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# Understanding the Mediating Role of Eco-Anxiety in Promoting Pro-Environmental Behaviors Across Diverse Cultural Worldviews: a preliminary study

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ABSTRACT

*Background*: Eco-anxiety describes the emotional response to the impacts of climate change, with pro-environmental behaviors serving as an effective coping strategy. However, little is known about how individuals' environmental behaviour is shaped by cultural worldviews and which dimensions of eco-anxiety are most prevalent in this relationship. This preliminary study investigates the mediating role of eco-anxiety in promoting pro-environmental behaviors through the lens of Semiotic-Cultural Psychology Theory.
*Method*: A sample of 404 Italian adults completed a questionnaire made by the Hogg Eco-Anxiety Scale, self-reported pro-environmental behaviors, and the View of Context questionnaire. Data were analyzed using multiple regression models and interaction analyses with moderators, employing PROCESS for SPSS (v4.2) and SPAD (v5.5).
*Results*: Positive correlations emerged between all dimensions of eco-anxiety and pro-environmental behaviors. A combination of data analysis identified four distinct cultural worldviews and the eco-anxiety dimension “anxiety about personal impact” was a significant mediator across all worldviews, linking eco-anxiety to pro-environmental actions.
*Conclusions*: These findings emphasize the cultural embeddedness of eco-anxiety and its potential to foster sustainable behaviors.The results offer valuable insights for interventions promoting environmental engagement across diverse cultural contexts, such as personalised environmental campaigns, tailored emotional coping programmes, environmental policies that promote a sense of community

*Keywords*: Eco-Anxiety; Climate Change; Clinical Psychology; Pro-Environmental Behaviours; Cultural Worldviews

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## Introduction

The psychological effects of the direct, indirect and vicarious impacts of climate change events on populations are widely recognised as a global health emergency (Cianconi et al., 2023; Costello et al., 2009). These effects manifest themselves in very different ways, and one of the phenomena used to describe them has been summarised in the term eco-anxiety (Albrecht, 2011). Eco-anxiety is a word coined by the philosopher Glenn Albrecht to describe *"the generalized sense that the ecological foundations of existence are in the process of collapse"* (Albrecht, 2012). The American Psychological Association recognises eco-anxiety as a psychological construct and defines it as: *"the chronic fear of environmental doom"* (APA, 2017, p.29). At present eco-anxiety is not yet considered as a mental disorder and scientific research has focused on the analysing the dimensions of eco-anxiety dimensions such as: affective symptoms, rumination, behavioural symptoms and anxiety about personal impact (Hogg et al., 2021, 2023; Rocchi, Pileri, et al., 2023). The dimensions of eco-anxiety are intertwined with other psychological and emotional dimensions of a person's life, characterised by fear, anger and despair for themselves, future generations and the environment in which they live (Albrecht, 2011; Clayton et al., 2017).

Globally, the demographics that seem to be most affected by eco-anxiety are women, young people, indigenous populations and scientists or researchers who study the effects of climate change on the planet and promote environmental sustainability (Head & Harada, 2017; Hickman et al., 2021; Middleton et al., 2020; Stone et al., 2022). What seems to unite these affected groups is the ability to identify their feelings about climate and the recognition of activism as a coping strategy to strengthen their resilience and self-efficacy (Sanson et al., 2019; Schwartz et al., 2022). This shared goal among "eco-anxious" people leads researchers to see eco-anxiety as different from the construct of anxiety as we are used to know it. In fact, eco-anxiety may not be associated with negative psychological states (Passmore et al., 2022; Pritchard et al., 2020), but to be more like a practical anxiety (Panu, 2020) or a positive fear for the future of the planet (Cunsolo et al., 2020; Verplanken et al., 2020; Verplanken & Roy, 2013). Several studies show that eco-anxiety can lead people to take action through the adoption of pro-environmental behaviour, and attitudes and beliefs (Hogg et al., 2024; Liga et al., 2024; Tecuta et al., 2024). This aspect of eco-anxiety seems perfectly in line with psychological theories of how anxiety states can motivate people to take protective action in the face of personal and environmental threats (Pileri et al., 2024; Tannenbaum et al., 2015; van Zomeren et al., 2010). It is important to point out that for many researchers the relationship between eco-anxiety and pro-environmental behaviors may not be as linear, but they would consider it much

closer to an inverted U-shaped relationship (Wullenkord et al., 2021). This hypothesis is based on the theory that sees a positive correlation between arousal levels and an individual's performance (Yerkes & Dodson, 1908). Thus, only moderate levels of eco-anxiety would correspond to greater adoption of pro-environmental behaviour, while in the presence of low or high levels of eco-anxiety, lower levels of pro-environmental activism might occur (Wullenkord et al., 2021).

However, little is known about how individuals' pro-environmental behaviour may be shaped by their cultural worldviews and which dimensions of eco-anxiety are prevalent in this relationship. Eco-anxiety arises as a phenomenon that is not only clinical, but also embedded in the general dynamics of the interaction between the individual and society, which in recent decades has been increasingly characterised by accelerating technological progress, economic recession, pandemic crises and general uncertainty about the future (Barchielli et al., 2022).

In order to fully comprehend eco-anxiety and its manifestations, it is not sufficient to analyse only the clinical aspects, but also the cultural component, a superordinate factor that seems to be decisive in the manifestation of symptoms related to eco-anxiety. This focus proves to be very important in order to look at the different dimensions of eco-anxiety from a perspective that considers them also as response patterns defined by specific cultural conditions. In order to understand the role that interpretations of cultural context play on the emotional and behavioural dimensions of eco-anxiety, I decided to adopt the perspective of Semiotic Cultural Psychology Theory (SCPT;Cremaschi et al., 2021; Valsiner, 2014) In fact SCPT allows to consider the affective dimension of eco-anxiety on a clinical perspective but also permits not only to estimate its distribution in the population as well as its salience (i.e. its ability to influence beliefs and behaviour) so it appears a comprehensive theory to investigate a multifaceted phenomenon as eco-anxiety. Semiotic Cultural Psychology Theory (Cremaschi et al., 2021) posits that individual cognition is mediated by semiotic resources (e.g., beliefs, values, worldviews) based on embodied meaning schemas embedded in the cultural milieu of the social group (Cole, 1996)). Such semiotic resources are in turn shaped by hyper-generalised, a-semantic and affect-laden meanings, which are reduced to symbolic universes or cultural worlviews (Salvatore et al., 2018). A symbolic universe is not about a specific object, but provides a global representation of experience. SCPT has already been used in psychology for the analysis of psycho-social phenomena such as: the study of population attitudes towards renewable energy installations (Rocchi, Reho, et al., 2023) voting behaviour (Andreassi et al., 2023), vaccination campaign adherence (Cordella et al., 2023) and immigration (Kosic et al., 2023).

The aim of this preliminary study was to adopt the perspective of Semiotic-Cultural

Psychology Theory to analyse whether the adoption of pro-environmental behaviours (PEBs) could be influenced by the cultural worldviews with which individuals make sense of the impact of the climate crisis, through the effect of the four dimensions of eco-anxiety as mediators.

## Material and Method

The study has received approval from the Ethics Committee of the Department of Dynamic, Clinical and Health Psychology at Sapienza University of Rome (protocol No.XXX). The present study complies with the Declaration of Helsinki of the World Medical Association (1964). Participants in this research expressed their willingness to participate by signing the informed consent and received no compensation for their participation.

### Participants

Participants were recruited through an online survey on Psytoolkit.org (Stoet, 2017). The final sample included 404 Italian adults (80.7% female, 18.1% male, 1.2% rather not answered) whose ages ranged from 18 to 73 years (M = 31.50; SD = 10.34). 69.1% of the participants resided in northern Italy, 19.3% in the center, and 11.6% in southern Italy or the islands.

### Instruments

#### *The Hogg Eco Anxiety Scale (HEAS)*

The Hogg Eco Anxiety Scale (Hogg et al., 2021, 2023) is a self-report questionnaire made of 13 items that considers the frequency of four dimensions of eco-anxiety: Affective symptoms, Rumination, Behavioural symptoms, and Anxiety about a person's negative impact on the planet in the past two weeks. The Italian version of HEAS has been validated (Rocchi, Pileri, et al., 2023) and showed good Cronbach's alpha and McDonald's omega coefficients for each subscale (Affective Symptoms: $\alpha = 0.859$. $\omega = 0.860$; Rumination: $\alpha = 0.836$. $\omega = 0.840$; Behavioural Symptoms: $\alpha = 0.781$. $\omega = 0.785$; Anxiety about personal impact: $\alpha = 0.845$. $\omega = 0.851$).

#### *Self-reported pro-environmental behaviors (PEBs)*

Pro-environmental behaviours were assessed using a self-report scale that asked participants to indicate how often they had engaged in specific private environmental behaviours in the past year. The 10 selected items were adapted from (Schultz et al., 2000). ($\alpha$

= 0.76).

### *View of Context (VOC)*

The short version of the VOC questionnaire (Ciavolino et al., 2017) was used. The questionnaire is made of 29 items and is designed to identify symbolic universes that are active within the sample, based on how people represent the meaningful and affective aspects of their life contexts (Kerusauskaite et al., 2023). The VOC has been shown to have satisfactory construct validity and internal consistency ($\alpha = .70$).

## Data Analysis

Pearson's correlations have been interpreted, according to Cohen's criterion (Cohen, 2013), as "large"(>0.50), "medium"(from 0.30 to 0.49), or "small" (from 0.10 to 0.29). For the determination of the active symbolic universes in the sample, the responses to the VOC were subjected to a combination of Multiple Correspondence Analysis (MCA) and Cluster Analysis (CA) (Salvatore et al., 2019). Data were analysed using SPAD v5.5 software. The additional data collected were analysed using the multiple regression model, with the addition of analyses of the interactions between the independent variables and the moderators. PROCESS Procedure for SPSS version 4.2 was used to carry out these analyses.

## Results

### *Pearson's correlations between HEAS and PEBs*

Pearson's correlations between the HEAS subscales and PEBs were computed to assess the relationship between eco-anxiety and sustainable behavior. As shown in Table 1, all dimensions of eco-anxiety were positively correlated with pro-environmental behaviors. Specifically, the correlation between "Anxiety about Personal Impact" and PEBs was moderate ($r = 0.340$, $p < .01$). Similarly, "Affective Symptoms" ($r = 0.311$, $p < .01$), "Rumination" ($r = 0.318$, $p < .01$), and "Behavioral Symptoms" ($r = 0.249$, $p < .01$) showed medium, positive correlations with pro-environmental behaviors. This means that all the manifestations of eco-anxiety play a role in fostering pro-environmental behaviours, especially the ones related to the emotional sphere.

**Table 1**. Pearson's correlations between HEAS subscales and PEBs.

| | Hogg Eco-Anxiety Scale | | | |
|---|---|---|---|---|
| | **Affective Symptoms** | **Rumination** | **Behavioral Symptoms** | **Anxiety about personal impact** |
| **Pro-environmental Behaviours** | 0.311** | 0.318** | 0.249** | 0.340** |

**Note.** *p < .05. **p < .01. ***p < .001.

### *Symbolic Universes or cultural worldviews*

The MCA extracted 6 main factors, which explain 96.07% of the total inertia. The factors were used as classificatory criteria in the subsequent CA, which identified the following four clusters representing four different symbolic universes:

**Cluster 1**: Disheartened Affiliates (23.0%). The profile is characterised by moderate fatalism, familism, distrust of people, pessimism, conformism, passivity, amorality, adherence to power. For the people in this cluster community is not understood as a place of meaningful experiences of bonding and reciprocity; rather, it is a system to which one must adhere, even at the cost of sacrificing moral bonds, in order to gain protection from a threatening outside world, to somehow maintain some form of control over one's life, and to avoid being harmed.

**Cluster 2**: Confident Engaged (40.3%). These people reject fatalism and show moderate trust in people and institutions. People in this cluster see interpersonal relationships and feelings of love and friendship as what gives meaning to people's lives. Indeed, relationships provide stability and protection, and shared values enable collective needs to be met. A consistent confidence in one's own ability to act and pursue projects goes hand in hand with a moderate confidence in institutions, people, the present and the future, and this allows for collective action aimed at improving community life.

**Cluster 3**: Idealising optimists (31.2%). This segment of respondents is characterised by an extreme rejection of fatalism, high trust in people, institutions and the future, and a high capacity for action. People belonging to this cluster have solidarity and the desire to make their lives meaningful as core values. The central theme of this cluster is acting ethically and actively participating in community life to make it better for all its members.

**Cluster 4**: Reactive anomics (5.4%). These respondents express extreme distrust of institutions - but trust in people - and extreme fatalism. For those in this cluster, any project or effort is seen as pointless. Since no change is possible, values, interpersonal relationships and a sense of community are seen as irrelevant. Institutions are also completely unreliable and

impervious to people's needs and demands, so it is not worth pursuing causes or adopting certain behaviours, what one has to do is give up.

### *Means and standard deviations for the HEAS subscales in different symbolic universes*

Table 2 shows the means, standard deviations for each HEAS subscale among different symbolic universes. Cluster 1 and Cluster 4 showed higher means than Cluster 2 and Cluster 3 in every subscale "Affective Symptoms'' (M = 5.81, vs. M =7.50, vs M = 4,25 vs M = 3,75); "Rumination" (M = 4.04, vs. M = 4.95, vs M = 3.04, vs M = 2.46 ); "Behavioural Symptoms" (M = 1.97, vs. M = 2.36, vs M = 1.09, vs M = 1.10), and "Anxiety about personal impact" (M = 5.22, vs. M = 6.50, vs M = 4.19, vs M = 4.01). This finding confirms that groups with a more pessimistic worldview tend to manifest more of the emotional dimensions of eco-anxiety

**Table 2.** Means and standard deviations for the HEAS subscales in different symbolic universes

| | **Disheartened Affiliates** | | **Confident Engaged** | | **Idealizing Optimists** | | **Reactive Anomics** | |
|---|---|---|---|---|---|---|---|---|
| | **M** | **SD** | **M** | **SD** | **M** | **SD** | **M** | **SD** |
| **Affective Symptoms** | 5.81 | 3.43 | 4.25 | 3.40 | 3.75 | 3.24 | 7.50 | 3.46 |
| **Rumination** | 4.04 | 2.88 | 3.04 | 2.77 | 2.46 | 2.41 | 4.95 | 2.69 |
| **Behavioral Symptoms** | 1.97 | 2.20 | 1.09 | 1.51 | 1.10 | 1.46 | 2.36 | 1.91 |
| **Anxiety about personal impact** | 5.22 | 2.83 | 4.19 | 2.79 | 4.01 | 2.94 | 6.59 | 2.28 |

### *Multiple comparisons of SUs and HEAS Subscales*

ANOVA was used to compare the differences between the SUs in relation to the HEAS subscales. The ANOVA showed a significant effect of all the HEAS subscales on the groups: "Affective Symptoms" ($F(3, 400) = 12.600$, $p < 0.001$); "Rumination" ($F(3, 400) = 9,544$, $p < 0,001$); "Behavioural Symptoms" ($F(3, 400) = 8,906$, $p < 0,001$); "Anxiety about personal impact" ($F(3, 400) = 7.929$, $p < 0.001$). The ANOVA results confirmed that there are differences in how people from different symbolic universes can manifest different levels of the four dimensions of eco-anxiety

### *Means and Standard Deviations for Pro-Environmental Behaviors (PEBS) across symbolic universes*

Means and standard deviations were computed to detect differences in the adoption of PEBs across symbolic universes. Reactive Anomics reports the highest mean for PEBS (M = 41.2, SD = 7.99), followed closely by the Idealizing Optimists group (M = 40.6, SD = 8.06). The Confident Engaged group shows a slightly lower mean (M = 39.4, SD = 6.85), while the Disheartened Affiliates group has the lowest mean for PEBS (M = 38.8, SD = 9.68). In line with the SCPT, the symbolic universes showed different means in terms of the adoption of pro-environmental behaviour, as the salience of eco-anxiety leads to different behavioural manifestations in the groups.

### *Indirect Effects of HEAS subscales on Pro-Environmental Behaviors (PEBS) Across symbolic universes*

The indirect effects of HEAS subscales on pro-environmental behaviors (PEBS) across symbolic universes were tested. Table 3 shows how the HEAS subscale "Anxiety about personal impact" was significant across all clusters. For Disheartened Affiliates, the indirect effect was significant with a path coefficient of 0.176, t = 3.28, p < .001, and a 95% confidence interval ranging from 0.235 to 0.927. Similarly, Idealizing Optimists exhibited a significant indirect effect (0.178, t = 3.153, p < .001), with a confidence interval between 0.211 and 0.912. Confident Engaged individuals showed a comparable significant effect (0.181, t = 3.22, p < .001), with the confidence interval ranging from 0.2281 to 0.940. Finally, Reactive Anomics demonstrated the highest significant indirect effect (0.181, t = 3.24, p < .001), with a confidence interval between 0.231 and 0.943.

**Table 3.** Indirect Effects of HEAS Subscale "Anxiety about personal impact" (HEASAnxiety) on Pro-Environmental Behaviors (PEBS) across symbolic universes.

| Variable /Effect | SE | t | p | LLCI | ULCI |
|---|---|---|---|---|---|
| **Dishearted Affiliates -> HEASAnxiety -> PEBS** | .176 | 3.28 | .001*** | .235 | .927 |
| **Idealizing Optimists -> HEASAnxiety -> PEBS** | .178 | 3.153 | .001*** | .211 | .912 |
| **Confident Engaged-> HEASAnxiety -> PEBS** | .181 | 3.22 | .001*** | .2281 | .940 |
| **Reactive Anomics -> HEASAnxiety - > PEBS** | .181 | 3.24 | .001*** | .231 | .943 |

**Note**. *p < .05. **p < .01. ***p < .001.

## Discussion

This preliminary study aimed to enrich the scientific research on the relationship between eco-anxiety and the adoption of pro-environmental behaviours using the perspective of Semiotic-Cultural Psychology Theory. The significant positive correlations between the four dimensions of eco-anxiety and self-reported pro-environmental behaviour are consistent with findings that the combination of the emotional component of eco-anxiety, climate concern and behavioural symptoms may lead people to support climate change policies and promote engagement in climate and environmental action (Hogg et al., 2024; Ogunbode et al., 2022; Schwartz et al., 2022). As previously discussed by Rocchi (Rocchi, Pileri, et al., 2023), the presence of behavioural symptoms related to eco-anxiety does not necessarily increase anxiety about the impact of one's own behaviour. Although these two dimensions are related to aspects of people's anxiety, these two dimensions are likely to be related to one's individual functioning (behavioural symptoms) and one's functioning as a social actor (anxiety about personal impact). This is consistent with the Yerkes-Dodson theory (Yerkes & Dodson, 1908) and the approach of viewing eco-anxiety as a continuum from higher levels of anxiety with the potential to affect the individual's mental health (insomnia, self-destructive behaviour, difficulties functioning) to milder symptoms (restlessness, recurrent thoughts) that are more or less stable over time that can have a different role in promoting the adoption of sustainable behaviours (Clayton et al., 2023; Ogunbode et al., 2022).

### *Cultural Worldviews, Eco-Anxiety, and Tailored Interventions for Sustainable Behaviors*

The MCA was able to extract four clusters representing four different cultural worldviews. Multiple comparisons of symbolic universes and the dimensions of eco-anxiety revealed significant differences between the groups. In particular Disheartened Affiliates and Reactive showed higher means on each subscale of the HEAS. This is in line with their characteristics and with previous studies that have confirmed tendency of people in these symbolic universes towards pessimism and catastrophism and for their low trust in institutions, people and in general towards processes of social and cultural change (Andreassi et al., 2023; Cordella et al., 2023; Kosic et al., 2023), while Idealising Optimists and Confident Engaged may cope better with eco-anxiety due to their idealised representation of the world, which envisages a harmonious coexistence between humans and the environment who are part of a large community sustained by interpersonal bonds and cooperation (Rocchi, Reho, et al., 2023). Although the means and standard deviations for (PEBS) across symbolic universes didn't show large differences, all the indirect effects of the 'anxiety about personal impact' subscale on pro-

environmental behaviour was statistically significant, with p-values less than .001, supporting the hypothesis that eco-anxiety plays a role in promoting pro-environmental behaviour across different symbolic universes. This reasoning can be assimilated to the studies on how negative emotions and personality traits might influence the manifestation of eco-anxiety and the adoption of sustainable behaviours (Hirsh, 2010, 2014). In particular, in a recent study across six European countries, Ogunbode has found that neuroticism positively predicts concern about climate change and that interventions that promote the processing of negative emotions about climate change through action can help people limit their psychological distress (Ogunbode et al., 2024). Our findings suggest that individuals with different cultural representations may respond differently to PEBs as a result of their eco-anxiety. Understanding this relationship is crucial for developing effective interventions to promote environmental policies and awareness campaigns that take into account these cultural differences and their impact on eco-anxiety and sustainable behaviour. Examples of environmental interventions tailored to cultural worldviews could include: educational campaigns that address eco-fear as a motivational factor, integrating it into school curricula, and public awareness programmes that have been shown to be effective with children and adolescents around the world (Jackson et al., 2024; Ojala, 2021) . Policy-makers can use the dimension of 'fear of personal impact' to design emotionally engaging initiatives and communication campaigns that promote individual responsibility and collective action (Schmidt et al., 2013; Wang et al., 2023). Mental health services should provide eco-psychological support to transform distress into proactive behaviour, especially for highly anxious groups. Businesses and urban planners can use these insights to develop personalised communication strategies, sustainable products and community-centred spaces that promote pro-environmental engagement in diverse cultural contexts (Ogunbode et al., 2021).

## Conclusion

The aim of this study was to explore the psychological and psychocultural factors influencing pro-environmental behaviour, with a particular focus on the mediating role of eco-anxiety dimensions across cultural worldviews. The SCPT is a framework that has already been used in the analysis of various social phenomena and also in studies in different countries, but in future research on the topic presented in this study, it could be very interesting to repeat the revelation by enlarging the sample and introducing qualitative methods that could broaden the understanding of the emotional and behavioural experience derived from eco-anxiety and how this can vary according to many factors such as gender, age, cultural affiliation, value system,

beliefs and attitudes. Although the study contributes to the existing literature, it is not without limitations. The small sample size, combined with the use of snowball sampling and online administration of self-report questionnaires, limits the generalisability of the findings to the broader Italian population. These methodological choices may have introduced selection bias and reduced the representativeness of the results.

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**Data sharing**

Data are available from the corresponding author upon request.

**Conflict of interest**

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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