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Environmental Change Experience Outperforms Eco-anxiety in Predicting Behavioral Engagement Among Emerging Adults

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Abstract: This study investigates the relative influence of eco-anxiety (EA) and environmental change experience (ECE) on environmental change behavioral engagement (ECBE) among emerging adults. Drawing on the Theory of Planned Behavior, Protection Motivation Theory, and resilience-informed models of adaptation, the study conceptualizes EA as an activating emotion that can motivate or inhibit engagement depending on regulatory and contextual supports and ECE as a cognitive-experiential construct encompassing direct and vicarious exposure to environmental disruption. A sample of 450 undergraduate students from three southern US universities completed a survey measuring EA, ECE, and ECBE. Multiple regression analyses tested the relative predictive power of EA and ECE. Results indicated that ECE was a significantly stronger predictor of ECBE than EA, suggesting that firsthand and contextual experiences with environmental change more effectively mobilize engagement than emotional distress alone. Geographic patterns were also observed, with students attending institutions in disaster-prone regions reporting higher levels of ECE and stronger behavioral engagement. These findings advance theoretical understanding by positioning EA within a broader framework of resilience and behavioral regulation, emphasizing the interactive role of emotional activation and experiential learning in fostering adaptive engagement. The results underscore the need for educational and communication strategies that integrate lived experience, place-based reflection, and collective efficacy to translate emotional concern into purposeful action. The study contributes to growing interdisciplinary evidence that environmental resilience depends not only on awareness and affective concern but also on opportunities for experiential learning, agency, and justice-oriented engagement among youth and other vulnerable populations.

Keywords: resilience theory, climate adaptation, environmental education, pro-environmental behavior

1. Introduction

Climate and environmental change is increasingly recognized not only as a perceived economic crisis but also as a growing psychological burden. A substantial body of evidence now documents associations between climate-related stressors and heightened anxiety, despair, and grief, collectively referred to as eco-anxiety (EA) [1–3]. EA or climate anxiety has been defined as a chronic fear of environmental doom that manifests through worry, helplessness, and distress over the future of the planet [2, 3]. Although such distress is a normative emotional response to environmental degradation, elevated levels of worry and fear have been associated with impaired concentration, sleep difficulties, and reduced overall well-being [4, 5]. The phenomenon has drawn increasing attention from researchers and clinicians concerned about its implications for mental health and collective efficacy [6, 7].

Emerging evidence indicates that EA may be particularly salient during emerging adulthood, a developmental period roughly spanning the ages of 18–29 and characterized by identity exploration, frequent transitions in relationships and work, and the gradual formation of enduring commitments in love and career [8]. During emerging adulthood, individuals are developing self-knowledge, autonomy, and future orientation, often while encountering global social and ecological challenges that shape their sense of agency and responsibility. Regarding climate change, emerging adults have reported both acute distress and strong motivation to act [4, 5, 9]. College students, who largely

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fall within this developmental stage, therefore represent a critical population for examining how emotional and experiential factors influence environmental engagement.

Although EA has been associated with both adaptive and maladaptive outcomes, the mechanisms that determine these divergent pathways remain under investigation [1, 3, 10]. Empirical research suggests that moderate levels of EA can enhance awareness, moral concern, and motivation for engagement, whereas excessive or chronic anxiety may contribute to paralysis, avoidance, or emotional exhaustion [3, 10–12]. This duality underscores the importance of identifying contextual and psychological conditions under which EA facilitates rather than hinders behavioral engagement.

From a resilience perspective, the ability to adaptively regulate distress in response to environmental threat is central to maintaining functioning under stress. Resilience theory posits that individuals sustain or regain well-being through cognitive, emotional, and social protective factors such as self-efficacy, meaning-making, and social connection that enable flexible adaptation [13–15]. Within this framework, EA can function as an activating emotion that promotes coping efforts and moral engagement rather than dysfunction, depending on the availability of regulatory and social resources [1, 3, 14]. Identifying when and how these processes shift from maladaptive worry to constructive engagement aligns with resilience-informed models of adaptation and psychological growth in the face of stress [13–15].

Concurrently, evidence indicates that environmental change experience (ECE), which includes direct or vicarious exposure to environmental disruption, plays a key role in shaping perceived risk, efficacy beliefs, and behavioral responses [16, 17]. Individuals who have personally witnessed or experienced environmental degradation often exhibit stronger pro-environmental attitudes and actions, particularly when they attribute those experiences to climate change [16–18]. Resilience frameworks integrate emotional arousal and behavioral regulation by emphasizing how individuals sustain goal-directed functioning under pressure. Viewed through this lens, EA represents a form of adaptive activation that mobilizes coping resources and facilitates sustained engagement with ECE [1, 13–15].

Recent discussions within environmental and social psychology have emphasized the importance of differentiating emotional concern from experiential understanding when predicting engagement. Specifically, whereas EA represents an affective reaction to perceived environmental threat, ECE reflects a cognitive and sensory grounding that may strengthen perceived control and efficacy [19–20]. Integrating these perspectives, current theoretical frameworks propose that both emotional and experiential processes contribute to environmental change behavioral engagement (ECBE), but the relative influence of each remains unclear [6, 10, 17]. Addressing this question is crucial for designing interventions that promote adaptive engagement and resilience without pathologizing legitimate emotional responses to environmental issues, including climate change [21–23].

The present study investigates whether EA or ECE serves as a stronger predictor of ECBE among emerging adults. By examining these relationships in a large sample of undergraduate students across three southern US universities, this study contributes to the growing literature on environmentally related mental health and behavior. Understanding these psychological and experiential drivers of engagement is critical for designing cost-effective climate education and communication strategies that complement economic and policy measures aimed at accelerating the transition to a low-carbon economy.

2. Literature Review

2.1. Theoretical framework

The conceptual foundation for this study draws on behavioral and cognitive-affective models that explain how individuals translate environmental concern into concrete action. The Theory of Planned Behavior (TPB) [19] posits that attitudes toward the behavior, subjective norms, and perceived behavioral control jointly shape behavioral intention and subsequent action. In climate-related contexts, EA may influence these determinants by heightening perceived responsibility and moral urgency, while perceived efficacy and control may determine whether anxiety culminates in engagement or avoidance [1, 3, 10]. The Protection Motivation Theory (PMT) [20, 21] similarly emphasizes cognitive appraisals of threat severity, vulnerability, and coping ability as precursors to adaptive behavioral intentions. Both TPB and PMT propose that emotional arousal stimulates threat appraisal, whereas beliefs about efficacy and control determine the translation of motivation into protective behavior [19, 20].

Within this integrative TPB and PMT framework, EA represents an affective appraisal of environmental threat that can either energize or inhibit pro-environmental behavior, depending on how the anxiety is regulated and the degree to which the situation is perceived as controllable [1, 3, 11, 12]. Psychometric research has demonstrated that EA includes cognitive-emotional and functional-impairment components [1] as well as ruminative, affective, and behavioral subdimensions [11, 12]. Some of these dimensions, particularly affective arousal and behavioral concern, correlate positively with climate activism and personal mitigation behaviors [10–12]. These findings support PMT's assumption that threat appraisal can motivate protective action when paired with strong coping appraisal and align with TPB's assertion that emotion shapes attitudes and perceived behavioral control [19, 20]. In this view, EA provides the emotional activation that initiates the threat-appraisal process and strengthens attitudinal and moral-belief pathways toward engagement [1, 3, 10].

In contrast, ECE constitutes the cognitive and experiential dimension of engagement. Empirical evidence indicates that direct or vicarious exposure to environmental disruption enhances perceived risk, relevance, and concern, leading to stronger pro-environmental attitudes and behavioral intentions [17]. Within the present model, ECE functions as an informational antecedent that shapes both threat and coping appraisals by refining perceptions of risk and control. Individuals who have personally experienced or observed environmental degradation tend to report higher environmental self-efficacy and stronger motivation to act [16, 17, 20]. Consequently, ECE contributes cognitive grounding and efficacy beliefs that complement the affective activation of EA in predicting behavioral engagement. This integration parallels resilience models that emphasize the interaction between stress exposure, adaptive capacity, and protective processes. Ecological models of resilience describe adaptation as a dynamic balance between environmental challenge and psychological resources, wherein exposure to manageable stressors can strengthen coping systems and future readiness [14, 15]. Applying this logic to climate-related contexts suggests that both emotional activation and experiential learning contribute to environmental resilience, defined here as the process of sustaining functioning and purpose under ecological threat [24, 25].

ECBE is defined as the intentional enactment of mitigation, adaptation, or advocacy behaviors that address environmental threats [10, 26, 27]. Extensions of TPB emphasize that engagement

is influenced not only by individual efficacy but also by collective efficacy and social identity processes [26, 27]. Jugert et al. [26] demonstrated that collective efficacy strengthens personal efficacy and thereby increases environmental action intentions. The Social Identity Model of Pro-Environmental Action (SIMPEA) proposed by Guenthner et al. [27] further shows that perceiving climate action as normative and identity-affirming enhances commitment and persistence. These frameworks collectively position ECBE within a multilevel system where individual cognition, emotion, and social identification interact to determine sustained engagement.

Behavioral engagement is not only a psychological phenomenon but also an economic and policy imperative. Individual and collective actions influence energy consumption patterns, demand for sustainable products, and support for regulatory frameworks. Integrating behavioral insights into carbon pricing, incentive structures, and community-based adaptation programs can enhance the efficiency and equity of low-carbon transitions.

Taken together, TPB, PMT, and SIMPEA converge on the proposition that EA provides emotional activation, ECE provides cognitive grounding and efficacy, and behavioral engagement emerges when these processes are reinforced by supportive social identities and collective efficacy [17, 19, 26–28]. This integrated framework conceptualizes environmental action as a multifactorial process in which affective arousal, experiential understanding, and social cognition jointly determine whether individuals transform concern into sustained engagement [1, 3, 10–12].

2.2. Emotional and experiential pathways to environmental engagement

Rapidly expanding research on environmental emotions has revealed that climate-related emotions can give rise to both adaptive and maladaptive responses [1, 3, 10, 12]. EA, eco-grief, and eco-anger represent related but distinct affective responses that influence both cognition and behavior [3, 11, 28]. Empirical findings indicate that moderate levels of EA enhance awareness and readiness for action [1, 10], whereas high or chronic levels are associated with avoidance and emotional fatigue [3, 12]. These patterns are consistent with cognitive-affective models suggesting that the motivational utility of anxiety depends on perceived self-efficacy and controllability of environmental threats [19, 20].

The adaptive potential of EA is further clarified through research showing that EA is not inherently pathological but often co-occurs with strong moral concern and pro-environmental identity [1, 10, 12]. In experimental and survey-based studies, EA has been found to correlate with both climate-related distress and increased civic engagement [18, 29, 30]. Such evidence supports the proposition that emotional activation can foster behavioral intention when accompanied by coping appraisal and perceived behavioral control [19, 20]. Conversely, when efficacy is low, anxiety may contribute to emotional disengagement or denial [3, 10].

Beyond individual emotion, environmental experience plays a central role in shaping engagement. Direct and vicarious exposure to environmental change, such as experiencing extreme weather events or witnessing ecological degradation, has been shown to increase perceived risk and strengthen pro-environmental attitudes [16–18]. Such experiences also reduce psychological distance and enhance the perceived immediacy of climate change, making environmental issues more personally relevant [17, 18]. Empirical evidence further indicates that individuals who attribute these events to environmental causes develop stronger environmental self-efficacy and behavioral intentions [16, 20, 30]. Therefore, ECE serves as both a cognitive and experiential mechanism that transforms abstract concern into actionable motivation [17, 18].

Social and cultural contexts further influence how emotional and experiential processes translate into engagement. The SIMPEA posits that collective efficacy and group norms amplify personal motivation and persistence [26, 27]. When pro-environmental behavior aligns with valued social identities, individuals report stronger commitment to mitigation and advocacy efforts [26, 27, 30]. Conversely, social environments that minimize environmental responsibility can suppress engagement, even among individuals with strong emotional concern [21, 22]. These findings emphasize that the interaction between emotion, experience, and social identity determines whether EA leads to adaptive engagement or defensive avoidance [3, 10, 27].

Longitudinal and intervention-based studies have begun integrating these components within cohesive behavioral frameworks. [30] reported that EA predicted pro-environmental behavior over time through perceived efficacy and moral obligation, whereas Zhang et al. [18] demonstrated that self-transcendence values strengthened the EA-behavior link. Similarly, experiential learning research shows that reflection-based interventions such as place-based community projects can transform climate distress into sustained action [31–33]. These findings align with theories of transformative learning and experiential resilience, which posit that meaning-making processes can convert anxiety and perceived threat into prosocial motivation [32, 34, 35]. Together, this literature supports an integrative view in which emotional activation and environmental experience operate synergistically: coupling of EA with experiential understanding and social support fosters agency and sustained behavioral engagement [1, 17, 27, 30].

These findings collectively support the view that pro-environmental action may represent a form of resilience response to ecological stress. Adaptive environmental engagement reflects not only emotional regulation but also behavioral persistence and social connectedness, which are core features of resilience identified in cross-cultural research [15, 36]. The transformation of anxiety and exposure into purposeful behavior parallels resilience processes observed in other domains of chronic stress, where meaning-making and agency mediate the relationship between adversity and positive adaptation.

Building on these converging findings, the present study examines whether EA or ECE more strongly predicts ECBE among emerging adults. By empirically testing affective and experiential pathways within a unified behavioral framework, this research aims to clarify how emotional concern, experiential learning, and collective identity jointly contribute to sustained environmental action [17, 19, 26, 28, 27].

3. Research Methodology

3.1. Research design

This study employed a cross-sectional survey design to examine the relationship between EA, ECE, and ECBE among emerging adults. Following approval from the University of Arkansas' Institutional Review Board, data were collected using an online questionnaire administered during the fall 2024 semester—one in which only two disaster declarations in the states of interest occurred (one Category 2 hurricane and one

fire), with no deaths attributable to either. Multiple regression analysis was used to test the hypothesis that ECE would be a stronger predictor of ECBE than EA.

3.2. Participants

Undergraduate students (n = 450) from selected courses enrolled in three southern US land-grant universities participated in the study. Of these, 73% were enrolled at the same university, with the remaining 27% divided between the other two institutions. Two of the three universities were located in states more prone to disasters, primarily hurricanes and tornadoes [37, 38]. Based on the enrollment composition of the selected courses, the sample predominantly comprised unmarried, White, middle-income females aged 18–25, with demographic distributions closely approximating those of the respective campus populations.

3.3. Instruments

The survey comprised all of the items (n = 22) from the scale developed by Clayton and Karazsia [1], who conceptualized the construct using the term *climate* rather than *eco* or *environmental*. Items were rated on a 5-point Likert scale ranging from 1 (never) to 5 (almost always). The measure included 13 items assessing climate change anxiety or EA, capturing both cognitive-emotional responses and functional impairment; 3 items assessing climate change or ECE, an acknowledged limitation; and 6 items assessing climate change or ECBE. Higher scores indicate greater levels of EA, more extensive experience with environmental change, and stronger behavioral engagement. After computing univariate statistics and scale scores (by summing items within each subscale), a multiple regression analysis was conducted to examine the relative predictive strength of ECE and EA on ECBE.

4. Results

The individual means of the 13 items measuring EA ranged from 1.22 ("My concerns about climate change undermine my ability to work to my potential") to 1.86 ("Thinking about climate change makes it difficult for me to concentrate"). The mean score of the summed items representing EA was 18.11 (SD = 7.63) with a range from 8 to 65 and a reliability coefficient (Cronbach's alpha) of 0.94 (Table 1).

The individual means of the three items measuring ECE ranged from 1.81 ("I have been directly affected by climate change") to 2.18 ("I have noticed a change in a place that is important to me due to climate change"). The mean score of the summed items representing ECE was 5.92 (SD = 3.26) with a range of 3–15 and a reliability coefficient (Cronbach's alpha) of 0.86 (Table 2).

The individual means of the six items measuring ECBE ranged from 2.83 ("I believe I can do something to help address the problem of climate change") to 4.30 ("I turn off lights"). The mean score of the summed items representing ECBE was 19.64 (SD = 5.17) and a reliability coefficient (Cronbach's alpha) of 0.83 (Table 3).

In general, the mean scores of the EA items were lower than the mean scores of the ECE items. The mean scores of the ECBE items were higher than the mean scores of both the EA and ECE items.

To test differences in EA, ECE, and ECBE between geographic locations by university, a t-test analysis was conducted by combining the two universities with fewer respondents that are also more prone to extreme weather events. Before conducting the t-test, the distribution of all three variables was examined to assess normality. Among these variables, EA was the only one that was non-normally distributed with a skewness (2.18) and kurtosis (5.87). Accordingly, the EA variable was standardized prior to testing.

Unsurprisingly, differences by geographic location were statistically significant for ECE ($t = -3.03$, $p < 0.01$), but not for EA and ECBE. To delve further, additional t-test analyses were conducted using the three items that comprise ECE. All three items were statistically different and in the expected direction with the item, "I have noticed a change in a place that is important to me due to climate change," having the greatest level of statistical significance (p = 0.001 v. 0.01). This finding may indicate that place matters to students.

The multiple regression analysis revealed that the overall model was statistically significant ($F^2_{,\ 446} = 61.03$, p = 0.001). Multicollinearity diagnostics indicated no substantial concern, as

Table 1
Descriptive statistics of eco-anxiety

Item	$\bar{X}$	SD
Thinking about climate change makes it difficult for me to concentrate	1.86	0.97
Thinking about climate change makes it difficult for me to sleep	1.52	0.84
I have nightmares about climate change	1.36	0.77
I find myself crying because of climate change	1.29	0.71
I think, "Why can't I handle climate change better?"	1.55	0.93
I go away by myself and think about why I feel this way about climate change	1.34	0.74
I write down my thoughts about climate change and analyze them	1.24	0.65
I think, "Why do I react to climate change this way?"	1.40	0.78
My concerns about climate change make it hard for me to have fun with my family or friends	1.32	0.73
I have problems balancing my concerns about sustainability with the needs of my family	1.52	0.88
My concerns about climate change interfere with my ability to get work/school assignments done	1.24	0.64
My concerns about climate change undermine my ability to work to my potential	1.22	0.59
My friends say I think about climate change too much	1.27	0.72

Table 2
Descriptive statistics of environmental change experience

Item	$\bar{X}$	SD
I have been directly affected by climate change	1.81	1.15
I know someone who has been directly affected by climate change	1.93	1.23
I have noticed a change in a place that is important to me due to climate change	2.18	1.31

Table 3
Descriptive statistics of environmental change behavioral engagement

Item	$\bar{X}$	SD
I wished I behaved more sustainably	2.90	1.27
I recycle	3.30	1.16
I turn off lights	4.30	.96
I try to reduce my behaviors that contribute to climate change	3.15	1.23
I feel guilty if I waste energy	3.05	1.21
I believe I can do something to help address the problem of climate change	2.83	1.23

both the variance inflation factors (1.40) and Condition Index values (<5.00) were well within established thresholds. ECE emerged as a statistically significant predictor of ECBE (β = 0.42, t = 8.40, p = 0.001) and was a stronger predictor than EA, which did not reach statistical significance (β = 0.08, t = 1.56, p = 0.12). Together, the two variables accounted for a meaningful proportion of the variance in ECBE, with an adjusted r^2 of 0.21.

5. Discussion

The present study examined whether EA or ECE more strongly predicts ECBE among emerging adults. Results indicated that ECE accounted for more variance in behavioral engagement than EA, suggesting that experiential understanding of environmental change may be a more robust driver of pro-environmental action than emotional activation alone. These findings are consistent with the TPB and PMT, both of which posit that perceptions of efficacy and control are central to translating intention into behavior. Within these frameworks, emotional activation such as EA can heighten perceived threat and moral urgency [1, 3, 10], but adaptive behavioral outcomes require confidence in one's ability to respond constructively [19, 20]. The stronger predictive value of ECE observed here supports this logic: cognitive and experiential grounding in environmental change appears to enhance both efficacy and control, enabling concern to manifest as sustained, effective engagement rather than avoidance.

Although ECBE was modeled in this study as a single composite outcome in this study, prior literature suggests that distinct psychological pathways may differentially predict specific types of behavior. EA has been shown to motivate primarily private, low-cost, and self-regulatory behaviors, such as energy conservation or consumption reduction, which function as coping responses to emotional distress and provide short-term moral regulation [1, 11, 12]. In contrast, ECE, particularly direct or place-based exposure, is more consistently associated with public, collective, and civic forms of engagement, including advocacy, community participation, and support for policy action, through its effects on perceived efficacy, relevance, and controllability [16, 17, 30]. This differentiation offers a plausible explanation for why ECE emerged as the stronger overall predictor of ECBE in the present study: experiential exposure may preferentially activate behaviors with broader societal and economic impact, whereas EA alone may channel engagement toward private actions that, while psychologically meaningful, contribute less directly to systemic decarbonization and low-carbon transitions.

The current findings also align with recent multidimensional models of EA that distinguish between adaptive and maladaptive expressions of climate-related distress. Empirical work demonstrates that moderate EA is associated with motivation, activism, and civic engagement, whereas chronic or unregulated anxiety predicts withdrawal and hopelessness [1, 10–12]. The absence of a strong independent association between EA and behavioral engagement in the present sample likely reflects this duality. Without sufficient coping resources or efficacy beliefs, anxiety may heighten awareness but fail to generate sustained or effective behavioral intention [3, 10]. The results, therefore, support conceptualizations of EA as a motivational precursor that requires reinforcement through experiential and cognitive mechanisms to produce adaptive engagement. The results can also be interpreted through the lens of resilience science, which conceptualizes adaptation as the maintenance or recovery of functioning following exposure to adversity [14, 15]. From this perspective, EA and ECE can be understood as stress-response mechanisms that contribute to adaptive functioning when regulated through efficacy, meaning-making, and social connection. Thus, environmentally engaged behavior may represent a resilience pathway or a tangible outcome of successful adaptation to ecological uncertainty.

ECE, in contrast, provides both informational and emotional grounding that can facilitate pro-environmental action. Prior studies show that direct or vicarious exposure to environmental disruption increases perceived risk, enhances relevance, and strengthens personal efficacy [16–18]. Individuals who attribute environmental change to human activity report higher environmental self-efficacy and stronger intentions to engage in mitigation behaviors [16, 30]. The present results extend this literature by demonstrating that such experiences are significant predictors of behavioral engagement even when emotional concern is controlled, indicating that experience-based cognition may be a necessary bridge between concern and action.

Social-cognitive mechanisms such as those described in the SIMPEA also help contextualize these findings. As noted earlier, SIMPEA proposes that engagement is shaped by group norms, social identity, and collective efficacy [26, 27]. When environmental action aligns with valued social identities, individuals

experience greater perceived efficacy and moral obligation to act [26, 30]. Conversely, when environmental concern conflicts with salient group norms or identities, anxiety may promote disengagement rather than participation [21, 22].

Given that participants in this study were drawn from three southern US universities, contexts where climate discourse can be politically polarized and environmental exposure varies, both social identity and environmental pressures may have moderated the relationship between EA and engagement. ECE, being grounded in tangible experience, may be less susceptible to such contextual moderation, thereby producing a more consistent relationship with behavior.

Findings from the present study also align with experiential and transformative learning theories, which suggest that reflection on lived experience fosters meaning-making, resilience, and agency [31–33]. The pairing of anxiety-provoking experiences with structured opportunities for understanding and action can promote adaptive transformation rather than distress [34, 35]. The pattern observed here, that ECE predicts engagement more strongly than EA, supports this framework by demonstrating that experiential learning and reflection function as mechanisms for converting emotional concern into behavioral persistence.

From a developmental perspective, these results are particularly meaningful for emerging adults, who are navigating identity formation and developing long-term life commitments [8]. During this period, individuals are especially responsive to emotionally salient and value-driven issues, and environmental change represents both a source of existential anxiety and a potential avenue for identity-based purpose [4, 9]. Prior research indicates that emerging adults who engage in environmental or community-based projects experience gains in self-efficacy and psychological well-being [31, 33]. The current findings, thus, underscore the developmental importance of pairing emotional awareness with experiential education to foster agency and resilience.

5.1. Limitations and future directions

Several limitations warrant consideration. The cross-sectional design limits causal inference, and future studies employing longitudinal or experimental designs are needed to assess the temporal sequencing of EA, experience, and engagement [18, 30]. The sample consisted primarily of undergraduate students in the southern USA, which may restrict generalizability to other cultural or political contexts [21, 22]. Additionally, while the study captured behavioral engagement broadly, it did not distinguish between individual-level mitigation actions and collective advocacy behaviors, which may follow different motivational pathways [26, 27]. The operationalization of ECE through three items provides an initial but narrow lens on a complex construct. Future iterations could benefit from multidimensional or mixed-method approaches that differentiate between direct exposure, perceived impact, and attribution to climate change. Finally, future work should examine how intersecting constructs such as hope, self-compassion, and psychological capital influence the balance between distress and action [37, 38].

5.2. Implications for research and practice

These findings have several implications for research, education, and psychological intervention. First, they highlight the need to integrate emotional and experiential components into climate education and outreach. Programs that acknowledge EA while providing structured opportunities for action can help prevent emotional overload and foster adaptive coping [1, 3]. Second, future research should incorporate social identity variables such as collective efficacy, as the interaction between personal experience and group identification likely mediates engagement outcomes [26, 27, 30]. Third, psychological frameworks of resilience and meaning-making should be applied to understand how individuals transform distress into purposeful engagement over time [32, 34, 35]. Together, these approaches can deepen our understanding of how affective, cognitive, and social factors converge to produce sustained behavioral change.

Beyond psychological and social dimensions, these findings also have implications for economic and policy strategies central to achieving a green and low-carbon economy. Policies that leverage experiential learning, such as disaster preparedness programs, community resilience initiatives, and sustainability education, can reduce adaptation costs and increase public support for carbon-neutral strategies. By fostering behavioral engagement, governments and organizations can amplify the economic benefits of mitigation and adaptation investments. Finally, since ECE emerged as a stronger predictor of behavioral engagement among emerging adults, these findings suggest that climate-related investments may yield higher returns when directed toward experiential learning rather than broad awareness campaigns. Similar to the policy implications, redirecting funding toward internships, disaster simulation training, and place-based community service initiatives may more effectively translate climate concern into sustained pro-environmental behavior, while also avoiding the economic inefficiency of awareness strategies that risk amplifying anxiety without corresponding action.

Future research should explore how psychological drivers interact with economic incentives and policy instruments, such as subsidies for renewable energy, carbon pricing, and community-based adaptation programs. Understanding these intersections can inform integrated frameworks that align behavioral engagement with systemic decarbonization goals, ensuring that interventions are both cost-effective and socially equitable.

6. Conclusion

In summary, this study provides empirical evidence that ECE is a stronger predictor of behavioral engagement than EA among emerging adults. These findings highlight the importance of experiential and efficacy-based mechanisms in fostering sustainable environmental behavior. They also underscore the importance of experience with environmental issues or disasters in positions of municipal or community leadership. Within theoretical models such as TPB, PMT, and SIMPEA, ECE strengthens perceived control, efficacy, and social identity alignment, which are conditions that enable emotional concern to translate into meaningful action [17, 19, 26–28]. Conceptually, this work supports a shift from pathologizing climate-related emotions toward understanding them as part of a broader adaptive system in which distress, experience, and collective meaning-making promote resilience and engagement [1, 3, 34, 35]. Conceptualizing EA and ECE as components of a broader resilience system reframes climate-related distress as an adaptive catalyst rather than pathology. Interventions that enhance emotional regulation, self-efficacy, and collective purpose can strengthen environmental resilience, equipping individuals (emerging adults) and communities to sustain engagement under continuing ecological stress.

This study contributes to the broader discourse on transitioning to a green and low-carbon economy. Understanding

how EA and ECE influence engagement can inform policy frameworks and economic strategies that rely on public participation for success. Behavioral engagement is a lever for reducing carbon emissions, shaping consumer demand for sustainable products, and supporting acceptance of economic instruments such as carbon pricing and renewable energy incentives. Integrating these behavioral insights into policy design can enhance cost-effectiveness, equity, and resilience in the pursuit of carbon neutrality.

Ethical Statement

The study is conducted in accordance with the ethical standards of University of Arkansas, Fayetteville, USA. Ethical approval for the study is obtained (Approval No.: 2308487372). Informed consent is obtained from all participants prior to data collection. Participation is voluntary, and participant anonymity and confidentiality are strictly maintained. The collected data are used solely for academic research purposes.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

Data are available from the corresponding author upon reasonable request.

Author Contribution Statement

Elisabeth R. Ponce-Garcia: Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Charleen McNeil:** Validation, Writing – original draft, Writing – review & editing. **Robert V. Rohli:** Software, Writing – original draft, Writing – review & editing. **M. E. Betsy Garrison:** Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing.

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