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HOW DOES ECO-ANXIETY AMONG GEOGRAPHY TEACHERS AFFECT THEIR PERFORMANCE? EVIDENCE FROM THE BANJA LUKA REGION (B&H)

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Abstract: Geographical education plays a crucial role in shaping individuals' understanding of the importance of addressing climate change and environmental issues. Nonetheless, the impact of ecological anxiety (eco-anxiety) on geography teachers, and its effect on their performance, remains insufficiently explored. This study examines the nature of eco-anxiety among geography teachers in the Banja Luka region of the Republic of Srpska, Bosnia and Herzegovina (B&H). The research utilizes the HEAS-13 scale, which has been adapted into Serbian for the first time. This scale encompasses affective, rumination, behavioral impairment, and personal impact as the fundamental dimensions of ecological anxiety, comprising a total of 13 questions. The collected data were analyzed using the JASP software. Given the relatively small sample size (N = 40) and the observed non-normal distribution of data (*Z*-test), as well as their ordinal nature (Likert scale), correlations were determined using Spearman's rho factor. The primary hypothesis of the study suggests that geography teachers will exhibit a higher degree of rumination compared to other measured dimensions. The findings confirm the hypothesis, as rumination is the most prominent symptom of eco-anxiety (M = 0.925). The eco-anxiety of teachers in the Banja Luka appears to align with established trends based on gender, age, and type of school. The most notable correlation is observed between the dimensions of rumination and concern for personal impact on climate change (rho = 0.635). The expression of negative symptoms of rumination implies that teachers employ maladaptive coping strategies when addressing the adverse effects of climate change.

Keywords: eco-anxiety; geography teachers; HEAS-13; rumination; Banja Luka

1. Introduction

Popular culture has always been a kind of litmus test to indicate transformation of certain social paradigms. In the 20th century, the primary form of collective fear of potential annihilation was the nuclear anxiety, described by Margaret Mead (Findlay, 2018). Films such as *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb* (Kubrick, 1963) and *The Day After* (Meyer, 1983) unequivocally addressed nuclear catastrophe. The paradigm shift is made clear from by the title of one of the most famous films dealing with climate-induced global catastrophe—*The Day After Tomorrow* (Emmerich, 2004), which refers directly to

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Meyer's film 40 years later. This film suggests that instead of nuclear threat, or perhaps more accurately, in addition to it, humanity is faced with new risks that have different causes, manifestations, and timescales, but whose effects are essentially the same. This shift in the causes threatening the survival of humanity also entails a change in individual responsibility. Whereas atomic anxiety implied a kind of mediation of responsibility, which shifted from the individual to those who had direct control over the nuclear arsenal, in the case of eco-anxiety, the responsibility of each individual is tangible and omnipresent. When responsibility is transferred from the collective decision-making body to the individuals, the psychological pressure on the individual increases.

The consequence of this is an increasing subjectivization of the sense of responsibility. This subjectivization can be observed above all among those who are professionally involved in climate change education. The influence that geography teachers have as role models on the formation of attitudes toward climate change of future generations, i.e., on their climate behavior, is important (Favier et al., 2021; Ivkov Džigurski et al., 2020). However, research on the characteristics of geography teachers' eco-anxiety is still very scarce and insufficient. The research conducted by Hermans (2016) in Finland on the impact of negative emotions related to climate change and their influence on geography teaching is an exception in this field. Although the results of this research are very important, they are insufficient considering the importance of the topic. In particular, there is a lack of studies conducted with a specific universal scale that would allow for relevant comparisons. This is precisely the main motivation for this study—to analyze the characteristics of eco-anxiety among geography teachers using an appropriate scale. One such scale is the HEAS-13 scale by Hogg and collaborators (2021), which allows for the measurement of four basic dimensions of environmental anxiety—affective (AF), rumination (RU), behavioral impairment (BI), and personal impact (PI).

The key objective of the research is to analyze the characteristics of eco-anxiety among geography teachers in the Banja Luka region of the Republic of Srpska (B&H). The main task was the linguistic adaptation of the HEAS-13 measurement scale to the Serbian language. The central hypothesis of the research is that geography teachers will show a higher level of rumination compared to other dimensions measured in the scale. This hypothesis is based on previous research indicating that individuals whose profession is related to climate change primarily perceive the process cognitively, while those without professional training primarily exhibit affective symptoms (American Psychological Association Task Force on the Interface between Psychology and Global Climate Change, 2010; Clayton, 2003; Clayton & Karazsia, 2020).

By adapting the HEAS-13 scale into the Serbian language for the first time, a suitable instrument for researching eco-anxiety was created. Additionally, to the best of authors' knowledge, this was the first exact study of eco-anxiety in the former Yugoslav territories and also the first study of eco-anxiety among geography teachers using the HEAS-13 scale in general.

2. Literature review

Increased interest among psychologists in the effects of climate change on human mental health began after Hurricane Sandy in 2012. Several clinical studies (Clayton & Manning, 2018; Clayton et al., 2014; Dodgen et al., 2016; Doherty & Clayton, 2011; Manning & Clayton, 2018) have emerged indicating the need to adequately identify this phenomenon and more

accurately determine its underlying characteristics in order to find appropriate therapies. There are several terms employed in scholarly works to characterize this topic.

Goleman (2009) refers to the unsettling feeling we experience in relation to ecological information as "eco-angst". Searle and Gow (2010) use the term "climate change distress". Albrecht (2011) coined the term "psychoterratic syndromes" to describe a group of negative effects of climate and environmental change on human health, including "ecoparalysis", "solastalgia", and "econostalgia" as well as "eco-anxiety". Morton (2013) views the consequences of global warming for humans as "ecological trauma". When analyzing the representation of the phenomenon of global warming in literature and films, Kaplan (2015) uses the term "climate trauma". Cunsolo and Ellis (2018) define the response to the emotional impact of climate change as "ecological grief". Stanley and colleagues (2021) add the terms "ecological depression" and "ecological anger" as different adaptive responses to psychological climate trauma.

Despite the lack of consensus on a common term for the negative effects of climate change on human mental health and the different operationalizations of the concept of eco-anxiety in scientific papers (Coffey et al., 2021), the term eco-anxiety remains prevalent as a buzzword in both the media and the literature. The reason for this is of a practical nature, as eco-anxiety is directly linked to a generalized anxiety disorder, for which there is already a theoretical basis and measurement instruments, such as the General Anxiety Disorder-7 (Spitzer et al., 2006). Eco-anxiety is also seen as a new, distinct form of anxiety that arises as a psychological reaction to an increased sense of uncertainty due to environmental change. Albrecht (2011) defines eco-anxiety as the most general form of environmentally induced feelings of horror and despair in the face of increasingly widespread facts and information about the unsustainability and harmful effects of current economic practices.

Various instruments for measuring the presence and extent of environmental anxiety can be found in the literature. Some studies focus on measuring negative emotions triggered by climate change (Helferich et al., 2020; Ogunbode et al, 2021; Reseret al., 2012; Searle & Gow, 2010; Stevenson & Peterson, 2015). On the other hand, Clayton and Karazsia (2020) broaden the focus of climate anxiety from the emotional aspect to general well-being. Based on previous research on clinical symptoms, they introduce factors such as rumination (which combines cognitive with emotional states), functional impairment, and behavioral aspects of personal commitment to environmental protection. Research conducted by Hogg et al. (2021) confirmed the validity of including these elements in the study of eco-anxiety symptoms. In this context, they developed the Hogg Eco-Anxiety Scale (HEAS-13), which includes four groups of symptoms: affective symptoms, rumination symptoms, behavioral symptoms, and symptoms related to personal impact on climate. Hogg's eco-anxiety scale examines these symptoms using 13 questions. In this study, Hogg's scale was used.

3. Research methodology

3.1. Research design

The primary aim of the research is to find out the characteristics of eco-anxiety among geography teachers in the Banja Luka. The initial assumption is that the dimension of rumination will be more pronounced than other symptoms, considering the profession of geography teachers. A prerequisite for the study was the linguistic adaptation of the HEAS-13

scale to the Serbian language. The teachers were surveyed using an anonymous questionnaire and the data were analyzed with the statistical software JASP (version 0.18.3; JASP Team, 2024).

3.2. Population of the study and the method of data collection

The participants were geography teachers from the Banja Luka. The survey was conducted during a seminar for geography teachers that took place on April 26th, 2023 in Banja Luka. A total of 40 teachers were interviewed, 32 of whom work in urban and eight in rural schools. The distribution of participants by gender was 31 female and nine male. The age structure was analyzed in three age groups: under the age of 30 (7.5%), 30–50 (52.5%), and aged 50 years and older (40%), as shown in Table 1.

Table 1. Participant structure

	N	%
Gender		
Male	9	22.5
Female	31	77.5
Age		
<30	3	7.5
30–50	21	52.5
>50	16	40
School type		
Rural	8	20
Urban	32	80

3.3. Properties of the HEAS-13 scale

As we have already mentioned, the symptoms of eco-anxiety in teachers were measured using the four-dimensional Hogg scale (HEAS-13). The authors of the scale find that it has "high reliability (α > .82 for all the four groups of symptoms) and validity, making it suitable for assessing eco-anxiety in the population" (Hogg et al., 2021, p. 21). The dimensions of anxiety are captured by 13 questions. The dimension related to the affective symptoms of eco-anxiety is measured by the first four questions which relate to the negative emotional response to existential insecurity caused by climate change. The dimensions of rumination symptoms are determined by questions five, six, and seven. Eco-anxious rumination is characterized by persistent, repetitive, and debilitating thoughts related to the negative consequences of climate change, without considering possible productive actions toward solving the problem. Behavioral impairment is assessed by questions eight, nine, and 10, which refer to the assessment of the respondents' performance of daily behaviors and functions. The remaining questions aim to determine the level of anxiety related to the personal impact on climate change. The scores were measured using a 4-point Likert scale (0–3), which mainly assessed the frequency of anxiety during the measured period (in the last two weeks): 0 = *not at all*, 1 = *a few days*, 2 = *more than half the time*, and 3 = *almost every day*. Before conducting the study, it was necessary to adapt the Hogg scale to the specific research setting.

3.4. Adaptation of the scale

Adapting a specific psychological measurement instrument that was originally created in a foreign language is a much more complex process than simply translating and applying it in a specific research setting. This process requires adapting the measurement instrument to a new linguistic and cultural context (Borsa et al., 2012). According to Hambleton (2004), this process consists of several phases. In the first phase, the original Hogg test was translated into

Serbian by two translators. In the second phase, the translations were synthesized. In the third phase, the synthesized version was evaluated taking into account an appropriate contextualization of the scale within the psychological and geoscientific terminology registers. This contextualization was achieved by reviewing the translations by researchers from the fields of psychology and earth sciences. In this way, a Serbian version of the Hogg scale was created (Trifunović & Rajčević, 2024), which enables appropriate measurement and comparison of eco-anxiety symptoms.

Given that the study was based on a relatively small sample (N = 40) and that it involved a specifically professionally homogeneous population, it was necessary to perform a check for the normality of data distribution before further statistical analysis. The normality test was conducted using the Z-test for data normality (Kim, 2013). Z-test values were obtained by dividing the data for the skewness function (which measures the asymmetry of the data distribution of the variable) by their standard error. According to Kim (2013), for samples of fewer than 50 participants, all Z-test values greater than 1.96 indicate a non-normal distribution of data.

4. Results

The mean values of the eco-anxiety variables (AF, RU, BI, PI) clearly showed that the dimension of rumination (M = 0.925) is the most pronounced symptom among the surveyed geography teachers (Table 2). This confirms our hypothesis that the cognitive elements of geography teacher training have a decisive influence on the symptoms of eco-anxiety shown, namely that the rumination symptoms will be the most pronounced.

Table 2. Mean values of the basic dimensions of eco-anxiety

	AF	RU	BI	PI
Valid	40	40	40	40
Missing	0	0	0	0
Mean	0.625	0.925	0.583	0.550

The dimension of affective symptoms (AF mean = 0.625) ranks second. Geography teachers in the Banja Luka showed the lowest level of eco-anxiety in relation to their personal impact on the environmental crisis (PI mean = 0.550).

When these data were analyzed according to the gender structure of the respondents, a more nuanced picture of teachers' eco-anxiety emerged. The results (Table 3) clearly showed that female teachers were more concerned in all categories. The only exception was the dimension of symptoms of behavioral impairment, where male respondents show a higher level, albeit only slightly (M = 0.593), than female respondents (M = 0.581).

Table 3. Mean values of the basic dimensions of teachers' eco-anxiety by gender

	AF		RU		BI		PI	
	Male	Female	Male	Female	Male	Female	Male	Female
Valid	9	31	9	31	9	31	9	31
Missing	0	0	0	0	0	0	0	0
Mean	0.361	0.702	0.519	1.043	0.593	0.581	0.111	0.677

Rumination is therefore most pronounced among female geography teachers (M = 1.043). Interestingly, the greatest difference between male and female population groups can be seen

in relation to the personal impact on climate change. Here, male teachers showed the least concern (M = 0.111), while this dimension is much more pronounced among women (M = 0.677).

The participants were divided into three age groups: under the age of 30, 30–50 years, and aged 50 years and older. The data (Table 4) show that rumination is the most pronounced among teachers aged 30–50 (M = 0.984). Rumination is the least pronounced among younger teachers, i.e., those aged under 30 years. This distribution is completely reversed for the affective dimension of eco-anxiety. Here, the symptoms are most pronounced among teachers in the under 30 age group, while the oldest teachers show the lowest affective investment in relation to environmental issues.

Table 4. Eco-anxiety across age groups

	AF			RU			BI			PI		
Age	<30	30–50	>50	<30	30–50	>50	<30	30–50	>50	<30	30–50	>50
Valid	3	21	16	3	21	16	3	21	16	3	21	16
Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0.750	0.536	0.719	0.667	0.984	0.896	0.556	0.476	0.729	0.111	0.492	0.708

The anxious feeling regarding personal impact in reducing the effects of the ecological crisis was most prevalent again among the oldest group of teachers, just as behavioral impairment. The analysis showed that the type of settlement where the schools employing the teachers are located also plays a certain role in the characteristics and distribution of symptoms of their eco-anxiety. In general, it can be concluded that teachers in rural schools exhibit significantly more pronounced symptoms of eco-anxiety compared to teachers employed in urban schools of the region (Table 5).

Table 5. Teachers' eco-anxiety according to school type

	AF		RU		BI		PI	
School type	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Valid	32	8	32	8	32	8	32	8
Missing	0	0	0	0	0	0	0	0
Mean	0.609	0.688	0.781	1.500	0.490	0.958	0.469	0.875

Geography teachers from rural schools exhibited a higher level of rumination (M = 1.500) compared to teachers from urban schools of the region (M = 0.781). This trend applies to behavioral symptoms and symptoms related to personal impact as well, while the affective dimension of eco-anxiety was fairly evenly present among teachers in both categories of schools. .

As already emphasized in the methodological section, the characteristics of the studied sample indicate the need to assess the normality of the data before proceeding with the correlation analysis. The conducted *Z*-test for the normality of data distribution for our study shows that they are not normally distributed (Table 6).

Table 6. *Z*-test normality of data distribution

Variables	AF	RU	BI	PI
Skewness	–0.122	0.821	0.695	1.399
Std. error	0.374	0.374	0.374	0.374
Z-test	–0.326	2.195	1.858	3.740

Three fundamental characteristics of the obtained data are: a) a relatively small number of participants, b) non-normality of their distribution, and c) ordinality (Likert scale), rather than the continuity of variable values. These indicate the need to use Spearman's coefficient instead of Pearson's coefficient to calculate correlations between individual variables (Jamieson, 2004; Kuzon et al., 1996; Portney & Watkins, 2002; Schober et al., 2018).

The calculated correlations between the four dimensions of eco-anxiety among geography teachers showed (Figure 1) that between the dimensions of RU and PI, Spearman's rho was 0.635, which, according to the descriptors provided by Dancey and Reidy (2004), represented a strong positive correlation. A weak correlation existed between RU and BI (rho = 0.255), while the correlation between the dimensions of concern for PI and BI was negligible (rho = 0.18).

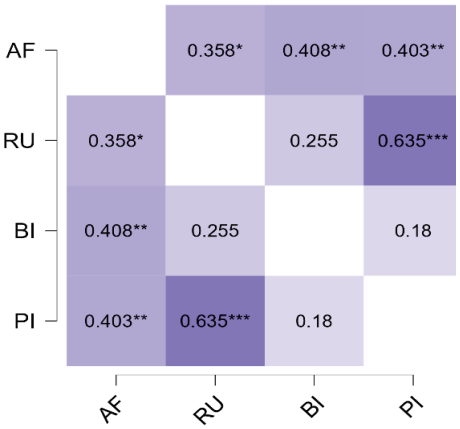

Figure 1. Heat map of Spearman's rho correlation between variables.
Note: *p < .05, **p < .01, ***p < .001.

5. Discussion

Eco-anxiety among geography teachers is evidently a very important factor that affects their professional and daily activities and performance. This study showed that teachers' eco-anxiety manifests differently depending on their age, gender, and the location of the school they are employed in.

The study was based on the hypothesis that the symptoms of rumination are most pronounced in teachers depending on their professional training. The results obtained confirmed this hypothesis (Table 2). These results are consistent with previous researches showing a close relationship between professional training in climate change, professional identity, and the characteristics of individual dimensions of eco-anxiety (American Psychological Association Task Force on the Interface between Psychology and Global Climate Change, 2010; Clayton, 2003; Clayton & Karazsia, 2020).

Characteristics of eco-anxiety among geography teachers across gender and age groups also align with previously observed trends. The AF and the dimension of PI are significantly more pronounced in the female population (Table 3), which is consistent with previously researched results of eco-anxiety in the general population (Clayton et al., 2023; du Bray et al., 2019; Searle & Gow, 2010; Verplanken et al., 2020; Wullenkord et al., 2021).

The results of eco-anxiety among teachers according to the type of school are interesting. Teachers working in rural schools exhibit a significantly higher level of eco-anxiety than teachers from urban schools. The reason for this could be found in the more intimate and closer relationship these teachers have with nature compared to teachers working in urban schools. In rural areas, the devastation and changes to the natural environment are also more obvious and direct when

compared to urban areas, making the personal impact on climate change more noticeable and intensively evident in rural environments, which are much more vulnerable and sensitive to the negative implications of climate change (Berenguer et al., 2005; Patrick et al., 2022).

The strong positive factor of Spearman's correlation observed between RU and PI of teachers (Figure 1) represents, according to Hogg and colleagues (2021), an intrinsic characteristic of the HEAS-13 measurement scale itself, which is also evident in other studies of eco-anxiety using this scale (Hogg et al., 2023; Sampaio et al., 2023; Uzun et al., 2022;). However, this correlation needs to be interpreted from the perspective of the role geography teachers play in shaping behavior regarding climate change. The ways in which teachers deal with the symptoms of eco-anxiety, especially with RU as its strongest dimension, will greatly influence the teaching process, the selection of teaching content, the depth, and emotional investment of teachers in explaining the consequences of climate change. RU can indeed serve as a motivational factor for practical action. However, if it is associated with anxiety, rumination is characterized by a maladaptive form of repetitive worry, which actually hinders action (Ehring, 2021; Joormann et al., 2006; Smith & Alloy, 2009). Hermans (2016) particularly emphasizes unproductive strategies that geography teachers use to cope with climate change, highlighting the negative aspects of rumination and blaming other decision-making factors. Although the mentioned study is qualitative in nature and lacks a directly comparable statistical expression (HEAS-13 scale was not used), it is still possible, with some reservation regarding different methodological approaches to research, to draw certain conclusions. The strong correlation between RU and PI among geography teachers in the Banja Luka most likely indicates the use of unproductive coping strategies for dealing with negative emotions and thoughts. The content of rumination is mostly associated with thoughts of personal guilt, which is intensified as geography teachers are role models for behavior regarding climate change. All of this suggests that teachers lack practical and productive strategies and actions regarding climate change. Additional research is needed to obtain comparable results and gain insight into these coping strategies. Only then can appropriate additional education for teachers be conducted.

6. Conclusion

The adaptation of the HEAS-13 scale into Serbian and subsequent research findings mark an initial exploration into eco-anxiety within the Serbian-speaking community, shedding light on a topic which is currently a kind of terra incognita in this context. The Serbian HEAS-13 scale provides researchers with a suitable tool to obtain valid and comparable results that can serve as a basis for the development of various policies and strategies regarding the impact of climate change on mental health. The research clearly shows that the relevant authorities, especially the Pedagogical Institute of the Republic of Srpska, the Ministry of Education and the Ministry of Health in the Government of the Republic of Srpska, need to respond appropriately to formulate and implement curricula for additional training of teachers on eco-anxiety.

The main limitation of this study is the relatively small number of participants and its spatial-regional restriction. There's also the issue of comparing research results, which wasn't possible to adequately address since similar studies haven't been conducted yet. Additionally, the linguistic adaptation of the scale was conducted in the study, but it is necessary to validate it through confirmatory factor analysis (CFA), which requires increasing the number of

participants. Furthermore, the study needs to be expanded to explore the strategies teachers use to cope with eco-anxiety symptoms.

Future research should involve a broader population of geography teachers in the Republic of Srpska, and B&H, in order to gain a more comprehensive insight into the characteristics of their eco-anxiety. Additionally, the HEAS-13 (SRB) scale can be used to investigate eco-anxiety among geography teachers (as well as other professions and population groups) in Serbia. Comparing such potential studies with this one would likely provide significant insights into the structure of eco-anxiety within the Serbian-speaking population. The framework of the research needs to be expanded to include questions and strategies that teachers undertake to address the consequences of climate change, as well as proposals for measures that would assist them in coping with it.

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