Climate Change Awareness and Eco-Anxiety Among Undergraduate Students

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ABSTRACT	Published Online: September 16, 2024

The Philippines is one of the most climate-vulnerable countries in the world and faces several disasters, including floods, droughts, typhoons, earthquakes, landslides, and volcanic eruptions. These events are known to have negative impacts on people's mental health. Studying the harmful effects of climate change on people's mental health is in line with the United Nations' Sustainable Development Goals 3 (Good Health and Well-being) and 13 (Climate Action). Eco-anxiety, defined as anxiety relating to climate change and other environmental problems, is one of the adverse effects of climate change on mental health. Among young Filipinos, prior studies indicate that eco-anxiety is prevalent, but research investigating the various factors contributing to eco-anxiety is limited. In the present study, the researchers focused on climate change awareness as a factor associated with eco-anxiety. This study aimed to determine the level of climate change awareness and eco-anxiety among undergraduate students and determine if there is a significant relationship between these two variables. Using the Awareness Scale for Climate Change and Hogg's Eco-Anxiety Scale, data were gathered among 392 undergraduate students in one of the higher education institutions in Davao City. Results showed that undergraduate students, on average, exhibit a very high level of climate change awareness. Additionally, results revealed that, on average, undergraduate students experience a moderate level of eco-anxiety. Results also showed a significant but low positive relationship between climate change awareness and eco-anxiety. The results of this study add to the growing body of research investigating the prevalence of and relationship between climate change awareness and eco-anxiety. This study highlights the need to reassess various climate change awareness programs and implement other interventions to help address eco-anxiety among young people and students.

KEYWORDS:
climate change awareness, eco-anxiety, correlational, undergraduate students, SDG 3: Good Health and Well-being, SDG 13: Climate Action, Davao City

INTRODUCTION

Climate change is one of the most pressing problems in the world today (World Bank Group, 2021; World Meteorological Organization, 2024). Among the most damaging effects of climate change are rising temperatures, more severe weather events, rising sea levels, and loss of biodiversity (United Nations [UN], n.d.a). All of these occurrences have significant impacts on the livelihoods, food and water supplies, and health of individuals and communities (UN, n.d.b). In recent years, while the focus of

studies on the impact of these occurrences has been largely on physical health, the effects of climate change also extend

to people's mental health (World Health Organization, 2022). According to Cianconi et al. (2020), some of the adverse consequences of climate change on mental health are anxiety, stress, sleep disturbances, post-traumatic stress disorder, depression, and suicidal thoughts.

In September 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, a 15-year plan of action to address major economic, social, and environmental issues around the world (UN, 2015). The 2030 Agenda provided 17 Sustainable Development Goals (SDGs), each of which has several indicators. SDG 3 pledged to "Ensure healthy lives and promote well-being for all at all ages" (UN, 2015, p. 16), which, among other indicators, aimed to reduce mortalities from diseases and accidents. In a subsequent

resolution in July 2017, the United Nations adopted a revised version of the SDGs, which explicitly included an indicator on the promotion of mental health under SDG 3 (UN, 2017). Additionally, SDG 13 aimed to "Take urgent action to combat climate change and its impacts" (UN, 2015, p. 23). Among other indicators, SDG 13 sought to address the effects of climate change and raise awareness of it. While the 2030 Agenda was primarily intended for governments, international institutions, and the business sector, it also called on the scientific and academic community to be involved. Trane et al. (2022) pointed out that research may help in achieving the SDGs, such as through assessment of developments towards the goals and further operationalization of the goals.

In the Philippines, the effects of climate change are particularly pronounced. The International Monetary Fund (2022) identified the Philippines as one of the most climate-vulnerable and disaster-prone countries in the world. The country faces several disasters, including typhoons, floods, droughts, earthquakes, landslides, and volcanic eruptions (World Bank Group & Asian Development Bank, 2021). Given that these events are known to affect mental health (Cianconi et al., 2020), it is therefore important to investigate the psychological effects of climate change among Filipinos. A phenomenon called "eco-anxiety" is among the emerging terms that describe the interconnections between climate change and mental health (Cianconi et al., 2020). It has been a rising interest in several studies and a subject of various discussions in contemporary media (Pihkala, 2020). According to Hogg et al. (2021), eco-anxiety refers to anxiety relating to climate change and other environmental problems. It is often used interchangeably with the terms "climate anxiety" and "climate change anxiety" (Aruta et al., 2022). Among young Filipinos, studies show that eco-anxiety is prevalent. A global survey among ten countries indicates that Filipino youths are the most vulnerable to eco-anxiety (Hickman et al., 2021). Studies by Reyes et al. (2021) and Simon et al. (2022) likewise show that many young Filipinos experience anxiety relating to climate change. While it is established that many young Filipinos experience eco-anxiety, research exploring various factors that contribute to this phenomenon is still limited.

One significant factor associated with eco-anxiety is climate change awareness. The American Psychological Association (n.d.) defines awareness as the "perception or knowledge of something." In the context of climate change research, awareness is the knowledge or understanding of the events happening in an individual's environment (Ezeudu et al., 2016). A recent scoping review by Mastine et al. (2022), which looked into research articles mostly from the United States, reveals that awareness of climate change results in eco-anxiety, particularly among young people. However, the review has also identified the need to expand research on the psychological effects of climate change on young people in non-Western, low-, and middle-income countries,

considering that they have already experienced the worst impacts of climate change (Mastine et al., 2022). In the Philippines, research exploring climate change awareness and eco-anxiety among young people is limited and must be further examined.

Considering the general lack of research exploring the psychological effects of climate change among young Filipinos, and in line with SDGs 3 and 13 by the UN (2015), this research investigated the relationship between climate change awareness and eco-anxiety among undergraduate students. More specifically, this study aimed to determine the level of climate change awareness among undergraduate students, determine the level of eco-anxiety among undergraduate students, and determine if there is a significant relationship between climate change awareness and eco-anxiety among undergraduate students.

The findings of this study may contribute to the general understanding of the psychological effects of climate change. The students can benefit from this study by gaining an understanding and insights into the psychological aspects of climate change awareness and the potential for eco-anxiety. In addition, teachers and academic institutions can incorporate the findings of this study into their teaching materials and strategies, improving climate change education and supporting student mental health. This study may also provide valuable insights into improving climate change awareness activities in schools while taking into consideration their possible impact on mental health. For mental health service providers, this study can aid in better understanding the emotional responses associated with climate change and address eco-anxiety, which might be a growing concern among undergraduate students. For policymakers and environmental organizations, the findings of this study can be used to design targeted interventions and policies to address the increasing eco-anxiety among undergraduate students, leading to more effective environmental action and improved mental health. The findings of this study can serve as a valuable resource for future research. Future researchers can build upon this study to explore other aspects of eco-anxiety or investigate similar issues in different demographic groups.

This study employed the appraisal theory as described by Smith and Lazarus (1990), which suggests that a person's assessment or interpretation of how a situation may be relevant to their well-being and interests is a determining factor of their emotional response. Moreover, anxiety is viewed in this theory as an emotional response to perceived danger or threat. This may imply that individuals may perceive climate change as a significant threat, especially when they are exposed to information about its potential impacts, which may result in heightened eco-anxiety. Furthermore, this research is anchored on the transactional model of stress and coping proposed by Lazarus and Folkman (1984). This theory describes how an individual's appraisal of a stressor influences their coping mechanisms and

response to it. It includes determining whether the stressor poses a threat (primary appraisal), assessing the resources or coping methods in addressing the threat (secondary appraisal), and continually re-evaluating both the stressor and the available resources to deal with it (reappraisal). This may suggest that individuals who are exposed to information about climate change may perceive it as a significant threat to their well-being and the environment. In turn, they assess their coping resources and strategies for addressing the perceived threats or anxiety of climate change, such as taking action and seeking social support. Students may constantly reassess their understanding of climate change and the effectiveness of their coping efforts to address eco-anxiety.

The appraisal theory and transactional model of stress and coping provided a helpful framework for understanding how awareness of climate change is associated with eco-anxiety.

METHOD

This study employed a quantitative research approach, which is a systematic investigation of phenomena by gathering quantifiable data and performing statistical, mathematical, or computational techniques (Fleetwood, n.d.). Moreover, a correlational research design, a type of quantitative research that does not involve experiments, was used to evaluate the relationship between the two variables with the help of statistical analysis (VoxCo, 2021). With a quantitative research approach and correlational research design, the researchers were able to investigate how climate change awareness and eco-anxiety might be associated. This design

aided in determining the possible relationship between the variables and assessing the strength of their connection.

In this correlational research, the respondents were undergraduate students at one of the higher education institutions in Davao City. The researchers selected 392 respondents from the population. Simple random sampling was used to choose the respondents. This means each student in the population has an equal chance of being selected. The participants were at least 18 years old and were bona fide undergraduate students at one of the higher education institutions of Davao City. Moreover, the respondents were enrolled in the academic year 2023-2024.

Researchers employed two online survey questionnaires as the research instrument for this study. The researchers adapted two survey questionnaires to assess the relationship between climate change awareness and eco-anxiety. The Awareness Scale for Climate Change (ASCC) by Ezeudu et al. (2016) was used in this research. It measured students' awareness of climate change problems, facts, and general climate change. This research instrument is a 15-item survey questionnaire used to measure climate change awareness. Respondents were asked to answer using a five-point Likert scale, which included the options "strongly agree," "agree," "neutral," "disagree," and "strongly disagree." The instruments were validated by three experts: one in Geography & Environmental Education and two experts in Measurement & Evaluation, all from the Department of Science Education, University of Nigeria, Nsukka. The rating scale for ASCC is shown in Table 1.

Table 1: Rating Scale for the Awareness Scale for Climate Change

Range Interval	Mean Rating	Interpretation
4.20-5.00	Very High	This demonstrates that the level of their awareness is very evident among the students.
3.40-4.19	High	This demonstrates that the level of their awareness is evident among the students.
2.60-3.39	Moderate	This demonstrates that the level of their awareness is somewhat evident among the students
1.80-2.59	Low	This demonstrates that the level of their awareness is less evident among the students.
1.00-1.79	Very Low	This demonstrates that the level of their awareness is not evident among the students.

The Hogg's Eco-Anxiety Scale was also utilized to measure the level of eco-anxiety among the respondents. Eco-anxiety was measured in terms of affective symptoms (e.g., "Feeling nervous, anxious, or on the edge"), ruminative thoughts relating to climate change (e.g., "Unable to stop thinking about future climate change and other global environmental problems"), and impairment to behavioral and social functioning (e.g., "Difficulty working and/or studying")

(Hogg et al., 2021). This is a 13-item questionnaire that was provided on a five-point frequency scale that implies a response from "not at all" to "every day." The rating scale for the Hogg's Eco-Anxiety Scale is shown in Table 2. These two online survey questionnaires aided in producing results and establishing the correlation between climate change awareness and eco-anxiety.

Table 2: Rating Scale for the Hogg's Eco-Anxiety Scale

Range Interval	Mean Rating	Interpretation
4.20-5.00	Very High	Eco-anxiety is severely demonstrated by the students.
3.40-4.19	High	Eco-anxiety is mildly demonstrated by the students.
2.60-3.39	Moderate	Eco-anxiety is moderately demonstrated by the students
1.80-2.59	Low	Eco-anxiety is occasionally demonstrated by the students.
1.00-1.79	Very Low	Eco-anxiety is not demonstrated by the learners.

Data Gathering Procedure

This research followed some steps to ensure that the flow was established appropriately.

First, to start the study, the researchers obtained approval from the dean, research subject teacher, and research adviser. Second, once permission was granted, the researcher informed the respondents with an orientation of the informed consent to ensure that they were willing to participate.

If the respondents agreed to participate, the researchers proceeded with survey questionnaires.

Afterward, the survey questionnaires were distributed to the respondents in an online setting to collect the responses.

Furthermore, all the respondents were given the same set of questionnaires, and the researchers gave the respondents a certain amount of time to finish.

Finally, once all the respondents had completed all the questionnaires, the researchers collected the survey questionnaires and organized them for interpretation.

Statistical Tools

The techniques used to analyze and interpret the data gathered from respondents included the mean and Pearson correlation coefficient. These methods helped the researchers comprehend the results of the study.

Mean. This serves as a fundamental tool for calculating the average scores of both climate change awareness and eco-anxiety. This is achieved by summing up all the scores and dividing this sum by the total count of data points (BYJU'S, n.d.). In essence, it provided the researchers with a central value that represents the average level of these two variables in the dataset.

Pearson Correlation Coefficient. This allowed the researchers to assess the average values and the relationship between climate change awareness and eco-anxiety in this study. Strength and direction of the linear connection between these two variables (Laerd Statistics, 2020). These statistical tools aimed to determine the nature and significant relationship between climate change awareness and eco-anxiety in this research.

DISCUSSION

In this section, the results of this study are presented and discussed. The data was gathered from 392 respondents, all of whom were at least 18 years old and were enrolled in one of the higher education institutions in Davao City. Table 3 shows the level of climate change awareness, while Table 4 shows the level of eco-anxiety. Table 5 presents the association between climate change awareness and eco-anxiety among undergraduate students. Prior studies that are relevant to the results of this research and possible explanations related to the results are also discussed.

Level of Climate Change Awareness Among Undergraduate Students

Table 3. Level of Climate Change Awareness Among Undergraduate Students

Variable	N	Mean	Standard Deviation	Qualitative Description
Climate change awareness	392	4.24	.495	Very High

Table 3 reveals the student's level of climate change awareness through the Awareness Scale for Climate Change by Ezeudu et al. (2016). With a mean score of 4.24 and a standard deviation of .495, this suggests that undergraduate students, on average, experience a very high level of climate change awareness, based on the rating scale for the Awareness Scale for Climate Change shown in Table 1.

According to Salas (2023), the Philippines faced the most significant risk of natural disasters among all countries globally. Further, in a study conducted by Alcantara et al. (2023) on climate change awareness and risk perceptions in the coastal marine ecosystem of Palawan, Philippines, locally, the key factor influencing how people perceive the risk of climate change impacts is temperature changes, while on a global scale, awareness of climate change is mainly influenced by educational attainment. Particularly now, as stated by Hernando-Malipot (2022), the Department of Education (DepEd) in the Philippines strengthens climate education within the K to 12 curricula by integrating climate change concepts in various subjects, including Science, Health, *Araling Panlipunan* (Social Studies), *Edukasyon sa Pagpapapakatao* (Values Education), Mathematics, English, Filipino, *Edukasyong Pantahanan at Pangkabuhayan*, Technology and Livelihood Economics, and Music, Arts, Physical Education and Health (MAPEH). Hence, these can be one of the leading contributing factors to a very high level of climate change awareness among undergraduate students.

Furthermore, as stated by Mustapha et al. (2022), newspapers and various media platforms contribute to making information accessible and raising awareness of climate change. This can be grounds for a very high level of climate change awareness among undergraduate students. The same study revealed that the majority of undergraduate students are aware of climate change. This implies that with information availability and awareness in the media, most undergraduate students are already aware of climate change, which resulted in a high level of awareness among them.

Level of Eco-Anxiety Among Undergraduate Students
Table 4: Level of Eco-Anxiety Among Undergraduate Students

Indicators	N	Mean	Standard Deviation	Qualitative Description
Affective symptoms	392	3.10	1.049	Moderate
Rumination	392	3.19	1.038	Moderate
Behavioral symptoms	392	2.97	1.15	Moderate
Anxiety about personal impact	392	3.12	1.07	Moderate
Overall	**392**	**3.09**	**.890**	**Moderate**

Table 4 presents the resulting descriptive statistics for eco-anxiety, along with its four constituent dimensions: affective symptoms, rumination, behavioral symptoms, and anxiety about personal impact. The data was collected using the Hogg's Eco-Anxiety Scale by Hogg et al. (2021). The results show that the mean score for eco-anxiety is 3.09, with a standard deviation of .890. This means that undergraduate students, on average, experience a moderate level of eco-anxiety, based on the rating scale for Hogg's Eco-Anxiety Scale shown in Table 2.

The results further show that the respective mean scores of all four dimensions of eco-anxiety fall within the moderate range, likewise, based on the rating scale in Table 2. Affective symptoms yielded a mean score of 3.10 and a standard deviation of 1.049; the mean score for rumination is 3.19, with a standard deviation of 1.038; behavioral symptoms had a 2.97 mean score and 1.15 standard deviation; and anxiety about personal impact accumulated a mean score of 3.12 and a standard deviation of 1.07. This means that undergraduate students, on average, experience these dimensions at a moderate level.

The results of this study add to the growing body of evidence documenting the prevalence of eco-anxiety and other related phenomena (e.g., climate anxiety, climate change anxiety, and worry about climate change) experienced among young Filipinos. A study by Reyes et al. (2021) involving Filipinos aged 18 to 26 years indicates that some young Filipinos underwent anxiety about climate change. Another study by Simon et al. (2022) involving Filipino undergraduates at a university in Manila also reveals that climate change anxiety was experienced by several young Filipinos. Moreover, a survey by Hickman et al. (2021) published in *The Lancet* shows that 83% of young Filipinos felt anxious about climate change. The survey further indicates that 74% of young Filipinos report that their feelings about climate change have negative impacts on their functioning, a phenomenon that is similar to the behavioral symptoms dimension of eco-anxiety. The same survey also shows that 94% of young Filipinos were either moderately worried, very worried, or extremely worried about climate change.

Aruta et al. (2022) proposed several factors that possibly explain why certain individuals or groups experience anxiety relating to climate change and other environmental problems. The factors they proposed are exposure to extreme weather events, exposure to slow-onset events related to climate change, climate change awareness and education, and awareness of inadequate action to solve climate change. The experience of many Filipinos in various disasters and climate change-related events, as well as the mandated integration of climate change education in the Philippine education curricula, the authors argue, may explain why some people experience anxiety related to climate change and other environmental problems. In the present research, these are also possible factors contributing to the experience of eco-anxiety among some undergraduate students.

The findings of the present study, while limited in generalizability due to the small sample size and narrow population, can be helpful in gauging the level of eco-anxiety among young Filipinos when added to other studies on similar variables. Moreover, the findings of this study are useful when discussing or investigating eco-anxiety locally in Davao City, where the study was conducted.

Relationship between Climate Change Awareness and Eco-Anxiety Among Undergraduate Students
Table 5: Relationship between Climate Change Awareness and Eco-Anxiety Among Undergraduate Students

Correlated Variables	r-value	p-value	Decision
Climate Change Awareness	.216	.000	Reject H_0
Eco-Anxiety			

Table 5 shows that the p-value is less than the alpha value (.000 < 0.01), thus rejecting the null hypothesis. This means

there is a significant relationship between climate change awareness and eco-anxiety among undergraduate students. Specifically, the findings indicate that the correlation between climate change awareness and eco-anxiety levels is low among respondents. This suggests that individuals with lower awareness about climate change also exhibit lower levels of eco-anxiety.

According to Pihkala (2020), knowing about climate change and its consequences can bring upon many emotions, such as guilt, sadness, and anger, which all make up eco-anxiety. The climate problem has a considerably more significant influence on people's minds and bodies than they realize or debate. The constant barrage of disturbing news about environmental degradation and loss, or the uncertainty of the future, combined with a sense of hopelessness, can often worsen anxiety. This syndrome is known as climate or eco-anxiety. It refers to the ongoing worry and distress caused by climatic and ecological catastrophes.

In line with previous studies by Jain, N., & Jain, P. (2022), the researchers explored the relationship between eco-anxiety, eco-activism, and environmental concern. They found that while there was a significant relationship between eco-activism and both eco-anxiety and environmental concern, the correlations were mild. Various factors explain these low correlations. For eco-anxiety, negative emotions may lead to behavioral resistance, reducing the inclination towards activism. Additionally, a significant portion of the population denies climate change to avoid negative feelings, contributing to lower levels of eco-anxiety overall. On the other hand, the correlation between eco-activism and environmental concern is influenced by factors such as the lack of awareness about individual impact on conservation, a perceived lack of community support, financial constraints, limited availability of eco-friendly products, and inadequate implementation of environmental policies. Moreover, the type of coping style adopted by people determines the extent to which they engage in pro-environmental behaviors (PEBs). Individuals who adopt an emotion-focused coping style accept the existence of the problem but distance themselves from it. Individuals who adopt a meaning-focused coping style take concrete steps to deal with the issue.

Furthermore, the Appraisal Theory by Smith and Lazarus (1990) indicates that emotion is a result of an individual's evaluation of a situation. In the study, it was observed that individuals with limited awareness of climate change tend to evaluate the situation with relatively low concern, leading to lower levels of eco-anxiety. This aligns with the Appraisal Theory, as these individuals may perceive climate change as a distant threat due to their lack of information. Moreover, the Transactional Model of Stress and Coping, developed by Lazarus and Folkman (1984), further supports this understanding by emphasizing the dynamic interplay between individuals and their environment in the stress response process. In this case, individuals' appraisal of climate change as a distant threat reflects a transactional process wherein their cognitive evaluation of the situation influences their emotional response, contributing to variations in eco-anxiety levels. These insights not only contribute to the growing body of knowledge on the psychological impacts of climate change but also have practical implications for interventions and policymaking. By highlighting the association between awareness of climate change and eco-anxiety within the frameworks of the Appraisal Theory and the Transactional Model of Stress and Coping, this suggests that interventions aimed at addressing eco-anxiety should not only focus on raising awareness of climate change but also consider individual's coping styles and emotional responses to environmental challenges.

CONCLUSION

The results of the study reveal a significant relationship between climate change awareness and eco-anxiety among undergraduate students. This study determined the level of climate change awareness among undergraduate students, the level of eco-anxiety among undergraduate students, and the relationship between climate change awareness and eco-anxiety among undergraduate students.

The findings of the study show that, on average, undergraduate students possess a very high level of awareness regarding climate change. Several contributing influences resulted in undergraduate students' high level of climate change awareness, including the DepEd's integration of climate change concepts in various subjects, which strengthens climate education in the Philippines (Hernando-Malipot, 2022), media influence in disseminating information that shapes the awareness of students on climate change (Mustapha et al., 2022).

Moreover, the results reveal that undergraduate students, on average, experience a moderate level of eco-anxiety. These findings align with previous research highlighting the prevalence of eco-anxiety and climate change-related concerns among young Filipinos. In a study by Reyes et al. (2021), some young Filipinos aged 18 to 26 years underwent anxiety about climate change. Similarly, a survey by Hickman et al. (2021) shows that 83% of young Filipinos felt anxious about climate change.

This result implies that respondents who have a high level of climate change awareness may also exhibit eco-anxiety. Anchored by the Appraisal Theory of Smith and Lazarus (1990), individuals may perceive climate change as a significant threat, especially when they are exposed to information about its potential impacts, which may result in heightened eco-anxiety. This aligns with a recent study that most climate change education programs focus on teaching facts and skills rather than encouraging individuals to take action (Mebane et al., 2023). However, individuals may appraise this and develop coping mechanisms to address eco-anxiety as described in the transactional model of stress and coping by Lazarus and Folkman (1984).

While limited in generalizability due to the small sample size and narrow population, this result adds to the growing body of evidence and aligns with previous studies documenting the prevalence of eco-anxiety among young Filipinos. Although the findings of the study reveal a significant relationship and show a direct positive between climate change awareness and eco-anxiety among students, the correlation between the two variables is low among respondents. This implies that while awareness of climate change may influence eco-anxiety among undergraduate students, there may also be other factors that have a bigger impact in determining students' level of eco-anxiety. Thus, it is essential for future researchers to use larger and more diverse samples to enhance generalizability.

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