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Original Article

Eco-anxiety as a Public Health Problem: Evidence From Adult Individuals Living in Türkiye

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ABSTRACT

Objective: Climate change causes natural disasters and extreme weather events. It affects people's quality of life and psychological health directly or indirectly. This study investigates the relationship between various socio-demographic factors and the levels of eco-anxiety.

Methods: The study utilized a quantitative research design with a relational pattern. The research was conducted online with 1009 participants aged between 18 and 70 years residing in Türkiye. The "Personal Information Form" and the "Hogg Eco-Anxiety Scale" were used to assess participants' anxiety levels.

Results: The eco-anxiety levels of female participants were higher than those of men. Significant differences were found according to work status. Although not significant, it was determined that eco-anxiety decreased as the age of the participants increased.

Conclusion: Our study showed that the participants' eco-anxiety level was low and that eco-anxiety was affected by various variables. The results of the study will contribute to public health specialists working on eco-anxiety.

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

Introduction

Eco-anxiety and climate anxiety were initially mostly limited to the use of environmental activists. As the current and future dangers associated with climate change are identified and awareness developed by society increases, these concepts have gained a place in the literature. They have become a topic of interest in different circles. Eco-anxiety and climate change anxiety describe the negative emotions and states that people develop in response to the global climate crisis and risks.[1] Although some use eco-anxiety and climate change anxiety synonymously, there is a difference between the concepts. Eco-anxiety is defined as "feelings of loss, helplessness, and frustration resulting from their inability to feel that they are making a difference in stopping climate change",[2] while Climate Anxiety (CA)—a category of eco-anxiety—is defined as "a variety of psychological effects caused by climate change, which can be referred to as the mental health effects of climate change."[3] Studies on Eco-anxiety and Climate Change Anxiety in the world started to increase after 2010. Coffey et al.,[4] stated that there were only 4 empirical studies on climate change and eco-anxiety between 2010 and 2021. Afterward, there was a certain increase in the number of studies between 2021 and 2023.[5-8]

Recent studies have shown significant differences across societies and cultures in how people perceive and respond to climate change. Unfortunately, the existing knowledge is still largely based on research results from the Western world. Many argue that there is a need to expand the geographical representation of behavioral research in general and to increase the study of climate change and human behavior in particular.[9,10] Türkiye is a country where disasters such as extreme rainfall, floods, and forest fires have been increasing in recent years due to climate change. Floods in Türkiye are expected to intensify in the future, posing risks to the economy and infrastructure. Rising temperatures are likely to increase human stress levels and cause loss of life. It is also stated that disruptions in marine and terrestrial ecosystems will impact people. Losses in crop production due to water scarcity, extreme weather conditions, and temperatures point to vital problem areas. One of these problem

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areas is climate change-induced eco-anxiety, or in other words, climate change anxiety.[11]

Even though the issue poses vital threats to society, there are only a few studies on eco-anxiety in Türkiye conducted after 2022.[12-14] This study is important in terms of being the first comprehensive study that evaluates the factors affecting the levels of eco-anxiety in adult individuals living in Türkiye. In this context, this study is a guide for future studies and will contribute to the literature.

Methods

Research Model

In this study, a relational research design, one of the quantitative research methods, was employed to ascertain the relationships between variables.[15] The primary objective of utilizing this relational research model was to determine whether eco-anxiety is associated with variables such as education, age, and gender. Furthermore, the ease of data collection and analysis from a large sample size was a key rationale for selecting the relational research design.

Population and Sample of the Research

The study was conducted online through an internet-based data collection technique (Google Forms) using the "convenience sampling" method between March 18, 2024 and April 18, 2024 with 1009 individuals between the ages of 18 and 70 living in Türkiye. While convenience sampling provides the opportunity to collect data quickly from a large number of participants, it limits the generalizability of the findings. For this reason, the results obtained are limited to the participants only.

Data Collection Tools of the Research

A Personal Information Form created by the researcher and the Hogg Eco-Anxiety Scale (HEAS) were used.

Personal Information Form

The Personal Information Form consists of a total of 9 questions prepared by the researcher, including 5 questions on demographic information regarding gender, age, education, marital status, and employment status, and 4 questions (causes of climate change, climate-related disasters, belief in the existence of climate change, and belief in the benefits of the Paris Climate Agreement for the country) on knowledge and beliefs about global climate change. The form's content was developed based on a literature review.[11] Its validity was ensured through feedback from expert academics and a pilot study. The representativeness, clarity, and appropriateness of the questions were evaluated, and necessary revisions were made to finalize the form.

The Hogg Eco-Anxiety Scale

Hogg Eco-Anxiety Scale was developed by Hogg et al to measure the eco-anxiety levels of individuals. It was adapted into Turkish by Uzun et al.[13] The 4-point Likert-type scale consists of 13 items and 4 sub-dimensions: "emotional symptoms," "rumination," "behavioral symptoms," and "anxiety about the personal impact." There are no reverse items in the scale. An increase in the HEAS scale total score (0-39 points) indicates an increase in eco-anxiety levels.[8,13] The reliability Cronbach's α coefficient of the Turkish scale was 0.91. For the sub-dimensions, the reliability coefficients were 0.83 for "emotional symptoms," 0.86 for "behavioral symptoms," 0.84 for "rumination," and 0.84 for "anxiety about personal impact."

Statistical Analysis

The data were analyzed using The Statistical Package for Social Sciences version 22.0 software (IBM Corp.; Armonk, NY, USA). Percentage and number values were calculated for categorical variables, and mean, standard deviation, and range of change values were calculated for interval variables. The Spearman correlation test was performed to examine the relationship between the participants' eco-anxiety score and the variables obtained through the information form. The independent groups *T*-test was used for evaluations between paired groups, and the one-way ANOVA test was used for comparisons of more than 2 groups. The statistical significance level was accepted as $P < .05$.

Ethical Considerations

Ethics committee approval was obtained from İstanbul Medipol University Social Sciences Scientific Research Ethics Committee (Approval no: 36, Date: March 18, 2024). Participants were asked to read a short information note about the study when they entered the online participation link and then (those who voluntarily agreed to participate in the study) were asked to fill in the personal information form and scales.

Results

The mean age of the 1009 participants was 25.116 ± 8.6938 (range: 18-70, median: 22). About 75.1% (n = 758) were female, 82.7% (n = 834) were single, 58.8% (n = 548) graduated from high school or below, and 66.9% (n = 675) were students. The mean age (23.920 ± 7.721) of female participants (n = 758) was statistically significantly lower than the mean age (28.731 ± 10.3329) of male participants ($P < .001$). The mean HEAS level of the participants was 13.72 ± 7.62. About 98.5% (n = 994) of the participants stated that they believed there was a global climate change.

The main causes of climate change according to the participants (n = 1009) are air pollution (83.8%), use of fossil fuels (72.0%),

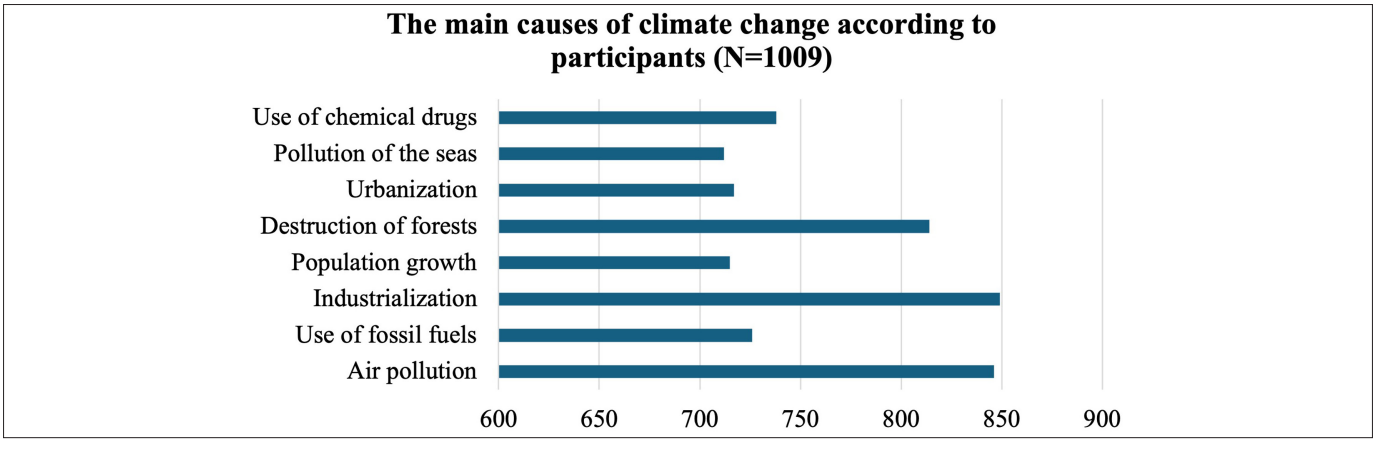

Figure 1. The main causes of climate change according to the participants.

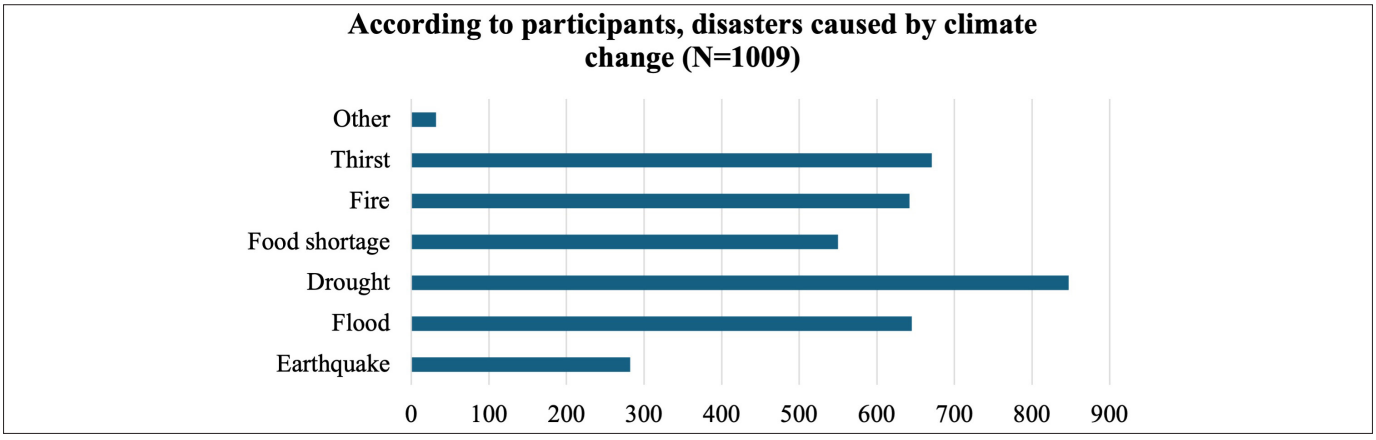

Figure 2. According to participants, disasters caused by climate change.

industrialization (84.1%), population growth (70.9%), destruction of forests (80.6%), urbanization (71.1%), pollution of the seas (70.6%), and use of chemical drugs (73.1%) (Figure 1).

According to participants, disasters caused by climate change (n = 1009) are earthquakes (27.9%), floods 63.9%, drought (83.9%), food shortage (54.5%), fire 63.6%, thrist 66.5%, and other disasters (3.3%) (Figure 2).

The mean HEAS level of female participants was statistically significantly higher than the mean HEAS level of male participants ($P < .05$). The mean HEAS level of the students was significantly higher than the mean of employed ones ($P < .05$). The mean HEAS level of the unemployed group was significantly higher than the employed group ($P < .05$) (Table 1).

Table 2 shows the comparison of participants' climate change beliefs and HEAS levels. A significant correlation was not found between the climate change belief status of the participants and the mean HEAS level ($P > .05$). The mean HEAS level of those who believed that signing the "Paris Climate Agreement" would be beneficial for our country was statistically significantly higher than the mean HEAS level of those who did not believe ($P < .05$) (Table 2).

There was an insignificant negative correlation between age and HEAS ($r = -0.02$; $P = .527$) (Figure 3).

Discussion

Climate change and its impacts are one of the most important issues in the world today. The World Health Organization and United Nations[16,17] emphasized that fossil fuels used in the production of power sources such as electricity and heat, in the production of cement, iron, steel, electronics, plastics, clothing, and other goods, transportation vehicles, and in the energy consumption of industry and buildings, are by far the biggest causes of global climate change. Deforestation and misuse of land for food production are also cited as causes. Similarly, in this study, participants reported that the top 5 most important causes of climate change are industrialization, air pollution, deforestation, use of chemical pesticides, and use of fossil fuels.

Table 1. Comparison of Socio-demographic Features with Mean HEAS Level

			HEAS	
Socio-demographic Features		**n**	**Mean ± SD**	***P***
Sex	Female	758	14.06 ± 7.44	**.014**
	Male	251	12.70 ± 8.07	
Marriage status	Married	175	13.78 ± 7.89	.914
	Single	834	13.71 ± 7.57	
Graduation status	High school and below	548	13.69 ± 7.29	.896
	University and higher school	461	13.75 ± 8.01	
Working status	Student	675	14.11 ± 7.56	**.001**
	Employed	259	12.29 ± 7.56	
	Student	675	14.11 ± 7.56	.243
	Unemployed	75	15.19±7.79	
	Employed	259	12.29 ± 7.56	**.004**
	Unemployed	75	15.19 ± 7.79	

HEAS, Hogg Eco-Anxiety Scale.

Table 2. Comparison of Climate Change Belief with Mean HEAS Level

			HEAS	
Climate Change Belief		**n**	**Mean ± SD**	***P***
Do you believe there is global climate change?	Yes	994	13.76 ± 7.61	.226
	No	15	11.13 ± 7.99	
	No information	482	13.05 ± 7.17	
Do you believe that signing the "Paris Climate Agreement" will benefit our country?	Yes	321	14.85 ± 8.27	**.044**
	No	31	11.74 ± 7.28	
	Yes	321	14.85 ± 8.27	.180
	Undecided	175	13.85 ± 7.40	
	Yes	321	14.85 ± 8.27	**.001**
	No information	482	13.05 ± 7.17	

HEAS, Hogg Eco-Anxiety Scale.

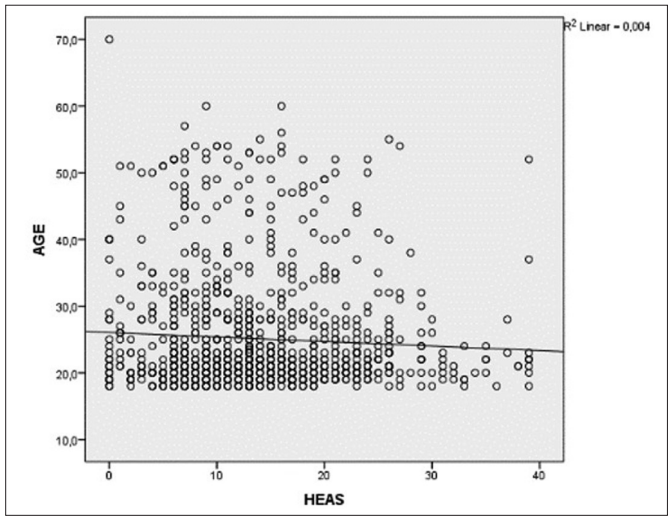

Figure 3. Correlation between age and HEAS. HEAS, Hogg Eco-Anxiety Scale.

The impacts of global climate change have been reported by the World Health Organization and United Nations as higher temperatures, more severe storms, increased drought, warming and rising oceans, loss of species, insufficient food, greater health risks, increased poverty, and displacement.[16,17] In this study, participants reported the top 5 disasters caused by climate change as drought, thirst, flooding, fire, and food shortages. Therefore, it is obvious that climate change will have many direct and indirect negative impacts on the health of humans and other living organisms if necessary measures are not taken.

One of these is the psychological effects of climate change on individuals. Climate change and environmental crises cause increasing psychological effects on individuals.[18] Interest in studies on the psychological effects of climate change has increased. Nevertheless, the number of studies in this field is quite low.

When the eco-anxiety levels of the participants were evaluated, it was determined that the participants had low levels of eco-anxiety. Similarly, in studies conducted with individuals in different countries, climate change anxiety was generally low.[7,19] The reason for this may be that individuals may have concerns about climate change, but this situation may not be effective enough to seriously affect their daily lives.[7] Likewise, in the current study, although the participants accepted the existence of climate change to a great extent, the scale evaluation was low.

According to the results of the study, the eco-anxiety levels of female participants were higher than those of male participants. In studies in the literature, women's climate anxiety is higher than men's,[20] and women are more concerned about climate change.[21] Therefore, it can be said that the findings in the literature overlap with the research results.

Another result of the study was that eco-anxiety did not differ significantly according to marital status. Although no study was found in which eco-anxiety and marital status were directly evaluated, it was found that marital status did not have a significant effect in a study in which "classroom waste" implementation behavior was evaluated.[22] The result that marital status does not significantly affect eco-anxiety can be thought to be related to the fact that this feeling is subjective. Having or not having a partner may not affect the individual experience. Another result of the current research is that the participants' eco-anxiety levels do not show a significant difference according to their level of education. A similar study revealed that the participants' climate change anxiety did not differ according to their level of education.[23] On the other hand, a study conducted with adults in European countries found that higher education graduates showed higher levels of eco-anxiety.[24] We expected such a result in our research. In other words, it was thought that as the level of education increases, awareness of climate change will increase, and this will increase the level of eco-anxiety.

Considering the employment status, the eco-anxiety levels of the students and the non-working group were higher than those of the working group. Eco-anxiety levels of the students were as expected. This can be explained by the fact that the age of the students is low within the scope of the sample group. On the other hand, the non-working group is not homogeneous. For this reason, future studies in which subgroups are discussed and analyzed in more detail will be useful. Although the results of the research did not show a significant difference, it was revealed that those who believe in climate change have higher levels of eco-anxiety. Oral and Durmuş also obtained a similar result in their study with university students.

Although not significant, it was observed that the level of eco-anxiety decreased with increasing age. This can be explained through the youth period. Clayton and Karazsia also determined that climate change anxiety is higher, especially among young adults.[25] At this point, the research conducted by Gislason et al. revealed that children and young people face many direct and indirect effects of climate change, affecting their mental health in various ways, and that many of them deal with intense eco-anxiety.[26] The fact that young people are more anxious about climate change can be explained by the fact that they think there will be disasters related to environmental degradation in the future. They expect that they will be exposed to the disasters for a longer period of time.[27]

The research findings suggest that, despite the high levels of eco-anxiety observed among those who believed in climate change, no significant relationship was identified between the participants' climate change belief status and the average HEAS level. Similarly, in a study conducted with university students, it was observed that although the ecoanxiety scores of those who believed in climate change were relatively high, there was no significant difference between the groups.[12]

According to the findings, those who believe the Paris climate agreement is beneficial have higher average HEAS levels. This can be explained by the fact that participants with high levels of eco-anxiety are aware of and interested in climate change. Indeed, a study of social work students indicated that those who demonstrated a high level of concern for climate change also exhibited a higher level of climate anxiety.[28]

Conclusion

This study was conducted to determine the factors affecting the eco-anxiety levels of individuals. It was revealed that the eco-anxiety levels of the participants were at a low level. According to the results, the eco-anxiety levels of female participants were higher than those of male participants and the eco-anxiety levels decreased as age increased.

Recently, interest in climate change and environmental degradation has started to increase. However, the number of studies on the psychological effects of climate change and environmental degradation on individuals, such as eco-anxiety, solastalgia, eco-grief, eco-guilt, and eco-anger, is quite low. In this context, it would be valuable to increase the number of studies on eco-anxiety, climate anxiety, solastalgia, etc., by including different sample groups. Considering that the effects of climate change and environmental degradation will increase in the future, increasing the number of studies on this subject is also important in terms of developing coping strategies. At the same time, for individuals to cope with eco-anxiety, it would be useful to develop intervention programs that take into account sociodemographic differences in line with the needs of vulnerable groups and investigate the effectiveness of these programs. The implementation of intervention programs/treatments for individuals with problems such as eco-anxiety and climate change anxiety will contribute to the protection of public health. It will also facilitate physicians and other mental health professionals such as social workers, psychologists, and psychiatric nurses in managing the process.

Limitations

Although the research allowed for the rapid collection of data from a large sample, the representativeness of the sample to the overall population is limited. Therefore, while the sample size is sufficient for statistical analysis, the findings may not be fully generalizable to the entire Turkish population. As such, caution should be exercised when interpreting the results. Additionally, since the sample predominantly consists of women, young individuals, and students, the

generalizability of the findings to other demographic groups is constrained. Insufficient data were obtained regarding the eco-anxiety of older individuals. Moreover, responses to the climate crisis may be influenced by different cultural norms across societies. Hence, the data collected are limited to participants' self-assessments. Despite these limitations, our findings provide valuable insights into the relationship between eco-anxiety and variables such as gender, age, and marital status. To improve the generalizability of future research, more representative sampling techniques, such as stratified random sampling, are recommended.

Availability of Data and Materials: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of İstanbul Medipol University (Approval no: 36, Date: March 18, 2024)

Informed Consent: Written informed consent was obtained from participants who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – F.C., T.A., S.A., D.N.Ö., I.A., A.A.; Design – F.C., T.A., S.A., D.N.Ö., I.A., A.A.; Supervision – F.C., T.A., D.N.Ö.; Resources – F.C., T.A., S.A.; Materials – F.XC., T.A., S.A.; Data Collection and/or Processing – F.C., T.A., A.A.; Analysis and/or Interpretation – D.N.Ö., T.A., I.A., F.C.; Literature Search – F.C., T.A, S.A., D.N.Ö., I.A., A.A.; Writing Manuscript – F.C., T.A., S.A.; Critical Review – F.C., T.A.

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