




Psychological dimensions associated with youth engagement in climate change issues: a person-centered approach

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Abstract

Climate change is one of the greatest global threats that has ecological, economic, social, and psychological consequences. Nowadays, young people are the target of political agenda since they represent potential future policymakers. Consequently, it is crucial to identify the psychological features that contribute to engagement of young people in climate change issue. This study aimed at identifying and describing different configurations of youth perceiving and experiencing climate change. A sample of 224 participants (61% females; $M_{age}=21.04$, $SD=1.65$) were involved in study. From a cluster analysis emerged three distinct profiles, Eco-Disengaged, Eco-Engaged/Oriented and Eco-Engaged/Disoriented, which differ in levels of climate change awareness, worry and anxiety. Findings suggest that institutions might develop green education programs based on young people's individual differences.

Keywords Climate change awareness · Climate change anxiety · Pro-environmental behaviors · Green self-efficacy · Locus of control · Youth

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Introduction

Climate change, caused by anthropogenic activities, impacts ecosystems (Findlay & Turley, 2021; Habibullah et al., 2022) and is acknowledged as the greatest threat to global health in the twenty-first century (Costello et al., 2009). While several studies have warned that the psychosocial consequences of climate change are impactful across populations (Abbass et al., 2022; Cianconi et al., 2023; Hickman et al., 2021), a line of research has stressed the importance of young individuals in this context, as they represent potential future policymakers. This underscores the importance of shedding light on the diverse factors that may influence how younger generations engage with this complex issue (Ojala, 2023; Periera & Freire, 2021).

Climate change, youth and pro-environmental actions

Young people are more likely to attend universities or nonprofit organizations that offer opportunities to acquire knowledge and participate in environmental discussions

(Vicente-Molina et al., 2018; Wallis & Loy, 2021). Research also shows that young people exhibit a strong concern for global issues, such as climate change, often surpassing that of older generations (Corner et al., 2015; Ojala & Bengtsson, 2019). Numerous studies have revealed that climate change heightens vulnerability among young individuals, affecting various aspects of their lives (Ojala, 2015).

The concept of pro-environmental behaviors (PEBs) effectively synthesizes the array of purposeful actions taken by individuals to reduce humanity's impact on the natural environment (Li et al., 2019). While PEBs are identified as the most important dimension to curb the impact of human activities on the environment (Genovese et al., 2023; Maki et al., 2019), psychology has also identified other personal characteristics that may help preserve natural resources and offset climate change.

In this regard, the concept of green self-efficacy parsimoniously encompasses that set of beliefs concerning how well individuals think they are able to engage in environmentally friendly behaviors (Chen et al., 2015). Prior studies showed the role of green self-efficacy as a catalyst for environmental-friendly actions, showing how individuals high in this kind of beliefs were more likely to undertake PEBs and exhibit environmental knowledge (Heath & Gifford, 2006; Kellstedt et al., 2008). In addition, well-developed green self-efficacy may foster the transition from simple and easily achievable PEBs to more challenging ones (Lauren et al., 2016). One of the core features of green self-efficacy is that it implies a sense of personal agency or control over one's actions and their impact on the environment (Cleveland & Kalamas, 2015; Rotter, 1954).

Similarly, the concept of locus of control reflects a belief in one's influence on contextual conditions. Specifically, according to Rotter's conceptualization (1954), locus of control involves individuals' assessment of event causation factors. In the context of sustainable actions, it pertains to the belief in personal control over environmental degradation, as discussed by Cleveland and Kalamas (2015). This factor influences PEBs and the utilization of climate change information (Chiang et al., 2019; Fraser et al., 2023). This brief overview suggests how it is possible to observe large individuals' differences that may manifest in different levels of sustainable attitudes and behaviors.

Approaching environmental psychology via a person-centered approach

Evidence suggests that thoughts and attitudes related to climate change and the natural environment can vary among individuals (Gifford & Nilsson, 2014; Li et al., 2019). Following this reasoning, van der Linden (2015) aimed to provide a systematic synthesis of factors influencing climate

change risk perception and concluded that negative affectivity toward climate change was the single largest predictor of all examined factors. In this regard, the concept of climate change anxiety (Lutz et al., 2023) has proven effective in encapsulating a set of negative emotional states characterized by feelings of stress, doom, or despair related to the current and future state of the environment (Passmore et al., 2023). More specifically, it tends to describe a relatively strong form of distress (Clayton & Karazsia, 2020; Pihkala, 2020; Verplanken et al., 2020) that also involves maladaptive self-beliefs, ultimately causing somatic symptoms, such as increased heart rate and sweating (Stewart, 2021).

One of the main features of climate change anxiety is apprehension for the ecological crisis, which may provide a useful arena for understanding how it could be linked to other psychological dimensions encompassing unpleasant states in response to the degradation of the Earth's climate, such as the concept of worry towards the environment (Lutz et al., 2023; Stewart, 2021). Indeed, the concept of worry towards the environment refers to fearful thoughts about the changing climate (Stewart, 2021) that do not necessarily interfere with individuals' functioning but may potentially prepare for future eco-related threats (Doherty & Clayton, 2011; Pihkala, 2020; Verplanken & Roy, 2013). Hence, while climate change anxiety and worry towards the environment share a common core of apprehension towards the environment (Lutz et al., 2023), climate change anxiety mainly refers to a state in which individuals are not able to transform their anxious feelings into action (Albrecht, 2011), while worry towards the environment is considered to be less severe (Helm et al., 2018; McBride et al., 2021; van der Linden, 2017) and mainly represents a cognitive state that prepares individuals to handle ecological crises (Stewart, 2021).

Worry towards the environment and eco-anxiety mainly involve the affective functioning of individuals (Coffey et al., 2021; Stewart, 2021), so it is important to also explore dimensions that are more cognitive in nature to provide a more nuanced description of individuals' sustainable actions. In this regard, perceived psychological distance (geographic, temporal, social, and hypothetical) from climate change could be a worthwhile area of assessment, as several studies have analyzed how it may inhibit climate action (Shrum, 2021; Van Lange & Huckelba, 2021). However, there appears to be no consistent evidence that psychological distance hinders climate action (van Valkengoed et al., 2023), that is why awareness towards climate change should be also considered. It refers to how individuals process information concerning alterations in the Earth's climate and acknowledge the reality, causes, impacts, and potential solutions associated with climate change (Innocenti, 2022).

Abundant research showed a connection between awareness of climate change and environmentally friendly actions. When people understand the seriousness of climate change, they tend to participate more in activities aimed at curbing their carbon footprint and addressing the effects of climate change. Hence, it is not surprising that previous studies have highlighted how this condition may cluster with different attitudes and beliefs regarding climate change. For example, Crawley et al. (2020) sought to observe public opinion on climate change and reported that the two predominant groups hold firm convictions that climate change is happening, yet they perceive it as a matter of low importance or express skepticism about governmental efforts to tackle it. Similarly, Hyland et al. (2016) found four different profiles based on levels of motivation to undertake pro-environmental action, productivism, environmental responsibility, and worry, and highlighted how highly aware individuals are likely to undertake environmentally responsible actions to lower their impact on the natural environment. This overview highlights the concept of PEBs as complex phenomena encompassing a wide range of behavioral and cognitive patterns. Analyzing clusters of individuals according to their characteristic configurations may provide a nuanced description of potential targets for educational programs.

The present study

Prior research has emphasized how individuals may engage in PEBs as a strategy to manage negative thoughts, such as worry and anxious beliefs concerning climate change (Stanley et al., 2021; Verplanken et al., 2020). Given that climate change poses numerous challenges in everyday life, it is unsurprising that many people experience unpleasant states in response to these changes. In this regard, both worry about climate change and climate change anxiety share a common core of apprehension regarding the alteration of Earth's climate (Ojala et al., 2021). Since both green self-efficacy and locus of control vary significantly among individuals (Chen et al., 2015), it is reasonable to infer the existence of several classes of individuals. Similarly, different configurations of awareness regarding climate change are likely to direct resources toward pro-environmental actions rather than a state of eco-paralysis (Treen et al., 2020).

In line of these premises, the present study aims at: a) determining whether it was possible to detect different profiles of young people according to their levels of awareness toward climate change, distance perception of climate change, climate change worry, and climate change anxiety; and b) examining differences in youths' PEBs, locus of control, and green self-efficacy associated with cluster membership.

Materials and methods

Participants

The sample consisted of 224 participants, of whom 61% were female. The ages of participants ranged from 19 to 26, with a mean age of 21.04 ($SD = 1.65$). Regarding educational level, 87.9% reported having a diploma, 8.9% reported having a university degree, and 3.1% reported having middle school certification. Participants reported that their parental marital status was as follows: 76.8% were cohabitating or married, 18.8% were divorced, and 4% were widowed. Participants also reported that their parents mostly held high school diplomas (father: 42.4%, mother: 47.8%). All participants were Italian native speakers.

Measures

Awareness toward climate change

Awareness toward climate change was assessed using the Awareness toward Climate Change Scale developed by Innocenti (2022). This 13-item questionnaire (e.g., "The effects of climate change are already occurring right now") evaluates the extent to which individuals are aware of climate change using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The mean scale score was computed by summing all the item scores and dividing by the number of items. In the current study, the internal consistency was good (Cronbach's $\alpha = 0.84$).

Pro-environmental behaviors

Pro-environment behaviors were assessed using the Pro-Environment Behaviors Scale developed by Barszcz et al. (2023). This 11-item questionnaire (e.g., "I save water when I wash myself") evaluates individuals' endorsement of sustainable behaviors using a 5-point Likert scale ranging from 0 (*never*) to 4 (*always*). The mean scale score was computed by summing all the item scores and dividing by the number of items. In the current study, the internal consistency was good (Cronbach's $\alpha = 0.75$).

Perceived distance from climate change

Perceived distance from climate change was assessed using the Perceived Distance from Climate Change Scale developed by Wang et al. (2019). It is an 18-item questionnaire (e.g., "Serious effects of climate change will mostly occur in areas far away from here") assessing to what extent individuals perceive themselves distant from the effects of climate change using a 5-point Likert scale ranging from 1 (*strongly*

disagree) to 5 (*strongly agree*). It consists of four different subscales: geographical distance (4 items), social distance (4 items), temporal distance (5 items), and hypothetical distance (5 items). A mean scale score was computed by summing all the item scores and dividing by the number of items. In the current study, the internal consistency was good (Cronbach's $\alpha = 0.87$).

Climate change anxiety

The Climate Change Anxiety Scale (Clayton & Karazsia, 2020; Italian adaptation by Innocenti et al., 2021) was used to assess individuals' levels of anxiety about climate change. This 13-item questionnaire (e.g., "My concerns about climate change interfere with my ability to get work or school assignments done") assesses the extent to which individuals experience anxiety in response to climate change using a 5-point Likert scale ranging from 1 (*never*) to 5 (*almost always*). A mean scale score was computed by summing all the item scores and dividing by the number of items. The internal consistency was good (Cronbach's $\alpha = 0.92$).

Climate change worry

The Climate Change Worry Scale (Stewart, 2021; Italian adaptation by Innocenti et al., 2023) was used to assess individuals' worries about climate change. It is a 10-item questionnaire (e.g., "I worry that I might not be able to cope with climate change") assessing to what extent individuals are worried about climate change using a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*). A mean scale score was computed by summing all the item scores and dividing by the number of items. The internal consistency was good (Cronbach's $\alpha = 0.87$).

Green self-efficacy

People's beliefs concerning their capabilities to undertake sustainable activities were assessed using the Green Self-Efficacy Scale by Chen et al. (2015). It is a 6-item questionnaire (e.g., "we feel competent to deal effectively with environmental tasks") assessing to what extent individuals perceive themselves as able to undertake pro-environmental behaviors using a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A mean scale score was computed by summing all the item scores and dividing by the number of items. In the present study, the internal consistency was good (Cronbach's $\alpha = 0.90$).

Locus of control

Participants' perceptions of their locus of control in relation to the environment were assessed using the statement derived by Fielding and Head (2012) and Chiang et al. (2019). The 3 items were "I am only one person, I can't make a difference to the environment", "I do not have time to protect the environment", "I am more concerned with saving money than protecting the environment". They were used to investigate individuals' beliefs about their ability to influence the environment using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A mean scale score was computed by summing all the item scores and dividing by the number of items. Higher scores represent a higher tendency to adopt an external locus of control. In the present study, the internal consistency was good (Cronbach's $\alpha = .60$).

Procedure

The protocol was implemented using an online survey, and participants were recruited by soliciting students and research assistants to distribute the survey among their friends and acquaintances, thus creating a snowball sample. All data were collected in a single session, and each question in the survey was set as mandatory. Prior to completing the questionnaires, individuals were informed of the general purpose of the study and provided signed consent. Data collection was conducted anonymously, and all participants agreed to take part in the study voluntarily, without receiving any form of compensation or monetary grant. The present study received approval from the Ethics Committee for Scientific Research of the University of Messina and was conducted in accordance with the ethical standards outlined in the 1964 Declaration of Helsinki.

Plan of data analysis

The data analysis proceeded through several steps. First, descriptive statistics and correlation analysis were conducted for all study variables. Second, to investigate gender differences in awareness toward climate change, distance perception of climate change, climate change worry, and climate change anxiety, a multivariate analysis of variance (MANOVA) was conducted. Third, a hierarchical cluster analysis was performed to identify distinct profiles of young adults based on their awareness toward climate change, distance perception of climate change, climate change worry, and climate change anxiety. Finally, to assess gender and cluster differences in pro-environmental behaviors, green

Table 1 Mean (M), Standard Deviation (SD), Skewness (S), Kurtosis (K), Minimum and Maximum values of study variables ($n=224$)

	<i>M</i>	<i>SD</i>	<i>S</i>	<i>K</i>	Range		Observed range	
					Minimum	Maximum	Minimum	Maximum
Awareness toward Climate Change	4.28	0.45	-0.56	0.13	1	5	2.69	5.00
Distance Perception of Climate Change	2.05	0.56	0.47	-0.44	1	5	1.11	3.67
Climate Change Worry	2.94	0.75	-0.06	-0.43	1	5	1.00	4.70
Climate Change Anxiety	1.49	0.62	1.90	3.64	1	5	1.00	4.08
Pro-Environmental Behaviors	2.89	0.57	-0.59	1.06	0	4	0.36	4.00
Locus of Control	2.35	0.85	0.44	0.20	1	5	1.00	5.00
Green Self-Efficacy	3.71	1.21	0.02	-0.11	1	7	1.00	7.00

self-efficacy, and locus of control, a series ANOVAs were conducted.

Results

Preliminary analyses

Table 1 presents mean, standard deviation, skewness, and kurtosis of all study variables. All the variables showed acceptable skewness and kurtosis values, except for climate change anxiety.

Pearson correlation coefficients of study variables are reported in Table 2. All the variables related to climate change showed a moderate association with each other except for climate change anxiety, which was not correlated with the distance perception of climate change. In addition, they showed an association between PEBs, locus of control, and green self-efficacy with the exception of the association between climate change anxiety and locus of control. No study variables was significantly correlated with the age of participants.

To evaluate gender differences in awareness toward climate change, distance perception of climate change, climate change worry, and climate change anxiety, a MANOVA was performed. Results showed significant gender differences, Wilks' $\lambda=0.93$, $F(4, 219)=4.12$, $p=0.003$, $\eta^2=0.07$ (see Table 3). Univariate tests showed that women reported slightly higher levels of awareness toward climate and climate change worry, and lower levels of distance perception of climate change than men.

Hierarchical cluster analysis

To determine whether it was possible to distinguish several profiles of young adults based on their levels of awareness toward climate change, distance perception of climate change, climate change worry, and climate change anxiety, a hierarchical cluster analysis was performed. In the cluster analysis, standardized scores were employed to control for gender differences in the scales. We determined configurations through Ward's (1963) clustering algorithm. The similarity between young adults' eco profiles was measured by squared Euclidean differences. The number of configurations to retain was decided by examining a scree plot of distance coefficients as a function of the number of configurations at each agglomerative step (Aldenderfer & Blashfield, 1984). Three configurations were retained because the scree plot indicated that the presence of additional configurations (more than three) did not reduce distance coefficients more than a minimal amount. Table 4 gives the number and percentage of young adults in each configuration, along with mean, standard deviations, and semantic labels for the configurations. A cutoff of $|\geq 0.30|$ was used to distinguish above and below average mean scores for descriptive purposes. The configurations were labeled as follows:

- Eco-Disengaged ($n=118$; 53%): Mean scores below average on awareness toward climate change, climate change worry, and climate change anxiety. Mean scores above average on distance perception of climate change.
- Eco-Engaged/Oriented ($n=56$; 25%): Mean scores below average on distance perception of climate change,

Table 2 Pearson correlation coefficients of study variables ($n=224$)

	1	2	3	4	5	6	7
1 Awareness toward Climate Change							
2 Distance Perception of Climate Change	-.50**						
3 Climate Change Worry	.44**	-.37**					
4 Climate Change Anxiety	.14*	.00	.55**				
5 Pro-Environmental Behaviors	.31**	-.24**	.47**	.28**			
6 Locus of Control	-.18**	.36**	-.35**	-.04	-.35**		
7 Green Self-Efficacy	.21**	-.22**	.38**	.31**	.45**	-.36**	
8 Age	-.09	.13	-.02	-.04	.09	-.05	.01

* $p<.05$. ** $p<.01$. *** $p<.001$

Table 3 Means and standard deviations of awareness toward climate change, distance perception of climate change, climate change worry, and climate change anxiety for men ($n=88$) and women ($n=136$), and F tests

	Men		Women		$F(1, 222)$	η^2
	M	SD	M	SD		
Awareness toward Climate Change	4.17	0.48	4.35	0.42	9.01**	.04
Distance Perception of Climate Change	2.19	0.59	1.96	0.52	9.41**	.04
Climate Change Worry	2.73	0.64	3.07	0.79	11.51***	.05
Climate Change Anxiety	1.42	0.63	1.53	0.60	1.69	.01

** $p < .01$. *** $p < .001$

average score on climate change anxiety. Mean scores above average on awareness toward climate change and climate change worry.

- Eco-Engaged/Disoriented ($n=50$; 22%): Mean scores above average on climate change worry and climate change anxiety. Average scores on awareness toward climate change and distance perception of climate change.

To assess the existence of an association between cluster membership and gender, a 3 (cluster) \times 2 (gender) chi-square analysis was performed. Results showed a significant and strong association: $\chi^2(2) = 14.07$, $p < 0.001$, Cramer's $V = 0.25$ (see Fig. 1). To follow up on this result, we examined standardized residuals for each cell. A standardized residual greater than $\geq |2|$ indicates that there were significantly more (or fewer) participants in a profile than would be expected if each profile were equally composed across gender. Results showed a high rate of men in the cluster Eco-Disengaged.

To examine age differences between clusters, an ANOVA was performed. Results showed significant small age differences among profiles: $F(2, 221) = 4.13$, $p = 0.017$, $\eta^2 = 0.04$. Scheffè post hoc tests revealed that young adults classified as *Eco-Disengaged* ($M = 21.27$, $SD = 1.67$) were significantly older than young adults classified as *Eco-Engaged/Oriented* ($M = 20.52$, $SD = 1.52$).

Cluster and gender differences in pro-environmental behaviors, locus of control, and green self-efficacy

To examine differences in young adults' pro-environmental behaviors, locus of control, and green self-efficacy associated with cluster membership, a series of 2 (gender) \times 3 (cluster) ANOVAs was performed (see Table 5).

With regard to pro-environmental behaviors, results showed significant effects of cluster membership, while gender and interaction effects were not significant. Scheffè post hoc tests showed that young adults classified as Eco-Disengaged reported significantly lower levels of pro-environmental behaviors than young adults classified in the other two clusters.

Regarding green self-efficacy, results showed significant effects of cluster membership and gender, while the interaction effect was not significant. Scheffè post hoc tests found that young adults classified as Eco-Disengaged reported significantly lower levels than participants classified as Eco-Engaged Oriented, and men reported higher levels than women.

For locus of control, results showed significant effects of cluster membership, while gender and interaction effects were not significant. Scheffè post hoc tests found that young adults classified as Eco-Disengaged reported significantly higher levels than participants classified as Eco-Engaged Oriented.

Table 4 Means and standard deviations of standardized scores of awareness toward climate change, distance perception of climate change, climate change worry, and climate change anxiety by clusters ($n=224$)

	Eco-Disengaged		Eco-Engaged/Oriented		Eco-Engaged/Disoriented	
	M	SD	M	SD	M	SD
Awareness toward Climate Change	-0.42	0.89	0.93	0.46	-0.06	1.00
Distance Perception of Climate Change	0.40	0.92	-0.88	0.52	0.05	0.98
Climate Change Worry	-0.70	0.71	0.71	0.58	0.85	0.71
Climate Change Anxiety	-0.54	0.29	-0.16	0.48	1.45	1.11
n	118		56		50	
%	53		25		22	

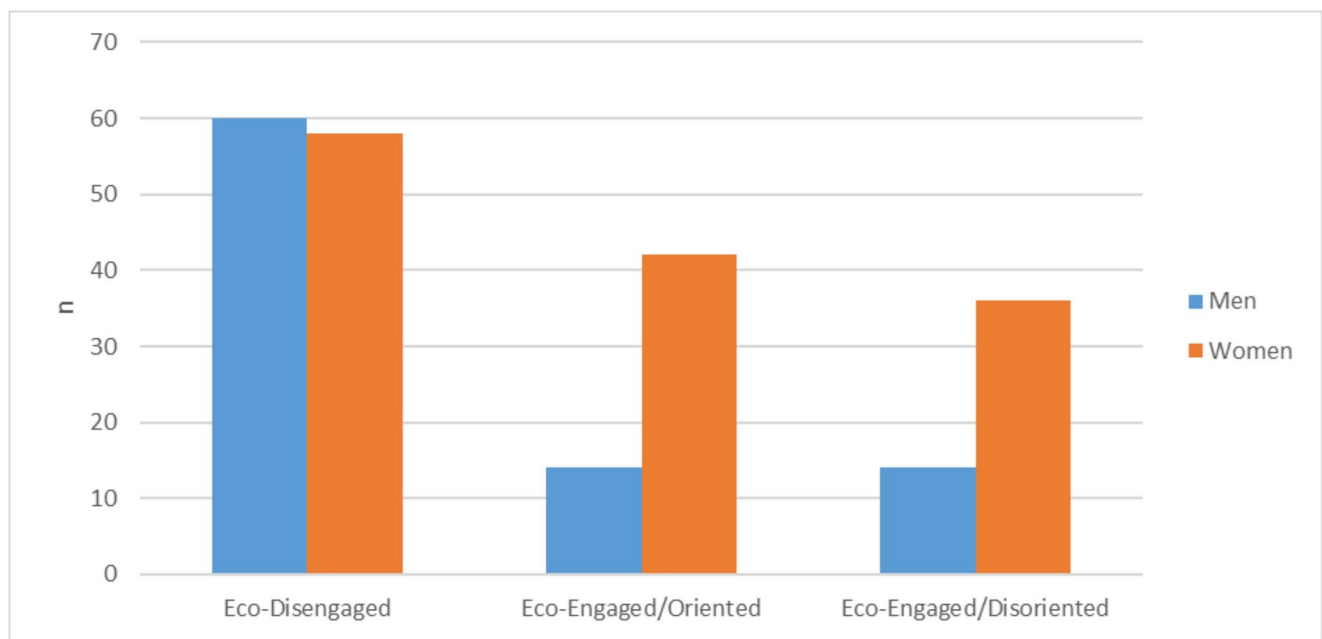


Fig. 1 Gender composition of the three clusters

Discussion

This study used a person-centered approach to identify and describe different configurations of youth experiencing climate change. The results showed three main configurations: Eco-Disengaged, Eco-Engaged/Oriented, and Eco-Engaged/Disoriented.

Eco-Disengaged individuals are predominantly unaware of climate change and, for this reason, are likely to experience low climate change worry and anxiety. People in this configuration also do not engage in pro-environmental behaviors and have low levels of green self-efficacy with an external locus of control. They probably do not believe climate action to be necessary (given their levels of worry and anxiety) and view climate change as something that cannot be mitigated by human actions. Finally, consistent with other studies, Eco-Disengaged individuals appear to be older than Eco-Engaged individuals and are prevalently male (Poortinga et al., 2019).

At the opposite pole, we found two configurations of the Eco-Engaged who, in general, are mostly climate change aware, worried, anxious (mostly women), and adopt

pro-environmental behaviors. However, the two configurations of the Eco-Engaged have some differences between them, so they have been distinguished into Oriented and Disoriented. Differences are present in the levels of perceived distance, awareness, and climate change anxiety.

The Eco-Engaged/Oriented are very aware of climate change (with low levels of perceived distance), have high levels of worry, and average levels of climate anxiety. In comparison, the Eco-Engaged/Disoriented are moderately aware of climate change (average levels of awareness and perceived distance of climate change) but have high levels of worry and anxiety. Differences between these configurations relate to climate change awareness and levels of climate worry and anxiety. The Oriented are likely to be better able to manage personal resources and climate information by enacting pro-environmental behaviors, which may help them manage climate change-related worry and anxiety (Innocenti et al., 2023; Stanley et al., 2021; Verplanken et al., 2020). The Disoriented, who also enact pro-environmental behaviors like the Oriented, are likely to have difficulty navigating climate change resources and information (they know climate change is happening, but it may still be something that will impact their lives hypothetically or

Table 5 Means and standard deviations of pro-environmental behaviors, green self-efficacy, and locus of control by clusters (n = 224)

	Eco-Disengaged		Eco-Engaged/Oriented		Eco-Engaged/Disoriented		F (2, 218)	η ²
	M	SD	M	SD	M	SD		
Pro-Environmental Behaviors	2.69 ^a	0.50	3.12 ^b	0.47	3.10 ^b	0.65	16.36***	.13
Green Self-Efficacy	3.32 ^a	1.20	4.02 ^b	1.15	4.25 ^b	0.99	17.42***	.14
Locus of Control	2.56 ^a	0.87	1.98 ^b	0.68	2.28 ^{ab}	0.82	8.36***	.07

In rows, means with different superscripts differ at the p = .05 level by Scheffé post-hoc test

*** p < .001

in distant times/locations) and experience high levels of climate-related worry and anxiety. However, it should be highlighted that there is no consistent information in the literature regarding the relationship between individuals' information about climate change and climate anxiety. Individuals with lower information on climate may still experience high levels of worry and anxiety (Asgarizadeh et al., 2023).

The results of our study show that worried and anxious individuals act pro-environmentally; in fact, these behaviors are often helpful in mitigating climate anxiety and worry (Innocenti et al., 2023; Stanley et al., 2021; Verplanken et al., 2020). However, those who are concerned and anxious about climate are not always very aware of climate change and its consequences. We might hypothesize that the average levels of awareness presented by some individuals may be related to some modes of climate change communication that lead to emotional responses (Liga et al., 2024; Ojala et al., 2021) in relation to the language used (technical-scientific language) or the way the news is shared in a doomsday manner (Stoknes, 2014). Many individuals exhibit pro-environmental behaviors (which could also be emitted in relation to external factors related to the living context), but they do not perceive themselves as aware of climate change and its consequences due to the difficulty in processing the information provided by the media, or they may be implementing avoidance strategies (Pavani et al., 2023). This might suggest that individuals worried and anxious about climate change may need support in information management (Baudon & Jachens, 2021; Heeren et al., 2023), as well as necessary attention to the ways in which the media share information about climate change (Shao & Yu, 2023).

Conclusions

It should be noted that this study had a number of notable drawbacks that should be addressed in the future. First of all, it is a cross-sectional study, and therefore, it was not possible to generate conclusions about the direction of effects. Moreover, it relied solely on self-report instruments, which may foster measurement bias. Future studies may consider using a multi-source approach to decrease the risk of measurement distortions. Additionally, the current study relied on a convenience sample, which requires caution when generalizing the results. Despite these shortcomings, the results provide relevant insights on a practical and theoretical level. Firstly, these results highlight how different individual characteristics may cluster together to reflect differential behavioral and thinking patterns toward climate change, as previously observed in other studies adopting a person-centered approach (Helm et al., 2021). Policymakers

and institutions may want to develop various preventive and educational programs based on this heterogeneity. In addition, future studies may further explore how the difficulty of orienting among the multitude of information about climate change may make it difficult to evaluate the phenomenon and influence the emotional response by impacting well-being (Brosch, 2021). This shows the need for improved ways of communicating about a complex phenomenon such as climate change.

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Declarations

Publication ethics Informed consent was obtained from all participants included in the study.

Conflict of interest Authors declare no conflict of interest.

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