cognitive level, by the anticipation of a possible danger that is not present and may never occur (e.g., worry about a potential and uncertain threat; Öhman, 1996) and, at the physiological level, by physical tension and chronic over-arousal (e.g., muscle tension) thought as reflecting readiness for dealing with a future danger should it occur (Heeren, 2020; Öhman, 1996). At the behavioral level, anxiety may thus foster a strong tendency to deploy behavioral responses aiming to avoid the occurrence of the anticipated threat. From this perspective, anxiety's adaptive value may allow planning and preparing for a possible threat.

Interestingly, one of our most striking observations emerged when comparing people with higher climate anxiety levels to those with lower levels. First, the former described themselves as more behaviorally engaged in pro-environmental behaviors than those with lower scores. But, we also found that the association between climate

anxiety and pro-environmental behaviors depends upon the severity of climate anxiety. People with higher levels of climate anxiety exhibited significantly lower correlations with pro-environmental behaviors than those with lower levels of climate anxiety. And this pattern of observations should not come as a surprise. From an anxiety research framework, when anxiety turns to be excessive or severe, it may not only impair daily functioning and cause psychological distress but may also no longer serve its adaptive function. Thus, our results suggest that similar conclusions might apply to climate anxiety. These results also echo the notion of « eco-paralysis » (Albrecht, 2011), where people become so anxious about climate change that it inhibits them from taking real behavioral action— a phenomenon, sometimes misinterpreted as apathy (Usher et al., 2019; see also the notion of "total inertia", Cianconi et al., 2021).

However, the link between climate change anxiety and pro-environmental behaviors requires further advancement, especially regarding its causal and temporal unfolding. An especially decisive step will also be to elucidate the psychological mechanisms bridging climate anxiety and pro-environmental behaviors. So far, research has pointed to coping strategies—i.e., constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141)—has a potential candidate bridging the emotional experience vis-à-vis climate change, including climate anxiety, and pro-environmental behaviors (Brosch, 2021; Mah et al., 2020; Ojala et al., 2021). However, coping strategies encompasses varying processes (Zimmer-Gembeck & Skinner, 2016), arising from both the individual (e.g., emotion, motivation, attention, cognition) and the collective levels (e.g., cooperative action to mitigate stressors; for a discussion, see Lyons et al., 1998). A significant challenge will thus be to examine the respective and joint influences of these different levels of coping in the relationship between climate anxiety and pro-environmental behaviors (e.g., Mah et al., 2020).

The present study may yield implications. Given our observation of a substantial proportion of participants experiencing climate anxiety levels that threaten their daily life functioning, actionable efforts are required (for a discussion, see Cunsolo et al., 2020). First, because anxiety is assumed to be triggered when facing an unpredictable possible future-oriented threat, the communication strategy of the governments' representatives should not only communicate about climate change per se but also about the national plan to anticipate adaptation to the many challenges posed by climate change (for discussion, see Mah et al., 2020; Moser, 2017). Of note, several initiatives about communicating climate change adaptation, anxiety, and resilience offer online resources to do so (e.g., APA Task Force on Climate Change; Climate Psychology Alliance). Second, mental health

practitioners should carefully audit and follow-up climate anxiety in their practice. Although clinical research on climate anxiety is still at an early stage, research has pointed to treatment options tapping into nature contact and connectedness as up-and-coming tools to alleviate climate anxiety and foster adaptation to climate change (for a review, see Baudon & Jachens, 2021). Moreover, research has also emphasized empowerment—encouraging people with climate anxiety to engage in conservation actions— as a beneficial treatment option (e.g., Baudon & Jachens, 2021; Cunsolo et al., 2020). Recent research also shows that environmental activism may buffer the mental health consequences of climate anxiety (e.g., Schwartz et al., 2022). By helping people with severe climate anxiety engage in collective actions, clinical researchers and social workers may foster a cascade of downstream benefits, combating feelings of hopelessness and promoting community connection and social support (for a discussion, see Schwartz et al., 2022).

The present study has limitations that deserve careful consideration in future iterations. First, one of our study's main limitations is that we relied on a cross-sectional research design. Although we aimed at easing the comparison across studies (e.g., Clayton & Karazsia, 2020; Wullenkord et al., 2021), such a cross-sectional approach precludes any potential cause-effect relationships between our variables of interest (e.g., Maurage et al., 2013). And this is unfortunate since such psychopathological mechanisms fluctuate over time (e.g., Blanchard et al., 2022; Heeren et al., 2015). For instance, one may wonder about the temporal unfolding of the relation between climate anxiety's cognitive-emotional and functional features (e.g., does the onset of functional impairments require the precedence of cognitive and emotional impairments?). A second major shortcoming is the limited number of participants from African countries, precluding any definite conclusions regarding the absence of differences between geographic locations. On the other hand, neither the *p*-values nor the effect-sizes were close to meaningful values when comparing African and European countries. Future iterations may thus want to replicate this study in larger and more culturally diverse African samples. Third, we relied on the CAS, while recent research has suggested that this scale has limitations (e.g., Wullenkord et al., 2021), including its focus on the maladaptive nature of anxiety, as compared to the possible practical nature of anxiety (for a discussion, see Pihkala, 2022). Likewise, other scales assessing climate anxiety have been published since we initiated this project. For instance, Hogg et al. (2021) recently developed a 13-item scale encompassing four factors (i.e., affective symptoms, rumination, behavioral symptoms, and anxiety about one's negative impact on the planet). A critical next step would thus be to examine whether the present findings replicate when using other measurements tools. Fourth, we assessed pro-environmental behaviors through the self-reported items developed by Clayton and Karazsia (2020). Although we aimed at ensuring the standardization of the measurement approach across studies, these items are

restricted to individual behaviors and do not cover collective actions (e.g., environmental activism). This is unfortunate given prior research linking climate anxiety to collective actions (e.g., Schwartz et al., 2022; Stanley et al., 2021). Finally, although climate anxiety has been seen as distinct from other sources of anxiety (e.g., COVID-19; Kulcar et al., 2022), one may wonder whether those with higher levels of climate anxiety exhibit higher threat reactivity, regardless of the nature of the threat.

Notwithstanding these limitations, the present findings suggest that climate anxiety may impede the daily life functioning of a large proportion of people. Moreover, although climate anxiety may foster behavioral adaptation to climate change, it may block it in people with severe climate anxiety. Thus, the development of interventions helping those with severe climate anxiety will be a critical next step to lessen the threat it may pose to our adaptation.

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Acknowledgements.

Alexandre Heeren is funded by the F.R.S.-FNRS Belgian National Science Foundation (as FRS-FNRS research associate). Camille Mouguiama Daouda is funded by a research fellowship from the "Agence Nationale des Bourses du Gabon". Alba Contreras is supported by a FSR Postdoctoral fellowship (UCLouvain) and International Wallonie-Bruxelles International (WBI) Excellence Grant. These funds did not exert any influence or censorship of any kind on the present work.

Author Statement

AH: Conceptualization, Funding Acquisition, Investigation, Methodology, Project Administration, Formal Analysis, Writing – original draft. **CMD**: Conceptualization, Funding Acquisition, Investigation, Methodology, Ressources, Data Curation, Validation, Writing – review & editing. **AC**: Visualization, Validation, Writing – review & editing

Data Availability

The anonymized data and the supplementary materials are available on the Open Science Framework at the following repository link: https://osf.io/g2cre/.

Conflict of interest

The authors have no conflict of interest to disclose.

Table 1. *Climate Anxiety and Other Features as a Function of Gender*

	Female (n = 1079)	Male (n = 1001)	t	p	*Cohen's d*
Climate anxiety					
CAS, M (SD)	**2.12 (.69)**	**1.99 (.70)**	**3.89** [a]	**< .001**	**.19**
Cognitive-emotional impairments, M (SD)	**2.09 (.70)**	**1.89 (.66)**	**6.72** [a]	**< .001**	**.29**
Functional impairments, M (SD)	2.15 (.81)	2.16 (.91)	.35 [a]	.73	.01
Experience of climate change, M (SD)	2.26 (.99)	2.15 (.98)	2.54 [a]	.01	.11
Pro-environmental behaviors, M (SD)	**4.19 (.48)**	**3.95 (.62)**	**9.89** [a]	**< .001**	**.43**

Note. CAS = Climate Anxiety Scale (CAS; Clayton & Karazsia, 2020); M = mean score; SD = Standard Deviation. Significant differences appear in bold (at $p < .005$)

[a] Value for $t(2078)$

Table 2.

Correlations between climate anxiety, age, years of education, reported experience of climate change, and pro-environmental behaviors

		1.	2.	3.	4.	5.	6.
1.	Age	—					
2.	Education	.02	—				
3.	Climate anxiety	**-.15****	.02	—			
4.	Cognitive-emotional impairments	**-.16****	< .01	**.94****	—		.
5.	Functional impairments	**-.11****	.03	**.90****	**.71****	—	
6.	Experience of climate change	.06	.04	**.35****	**.34****	**.31****	—
7.	Pro-environmental behaviors	-.06	.03	**.41****	**.39****	**.37****	**.26****

Note. CAS = Climate Anxiety Scale (CAS; Clayton & Karazsia, 2020). Significant correlations appear in bold.

***p* < .001 (with Bonferroni-corrected adjustment for multiple comparison).

Table 3. *Participants' characteristics as a function of their levels of climate anxiety*

	Overall sample (*n* = 2080)	Below the midpoint (*n* = 1838)	Above the midpoint (*n* = 242)	*t* or χ^2	*p*	Cohen's *d* or φ
Age, M (SD)	43.04 (13.52)	**43.76 (13.60)**	**37.57 (11.46)**	**6.77** [a]	**< .0001**	**.49**
Gender (%)				2.68 [b]	.10	.04
Female	51.88%	51.2 [c]	43.00[c]		.	
Male	48.12%	48.8 [c]	57.00 [c]			
Years of Education	16.77 (2.71)	16.77 (2.73)	16.76 (2.58)	.08[a]	.94	< .01
Climate anxiety						
CAS, M (SD)	2.06 (.70)	**1.89 (.56)**	**3.30 (.31)**	**38.53[a]**	**< .0001**	**3.12**
Cognitive-emotional impairments, M (SD)	2.00 (.69)	**1.84 (.56)**	**3.16 (.40)**	**35.36[a]**	**< .0001**	**2.71**
Functional impairments, M (SD)	2.16 (.86)	**1.98 (.72)**	**3.52 (.55)**	**32.17[a]**	**< .0001**	**2.40**
Location (%)				.03[d]	.87	<. 01
European countries (*n* = 2034)	97.79%	88.3%[e]	11.7% [e]			
African countries (*n* = 46)	2.21%	89.1% [e]	10.9% [e]			

Experience of climate change, M (SD)	2.20 (.99)	**2.13 (.97)**	**2.79 (.96)**	**10.04** [a]	**< .001**	**.68**
Pro-environmental behaviors, M (SD)	4.07 (.56)	**4.04 (.57)**	**4.37 (.46)**	**8.70**[a]	**< .001**	**.64**

Note. CAS = Climate Anxiety Scale (CsAS; Clayton & Karazia, 2020); M = mean score; SD = Standard Deviation. Significant differences (at $p < .005$) appear in bold.

[a] Value for $t(2078)$

[b] Value for χ^2 (1, $N = 2080$)

[c] Value reflecting % within each gender category.

[d] Value reflecting % within each location.

Table 4.

Associations between climate anxiety and pro-environmental behaviors and experience of climate change as a function of participants' levels of climate anxiety

	Below the midpoint (n = 1838)	Above the midpoint (n = 242)	Z	p (2-tailed)
CAS & Pro-environmental behaviors	**.40****	**.15***	**3.96**	**< .001**
Cognitive-emotional impairments & Pro-environmental behaviors	**.38****	**.13***	**3.92**	**< .001**
Functional impairments & Pro-environmental behaviors	**.34****	**.06**	**4.28**	**< .001**
Experience of Climate Change & CAS	.30**	.23**	1.10	.27
Experience of Climate Change & Cognitive-emotional impairments	.28**	.23*	.78	.44
Experience of Climate Change & Functional impairments	.25**	.08	2.55	.01
Experience of Climate Change & Pro-environmental behaviors	.25**	.11	2.11 [a]	.03

Note. CAS = Climate Anxiety Scale (CAS; Clayton & Karazsia, 2020). Significant differences between groups (at $p < .005$) appear in bold. ** denotes correlations significant at $p < .005$ (with Bonferroni-corrected adjustment for multiple comparison).