

Proceeding Paper

How Eco-Anxiety Is Affected by Community Health Status and Climate Justice Determinants: An Exploratory Study in Young Population [†]

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Abstract: The climate crisis, combined with the COVID-19 lockdown measures, exacerbated pre-existing psychological conditions among young people experiencing climate anxiety due to a lack of information and a diffuse sense of powerlessness. The current study aimed to find correlations between the health status of a community, the environmental determinants among youths, and how these affect their vision of climate change and their mental health. An exploratory survey was conducted among people aged between 18 and 33 years old from three continents, with a focus on emotional states related to natural disasters occurring in their regions. The online survey consisted of six questions. The pilot phase results showed that more females from India experienced stressful situations related to climate change, and that respondents aged between 18 and 20 years old were more informed about eco-anxiety. Given its growing frequency among young adults, further studies should be conducted to address the problem and create alternatives and coping mechanisms such as climate action.

Keywords: young adults; eco-anxiety; disorders; vulnerability; climate action



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1. Introduction

The last IPCC report highlighted that climate change threatens our environment and most of our human rights, particularly that of health.

Despite the increasing interest in the psychological effects of various phenomena, there is still a lack of research on how these phenomena impact marginalized groups, particularly young people aged 10–24. Additionally, there is an urgent need for more extensive studies on the effects of such phenomena on the youth demographic, specifically those aged 15–24, and particularly on vulnerable populations such as Indigenous communities. These communities face direct risks as media influence amplifies climate concerns, shaping perceptions beyond personal experiences.

The climate crisis, along with pandemic lockdown measures, has created unprecedented psychological conditions. This has worsened existing mental illnesses among young people who are experiencing climate anxiety. This is associated with a lack of information and a widespread sense of being unable to act [1–3].

Negative emotionality associated with anxiety may include physical symptoms and future-oriented apprehension, which can help to prepare or prompt adaptive responses [4,5]. Yet, in extreme cases, it may become maladaptive, causing emotional dysregulation [4], chronic worry [5], and, sometimes, the so-called eco-paralysis [1,6].

Moreover, non-communicable diseases can significantly affect the productivity of a community. These two factors are closely linked to the overall well-being and mental resilience of communities and thus greatly influence their ability to handle external stressors. The concepts of energy psychology and psychological energy have been incorporated

in various instances related to both natural and human-made disasters [7–9]; different international humanitarian relief organizations have utilized this concept in their post-disaster strategies.

Disaster relief strategies rooted in energy psychology are intricate, involving the management of stress reactions and chronic disorders through cognitive operations, visualization techniques, and physical activities. As outlined in “Ecological Grief and Anxiety: The Start of a Healthy Response to Climate Change,” the breakdown of the systems crucial to human survival, such as environmental and socio-economic systems, can precipitate a range of mental health issues, including post-traumatic stress disorder, depression, anxiety, and even suicidal thoughts or actions [10].

“Thus, eco-anxiety is an umbrella term that encompasses concerns about ecosystem loss, species extinction, and widespread environmental issues like pollution and deforestation, all linked to human-induced climate change [11,12]. Pihkala’s taxonomy of climate-related emotions includes numerous categories, such as surprise, threat, anxiety, sadness, depression, guilt, shame, resentment, disgust, anger, hostility, envy, and positive emotions.” [13].

This study, along with other studies, demonstrates how feelings of eco-anxiety, eco-guilt, and eco-grief are complex constructs influenced by multiple factors [1,12,14]. Climate justice, vulnerability to extreme events, and government responses to climate change are key factors contributing to the spread of eco-anxiety within a community, particularly among young people. These factors can be further broken down into environmental risk factors, policy-related dimensions, and psychological health factors. Greater awareness and knowledge about climate change often result in heightened eco-anxiety, as individuals who are well-informed tend to worry more about its impacts. Communities that have directly experienced extreme weather events, such as hurricanes, wildfires, floods, or prolonged droughts, tend to exhibit higher levels of eco-anxiety due to firsthand exposure to the effects of climate change. Media portrayal also plays a significant role; sensationalized or alarming news reports can exacerbate fear and anxiety about the environment, leading to feelings of helplessness and despair. Social norms and values within a community that prioritize environmental conservation and sustainability can intensify eco-anxiety, as individuals internalize these concerns. Psychological factors, including a predisposition to anxiety or pre-existing mental health conditions, influence the depth of individuals’ experience with eco-anxiety, with psychological resilience and coping mechanisms playing crucial roles.

Additionally, demographic characteristics, such as age and gender, show that younger individuals, particularly those in their 20s and 30s, and women, are more likely to experience eco-anxiety due to their future-oriented concerns and greater empathy towards environmental issues. Addressing eco-anxiety requires a comprehensive approach that takes these various determinants into account [15].

The primary objective of this study is to conduct a comprehensive qualitative analysis of psychological phenomena related to climate change, including eco-anxiety, eco-guilt, and eco-grief among young people. The study aims to identify potential connections between these phenomena and community and climate risk factors associated with climate justice and climate action at the national level.

2. Materials and Methods

2.1. Data Collection

A pilot survey was conducted among young adults aged 18 to 33 during 2023 to explore eco-anxiety prevalence with convenience sampling and analysis. Participants were asked to complete a voluntary and anonymous questionnaire that collected information on age, gender, and country of origin. In addition, we integrated the General Anxiety Disorder-7 (GAD-7) [16], Kessler Psychological Distress Scale (K-10) [17], and Eco-Anxiety Scale to measure anxiety levels among the worldwide group of the Children’s and Youth Constituency of the United Nations Frame Conference of Climate Change (YOUNGO),

comprised of individuals from 34 countries. The survey received 80 answers, which constituted our sample for the analysis.

We aimed to compare anxiety levels across different ages and geographical contexts, with English and Spanish adaptations of the tools being made available.

2.2. Dataset Integration

To consider climate risk determinants, the dataset of answers from the survey were integrated with a dataset extracted from the Emergency Events Database (EM-DAT): EM-DAT [18], maintained by the Centre for Research on the Epidemiology of Disasters (CRED). This is a global database of disasters, including information on natural disasters and technological accidents. It provides data on the impact and characteristics of extreme events. To associate climate-related hazards that could have influenced survey participants within their developmental lifespan, the records of extreme events classified as “climatological”, “meteorological”, or “hydrological” occurring from 2010 to 2023 were selected for inclusion in the dataset. To assess and consider the governmental responses to the climate crisis, the Institute for Global Environmental Strategies (IGES) NDC Database [19] was also considered within the data framework of the study; the database collects the key aspects of nationally determined contributions (NDCs) submitted by UNFCCC parties, detailing country-specific climate targets and measures aligned with their national circumstances for implementing the Paris Agreement. For the study, adaptation pledges and financial metrics regarding adaptation and mitigation over the total resources required by the NDC implementation were selected. Both datasets have been queried and restricted among the collection of the countries of the nationalities declared by the participants, selecting only the instances related to the countries of the nationalities of the participants; this condition ensured referential integrity within the answers dataset.

2.3. Data Analysis

A descriptive statistical analysis was conducted on the data using the qualitative software analysis tool Atlas.ti Version 22.2.1 to determine the frequency of concepts mentioned by the respondents. Questions included yes–no questions, multiple-choice questions, and open questions. This method enabled the study to adopt a quantitative perspective. Explorative statistics were calculated for the following constructs:

Worry-Climate-related functional impairment—Climate-related emotions—Negative thoughts about climate change—Experience of having one’s climate change concerns dismissed—Beliefs about and emotional impact of governmental responses to climate change.

A correlation analysis was performed to explore the possible influence of climate risk and governmental climate action determinants using the integrated dataset. Extreme events were set and NDC pledges were first grouped by country. The following metrics were evaluated using the EM-DAT extracted dataset: several extreme events (N_event); temporary mean yearly frequency of events (MeanFreq); and spatial frequency of events over the country’s total area (Spatial_Freq). The following metrics were evaluated using the (IGES) NDC Database: Adaptation budget over Mitigation budget (A/M); Adaptation budget/Total budget (A/T); and length in character of the description of the Adaptation actions (STRLEN).

All the metrics were then discretized, clustering their values in the min–max respective ranges over a scale of the same grades of the GAD-7 in order to have comparable series with the survey responses.

The correlation analysis thus consisted of, as follows:

- the estimation of the multivariate Lin’s concordance correlation coefficient ($p = 0.05$) [20–22]. Among GAD-7, K-10, Eco-anxiety scale answers and EM-DAT extracted dataset discretized metrics (N_event, MeanFreq, Spatial_Freq) and GAD-7, K-10, Eco-anxiety scale and (IGES) NDC Database discretized metrics (A/M, A/T, STRLEN);

- the evaluation of the bivariate Kendall rank correlation [23] coefficient matrices ($p = 0.05$) over the variables of a couple of datasets: the choice of Kendall was justified by the discrete ordinal shape of the series considered and the non-linear relationships involved.

All analyses were conducted with the software MATLAB © version R2019a and R.

3. Results

3.1. Descriptive Statistical Analysis

The study results ($N = 83$) demonstrate that most participants were female, representing 73.2% of the sample size. Interestingly, only 23.2% of the male population responded to the survey, resulting in a relatively small number of male participants ($n = 19$). A minority of the sample identified as LGBT+ and accounted for 6.1% of the respondents. These findings underscore the need for further research to explore potential gender-related biases in this type of study and to ensure that future research efforts are inclusive of diverse populations.

According to Figure 1, a significant proportion of the study participants, precisely 69.5%, were residing in areas adversely affected by climate change. Interestingly, 76.8% of this population demonstrated a clear understanding of the concept of eco-anxiety, which is an emerging psychological phenomenon linked to climate change.

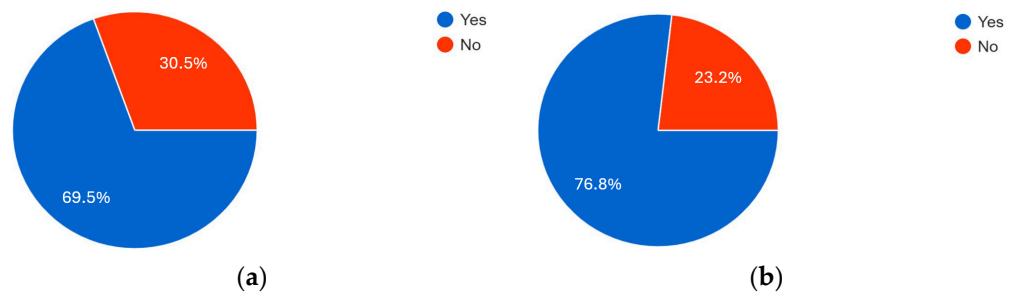


Figure 1. (a) Percentages of people that responded yes/no to the question “Are you living in an area currently affected by climate change? (Heatwaves, droughts, landslides, bad air quality, sea level rise)”; and (b) percentages of people that responded yes/no to the question “Do you know what eco-anxiety is?”.

Describing the findings presented in Figure 2, a significant portion of the studied population experienced prolonged feelings of anger and nervousness in response to the natural phenomena occurring within their respective regions, which were attributed to climate change.

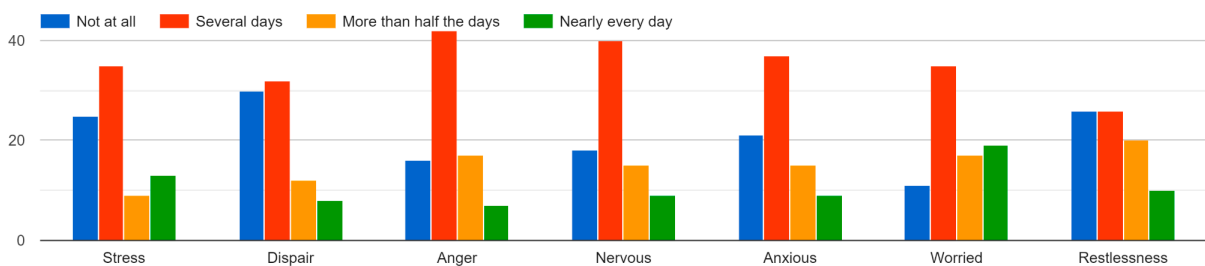


Figure 2. Prevalence of emotions in young adults related to climate change.

3.2. Correlation Analysis

The results of the multivariate Lin’s concordance correlation coefficient calculation are shown in Table 1, together with the respective confidence intervals (Conf. Int) and the Pearson correlation coefficient automatically calculated by the software and reported here as a reference.

Table 1. Multivariate Lin’s concordance correlation coefficient ($p = 0.05$) and respective confidence intervals.

	Lin CCC EM-DAT ¹	Lin CCC (IGES) NDC ¹	Conf. Int EM-DAT	Conf. Int (IGES) NDC
	0.501501502	0.501501502	0.324173963	0.324173963
Pearson correlation (reference)	0.508169264	0.508169264	0.64478222	0.64478222

¹ The abbreviation EM-DAT ad (IGES) NDC refers to the metrics variables obtained from the datasets extracted, respectively, by EM-DAT [18] ad (IGES) NDC databases [19].

Table 2 collects the mutual bivariate Kendall rank correlations among the variables considered for the study.

Table 2. Bivariate Kendall rank correlation coefficients among all the variables considered.

	Eco-Anxiety Experience	Despair	Anger	Nervous	Anxious	Worried	Restlessness	N_event Discrete *	Mean_Freq Discrete *	Spatial_Freq Discrete *	A/M Disc *	A_T Disc *	Strlen Disc *
Eco-anxiety experience *		0.490	0.299	0.490	0.495	0.365	0.495	0.052	0.052	0.015	0.205	0.237	0.309
Despair	0.490		0.407	0.439	0.435	0.302	0.546	0.142	0.142	0.005	0.206	0.160	0.326
Anger	0.299	0.407		0.190	0.164	0.315	0.266	0.058	0.058	0.075	0.077	0.102	0.121
Nervous	0.490	0.439	0.190		0.725	0.406	0.518	0.125	0.125	0.023	0.166	0.147	0.320
Anxious	0.495	0.435	0.164	0.725		0.429	0.580	0.191	0.191	0.018	0.264	0.199	0.279
Worried	0.365	0.302	0.315	0.406	0.429		0.255	0.086	0.086	0.003	0.024	0.047	0.169
Restlessness	0.495	0.546	0.266	0.518	0.580	0.255		0.169	0.169	0.020	0.212	0.192	0.329

* The Kendall correlation coefficient was calculated over the discretized series.

The same coefficients are graphically represented in Figure 3 to highlight the most relevant cross-correlation discovered among the considered variables. The strength of the correlation was estimated with reference to a scale reported in Table 3.

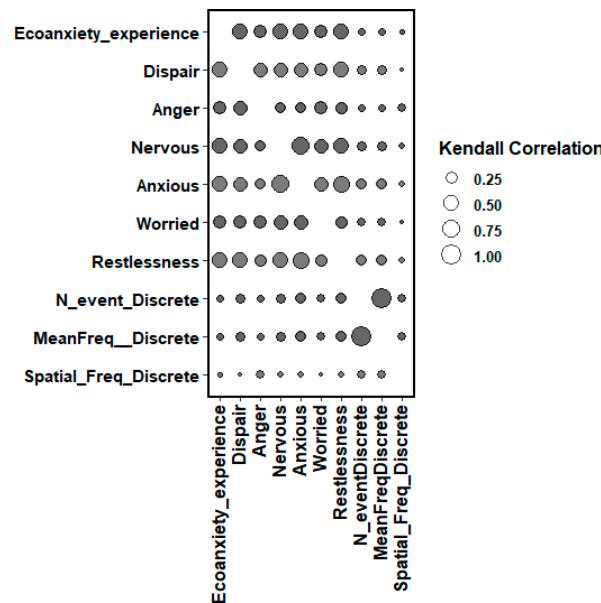


Figure 3. Cont.

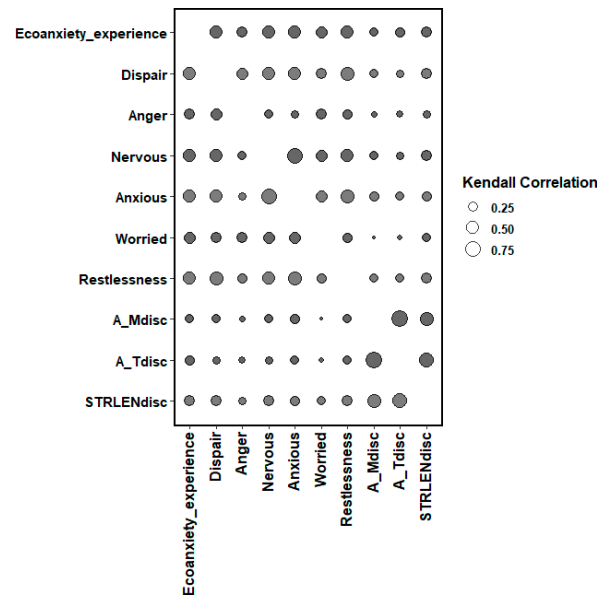


Figure 3. Graphical representation of the bivariate Kendall rank correlation coefficient to highlight the most prominent cross-correlations discovered.

Table 3. Correlation evaluation scale.

Scale of Correlation Coefficient	Evaluation
$0 < r \leq 0.19$	Very Low Correlation
$0 \leq r \leq 0.39$	Low Correlation
$0.4 \leq r \leq 0.59$	Moderate Correlation
$0.6 \leq r \leq 0.79$	High Correlation
$0.8 \leq r \leq 1.0$	Very High Correlation

From the 83 surveyed individuals, 67 respondents indicated familiarity with the concept of eco-anxiety. Among them, 35 participants from the global north acknowledged this emotional state, while only 32 individuals from the global south demonstrated awareness or understanding of eco-anxiety [2].

4. Discussion

From the results, the population showed a more prominent segmentation toward female respondents. The majority of the answers were obtained from a sensitized audience, as 76.8% declared to have already acknowledged eco-anxiety.

Surely, this aspect could have contributed to more aware answers to the questions proposed. However, it can also represent a sort of “bias” of the study because the interviewed sample pertains to an already concerned population, resulting in less exploration of the phenomenon outside of a perception of awareness.

Among the population, it can be registered that around 10% of the respondents declared themselves to be residing in areas adversely affected by climate change; therefore, this percentage can be improved upon in order to have greater significance on the association between the experience of extreme events and eco-anxiety.

Although there are some limitations related to this first preliminary analysis, the first thing that can be highlighted from the descriptive statistical analysis is that the gender balance within the sample of respondents favored females, with a small number of LGBTQ+ respondents. The participants perceived themselves as being in a country exposed to climate change, which also reflects a relatively equal distribution in terms of an awareness

of eco-anxiety. This information could show that climate “concern” could be coupled with eco-anxiety awareness among the young population analyzed.

Regarding the assessment of eco-anxiety-related conditions through (GAD-7), Kessler Psychological Distress Scale (K-10), and Eco-Anxiety Scale, it can be noted that the participants reported feeling a more severe emotional state of eco-anxiety (stress, despair, anger, nervous, anxious) more frequently (“several days”) and the state of being “worried” was experienced “almost every day”. This can lead one to consider that eco-anxiety-related feelings are very widespread, and at the limit of a possible pathological state, but that the state of worrying is diffuse, occurring constantly or frequently. According to “Anxiety and Climate Change: A Validation of the Climate Anxiety Scale in a German-speaking Quota Sample and an Investigation of Psychological Correlates”, individuals who experience climate anxiety tend to have higher levels of anxiety and depressiveness and are more likely to avoid thinking about climate change in their daily lives. They also experience frustration in meeting their basic psychological needs. On the other hand, such individuals are less likely to adopt climate-relevant self-protective strategies and denial. Interestingly, climate anxiety is not related to ideological beliefs but is positively associated with pro-environmental intentions and support for climate policies [20].

The study “The Continuum of Eco-Anxiety Responses: A Preliminary Investigation of Its Nomological Network” measured perceived ecological stress and eco-anxiety using established scales. The first scale consisted of four items assessing stress related to global environmental problems, pollution, species extinction, and the loss of forests. Participants rated each item on a 5-point scale indicating their level of stress. The second measure gauged the frequency of worrying or upsetting thoughts about the environment. This item was also rated on a 5-point scale. They positioned this second measure as potentially capturing more severe eco-anxiety due to its focus on intense distress. Additionally, they assessed general environmental concern using a single item, where participants rated their level of concern about the environment on a 7-point scale. This item has been previously used in environmental research [20].

This research observed robust associations among the three identified eco-anxiety metrics and the metric gauging environmental concerns. Specifically, the three eco-anxiety metrics displayed significant positive correlations with indicators of anxiety and stress while exhibiting no discernible relationship with manifestations of depression. Furthermore, the measure capturing environmental concern exhibited no significant associations with indices of general ill-being. Notably, all three eco-anxiety metrics and the environmental concern metric demonstrated comparable positive correlations with dimensions indicative of a pro-environmental stance [20].

Regarding correlation analysis, an observation can be inferred before considering the core statistical meaning of the multivariate Lin’s concordance correlation coefficient.

The multivariate Lin’s concordance correlation coefficient (Lin-CCC) can be described as the degree of concordance of a series of k rates from m voters [21–23], also considered as a sample of k occurrences evaluated in m variables or dimensions. Thus, when applied to our problem, Lin-CCC can be described as having a concordance of the ratings among eco-anxiety, climate risk, and governmental climate action dimensions. The results showed that both for the couples “eco-anxiety–climate risk” and “eco-anxiety–governmental climate action”, the association can be evaluated as “moderate”. This cannot lead to further inferences beyond that of the analyzed sample and the net results of the non-linearities and simplifications; only a certain influence can be hypothesized between eco-anxiety state and real climate risk, and between public climate action and concern. However, it can be suggested that information and peer-to-peer influences play a crucial role [1,12].

Interesting observations can be taken from the bivariate correlation analysis with the Kendall rank correlation coefficients [24], both within the eco-anxiety dimension and between the eco-anxiety, climate risk, and governmental climate action dimensions.

First, Table 2 demonstrates a high correlation ($r = 0.725$) between “Anxious” and “Nervous” emotional states. Both are moderately correlated with the state of “Restlessness” ($r_A = 0.580$, $r_N = 0.518$) and being “Worried” ($r_A = 0.429$, $r_N = 0.406$).

Regarding the integrated dimension, the correlation is generally very low. However, it is possible to distinguish that the eco-anxiety emotions of “Anxious” and “Restlessness” are highly correlated with the climate-risk dimensions and that “Anxious”, “Restlessness”, and “Nervous” are highly correlated with public governmental climate action. Due to the numbers, more observations cannot be inferred; however, even considering the study’s limitations, these results suggest possible lines for further research.

According to the coefficients of correlations on the Kendall rank provided in the dataset, the emotions most closely related to eco-anxiety are identified by the strength of their correlation coefficients. The following list presents the key emotions in the order of the strength of their correlations with eco-anxiety:

1. Restlessness ($\tau = 0.495$): This shows a strong positive correlation, indicating that as eco-anxiety increases, feelings of restlessness also increase prominently;
2. Nervousness ($\tau = 0.490$): This also shows a strong positive correlation, similar to restlessness, indicating that eco-anxiety is strongly associated with nervousness;
3. Anxiety ($\tau = 0.495$): The data reveal a notable positive correlation between anxiety and eco-anxiety, signifying that elevated levels of eco-anxiety are significantly associated with heightened levels of anxiety;
4. Despair ($\tau = 0.490$): A notable finding from our research is the strong positive correlation between eco-anxiety and feelings of despair. This indicates that an increase in eco-anxiety is linked to a corresponding increase in feelings of despair;
5. Worry ($\tau = 0.365$): This demonstrates a moderate positive correlation, suggesting that worry is positively associated with eco-anxiety, albeit not as strongly as the aforementioned emotions;
6. Anger ($\tau = 0.299$): This manifests a weaker yet still positive correlation, signifying that anger may have a comparatively less direct association with eco-anxiety in contrast to the other emotions delineated.

The Kendall rank showed that the emotions most closely associated with eco-anxiety, arranged in descending order of correlation strength, are restlessness, anxiety, nervousness, and despair. These emotions exhibit strong positive correlations with eco-anxiety, suggesting that individuals grappling with eco-anxiety are also predisposed to experiencing these emotions more intensively.

Finally, Figure 3 visually represents the Kendall rank correlation coefficients among various emotions and eco-anxiety experiences, highlighting the most prominent cross-correlations. There are only positive correlations; those with the highest Kendall rank correlation coefficients highlight the most prominent cross-correlations. These are the pairs of variables that have the most substantial relationship. The strongest correlations, represented by a thick edge indicating a strong positive correlation, are as follows: eco-anxiety and restlessness; eco-anxiety and nervousness; eco-anxiety and anxiety; and eco-anxiety and despair. Moderate correlations, represented by a moderately thick edge, showing a moderate positive correlation, included eco-anxiety and worry. The correlation with the thinner edge, indicating a weaker but still positive correlation, was between eco-anxiety and anger. The graph visually emphasizes the prominent cross-correlations between restlessness, nervousness, anxiety, and despair, which are closely linked to eco-anxiety. Comparing the results obtained in this study with studies in the literature, interesting observations can be taken.

Regarding gender balance, research has revealed that anxiety and depression-related disorders are more prevalent among women than men. This disparity is believed to be connected to how individuals of different genders respond to stress. Females frequently experience heightened negative emotions in reaction to stressors, although studies have yielded inconsistent results regarding physiological differences. A recent study examined the reactions of male and female participants to a standardized psychosocial stressor. The

results indicated that following the challenge, women reported experiencing more fear, irritability, confusion, and less happiness than their male counterparts. How these relate to sex differences in the etiology and clinical presentation of anxiety and mood disorders are further discussed in [25].

Upon accounting for various factors, including gender, age, marital status, parental status, education, employment, smoking, alcohol consumption, physical activity, chronic illness, self-assessment of health, and concerns related to coronavirus, a study in Germany discovered that heightened levels of climate anxiety are linked to an increased chance of experiencing potential depression (OR: 1.37, 95% CI: 1.25–1.50) and potential anxiety (OR: 1.27, 95% CI: 1.15–1.40). As a result, their findings imply a correlation between climate anxiety and psychological well-being in this region [26].

Similar studies have shown that eco-anxiety is caused by uncertainty, unpredictability, and uncontrollability. While most cases of eco-anxiety are not clinical, some cases can be considered pathological. Related terms to eco-anxiety include ecological grief, solastalgia, and ecological trauma. Research suggests that eco-anxiety is closely linked with fear and worry, and can even be seen as a form of existential anxiety. Additionally, social dynamics play a significant role in determining different forms of eco-anxiety. Psychosocial and sociological perspectives are important in assessing eco-anxiety [27].

Public perceptions of risks are crucial in shaping political, economic, and social actions to address them. The level of support or opposition to climate policies, such as treaties, regulations, taxes, and subsidies, is significantly influenced by how people perceive the risks and dangers associated with global climate change. A national study conducted in 2003 examined the risk perceptions and connotative meanings of global warming in the American mind. The findings indicated that Americans perceived climate change as a moderate risk that would predominantly impact geographically and temporally distant people and places. The study also identified several distinct interpretive communities, including naysayers and alarmists, with divergent perceptions of climate change risks. These findings suggest that the “dangerous” climate change concept is debated among scientists, policymakers, and the American public [28,29].

This assumption has also been reflected in our study, where the policy relevance and views expressed by the public regarding NDC ambitions have influenced some young people affected by eco-anxiety.

5. Conclusions

This study, conducted on a sample of 83 young adults aged 18–33, found that eco-anxiety is increasingly prevalent, especially among women.

While the severity of the symptoms assessed does not suggest a completely pathological scenario, the sub-maximum grades on the GAD-7, K-10, and Eco-Anxiety Scale indicate a high potential for the development of full eco-anxiety traits in this population. The analysis of the correlation between climate risk and public governmental determinants yielded limited results. Nonetheless, it suggests the need for further research into the association between eco-anxiety emotions and exogenous factors related to environmental status and socio-political factors. Overall, the study highlights the complexity of eco-anxiety as a multifactorial construct that can lead to maladaptation and general anxiety disorders if not properly addressed. However, coping mechanisms, such as climate action, can help to transform eco-anxiety into a more positive state of eco-hope, as proposed by climate activist Francisco Vera Manzanares in 2021. In this academic paper, the authors advocate for more extensive research to identify and explain the gender disparities in climate-related issues. They emphasize that existing studies in the literature on anxiety are not sufficiently specific to climate anxiety. Thus, more comprehensive studies are required to address the unique challenges associated with climate-induced anxiety. It can be suggested that a deeper understanding of gender gaps in climate anxiety could help policymakers to design more effective interventions aimed at mitigating the adverse effects of climate change on mental health.

By approaching the crisis with a pragmatic and optimistic outlook, we can better understand the available solutions, promote mental well-being, and prevent the rise of eco-anxiety among young adults.

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