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Development and Validation of Eco-anxiety Scale in Pakistan

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Present study is aimed at developing and validating an Eco-anxiety scale for Pakistani community. It is explored that Eco-anxiety is a neoteric phenomenon that gained much attention amidst environmental researchers. Eco-anxiety alludes to feelings of dread, fear and worrying about the impacts of climate change. This study was executed in three stages. In study I, careful focus group discussions and expert opinion were carried out, and an enriched item pool was generated. In study II, exploratory factor analysis was conducted 252 males and females. EFA established a four-factor structure including behavioral symptoms, anxiety symptoms, ruminations, and personal impact on environment. Through Principal Component Analysis, scree plot and eigenvalues, total 29 items with four factors were extracted. In study III, on a purposive and independent sample of 314 residents of Punjab, confirmatory factor analysis was carried out. Results validated the four-dimensional structure bringing about excellent model fit indices. The findings were in line with the previous scales as they showed four factor structure of the construct as well. This scale provides an indigenous tool measuring Eco-anxiety in Pakistani context, easing the assessment of this novel phenomenon. This study opens the way for future researches to gain insight about this unprecedented phenomenon contributing to the complexities of environmental changes.

Keywords. Eco-anxiety, climate change anxiety, emotional distress, ecological emotions

Eco-anxiety is a new paradigm that is declared as top most damaging threats to global health in 21st century. In 2019, Australian medical association has declared that climate change is Unquestionable truth, and creates warning to most vulnerable individuals (Flannery & Johnson, 2019).

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In 2020, the World Health Organization forecasted that climate changes could produce 250,000 deaths per year between 2030 and 2050 because of malaria, heat stress, malnutrition and diarrhea. The prognosis poses climate change among top hazardous global health threats of this century. There are numerous mental health problems arise as a result of environmental factors that encompass grief, distress, loss to several emotional and behavioral symptoms and psychopathology (Clayton et al., 2017; W.H.O, 2020). In 2019, Harland described that in Europe, feeling anxious about our planet is considered as a universal phenomenon. Same evidence was gathered from America (Leiserowitz et al., 2023), Pacific Islands (Gibson et al., 2019), Canada (Durkalec et al., 2015) and China (Hao & Song, 2020). Another research from Ministry for the Environment in 2018, every third individual in New Zealand find anxious about climate change and half of the population is extremely concerned about wastage impacts. Another research from The Australia Institute in 2020 speculated that 79% adults in Australia are worried about the native wildlife destruction while 59% youngsters believe that climate change is a crucial threat to their safety (Australia UNICEF, 2019).

As far as anxiety is concerned, it is usually described as a feeling of unease for future related uncertainty. It is alike fear but fear is usually described by a clearer threat (Barlow, 2004; Grupe & Nitschke, 2013; LeDoux, 2016). According to Crandon et al. in 2022 and Dodds in 2021 Climate anxiety (also known as a climate change anxiety, Eco-anxiety or ecological anxiety) refers to feelings of fear, dread and worrying about the effect of climate change. Apparently, sometimes, Eco-anxiety may serve as a dynamic adjustment that stimulate pro-environmental behavior (Cunsolo et al., 2020; Dodds, 2021; Verplanken et al., 2020), and sometimes effects children and adolescents (Crandon et al., 2022; Hickman, 2020) and can negatively affect wellbeing (Brosch, 2021; Clayton et al., 2017). This Eco-anxiety can be depicted in few insomnia symptoms, decreased mental health outcomes (Ogunbode et al., 2022), increased level of stress and generalized anxiety (Stanley et al., 2021).

Shahid et al. in 2021 mentioned a report published by The Asian Development Bank in 2012 in which it is clearly mentioned that over the past 50 years, average temperature in Pakistan has raised by 0.5°C. it is further reported that in 30 years average heat wave days has increased 5 times. It is anticipated by many researchers that annual average temperature of Pakistan will rise by 3°C. This will rise mortalities rate from heat waves. With these and more research evidences, the National Climate Change Policy of Pakistan in 2012 had made few climate change policies (Shahid et al., 2021). As far as

the effects on mental health is concerned, Hansen et al. (2008) declared a positive correlation between rising temperatures and hospital admissions due to mental disorder like neurosis, anxiety, mood disorder and other psychological problems.

Literature Review

Coffey et al., 2021, has done a scoping review about Eco-anxiety, they investigated that most of the data for Eco-anxiety comes from western countries, and there is a dire need for future research in some non-western countries. They further speculated that individuals connected to natural environment are more prone to Eco-anxiety. Most of the included work showed that children are more vulnerable to experience eco-anxiety (Clayton & Karazsia, 2020) as well as females and younger people (Clayton & Karazsia, 2020).

A systematic review on social, geographical and political determinants of Eco-anxiety has done by Kankawale and Niedzwiedz (2023). Researchers revealed that this form of anxiety affects our wellbeing negatively and is more seen in young people including children. They further postulated that the role of mass media is pivotal in preventing it. They also asked for future research to analyze factors associated with Eco-anxiety in different cultures.

Psychoanalytical perspective of mental health with climate change is studied by Hogenaar (2023). While popping through the literature, he found numerous associations of mental health and climate crisis. He further advised that environmental changes adversely affect few groups more than others. It is advised to work for more clinical practices for these mental health problems that arise from climate crisis.

Another research was conducted on responding to the Impacts of the Climate Crisis on Children and Youth (Sanson et al., 2019). They speculated that climate change is hazardous to upcoming generations and mostly children are more vulnerable with long term effects on their mental and physical health. They further analyzed that effects of this climate change is adverse in developing countries.

Many researchers (Eisenman et al., 2015; Homburg et al., 2007; Reser et al., 2012; Searle & Gow, 2010) have tried to measure how climate change impact individuals psychologically by incorporating discrete tools for at least a decade, but very few developed any self-report questionnaire to quantify eco-anxiety (Clayton & Karazsia, 2020). In 2021, Hogg et al. developed the Hogg Eco-anxiety Scale (HEAS-13), that is a multi-dimensional tool having four-factor

structure that assesses anxiety in relation to climate change. It has adequate reliability and validity, making it an indispensable tool for clinical as well as research practices. Until now, the HEAS-13 was adapted to Turkish (Kıvanç et al., 2022) and Portuguese (Sampaio et al., 2023). Studying the complexity of eco-anxiety, Hogg et al., 2021 conducted research to explore eco-anxiety of individuals, with categories of environmental degradation and negative behaviors that personally impact the planet. They formulated four main dimensions of Eco-anxiety i.e., affective symptoms, behavioral symptoms, rumination and anxiety about one's negative impact on planet. Another scale is widely used in literature developed by Clayton and Karazsia in 2020. It has 22 items and named as climate change anxiety scale (CAS) that assess climate anxiety through four factors.

While the literature of this new paradigm "Eco-anxiety" is rare, as this is a predominant and emerging area of research. A study conducted by Coffey et al. in 2021, argued that Eco-anxiety varies among specific vulnerable groups including young people and indigenous groups. They further suggested that future research should examine more diverse groups as Eco-anxiety varies among culture and land. The norms they developed for their population must be different and the factors they access would have different impact in our culture. That's why only validating the existing scale developed by Hogg et al. in 2021 or climate change anxiety scale (CAS) developed by Clayton and Karazsia in 2020 in Pakistani culture is insufficient.

In a recent indigenous study, Shahid et al. (2021) concluded that Pakistan is a vulnerable place for ecological disasters. They studied mental disorders emerged from climate change and suggested that there is a dire need of an indigenous measure to access Eco-anxiety. Probing new dimensions for Pakistani culture is need of the time hence present study is intended to fill this gap by making a valid measure of Eco-anxiety in Pakistani culture.

Method

The present study comprises of three consecutive studies. In first study, a new scale of Eco-anxiety was planned and developed. The second study pertains factor analysis which was done by exploratory and conformity factor analysis procedures. Whereas the third study affirmed the content and construct validity.

Study I: Development of Eco-anxiety Scale

Developing an Eco-anxiety scale consists of three distinct stages; the phase I starts with item pool generation through focus group

discussion and few items were picked from already existing scale on said phenomena. After this second phase starts with the expert opinion to finalize items. Furthermore, exploratory factor analysis was conducted to finalize the items.

Phase I: Item Pool Generation of Eco-anxiety Scale

Item pool for Eco-anxiety scale was generated by embedding in vast literature and focus group discussions. Theoretical framework was emerged from existing scales and articles while themes are emerged from focus groups. Four main themes are emerged as physical symptoms related to Eco-anxiety, anxiety symptoms, thinking about one's impact on planet and thinking about future and climate change or ruminations. These themes are included in new scale.

Focused Group Discussions

Four focus groups were conducted for item pool generation based upon vast literature. Each consists of 6-8 people of different age range and from different backgrounds. They are given comfortable environment and few incentives to be a part of discussions. The participants were asked open ended questions to get a clear understanding of the said phenomena in our culture and area.

The first focus group consisted of experts from field of environmental psychology and psychotherapy. Few experts were taken from department of psychology, college of home economics, Multan while three were clinical psychologists working in different cities in Punjab. All of them have expertise in validation, research and assessment.

The second focus group comprises of students taken from different colleges and universities of Multan. They were asked open ended question to have a clear understanding that Eco sensitivity and Anxiety lies in general adolescents as well.

Another focus group discussion was conducted from adults of general public working in government and private sector as well as few non workers (housewives). It was planned to get insight of the phenomena from all fields of life so a better view is captured. Fifty items emerged from focus group discussions.

Another focus group discussion was conducted to check the relevancy and appropriateness of the items emerged from past three focus groups. Three experts were PhD scholars from Bahauddin

Zakariya University Multan while two were PhD scholars from Islamia University Bahawalpur. Remaining three were lecturers from different colleges. All of them were asked open ended questions.

Phase II: Experts' Opinion

After conduction of focus group discussions, fifty items were carefully examined and were included in 1st draft. In order to get expert's opinion, six experts were recruited in phase II. All experts were competent enough to review the items and are experts in field of test construction and environmental psychology. In the light of expert opinion, overlapping and ambiguous statements were removed. Two experts are from Department of Applied Psychology, Bahauddin Zakarya University, Multan. Three judges are clinical psychologists working in different areas while one PhD scholar has symptoms of Eco-anxiety since last year. Their opinion was rated on 4-point scale, not relevant, somewhat relevant, quite relevant and highly relevant. Their rating helps us to calculate CVI, S-CVI and Kappa for validity. Out of 50 statements, 06 statements show kappa value lower than 0.4 so these items were removed from item pool. The remaining 44 items are selected for data collection to conduct EFA. Furthermore, judges approved 4-point Likert type response format for Eco-anxiety scale.

Study II

Exploratory Factor Analysis

Sample

Sample of the study comprised of 252 participants including 112 males (44.4%) and 140 females (55.6%) using purposive sampling technique. The demographic information was age, gender, profession, marital status, area of living and education. The age ranged from 18 to 60 years. The data was collected across Punjab.

Measures

A 44-item questionnaire of Eco-anxiety was administered through google form. The scale has response format of 4-point Likert scale with responses ranging from 4 = *most of the time*, 3 = *some of the time*, 2 = *seldom* and 1 = *never*. Data was gathered through web based survey across Punjab. The scale didn't have negative scoring. The greater score on Eco-anxiety scale showed higher level of Eco-

anxiety and low score showed lower level of Eco-anxiety among participants.

Results

Exploratory Factor Analysis was performed on data with Principal Component Analysis and Varimax rotation by setting the value of communalities as .5. Bartlette's test of Sphericity was analyzed to check correlation matrix, it showed significant correlation among factors of scale, n = 252, 3955.55, p = .000, 406. KMO analysis was undertaken to check sample adequacy and the results found excellent sample adequacy with value .936 (Kaiser, 1974). Numbers of factors were extracted by carefully examining scree plot and Eigenvalues greater than 1(Kim & Mueller, 1978). It revealed a four factor solution for the Eco-anxiety scale. The EFA component rotation results showed that only 29 items were remained on basis of loading ≥ .50 and all other items were removed due to poor loading. It extracted four factors of the Eco-anxiety scale including behavioral symptoms, anxiety symptoms, rumination and personal impact on environment.

Figure 1: *Scree Plot with Eigenvalues*

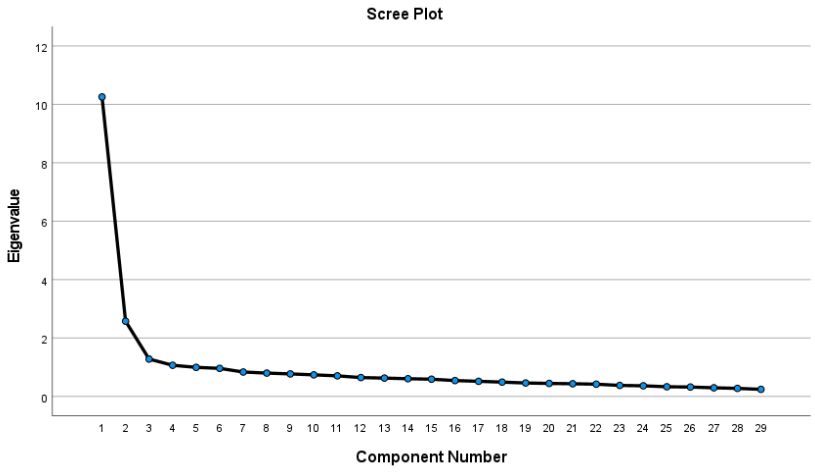


Table 1: *Rotated Factor Matrix (N = 252)*

Items	Factors			
	1	2	3	4
Behavioral symptoms				
concern for the planet impact my overall mood on a daily basis	**.59**	.07	.18	.08
concern for the environment influence my sleep patterns	**.65**	.18	.20	.08
I experienced physical symptoms, such as headaches or fatigue due to eco-anxiety	**.68**	.28	.12	.09
the state of the environment impact my interpersonal relationships	**.66**	.13	.24	.09
My appetite or eating habits changes due to concerns about the environment	**.64**	.09	.23	.31
I feel a sense of grief or mourning for the loss of natural habitats and ecosystems	**.55**	.08	.18	.06
I often avoid news or discussions related to environmental issues to prevent heightened anxiety	**.54**	.09	.23	.09
I do experience mood swings or irritability when confronted with environmental challenges	**.64**	.23	.08	.06
It really upsets me to see how animals suffer because of environmental pollution.	**.54**	.12	.23	.12
Rumination				
I find myself thinking about the environmental challenges our planet is facing	.12	**.51**	.21	.23
I often feel a sense of dread or fear when thinking about environmental issues	.23	**.59**	.09	.21
I often experience a sense of guilt or responsibility regarding environmental problems	.09	**.61**	.08	.18
I feel sorry for people whose health is already negatively affected by climate change.	.21	**.52**	.07	.09
I am frightened by how many things have changed in just a few years because of climate change.	.09	**.61**	.21	.08
I am worried about the increasing number of natural disasters caused by climate change.	.23	**.57**	.26	.12
I have a very negative perspective on the future of the planet because of climate change.	.12	**.62**	.09	.23
I am constantly on alert because there could be a climate change related disaster at any time.	.23	**.69**	.08	.21
Anxiety symptoms				
I feel helpless or overwhelmed in the face of ecological challenges	.12	.08	**.52**	.09
My eco-anxiety affect my ability to focus on work or academic tasks	.09	.07	**.64**	.12

Continued…

Items	Factors			
	1	2	3	4
My eco-anxiety manifest in dreams or nightmares.	.08	.04	**.51**	.21
In the past month, I often experienced increased feelings of distress when thinking about climate change	.12	.21	**.67**	.09
I feel anxious about the environmental consequences of my water usage	.21	.23	**.56**	.08
I have unfamiliar tension in my muscles since I've become more aware of climate change.	.23	.09	**.59**	.23
It terrified me that the weather is becoming more and more unpredictable because of climate change.	.12	.07	**.57**	.06
Personal impact on environment				
I noticed changes in my consumption habits (e.g. water consumption) as a result of eco-anxiety	.08	.12	.21	**.59**
I often participated in support groups or online communities to share and cope with eco-anxiety	.34	.21	.09	**.64**
I am concerned about the environmental impact of my daily transportation choices	.21	.09	.08	**.64**
I feel guilty about using single-use plastics in daily life	.21	.08	.07	**.51**
I feel a sense of responsibility to educate others about eco-friendly practices	.02	.04	.16	**.53**

Note. Factor loading > .50 was boldfaced.

Factors Description:

Factor 1: Behavioral Symptoms

Based on the similarities between the items of this factor, it was given the name of behavioral symptoms. This factor consisted of 9 items and items included like, “concern for the planet impact my overall mood on a daily basis” and “I experienced physical symptoms, such as headaches or fatigue due to eco-anxiety”.

Factor 2: Rumination

On the basis of the similarities between factors. This factor was given the name of rumination. It has 8 items and example included, “I find myself thinking about the environmental challenges our planet is facing” and “I often experience a sense of guilt or responsibility regarding environmental problems”.

Factor 3: Anxiety Symptoms

There were 7 items that constituted another factor labeled as anxiety symptoms. Items included like, "My eco-anxiety affect my ability to focus on work or academic tasks" and "I feel anxious about the environmental consequences of my water usage".

Factor 4: Personal Impact on Environment

On the basis of similarity index, 5 items made another factor names as personal impact on environment. These items include like, "I noticed changes in my consumption habits (e.g. water consumption) as a result of eco-anxiety" and "I feel guilty about using single-use plastics in daily life".

Study III

Confirmatory Factor Analysis

In study III, EFA explored the factorial model for the Eco-anxiety scale. The factorial model suggests running confirmatory factor analysis. AMOS version 26.0 was used to draw measurement model for the scale and confirm the factors by assessing model fit.

Sample

An independent sample of participants (N = 314) including 203 women (64.6%) and 111 men (35.4%) was purposively selected across Punjab. The age ranged from 18 to 60 years (M = 29.61, SD = 9.532). The minimum requirement of education of sample was bachelor and maximum were PhD degree. Moreover, career, area, marital status, were demographic variables for the Eco-anxiety scale.

Measures

A 29-item Eco-anxiety scale on 4-point Likert Scale (1 = *never to* 4 = *most of the time*) was used to collect data from the participants. There was no reverse coding used in the scale. Maximum scores on the scale demonstrated higher level of Eco-anxiety in participants and minimum scores resulted into lower level of Eco-anxiety.

Procedure

In study III, the researcher approached the participants across various settings including educational settings, job places, residential colonies, ensuring the diversity of sample taken. The objectives of the study were briefed at start and individuals are asked to give their informed consent. The confidentiality of their responses and information was assured. The questionnaire was administered to 314 individuals with the accuracy of responses emphasized. The respondents answered it promptly and returned the questionnaire with responsibility and in time. Few individuals need extra time. The researcher expressed gratitude towards study participants for their valuable time and information. 314 responses are included in the sample that were complete and meet the inclusive criteria in the study out of 350 questionnaires distributed. After the data collection, confirmatory factor analysis was calculated.

Results

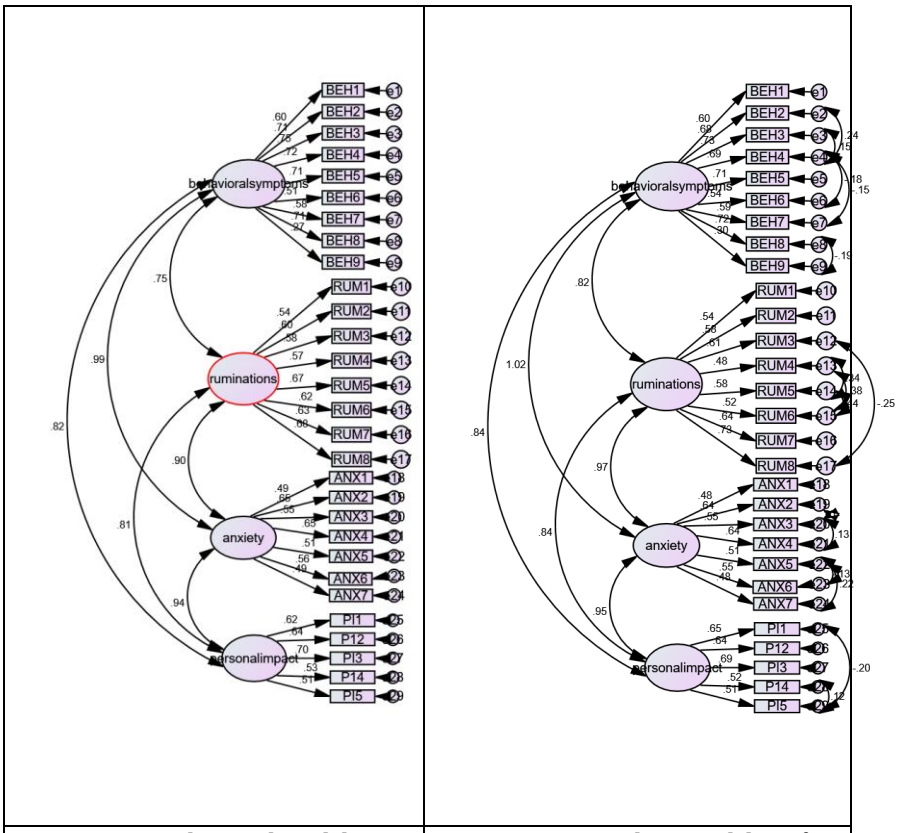
Table 2: *Initial Model Fit Indices of Confirmatory Factor Analysis Eco-anxiety Scale (N=314)*

Model	X^2	*Df*	X^2/df	*CFI*	*PCLOSE*	*RMSEA*
Initial model fit indices	851.67	356	2.392	0.903	0.001	0.067

Table 2 showed the results of confirmatory factor analysis of the Eco-anxiety scale and explained that data fitted well with the proposed four factor model as indicated through various model fit indices *(χ2* (356) = 851.674, *p* = .00; CFI = .90; RMSEA = .067; pclose = .001).

The relative chi-square (χ^2/df = 2.39) indicated an acceptable fit, which was less than the suggested cutoff of 3. The model appears to fit the data well, as indicated by the Comparative Fit Index (CFI) of.90. Furthermore, the Root Mean Square Error of Approximation (RMSEA) was.067, falling within the acceptable range of < .08. The RMSEA is substantially different from a close fit, though, as indicated by the PCLOSE value of.001.

Figure 2: *Measurement Model of Eco-anxiety Scale*



Eco-anxiety scale initial model	Eco-anxiety scale model after modifications

As shown in the Figure 2, factor loadings of different items ranged from .45 to .73 extracting 4 factors including 29 items showing excellent model fit. The factorial analysis of the scale provided powerful evidence supporting the construct validity, as all 29 items exhibited notably strong loadings on the underlying latent factor of Eco-anxiety scale. Internal consistency of the scale was measured through Cronbach's alpha which was found .934 showing excellent internal consistency.

Moreover, descriptive statistics of Eco-anxiety scale showed that the data were normally distributed on the basis of mean score, standard deviation, range, variance, skewness and Kurtosis (N = 319, M = 81.65, SD = .16.378, $Var.$= 268.25, SK =.63, *kurtosis*, .33 R = 29-116). The findings justified the utilization of Eco-anxiety scale for further analysis.

Table 3: *Measurement model analysis of Confirmatory Factor Analysis Eco-anxiety Scale (N=314)*

Items	CR	Ω	AVE	MSV	Λ
Behavioral symptoms	0.85	0.85	0.69	0.13	
BEH1					.60
BEH2					.68
BEH3					.73
BEH4					.69
BEH5					.71
BEH6					.54
BEH7					.59
BEH8					.72
BEH9					.45
Rumination	0.80	0.81	0.55	0.34	
RUM1					.54
RUM2					.58
RUM3					.61
RUM4					.48
RUM5					.58
RUM6					.51
RUM7					.64
RUM8					.73
Anxiety	0.75	0.75	0.61	0.13	
ANX1					.47
ANX2					.64
ANX3					.55
ANX4					.64
ANX5					.51
ANX6					.55
ANX7					.48
Personal impact on environment	0.74	0.74	0.67	0.40	
PI1					.65
PI2					.64
PI3					.69
PI4					.52
PI5					.51

Note. Λ(lambda) = standardized factor loading ≥ .40, CR = composite reliability , Ω = Macdonald's omega reliability coefficient, MSV= maximum shared variance, AVE = average variance extracted.

Table 3 explains measurement model analysis using composite reliability, omega reliability (Ω), maximum shared variance and

average variance extracted. CFA was used to assess the construct validity and reliability of the variables in order to establish psychometric properties of Eco-anxiety scale. According to Henseler et al. (2016) and Hair et al. (2014), all alpha coefficients, estimates, AVE and Composite reliability (CR) values must greater than the cutoff scores of .70, .50, and .70. All AVE values are greater than .50 that explains good reliability and convergent validity. The discriminant validity of the scale was evaluated using the Fornell and Larcker criteria (1981) which was another evidence. Estimates are higher than the threshold value which is less than AVE < .50 (Hair et al., 2014; Henseler et al., 2016). The range of MacDonald's reliability coefficient was between .79-.90. Overall the scale showed good reliability, convergent and discriminant validity.

Discussion

The present study focused on documenting experiences of anxiety in response to the climate change crisis, collectively developing a new eco-anxiety scale in Pakistan. This study aims to validate the four-factor model of Eco-anxiety; behavioral symptoms, anxiety symptoms, ruminations and personal impact on environment. Item pool was generated on the identified themes with the help of focus group discussions and expert opinion. 50 items were included in first draft. Expert rating helps us to calculate CVI, S-CVI and Kappa for validity. Out of 50 statements, 06 statements show kappa value lower than 0.4 so these items were removed from item pool. The remaining 44 items are selected for data collection to conduct EFA. In study 2 a sample of 252 participants was selected with age range of 18-60 years to conduct exploratory factor analysis (EFA) for generating a factorial structure of scale. After it, an independent sample of 314 was taken with same age range to have confirmatory factor analysis (CFA) with 29 items that are left after EFA. CFA is used to confirm the four-factor structure and provide evidences for construct validity of the scale. Internal consistency of the scale was measured through Cronbach's alpha which was found .90 showing excellent internal consistency. This Cronbach's alpha describes that all the items of the test measure the same construct and they all are inter related. It is one of the safest measures that should be determined before a test is presented for further research (Tavakol & Dennick, 2011). Streiner in 2003 argued that maximum value for Cronbach's alpha is 0.90. Data was gathered through web-based survey across Punjab. The scale didn't have negative scoring. The greater score on Eco-anxiety scale showed higher level of Eco-anxiety and low score showed lower level of Eco-anxiety among participants.

Therefore, the four-dimensional Eco-anxiety scale was developed with behavioral symptoms, anxiety symptoms, ruminations and personal impact on environment as factors. While developing and validating this multidimensional scale of eco-anxiety, this research contributes to the existing literature in several ways. First it validates the four-factor model of eco-anxiety given by Hogg et al. (2021). Secondly, while analyzing literature for this new concept, Coffey et al. (2021) discussed that most of the research on this phenomenon comes from western countries. They proposed a dire need of studying Eco-anxiety in Asian countries as the construct varies across area and culture. In Pakistan there is no previous attempt to develop and validate a scale on Eco-anxiety. The four dimensions measure the person's ecological anxiety in response to the climate change. This finding is consistent to the findings of Clayton and Karazsia in 2020. They developed a climate anxiety scale that also has four factors.

Our results demonstrated that Eco-anxiety scale is a useful tool to be used in Pakistani population. Its brief nature makes it a powerful handy tool to be used by clinicians and environmental psychologists. 29 item scales provide combined score of Eco-anxiety with 9 items measuring behavioral symptoms, 8 items measuring ruminations, 7 items measuring anxiety symptoms and 5 items show personal impact on environment. We recommend that future researchers can compute mean score of each factor and with higher score showing high Eco-anxiety. This scale can be used to assess how eco anxious people generally are and after any stressful climate crisis too.

Present research addresses a limitation in previous literature as Clayton and Karazsia in 2020 identified. They explained that they only included students in their sample and their research cannot estimate the severity of phenomena in general population. In this study we included general population from different fields of life to better understand the concept and promoting generalizability.

Our research in conjunction with previous literature (Hickman, 2020; Hogg et al., 2021; Pihkala, 2020) demonstrated that Eco-anxiety is an important phenomenon that interferes in a person's normal life. We did not intend to categories this construct as clinical and pathological, perhaps the important point is to understand and support person in varying degree of Eco-anxiety. Taylor (2020) also studied that Eco-anxiety can affect daily functioning and may need clinical attention when got severe. So conclusively, this indigenous scale could better guide researchers about this novel phenomenon and pave the way for future research in Asian countries as well.

Conclusion

In conclusion, this study aspired to develop and validate Eco-anxiety scale in Pakistan. Through rigorous methodological procedures including EFA and CFA, a four-dimensional Eco-anxiety scale was developed, including behavioral symptoms, anxiety symptoms, ruminations and personal impact on environment as factors. These dimensions can capture the ecological anxiety people experience in relation to climate change. The findings are consistent with the previous findings that have incorporated four-dimensional factor solution to Eco-anxiety and climate change anxiety respectively (Clayton & Karazsia, 2020; Hogg et al., 2021).

This scale will provide a comprehensive tool for developing countries like Pakistan to measure how eco anxious its people are with limited resources and low facilitation. It can also contribute to assess and address the psychological consequences of climate crisis, ultimately aimed at promoting individual wellbeing in uncontrolled environmental changes.

References

Australia, U. N. I. C. E. F. (2019). A climate for change: *Young Ambassador report*. UNICEF. https://apo.org.au/node/230771

Albrecht, G. (2011). Chronic Environmental Change: Emerging 'Psychoterratic' Syndromes. In: Weissbecker, I. (eds) Climate Change and Human Well-Being. *International and Cultural Psychology*. (Pp. 43-56) Springer. https://doi.org/10.1007/978-1-4419-9742-5_3

Barlow, D. H. (2004). *Anxiety and its disorders: The nature and treatment of anxiety and panic*. Guilford press.

Brosch, T. (2021). Affect and emotions as drivers of climate change perception and action: A review. *Current Opinion in Behavioral Sciences*, *42*, 15-21. https://doi.org/10.1016/j.cobeha.2021.02.001

Clayton, S., & Karazsia, B. (2020). Development and validation of a measure of climate change anxiety. *Journal of Environmental Psychology*, *69*, 101434. https://doi.org/10.1016/j.jenvp.2020.101434

Clayton, S., Colléony, A., Conversy, P., Maclouf, E., Martin, L., Torres, A. C., ... & Prévot, A. C. (2017). Transformation of experience: Toward a new relationship with nature. *Conservation letters*, *10*(5), 645-651. https://doi.org/10.1111/conl.12337

Coffey, Y., Bhullar, N., Durkin, J., Islam, M. S., & Usher, K. (2021). Understanding eco-anxiety: A systematic scoping review of current literature and identified knowledge gaps. *The Journal of Climate Change and Health*, *3*, 100047. https://doi.org/10.1016/j.joclim.2021.100047

Crandon, T. J., Scott, J. G., Charlson, F. J., & Thomas, H. J. (2022). A social–ecological perspective on climate anxiety in children and adolescents. *Nature Climate Change*, *12*(2), 123-131. https://doi.org/10.1038/s41558-021-01251-y

Cruz, S. M., & High, A. C. (2022). Psychometric properties of the climate change anxiety scale. *Journal of Environmental Psychology*, *84*, 101905. https://doi.org/10.1016/j.jenvp.2022.101905

Cunsolo, A., Harper, S. L., Minor, K., Hayes, K., Williams, K. G., & Howard, C. (2020). Ecological grief and anxiety: The start of a healthy response to climate change?. *The Lancet Planetary Health*, *4*(7), e261-e263. https://doi.org/10.1016/S2542-5196(20)30144-3

Dodds, J. (2021). The psychology of climate anxiety. *BJPsych bulletin*, *45*(4), 222-226. https://doi.org/10.1192/bjb.2021.18

Durkalec, A., Furgal, C., Skinner, M. W., & Sheldon, T. (2015). Climate change influences on environment as a determinant of Indigenous health: Relationships to place, sea ice, and health in an Inuit community. *Social science & medicine*, *136*, 17-26. https://doi.org/10.1016/j.socscimed.2015.04.026

Eisenman, D., McCaffrey, S., Donatello, I., & Marshal, G. (2015). An ecosystems and vulnerable populations perspective on solastalgia and psychological distress after a wildfire. *EcoHealth*, *12*(4), 602-610. https://doi.org/10.1007/s10393-015-1052-1

Flannery, J., & Johnson, C. (2019). Climate change is a health emergency. *Australian Medicine*, *31*(17), 3. https://search.informit.org/doi/10.3316/informit.641650703063962

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50.

Gibson, K., Haslam, N., & Kaplan, I. (2019). Distressing encounters in the context of climate change: Idioms of distress, determinants, and responses to distress in Tuvalu. *Transcultural Psychiatry, 56*(4), 667-696. https://doi.org/10.1177/1363461519847057

Grupe, D. W., & Nitschke, J. B. (2013). Uncertainty and anticipation in anxiety: An integrated neurobiological and psychological perspective. *Nature Reviews Neuroscience, 14*(7), 488-501. https://doi.org/10.1038/nrn3524

Haaland, T. N. (2019). *Growing up to a disaster: How youth conceptualize life and their future in anticipation of climate change* (Unpublished manuscript). University of Stavanger, Norway.

Hair, Jr. J., Sarstedt, M., Hopkins, L., & G. Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM) an emerging tool in business research. *European Business Review*, *26*(2), 106-121. https://doi.org/10.1108/EBR-10-2013-0128

Hansen, A. L., Bi, P., Nitschke, M., Ryan, P., Pisaniello, D., & Tucker, G. (2008). The effect of heatwaves on mental health in a temperate Australian city. *Epidemiology*, *19*(6), S85.

Hao, F., & Song, L. (2020). Environmental concern in China: A multilevel analysis. *Chinese Sociological Review*, *52*(1), 1-26. https://doi.org/10.1080/21620555.2019.1654367

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial management & data systems*, *116*(1), 2-20. https://doi.org/10.1108/IMDS-09-2015-0382

Hickman, C. (2020). We need to (find a way to) talk about … eco-anxiety. *Journal of Social Work Practice*, *34*(4), 411-424. https://doi.org/10.1080/02650533.2020.1844166

Hogenaar, T. (2023). *A troubled earth, a troubled mind: A psychoanalytic perspective on climate change and mental health* [Conference presentation]. ICEP 2023 International Conference on Environmental Psychology, Aarhus, Denmark.

Hogg, T. L., Stanley, K. S., & O'Brien, V. L. (2021). The Hogg Eco-Anxiety Scale: Development and validation of a multidimensional scale. *Global Environmental Change*, *71*, 102391. https://doi.org/10.1016/j.gloenvcha.2021.102391

Homburg, C., Grozdanovic, M., & Klarmann, M. (2007). Responsiveness to customers and competitors: The role of affective and cognitive organizational systems. *Journal of Marketing*, *71*(3), 18-38. https://doi.org/10.1509/jmkg.71.3.018

Kaiser, H. F. (1974). A computational starting point for Rao's canonical factor analysis: Implications for computerized procedures. *Educational and Psychological Measurement*, *34*(3), 691-692. https://doi.org/10.1177/001316447403400322

Kankawale, S., & Niedzwiedz, C. (2023). Eco-anxiety among children and young people: Systematic review of social, political, and geographical determinants. *medRxiv*, *12*. https://doi.org/10.1101/2023.12.19.23300198

Kim, J. O., & Mueller, C. W. (1978). *Factor analysis: Statistical methods and practical issues* (Vol. 14). Sage.

Kıvanç, U. Z. U. N., ÖZTÜRK, A. F., KARAMAN, M., CEBECİ, F., ALTIN, M. O., ARICI, A., & ARTAN, T. (2022). Adaptation of the eco-anxiety scale to Turkish: A validity and reliability study. *Archives of Health Science and Research*, *9*(2), 110-115.

LeDoux, J. (2016). *Anxious: Using the brain to understand and treat fear and anxiety*. Viking press, Penguin Books.

Leiserowitz, A., Maibach, E., Rosenthal, S., Kotcher, J., Goddard, E., Carman, J., ... & Thier, K. (2023). Global warming's six Americas, Fall 2023. *Yale University and George Mason University*.

Ministry for the environment. (2018). Understanding New Zealanders' attitudes to the environment. Ministry for the Environment. https://

environment.govt.nz/facts-andscience/science-and-data/understanding-new-zealanders-attitudes-to-theenvironment/

Ogunbode, C. A., Doran, R., Hanss, D., Ojala, M., Salmela-Aro, K., van den Broek, K. L., ... & Martinez-Buelvas, L. (2022). Climate anxiety, pro-environmental action and wellbeing: Antecedents and outcomes of negative emotional responses to climate change in 28 countries. *Journal of Environmental Psychology, 84*, 101887. https://doi.org/10.1016/j.jenvp.2022.101887

Pihkala, P. (2020). Anxiety and the ecological crisis: An analysis of eco-anxiety and climate anxiety. *Sustainability, 12*(19), 7836. https://doi.org/10.3390/su12197836

Reser, J., Bradley, G., Glendon, I., Ellul, M., & Callaghan, R. (2012). *Public risk perceptions, understandings, and responses to climate change and natural disasters in Australia, 2010 and 2011* (pp. 1-245). National Climate Change Adaptation Research Facility.

Sampaio, F., Costa, T., Teixeira-Santos, L., De Pinho, L. G., Sequeira, C., Luís, S., ... & Stanley, S. K. (2023). Validating a measure for eco-anxiety in Portuguese young adults and exploring its associations with environmental action. *BMC Public Health*, *23*(1), 1905. https://doi.org/10.1186/s12889-023-16816-z

Sanson, A. V., Van Hoorn, J., & Burke, S. E. L. (2019). Responding to the impacts of the climate crisis on children and youth. *Child Development Perspectives, 13*(4), 201-207. https://doi.org/10.1111/cdep.12342

Searle, K., & Gow, K. (2010). Do concerns about climate change lead to distress?. *International Journal of Climate Change Strategies and Management*, *2*(4), 362-379. https://doi.org/10.1108/17568691011089891

Shahid, S., Anwar, M., Majeed, A., & Siddique, A. R. (2021). Mental disorders emerging from climate change: A need to mitigate the eco-anxieties. *FUUAST Journal of Biology, 11*(1), 69-73.

Stanley, S. K., Hogg, T. L., Leviston, Z., & Walker, I. (2021). From anger to action: Differential impacts of eco-anxiety, eco-depression, and eco-anger on climate action and wellbeing. *The Journal of Climate Change and Health*, *1*, 100003. https://doi.org/10.1016/j.joclim.2021.100003

Streiner, D. L. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment, 80*(1), 99-103.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 2*, 53-55. https://doi.org/10.5116/ijme.4dfb.8dfd

Taylor, S. (2020). Anxiety disorders, climate change, and the challenges ahead: Introduction to the special issue. *Journal of Anxiety Disorders, 76*, 102313. https://doi.org/10.1016/j.janxdis.2020.102313

Verplanken, B., Marks, E., & Dobromir, A. I. (2020). On the nature of eco-anxiety: How constructive or unconstructive is habitual worry about global warming?. *Journal of Environmental Psychology*, *72*, 101528. https://doi.org/10.1016/j.jenvp.2020.101528

World Health Organization, (2020). *Health and climate change: Country profile 2020: Dominica* (No. WHO/HEP/ECH/CCH/20.01. 04). World Health Organization and the United Nations Framework Convention on Climate Change. https://www.who.int/globalchange/global-campaign/cop21/en/

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